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ABSTRACT

This is an equity study, focusing on the crowdedness and adequacy of California's public school facilities. Facilities data are from a 1988 state survey and include information about building space, age of facilities, air conditioning, and construction type. The research focuses on two equity principles: horizontal equity and facilities neutrality. First, as a measure of crowdedness, the study uses a computation of square footage of instructional building space per student. Second, a measurement of the general adequacy of the facilities is derived using principal components analysis. In summary, the author finds that the horizontal equity statistical measures demonstrate that assessed property valuation, instructional space, and adequacy of facilities are not equally distributed to each of the 4,891,143 students in the data set. The facility neutrality statistics indicate that there is a statistically significant positive, but low, relationship between a school district's property tax base and crowdedness, and the adequacy of its facilities. The foremost policy implication is the need for additional financial support of $13 to $17.4 billion. Three strategies are recommended: (1) increase local fundraising capability by lifting the two-thirds voter requirement for general obligation bonds; (2) devote sufficient state funds to school districts by channeling sufficient funds to school districts, and (3) increase federal support to the states, with particular emphasis on districts at the bottom half of the adequacy distribution. (Contains 45 references and the Appendix contains a School Facilities Inventory Building & Classroom Worksheet.) (GR)

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SCHOOL FACILITIES EQUITY IN CALIFORNIA:

AN EMPIRICAL STUDY

by

Davison Duane Lowe

A Dissertation submitted to the

Faculty of

The School of Education

University of Southern California

In Partial Fulfillment of the

Requirements for the Degree of

DOCTOR OF EDUCATION

Davison Duane Lowe

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May 1996

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Dedication

This study is dedicated to my family, who unselfishly gave me the support I needed to complete the journey I began nearly a decade ago. My parents' gentle prodding and generous financial support could always be depended upon. My wife, Mindy, who has endured life with a preoccupied and distracted spouse, was always there to give me the emotional and psychological support I needed. And my four year old son Albert, whose childish exuberance could be counted on to pull me out of periods writer's block, computer catastrophes, or academic ennui. Thank you all! Without your support, this work would not have been achievable.

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CHAPTER 1

INTRODUCTION

This dissertation is an equity study, using the school finance equity framework initially developed by Berne and Stiefel (1984) and refined by Odden and Picus (1992). Instead of using measurements of financial inputs, like typical equity studies, the input object of this study is the adequacy of the school facilities in school districts in California. The facilities data are from a 1988 survey conducted by the State. The survey data include information about square footage of building space, age of facilities, presence or absence of air conditioning, and permanent or relocateable construction type. Responses from 779 of the 1,010 K-12 school districts in the State are analyzed.

A two tiered analysis was prepared. First, as a measurement of the degree of crowdedness, the study uses a computation of square footage of instructional building space per student. Second, a measurement of the general adequacy of facilities was derived using principal components analysis and the survey data described above. For each of these two variables, statistical measures of horizontal equity and fiscal neutrality, with respect to facilities, are presented and discussed. To simplify the

verbiage, the term "facilities neutrality" will be used to represent the concept of fiscal neutrality, with respect to facilities.

This area of inquiry parallels the school finance equity reform movement that stemmed from Serrano v. Priest (1971) and resulted in the current "revenue limit" financing system in California. Instead of looking at the relationship between the level of financial support per pupil and district wealth, the research focuses on the relationship between adequacy of facilities and district wealth. The results of the study have significant policy implications because they will either demonstrate that students have equal opportunities to enjoy adequate facilities, or it will show significant facilities disparities related to school districts' property wealth per pupil served. If students have an equal opportunity to enjoy adequate facilities, then the existing financing mechanisms for school construction and renovation are providing an equitable distribution of facilities resources. On the other hand, if students do not have an equal opportunity to enjoy adequate facilities, then policy makers should consider adding reform measures to their political agenda, which would equalize funding for school facilities.

of facilities. In the court's written opinion, it expressed its concern about inequities in school buildings. In a more recent Texas case, Edgewood v. Kirby (1987), the Texas Supreme Court expressed a similar concern about the lack of fiscal neutrality for financing facilities. Similarly, in recent cases in Kentucky (Rose v. The Council for Better Schools, 1989), Montana (Helena v. Montana, 1989), and Arizona (Roosevelt Elementary School v. Bishop, 1994), the State Supreme Courts specifically ruled that, among other inputs, wealth related disparities in school facilities was unconstitutional (Verstegen, 1994).

Published reports indicate a current and growing school facilities crisis throughout the nation and in California. According to a 1989 study of the condition of the nation's educational infrastructure, 25% of the school buildings are inadequate because they are overcrowded, and have serious safety and deferred maintenance problems (Education Writers Association, 1989). The 1989 study estimates that the gargantuan cost of addressing this problem is $125 billion. This would cover the cost of new facilities, retrofitting older existing buildings, making major repairs, and performing deferred maintenance. More recently, the General Accounting Office (GAO) conducted a nationwide survey of public school facilities (General

Accounting Office, 1995). After surveying 10,000 schools, the GAO concluded that one-third of the nation's 80,000 schools need extensive repairs or replacement, at an estimated cost of $112 billion.

The problem is caused by both aging facilities and growth in student population (Education Writer's Association, 1989). The Education Writer's Association reported that 54% of the nation's school buildings were over 30 years old. In California, over 50% of the State's 60,000 school buildings[1] are over 30 years old, and most of these buildings need renovation and repairs (Scornaienchi, 1995). Although the rates of change in public school enrollment varies in different geographical regions of the nation, California has experienced an increase of over 40% between 1960 and 1989 (M. Vail, personal communication, October 7, 1994).

To get a perspective on the enormous size of the estimated $125 billion price tag for new school facilities and to renovate the deteriorating existing facilities, it is over 50% of the federal government's $207 billion budget deficit (Rubin, 1994).

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[1] A school buildings is defined as a separate structure at a school site.

In California the lack of adequate facilities has reached crisis proportions due to increases in student enrollment, which is growing at a rate of over 200,000 new students per year (Picus, 1992). According to estimates made by the legislative analyst (cited in Guthrie et al., 1990) 2,100 new schools need to be built at a cost of $11 billion. Furthermore, the legislative analyst estimates the cost of reconstruction or modernization of existing school facilities to be $2 to $3 billion (Legislative Analyst cited in California Ballot Pamphlet, 1993). As a matter of comparison, the total estimated cost for new facilities and renovated facilities of $13 to $14 billion is nearly half of California's 1995-96 budget for K-12 educational spending, which was $30.3 billion (Legislative Analyst, 1995). Assemblyman Jerry Eaves expresses the seriousness of the crisis by explaining that, "As it stands today, we need to build twenty classrooms a day, seven days a week, fifty-two weeks a year for the next five years just to keep up with the expected enrollment growth in this State" ("Eaves Sought Change," 1992).

The State School Building Program provides a source of State funds to school districts for facilities construction and renovation. As of 1989, the State School Building Program has provided approximately $4.3 billion for school

construction (Guthrie et al., 1990). Currently, however, the State School Building Program is unfunded and has a $6.3 million backlog of applications (D. Brooks, personal communication, January 10, 1994). In June 1994 the electorate narrowly rejected Proposition 1B, which would have authorized $1 billion in state bonds for the State School Building Program (Witt, 1994). Subsequently, the state legislature decided not to authorize a school facilities bond measure for the November, 1994 election. In 1995, the legislature again considered a bill to authorize a statewide ballot measure for school facilities. The bill would have authorized a $3 billion ballot measure for the consideration of the electorate in March 1996, but the bill failed to pass (Ruley, 1995). Finally, in January 1996 AB 1168 was passed by the state Assembly, along with a companion senate bill, to place a $3 billion bond measure on the March 1996 ballot (School Services of California, January 5, 1996). These bills were signed by the Governor, and the voters will cast their votes on this state-wide bond measure on March 26, 1996 (School Services of California, January 10, 1996).

The school facilities crisis raises the research question for this dissertation. Specifically, we know that school districts, in general, are overcrowded, physically

deteriorating, and suffering from deferred maintenance, but are these poor environmental conditions evenly distributed among the 1,010 school districts in California? Or, do wealthy districts, with high aggregate assessed property values, have comparatively better environmental conditions than less wealthy districts, with low aggregate assessed property values?

This research topic has significant policy implications for educational policy makers in the legislature, educational policy litigants, and educational policy researchers. Specifically, if the research findings demonstrate no relationship between adequacy of facilities and school district wealth, the implication is that of the State School Building Program and other existing facilities financing mechanisms provide all public school students with an equal opportunity to enjoy adequate facilities. The State School Building Program was designed provide school districts with financial assistance for facilities based only upon need. Therefore, it is intended to be fiscally neutral because the apportionment of State funds for facilities is not intended to be dependent upon or related to a school district's level of property wealth. On the other hand, if there are significant disparities between the adequacy of facilities available to students in high-wealth

districts compared to students in low-wealth districts, then legislative action is needed to create equalization programs to reduce those inequities.

In addition to policy makers in the legislature, this type of analysis is likely to be of great interest to educational policy litigants and the courts. Many researchers believe that the courts will continue to devote more attention to the issue of equity and adequate school facilities (Chastain, 1990; Honeyman, 1989; Stewart, 1989; Thompson, 1988; Verstegen, 1994; Westbrook 1989). If the results of this study show that high-wealth districts have superior facilities compared to low-wealth districts, then when this issue is brought before the courts, the courts may be inclined order the State to develop and implement a program of corrective action. On the other hand, if there already is facilities neutrality in California, then any litigation alleging unequal access to adequate school facilities would be without merit.

For education researchers, this exploratory study provides conclusive findings about the presence or absence of facilities neutrality in California in 1988. The study results can then be used as a baseline measurement, which can be used in future longitudinal studies to assess future

changes in facilities neutrality and to study the possible causes for those changes.

Assuming that legislative policy-makers, the courts, and society in general are committed to the principle of equity and equal educational opportunity, then the empirical answer to the research question will result in two possible scenarios. If there is no relationship between a school district's wealth and the adequacy of its facilities, then we can rest assured that the public school system is free from undue facilities inequities. Under this scenario all students, regardless to the wealth of the school district where they attend school, have equal access to adequate educational facilities. On the other hand, if wealthy school districts have significantly superior facilities compared to less wealthy districts, then policy-makers should consider reforms, such as programs to equalize funding for facilities. Equalization of funding for facilities construction and renovation would begin to reduce the inequitable distribution of adequate school facilities.

Research Questions

This dissertation poses the following exploratory research questions:

1. Do public school students in California enjoy equally adequate facilities?

2. Is there a relationship between the property wealth of California public school districts and the adequacy of the school facilities in those districts?

These are empirical questions about the degree of equity in the distribution adequate educational facilities in school districts with varying levels of wealth i.e., assessed property values within their boundaries. In other words, is the distribution of educational facilities skewed so that the students in wealthy districts enjoy more and better facilities, while relatively less wealthy districts labor with physical facilities that are comparatively less adequate? Or conversely, is there a high degree of school facilities equity, where there is no demonstrable relationship between a district's wealth and the adequacy of its physical facilities?

Since this is an exploratory study, there are no favored *a priori* hypotheses about the level of equity or inequity in the distribution of adequate facilities. At this point in the evolution of research in school facilities equity, there is no theoretical basis for justifying such hypotheses. However, there are two logical scenarios, which can be formulated based on what is known about school finance in California.

Senate Bill 90 and Proposition 13 prevent local school districts from raising additional income to finance the construction or modernization of facilities by simply increasing the property tax rate. In 1972 Senate Bill 90 introduced the concept of revenue limits as a mechanism to equalize per pupil funding. In 1978 the electorate approved Proposition 13, which amended the State constitution to prohibit school districts and local government agencies from imposing property taxes in excess of one percent of assessed valuation. This constitutional taxing limit was relaxed, somewhat, in 1986 by proposition 46, which allowed school district to incur bonded indebtedness, secured by *ad valorem* property taxes, only if two-thirds of the voters in the district vote to approve the additional property taxes needed to repay the bond.

Under these circumstances, one possible scenario is that: 1) a high percentage of facilities construction and modernization projects are financed through issuance of debt by school districts, and 2) wealthy school districts are more likely to be successful in local bond elections than less wealthy school districts. The reason for the second condition is that the amount of money that a district can raise for debt service on school construction bonds is the additional property tax rate times the assessed valuation of

real property in the district. The maximum amount of indebtedness for a K-8 or high school district is limited to no more than 1.25 percent of the assessed value of property in the district (California Education Section 15102). For a K-12 unified district the maximum indebtedness is 2.5% of assessed valuation (California Education Code Section 15106). To generate a certain level of financing though the sale of bonds, there would be greater economic impact (i.e. increases in property tax rates) on property owners in low-wealth districts, and comparatively less economic impact on property owners in high-wealth districts. Therefore, one logical scenario is that there is a significant level of facilities inequity because: 1) a high percentage of facilities projects may be financed by local bond issues, 2) there are disparities in school district wealth, which result in substantial differences in the tax rates need to generate the same level of bonding capacity, and 3) the differences in tax rates make it easier for high wealth districts to pass bond issues that for low wealth districts.

A second possible scenario is that there is not a significant level of facilities inequity because: 1) the State School Building Program is the financing mechanism used for most facilities construction and modernization projects, and 2) funding from the State School Building

Program is distributed in equal proportions to wealthy and non-wealthy school districts. The State School Building Program is essentially fully State funded, and it is intended to provide funds for school construction and renovation based on the needs of school districts, while disregarding a district's wealth or capacity to service bonded indebtedness.

The answers to the exploratory research questions will provide a basis for believing that one of these scenarios is correct. This will set the stage for the next level of research inquiry, which is to understand why there is or isn't a high level of facilities equity and to gather information about the how school construction and renovation projects are actually financed.

Methodology

The purpose of this research is to measure the degree of facilities equity in California in 1988. The unit of analysis is individual school districts in the State. The research focuses on two equity principles: horizontal equity and facilities neutrality. A two tiered analysis will be prepared. First, as a measurement of the degree of crowdedness, the study uses a computation of square footage of instructional building space per student. Second, a

measurement of the general adequacy of the facilities is derived using principal components analysis.

Odden and Picus (1992) present statistical measures, which can be used to assess horizontal equity and facilities neutrality. In this two tiered analysis, each statistical measure will be applied first to a measurement of crowdedness, and then to general facilities adequacy.

Limitations

The facilities data for this dissertation were gathered in 1988 by the Office of Local Assistance in the California Department of General Services. In 1984 Assembly Bill 2743 authorized the survey and provided $600,000 for the purpose of developing an automated school facilities inventory. The data were gathered in 1988 by surveying each of the school districts in California. The survey instrument is included in the appendix. The data set is broad, inasmuch as it includes approximately 76% of the school districts in the State, but the depth of the data leaves something to be desired. Information about libraries, labs for science or computers, auditoriums for theater arts or music, recreational facilities (swimming pools, gymnasiums, or ball fields), environmental hazards, et cetera is absent. Similarly, data about technological accouterments for tapping into the so-called "information

highway," interactive distance learning via satellite transmitted presentations, and computer aided instruction are not a part of the data set. Nonetheless, the available data can yield usable and interpretable results. In the 1988 survey the State attempted to gather data about how space was used (see appendix), but the data were so unreliable that the State declined to release it.

The scope of this dissertation includes an assessment of horizontal equity, with respect to facilities, and facilities neutrality. However, a discussion of vertical equity regarding facilities, effectiveness, and tax-payer equity is beyond the bounds of this study.

Delimitations

This dissertation includes an analysis of empirical school facilities data collected by the State of California in 1988. Data include information about the gross square footage, age, availability of air conditioning, and type of construction (permanent or relocatable) of the facilities in school district. The survey instrument is included in the appendix. There are 779 districts in the data set, which represent 77% of the 1,010 districts in the State at that time.

There is no reason to suspect that the districts responding to the survey are not statistically similar to

the total population of districts. Therefore, it would be reasonable to conclude that the results of the data analysis are generalizable on a State-wide basis. Also, the reliability of the data is expected to be high because respondents to a survey from an official State government agency are more likely respond accurately than if the survey was conducted by a private research organization or a graduate student.

Data about enrollment and total assessed valuation of real property within the boundaries of school districts, in 1988, were obtained from State Department of Education. These data, along with data about the square footage of school facilities, will be used to compute square feet per student, which is an indicator of comparative crowdedness. Enrollment data will also be used to compute school district wealth per pupil (total assessed valuation divided by enrollment).

The results of the data analysis will be specific with regard to location and time. Therefore, the results are not generalizable to states other than California, or to times other than 1988.

Definitions

Like other areas of inquiry, this dissertation will use specialized terms, which have abstract, technical meanings. These terms are briefly defined as follows:

adequacy - The concept of adequate school facilities is subjective and normative inasmuch as it reflects the value laden judgments of the person making an assessment about the adequacy of school facilities. This is similar to the difficulty of determining the nature of an adequate education. For the purposes of this dissertation, school facilities adequacy will be viewed as a two dimensional concept where more adequate is at one end of the spectrum and less adequate is at the other end. Factors to be considered in determining the adequacy of a district's facilities are crowdedness, average age of the facilities, availability of air conditioning, and type of construction i.e., permanent or relocatable.

equal educational opportunity - This is a broad equity concept that says that all students should have equal access to educational resources including funding, books and curriculum materials, specialized programs, technological tools, capable teachers, and adequate

facilities. Accessibility to these educational resources should not be related to the wealth of the school district where the students attend school.

equity - This is a complex and abstract concept, however Berne and Stiefel (1984) developed a conceptual framework for analyzing equity. In considering equity for children, i.e. students, they formulated three equity principles: horizontal equity, vertical equity, and equal opportunity.

facilities neutrality - This newly formulated equity concept parallels the fiscal neutrality concept. The principle of facilities neutrality says that the adequacy of school facilities available to students should not be related to the property wealth of the district where the they attend school. In other words, there should not highly adequate facilities available to students in wealthy districts and comparatively less adequate facilities available to students in less wealthy districts.

fiscal neutrality - This concept, developed by Coons, Clune, and Sugarman (1970), is a finance equity principle that says the funding available to students should not be related to the property wealth of the district where the

they attend school. In other words, there should not be high per pupil spending in wealthy districts and comparatively low per pupil spending in less wealthy districts.

horizontal equity - This conceptualization of equity says that similar students should be treated equally. Within this dissertation horizontal equity will mean that students should have equal treatment, in terms of the adequacy of their school facilities.

IFAPS - Index of Facilities Adequacy Per Student. This is a statistically derived theoretical construct, which will be developed in the dissertation through the use of principal components analysis. It is an index of the general adequacy of school facilities that will include factors of crowdedness, average age of the facilities, availability of air conditioning, and type of construction i.e., permanent or relocatable.

principal components analysis (PCA)- PCA is a data reduction technique, which yields one or a few new variables, which are uncorrelated linear combinations of original (manifest) variables. PCA will be used in the dissertation to develop a theoretical construct called "Index of Facilities Adequacy Per Student" (IFAPS).

school district wealth - School district wealth is the total assessed valuation of the real property within the boundaries of a school district. Prior to 1972 and the passage of Senate Bill 90, which introduced the concept of revenue limits, school district boards in California could increase the property tax rate to raise additional income. At that time, a wealthy school district could raise more income than a less wealthy school district when both districts imposed the same property tax rate.

vertical equity - This conceptualization of equity says that dissimilar students should be treated unequally and needier students (e.g., special education students) should receive more. Discussion and analysis of vertical equity, with respect to facilities, is beyond the scope of this dissertation.

CHAPTER 2

LITERATURE REVIEW

A review of the literature provides the context for understanding the relevance of studying the relationship between the adequacy of a school district's facilities and the aggregate assessed valuation of property within the district's boundaries. The literature also provides the methodological framework and the statistical analysis techniques for the research.

National Crisis

At the national level, a recent General Accounting Office (GAO) study estimates that $112 billion is needed to repair and upgrade one-third of the nation's public school facilities, which are attended by about 14 million students. (General Accounting Office, 1995). A earlier 1989 study of the condition of the nation's educational facilities found that, 25% of the school buildings are inadequate because they are overcrowded, and have serious safety and deferred maintenance problems (Education Writers Association, 1989). The report estimates the gargantuan cost of addressing this problem is $125 billion. This would cover the cost of new facilities, retrofitting older existing buildings, making major repairs, and performing deferred maintenance.

This national problem is caused by growth in student population, and aging facilities suffering from deferred maintenance. To get a perspective on the enormous size of the $125 billion price tag for new school facilities and to renovate the deteriorating existing facilities, it is over 50% of the nation's $207 billion budget deficit (Rubin, 1994).

California's Crisis

In California the lack of adequate facilities has reached crisis proportions due to increases in student enrollment, which is growing at a rate of over 200,000 new students per year (Picus, 1992). According to estimates made by the legislative analyst (cited in Guthrie et al., 1990) 2,100 new schools need to be built at a cost of $11 billion. Furthermore, the legislative analyst estimates the cost of reconstruction or modernization of existing school facilities to be $2 to $3 billion (Legislative Analyst cited in California Ballot Pamphlet, 1993). More recently, the California Department of Finance estimated that the cost of new facilities and modernization of antiquated facilities is $17.4 billion ("Let Voters Decide," 1995). As a matter of comparison, the total estimated cost for new facilities and renovated facilities of $13.0 to $17.4 billion is 43% to 57% of California's 1995-96 budget for K-12 educational

spending, which was $30.3 billion (Legislative Analyst, 1995). Assemblyman Jerry Eaves expresses the seriousness of the crisis by explaining that, "As it stands today, we need to build twenty classrooms a day, seven days a week, fifty-two weeks a year for the next five years just to keep up with the expected enrollment growth in this State" ("Eaves Sought Change," 1992).

Although the State has a fiscally neutral mechanism to provide school construction funds to school districts, the State School Building Program is currently unfunded and has a $6.3 million backlog of applications (D. Brooks, personal communication, January 10, 1994). In June 1994 the electorate rejected Proposition 1B, which would have authorized $1 billion in State bonds for the State School Building Program was narrowly rejected (Witt, 1994). Then the State legislature decided not to authorize a school facilities bond measure for the November, 1994 election. If that ballot measure was on the ballot and passed by the voters (by a simple majority), it would have made funds available for the State School Building Program (M. Vail, personal communication, October 7, 1994). In 1995, the legislature again considered a bill to authorize a statewide ballot measure for school facilities. The bill would have authorized a $3 billion ballot measure for the

consideration of the electorate in March 1996, but the bill failed to pass (Ruley, 1995). Finally, in January 1996 AB 1168 was passed by the state Assembly, along with a companion senate bill, to place a $3 billion bond measure on the March 1996 ballot (School Services of California, January 5, 1996). These bills were signed by the Governor, and the voters will cast their votes on this state-wide bond measure on March 26, 1996 (School Services of California, January 10, 1996).

School Finance Litigation

Historically, school finance litigation has been the impetus behind school finance reform. Since Serrano v. Priest (1971)(Serrano I), the courts have been a major force shaping educational public policy, and it is likely that they will be a driving force behind any future efforts to ensure facilities equity in the public schools. In Serrano II (Serrano v. Priest, 1976), five years after Serrano I, the California Supreme Court addressed inequities in the area of facilities. In the court's written opinion, it explicitly expressed its concern about inequities in school buildings:

> ...equality of educational opportunity requires that all school districts possess an equal ability in terms of revenue to provide students with substantially equal opportunities for learning. The system before the court fails in this respect, for it gives high-wealth districts a substantial advantage in obtaining higher quality staff, program expansion and variety, beneficial teacher-pupil ratios and class sizes, modern equipment and material, and *high-quality buildings* [italics added]. (p. 26)

In a more recent Texas case, Edgewood v. Kirby (1987), the Texas Supreme Court expressed a similar concern about the lack of fiscal neutrality for financing facilities. For example, although Texas has a foundation program to attempt to provide every student with basic education, the court noted that the foundation program does not provide for school facilities or debt service to finance facilities. Therefore, low-wealth districts must spend a greater proportion of its locally raised funds to pay the debt service on school construction bonds than high wealth districts with a lower property tax rate. The court said:

> High-wealth districts are able to provide for their students broader educational experiences including more extensive curricula, more up-to-date technological equipment, better libraries and library personnel, teacher aides, counseling services, lower student-teacher ratios, *better facilities,* parental involvement programs and drop-out prevention programs. [italics added]. (p. 4)

Similarly, in recent cases in Kentucky (Rose v. The Council for Better Schools, 1989), Montana (Helena v. Montana, 1989), and Arizona (Roosevelt Elementary School v. Bishop, 1994), the State supreme court specifically ruled that, among other inputs, wealth related disparities in school facilities was unconstitutional (Verstegen, 1994). In Rose v. The Council for Better Schools, (1989) the Kentucky State supreme court broadened the bounds of equity debate from just the school finance system to the whole system of education (Verstegen, 1994).

Conceptual Structure

The conceptual structure and methodology to be used for the proposed study is an application of the model presented by Odden and Picus (1992). They present a conceptual framework for understanding, applying, and measuring equity, which is based on the seminal work of Berne and Stiefel (1984). This well established framework is typically used to study financial inputs into educational systems. For

example, Berne and Stiefel (1984) reviewed fifty-five school equity studies, and forty three (78%) of those studies used expenditures, revenues, or costs as the resource object under scrutiny. The rest of the studies (32%) used personnel, teacher salaries, or teacher characteristics, as the object of study. Nonetheless, the equity framework is a tool suited for studying other educational inputs such as facilities. Indeed, in a later work Berne and Stiefel (1990) urge researchers to broaden the scope of the equity debate by studying other resource inputs, throughputs, outputs, and outcomes. Odden and Picus (1992) reiterate this point by arguing that physical inputs, process variables, and achivement or outcome variables should be targeted for analysis as school finance equity objects. The framework includes four principles for understanding the degree of equity in the distribution of educational resources to students: horizontal equity, vertical equity, fiscal neutrality, and effectiveness.

The principal of horizontal equity says that all students should be treated equally, with respect to the distribution of educational resources. Therefore, applying this principle to facilities, each student should have access to the same quality and quantity of adequate educational facilities. Qualifying and quantifying specific

standards of adequacy is problematic, but not impossible. For example, the West Virginia Supreme Court in Pauley v Kelly (1979) provided the following qualitative description of adequate school facilities:

> ...[School] facilities must be structural safe, contain fire safety measures, sufficient exits for safe and easy flow of traffic, an adequate, safe and potable water supply, an adequate sewage disposal system, sufficient and sanitary toilet facilities and plumbing fixtures, and adequate general instructional, administrative and custodial storage. All facilities must be adequately lighted, in good repair, and attractively painted. Facilities must be designed to prevent loud noises from traveling from one section of the building to the other.

Later, in Pauley v Bailey (1982) the West Virginia Supreme Court set quantitative size standards for adequate facilities. For example, the court ruled that elementary schools should have an art room for each 450-500 students and the size of the room should be at least 50 square feet per student. For high schools with 500 students, the court said that there should be at least one art room with at least 65 square feet per student.

By applying the facilities standards, defined in Pauley v Bailey (1982), for every school district in West Virginia, horizontal equity, with respect to facilities, would be achieved. However, California is not West Virginia, and it

would not be appropriate to use West Virginia's facility standards in California. The analytic strategy of the proposed dissertation is to avoid fixed standards of adequate facilities and to view adequacy as a two dimensional concept where more adequacy is at one end of the spectrum and less adequacy is at the other end. Factors to be considered in determining the adequacy of a district's facilities are crowdedness, average age of the facilities, availability of air conditioning, and type of construction i.e., permanent or relocatable.

The principle of vertical equity says that all students are not the same and that some should receive more resources than others, depending on their special needs. For example, handicapped, learning impaired, or limited English-proficient students need higher levels of educational inputs to be able to attain the same level of academic achievement has other students. The application of the vertical equity principle to school facilities means that certain types of students may need additional space or other special accommodations in the facilities available to them. For example, handicapped students may require additional classroom space to accommodate their wheelchairs. Measurements of vertical equity would use differential weightings for handicapped or other special need students.

Analysis of vertical equity issues are beyond the scope of this study.

The concept of fiscal neutrality is a principle that says that, when comparing school districts within a State, there should be no relationship between levels of financial resources provided and the wealth of the school districts. The notion of fiscal neutrality was developed by Coons, Clune, and Sugarman (1970). It is a theme used in most school finance litigation, beginning with Serrano v. Priest (1971). In the Serrano case the Supreme Court accepted the fiscal neutrality argument, and used the strict judicial scrutiny test to rule that the State's school finance system was unconstitutional. The court ruled that property wealth per student was a suspect class, which violated the equal protection clause of the constitution.

Analyses of fiscal neutrality are somewhat more complex than horizontal or vertical equity because fiscal neutrality involves two variables. In the dissertation the two variables will be the crowdedness (instructional space per student) and the property wealth per student of school districts. Then a second neutrality analysis will be prepared using Index of Facility Adequacy Per Student (IFAPS) and the property wealth per student of school districts. School district wealth will be measured in terms

of the total assessed valuation of the real property within the boundaries of the district. In a system with fiscal neutrality, with respect to facilities, there would be no relationship between the crowdedness or adequacy of facilities and the assessed valuation per student. To simplify the verbiage the term "facilities neutrality" will be used to represent this concept.

Kozol (1991) argues that in this country there are savage inequalities disparities in educational programs and facilities, which are related to a school district's property wealth. He presents some graphic contrasts between the condition of facilities in poor and wealthy school districts. For example, he describes the restroom facilities in a poor school, "Four of the six toilets do not work. The toilet stalls, which are eaten away by red and brown corrosion, have no doors. The toilets have no seats. One has a rotted wooden stump." In contrast, he describes a wealthy school where, "Future musicians have the use of seven well-appointed music suites. Carpeted hallways encourage students with free periods to curl up and study in a corner. Computer-equipped subject-related study halls are open throughout the day and manned by faculty." The dissertation, using the methodology described below, would

determine if there are similar types of facilities disparities in California.

The principle of effectiveness, formulated by Odden and Picus (1992), asks whether or not more of an educational resource will result in higher levels of student achievement. Educators and education policy-makers generally acknowledge the importance of adequate facilities as an implicit and intuitively obvious necessity. Safe, comfortable physical facilities are undoubtedly more conducive to the teaching-learning process than crowded, dangerous or inadequate facilities.

Facilities and Student Achievement

Currently, the research literature provides inconclusive findings on the validity of the proposition that (everything else being equal) there is a positive relationship between the adequacy of school facilities and student achievement.

Hanushek (1989) conducted a meta-analysis of 187 studies of educational production functions. Seventy-four of those studies examined facilities as an educational input. Twelve of those studies found facilities to statistically significant; Sixty-two found facilities to be statistically insignificant. A closer review of the twelve studies, indicating that facilities are a statistically

significant input into the production of student achievement, yields inconclusive results. Seven of the twelve studies found a positive relationship between facilities and student achievement, while five studies found a negative relationship. Interestingly, Hanushek also found no consistent relationship between teacher/pupil ratios, teachers' education, or years of teachers' experience and student achievement. Indeed, he found no strong or systematic relationship between educational expenditures and student achievement. Subsequently, Hanusek (1994) expands his position by presenting an approach to school reform based on the argument that greater student achievement can by attained through a strategy of efficient use of resources, performance incentives, and experimentation.

Hanusek's critics believe that there is a positive relationship between expenditures on public education and student achievement. For example, Hedges, Laine, and Greenwald (1994) conducted a new meta-analysis of Hanusek's original studies of educational production functions. Their meta-analysis used more sophisticated statistical techniques and concluded that there is a positive relationship between resource inputs and student achievement. This dialogue continues as Hanusek (1994a) raises methodological issues about Hedges, Laine, and Greenwald's (1994) meta-analysis.

Specifically, Hanusek argues that Hedges, Laine, and Greenwald's work is flawed because it uses a diminished sample of original studies, applies a statistical method of hypothesis testing that is inappropriate for non-independent estimates, and confounds their interpretation of the negative and positive regression coefficients in original studies. Hedges, Laine, and Greenwald (1994a) respond by reiterating their meta-analysis techniques are statistically sound, and that Hanushek's understanding of the problem of making statistical inferences in research synthesis confuses the true values parameters describing relationships with the estimates of those parameters.

In another meta-analysis of educational production functions, Childs and Shakeshaft (1986) examined 45 studies of educational expenditures and student achievement. They reached the conclusion that the relationship between educational expenditures and student achievement was minimal. The average correlation between these variables was positive but very low (r =.1023).

More recently, the Feistritzer (1993) analyzed twenty years of student performance measures and educational expenditure variables, and found no clear or systematic link between expenditures and student performance.

Other literature provides some limited research supporting the intuitive notion that adequate facilities are positively related to student achievement. For example, Bowers and Burkett (1989) compared measures of student achievement, attendance, positive behavior and self-concept between students at two schools in Tennessee. One group of students attended a school with modern facilities, while the other group attended a school with school with older facilities. Bowers and Burkett concluded that the students in the modern building had significantly higher levels of student achievement, attendance, positive behavior and self-concept, even when differences in socioeconomic levels were statistically controlled. In a similar study, Cash (1994), analyzed data from the forty-seven rural high schools in Virginia. She found that student achievement was higher in schools with better building conditions, and science achievement was better for students who used better science laboratories. With regard to specific school building characteristics, Chan (1979 and 1980) also found higher levels of student achievement for students in Georgia, who were housed in facilities with lower building age and in buildings equipped with air conditioning.

On the other hand, Summers & Wolfe (1977) conducted a multiple regression study on 627 sixth-grade students, 553

eight-grade students, and 716 twelve-grade students from schools in the Philadelphia School District to identify significant inputs related to student achievement. One of their finding was:

> The general physical facilities of schools did not seem to make much difference, one way or another, to students' learning. Whether the pupil had access to more or less playground space, a new or old building, or a building rated higher or lower in general physical condition, did not seem to matter much when it comes to achievement test scores. (p. 645-646)

Clearly, more research is need to understand the relationship between the adequacy of school facilities and student achievement. The Council of Educational Facility Planners, International (CEFPI) has commenced a research project to study this issue (CEFPI Communication, March 1994), and the results of that study will be helpful in resolving this issue. Assuming that further research shows that there is indeed a positive relationship between the adequacy of school facilities and student performance (while holding all other independent variables constant), the next challenge will be to isolate the particular components of physical facilities that have the greatest effect on student performance. Then, future school facilities can be designed with special attention to those components. For example, if

classroom space per student, acoustics, and lighting are shown to have a high positive effect on student achievement, while landscaping, lighting, and ceiling height have little or no effect on student achievement, then future school facilities can be designed accordingly.

For the purposes of this dissertation, a working assumption will be made that there is a positive relationship between the adequacy of school facilities and the level of student achievement (when all other variables are held constant). In addition to the intuitive appeal of this assumption, I believe that future high quality research into this question will demonstrate that indeed more adequate facilities are associated with higher levels of student achievement than less adequate facilities.

CHAPTER 3

RESEARCH METHODOLOGY

The purpose of this research is to measure the degree of facilities equity in California in 1988. The unit of analysis of will be individual school districts in the State. The research will focus on two equity principles: horizontal equity and facilities neutrality. Horizontal equity presumes that all students have equal needs for facilities. Therefore according the horizontal equity principle, each student should receive equal quantities of facilities resources and the quality of those resources should be similar. Facilities neutrality is an adaptation of the concept of fiscal neutrality. This equal opportunity principle says that the quantity and quality of facilities available to students should not be related to the wealth of the school district where they attend school. In other words, all students should receive equally adequate facilities, regardless to the wealth of their school districts.

Discussion

Equity is an abstract moral concept, and its application to the distribution of adequate school facilities is highly complex. Nonetheless, the intent of

this dissertation is to conduct a facilities equity study by applying the conceptual framework presented by Odden and Picus (1992), which is based on the seminal work of Berne and Stiefel (1984). This conceptual framework is typically used to study the distribution of financial resources to students. Nonetheless, the equity framework is a tool suitable for studying other educational inputs such as facilities. Indeed, both Berne and Stiefel (1990) and Odden and Picus (1992) argue that the use of the equity framework should be broadened by applying it to educational resource objects other than financial inputs.

The framework is invaluable for understanding the implicit values used in analyzing equity and for quantifying the chosen equity principles. The framework will be used to develop a quantitative assessment of facilities equity in California in 1988 by measuring horizontal equity and facilities neutrality. The data for the analysis is from a 1988 survey conducted by the California Department of General Services. Data from the survey covers 779 of the 1,010 K-12 school districts in the State, and provides information on square footage of building space, age of facilities, presence or absence of air conditioning, and permanent or relocateable construction type. The survey instrument is included in the appendix.

The equity framework poses the following four conceptual questions:

1. Whose equity is being considered?

Is it the taxpayers who finance the educational system, or is it the students who are receiving educational services? For this dissertation, the analysis focuseson students to determine whether or not they are being treated equitably, in terms of horizontal equity, and whether or not they have equal opportunities to enjoy adequate facilities.

2. What is the resource object that should be equitably distributed?

Instead of using measurements of financial inputs, like typical equity studies, the object of this study is the adequacy of school facilities in California in 1988. A two tiered analysis will be prepared. First, as a measurement of the degree of crowdedness, the study uses a computation of square footage of instructional building space per student. Second, a measurement of the general adequacy of the facilities will be derived using principal components analysis. Factors considered in determining the adequacy of a district's facilities are crowdedness, average age of the facilities, availability of air conditioning, and type of construction i.e., permanent or relocatable.

For the tier two analysis, principal components analysis is used as data reduction method (Pedhauzur and Schmelkin, 1991) to develop a single component score of facilities adequacy. The observed variables (square footage of instructional space per student, age of facilities, presence or absence of air conditioning, and permanent or relocateable construction type) are used in the principal components analysis to yield a component score of facilities adequacy based on uncorrelated linear combinations of the observed variables. This statistical procedure is superior to simply choosing one of the observable variables to represent adequacy, because it yields uncorrelated linear combinations of the original variables that capture most of the information in the original variables (Dunteman, 1989). After reducing the observed variables into a single variable, called the Index of Facilities Adequacy Per Student (IFAPS), the new variable will be used in a facilities equity analysis in the same way that other researchers have used measures of financial inputs, such as revenues per pupil, expenditures per pupil, or current operating expenditures per pupil.

3. **How should equity be defined i.e., what principles should be used to analyze the equity of how resources are distributed?**

This study uses the principles of horizontal equity and facilities neutrality. The principle of horizontal equity says that similar students should be treated equally. Within the context of this dissertation horizontal equity will mean that students should have the same quality and quantity of adequate educational facilities. The analytic strategy of this dissertation is to avoid fixed standards of adequate facilities and to view adequacy as a two dimensional concept where more adequacy is at one end of the spectrum and less adequacy is at the other end. Factors to be considered in determining the adequacy of a district's facilities are crowdedness, average age of the facilities, availability of air conditioning, and type of construction i.e., permanent or relocatable.

Facilities neutrality says that the adequacy of school facilities available to students should not be related to the property wealth of the district where the they attend school. In other words, there should not be highly adequate facilities available to students in wealthy districts and comparatively less adequate facilities available to students

in less wealthy districts. Analyses of fiscal neutrality are somewhat more complex than horizontal or vertical equity because fiscal neutrality involves two variables. In this dissertation the two variables are the crowdedness (instructional space per student) and the property wealth per student of school districts. Then a second neutrality analysis is prepared using Index of Facility Adequacy Per Student (IFAPS) and the property wealth per student of school districts. School district wealth is measured in terms of the total assessed valuation of the real property within the boundaries of the district. In a system with fiscal neutrality, with respect to facilities, there would be no relationship between the crowdedness or adequacy of facilities and the assessed valuation per student. To simplify the verbiage, the term "facilities neutrality" will be used to represent this concept.

4. How can the level of equity be measured?

Odden and Picus (1992) present statistical measures, which can be used to assess horizontal equity and facilities neutrality. In this two tiered analysis, each statistical measure is applied first to over-crowdedness, and then to general facilities adequacy. The measurement of the degree of crowdedness is computed as the square footage of

instructional building space per student. General facilities adequacy is measured by the Index of Facilities Adequacy per Student (IFAPS), which is derived using principal components analysis on the crowdedness measure, age of facilities, presence or absence of air conditioning, and permanent or relocateable construction type.

The following univariate statistical measures of horizontal equity is be used on the crowdedness variable and the IFAPS variable: range, restricted range, federal range ratio, coefficient of variation, Gini coefficient and McLoone index. Facilities neutrality will be measured with the bivariate statistics of correlation coefficient and elasticity. These statistical measures are applied to the crowdedness variable and the IFAPS.

After the statistical data analysis is completed, the dissertation interprets the meaning of the analysis, discusses policy implications, and suggests policy reforms (if appropriate). To reiterate the earlier discussion, if the study indicates high levels of horizontal equity and high facilities neutrality, then students have equal opportunities to enjoy similar facilities. If, on the other hand, the study indicates low levels of horizontal equity and low facilities neutrality, then policy-makers should consider reforms to the current system of financing school

facilities construction and renovation projects. The reforms should include a equalization program to provide more financial assistance for school facilities to school districts with low property wealth, and comparative less (or no) financial assistance to districts with high property wealth.

Data Analysis

The school facilities data received from the California Department of General Services, included information for 63,747 school buildings in 6,791 schools in 779 school districts. Most schools are comprised of more than one building, and data were available for each of the individual buildings located at a school site. The data included four usable variables: building age, square feet of space, presence or absence of air conditioning, and permanent or relocatable construction type. The data were reviewed and any obviously erroneous data were deleted from the data set. The result was 46,698 valid cases of school buildings with data for all four variables. This represented 73% of the school buildings in the initial sample. The 46,698 valid cases represented 779 school districts (77% of the 1,010 school districts in the State). See Table 1 for descriptive statistics.

Table 1

Building Level Descriptive Statistics: age, air conditioning, building type, and square feet

	N	Mean	Standard Deviation
Age of Building[1]	60,500	25.124	13.621
Air Conditioning[2]	59,685	.445	.497
Building Type[3]	54,542	.680	.513
Square Feet	61,236	5,363.917	13,538.472

Notes: 1. age in 1988
2. dichotomous variable: 1 = yes; 0 = no
3. dichotomous variable: 1 = permanent
0 = relocatable

Since the unit of analysis for this study is school districts, the building level data were aggregated into school district level data. This was done by computing the school district level means for the age of building, air conditioning, and building type, and the total for square feet. A crowdedness variable was computed by dividing total square feet of instructional space by enrollment to yield square feet per enrolled student. A high value for this variable means more square feet per student and less

crowdedness; a low value means less square feet per student and more crowdedness. Enrollment and aggregate assessed valuation data for 1988 were obtained from the California Department of Education.

The aggregated data were reviewed and any obviously erroneous data were eliminated from the data set. In cases where data for two or more variables were obviously erroneous, the entire school district (including enrollment data) was eliminated from the analysis. Similarly, scatter plots charting each facilities variable against assessed valuation, were prepared to identify and eliminate outliers. Descriptive statistics for school level variables are shown in Table 2.

Table 2

School District Level Descriptive Statistics: age, air conditioning, building type, and square feet, crowdedness, enrollment, and aggregate assessed valuation

	N	Mean	Standard Deviation
Age of Building[1]	829	23.982	10.017
Air Conditioning[2]	786	.549	.333
Building Type[3]	827	.773	.210
Square Feet	822	395,989.600	1,816,125.590
Crowdedness[4]	816	98.291	82.603
Enrollment	1,005	4,866.809	21,271.183
Assessed Valuation	1,005	1,926.526[5]	7,026.433[5]

Notes: 1. age in 1988
2. dichotomous variable: 1 = yes; 0 = no
3. dichotomous variable: 1 = permanent; 0 = relocatable
4. square feet per enrolled student
5. in millions

Next, a correlation matrix was used on the school district level data for the facilities adequacy indicators: air conditioning, building type, building age, and

crowdedness. The correlation matrix was computed using listwise deletion of cases with missing values and one-tailed significance. The correlation matrix is shown in table 3. The matrix does not show any strong correlations. The highest correlation is between building type and building age ($r = .4625$). Building type is a dichotomous variable, with zero representing relocatable construction type and one representing conventional construction type. The determinant of the correlation matrix ($|R| = .6772$), demonstrates that there are no linear dependencies between the indicators. The Bartlett Test of Sphericity is 298.17 ($p < .01$), which indicates that the correlation matrix is not an identity matrix. Therefore, the data set of facilities adequacy indicators is suitable for principal components analysis (PCA).

Table 3

Correlation Matrix: Facilities Adequacy Indicators

	Air Conditioning	Bldg Type	Bldg Age	Crowdedness
Air Cond.	1.0000			
Bldg Type	-.2628**	1.0000		
Bldg Age	-.2442**	.4625**	1.0000	
Crowdedness	-.0684*	.2345**	.1227**	1.0000

** P < .01 * P < .05 |R| = .6772

The PCA yielded one factor, with an eigenvalue of 1.7367, and the factor accounts for 43.4% of the variance in the data. The factor matrix for the extracted factor is shown in table 4.

Table 4

Factor Matrix: Facilities Adequacy Indicators

	Extracted Factor
Air Conditioning.	-.5679
Building Type	.8100
Building Age	.7590
Crowdedness	.4268

To generate component scores to be used in the equity analysis, the component score coefficients, shown in table 5, were applied to the unstandardized school district level data. Each variable was weighted by the respective component score coefficients, summed, and then that result was divided by the enrollment of each district. The results represent the Index of School Facilities Adequacy per Student (IFAPS), which is used in the following equity analysis. The IFAPS has a mean of .176 and a standard deviation of .496.

Table 5

Component Score Coefficients

	Index of Facilities Adequacy
Air Conditioning	-.3270
Building Type	.4664
Building Age	.4370
Crowdedness	.2457

CHAPTER 4

FINDINGS

Horizontal Equity

Central tendency and horizontal equity statistics for aggregate assessed valuation per student, crowdedness (square feet of instructional space per student) and the index of facilities adequacy per student (IFAPS) are shown in table 6.

Table 6

Central Tendency and Horizontal Equity Statistics

	Assessed Valuation per Pupil	Crowdedness (sf per Pupil)	IFAPS
Mean	$580,895	98	.176
Median	$351,003	80	.021
Range	$18,434,311	1,391	4.770
Restricted Range (5-95)	$1,498,402	173	.778
Federal Range Ratio	12.70	4.89	778.00
Coefficient of Variation	1.74	.85	2.78
Gini Coefficient	.2383	.0740	.2628
Mcloone Index	.6677	.7520	.1578

The horizontal equity measured by the range, restricted range, and federal range ratio indicate differences between the extreme ends of the distribution for assessed valuation per student, crowdedness and IFAPS. As a measurement of tax base supporting each student, the range of Assessed Valuation per Student shows a $18.4 million

difference between the lowest amount of tax base per student and the highest amount of tax base per student. Even when the extremes below the 5th percentile and above the 95th percentile are disregarded, the restricted range demonstrates that there is a $1.5 million difference between the tax base behind the student at the 5th percentile and the student at the 95th percentile. As measured by the federal range ratio, the $1.5 million difference represents over twelve times more tax base supporting the student at the 95th percentile, compared to the student at the 5th percentile.

For crowdedness, the range indicates that there is a 1,391 square feet per student difference between the space available to the student in the most crowded school district and the student in the least crowded district. The restricted range tells us that there is a 173 square feet per student difference between the space available to the student at the 5th percentile of the distribution and the student at the 95th percentile. The federal range ratio indicates that the 173 square feet difference represents almost five times more space for the student at the 95th percentile compared to the student at the 5th percentile.

The meaning of the horizontal equity statistics for range, restricted range, and federal range ratio for the

IFAPS is difficult to interpret because the unit of measurement is an abstract combination of building age, building type (permanent or relocatable construction type), crowdedness, and presence or absence of air conditioning. Nevertheless, the federal range ratio shows that the IFAPS is seven-hundred- seventy-eight times larger for the student at the 95th percentile of the IFAPS distribution than it is for the student at the 5th percentile.

The coefficient of variation is a useful statistic for assessing horizontal equity when the data conforms to a normal distribution or closely approximates a normal distribution. For this data set, the assessed valuation per student, crowdedness and IFAPS variables do not meet the condition of being normally distributed. Table 7 shows the measures of skewness and kurtosis for the variables. Clearly the distribution is not normal, because in a normal distribution the values for skewness and kurtosis would be zero. Therefore, the computed coefficients of variation are not interpretable. In a normal distribution the coefficients of variation would range from zero to one. The extremely high values of coefficient of variation for assessed valuation per student (1.74) and IFAPS (2.78) are due to the fact that the empirical data does not conform to a normal distribution.

Table 7

Skewness and Kurtosis

	Skewness	Kurtosis
Assessed Valuation per Pupil	10.72	155.46
Crowdedness (sf per pupil)	7.09	86.95
IFAPS	5.40	34.53

The Gini coefficient, unlike the range, restricted range, and federal range ration, considers all the students in the data set. As an indicator of horizontal equity, the Gini coefficient varies from zero to one. A low value suggests high horizontal equity; a high value suggests low equity. A rule of thumb, presented by Odden and Picus (1992), to interpret the Gini coefficient, is that a value of less than .1 is desirable. Applying this rule of thumb, indicates that there is a high level of horizontal equity for crowdedness (.0740) and a moderately high level of horizontal equity for assessed valuation per student (.2383), and IFAPS (.2628). A comparison of the Gini coefficient for these variables, shows that IFAPS has the least horizontal equity, assessed valuation per student

ranks second, and crowdedness has the highest horizontal equity.

Hertert (1995) computed a gini coefficient of .055 for per-pupil expenditures in California school districts during the 1990-91 school year. This high level of horizontal equity is not surprising considering that the revenue limit system of financing public schools has been in effect for over twenty years, and it was designed with the specific intention of creating a high degree of horizontal equity. Comparing the gini coefficient for per pupil expenditures with the gini coefficient for assessed valuation per pupil, crowdedness, and IFAPS produces interesting results. Crowdedness (.0740) is slightly higher and less equitable than per pupil expenditures. Assessed valuation per student (.2383) and IFAPS (.2628) are somewhat higher and somewhat less equitable than per pupil expenditures.

The Mcloone index focuses on, and considers, the bottom half of the distribution. Possible values of the Mcloone index range from zero to one. Smaller values indicate higher disparities; larger values indicate lower disparities. A value of one would represent no disparities in the distribution of the educational resource among the bottom half of the data set. Odden and Picus (1992) suggests that, as a rule of thumb, values above .9 represent

a desirable degree of horizontal equity. In this case assessed valuation per student and crowdedness have Mcloone indexes of .6677 and .7520, respectively. These moderately high values indicate a moderate degree of horizontal equity for the half of the state's students with the least amount of tax base and the least amount of instructional space. The Mcloone index for IFAPS is .1578, which indicates a very low level of horizontal equity.

Hertert (1995) computed a Mcloone index of .937 for per-pupil expenditures in California school districts during the 1990-91 school year. This high level of horizontal equity is not unexpected considering that the revenue limit system has been in effect for over twenty years, and it was designed with the goal of raising per-pupil spending for the districts at the bottom of the distribution. Comparing the Mcloone index for per-pupil expenditures with the Mcloone index for assessed valuation per pupil, crowdedness, and IFAPS produces noteworthy results. Crowdedness (.7520) is slightly lower and less equitable than per pupil expenditures. Assessed valuation per student (.6677) are somewhat lower and somewhat less equitable than per pupil expenditures. The Mcloone index for IFAPS (.1578) is significantly lower than Mcloone index for per-pupil expenditures. This means that there is a lot less

horizontal equity for the districts with the least adequate facilities, even though the overall per-pupil spending levels are similar.

Facilities Neutrality

Recall that the term facilities neutrality is an adaptation of the concept of fiscal neutrality. This equal opportunity principle says that the quantity and quality of facilities available to students should not be related to the wealth of the school district where they attend school. In other words, all students should receive equally adequate facilities, regardless to the wealth of their school districts. Facilities neutrality can be measured by the correlation coefficient and elasticity.

Correlation coefficients were computed to measure: 1) the relationship between assessed valuation per pupil and crowdedness; and 2) the relationship between assessed valuation per pupil and IFAPS. These results are shown in table 8. The correlation coefficients show weak, but positive and statistically significant relationships. The first correlation coefficient (.3262) shows that as assessed valuation per pupil increases (or decreases) the crowdedness variable also increases (or decreases). Since crowdedness is defined and computed as square feet of instructional space per student, higher levels of assessed valuation per

student are associated with higher amounts of square feet per student. In other words, students in wealthy districts tend to have more space, and students in less wealthy districts tend to have less space. Similarly, the .2713 correlation between assessed valuation per pupil and IFAPS indicates that higher levels of assessed valuation per student are associated with higher levels of facility adequacy per student.

Table 8

Correlation Coefficients

	Crowdedness (sq. ft./pupil)	IFAPS
Assessed Valuation per Pupil	.3262**	.2713**

** P < .01 (2-tailed)

Elasticity is calculated from a one-variable linear regression, and it is measures the magnitude of the positive relationships identified by the correlation coefficients. The elasticities for crowdedness and IFAPS is shown in table 9. For crowdedness the elasticity of .1489 means that a one percent increase in assessed valuation per student corresponds to a .1489 percent increase in square feet of

instructional space per student. Similarly, for IFAPS the elasticity of .3879 means that a one percent increase in assessed valuation per student corresponds to a .3879 percent increase in IFAPS. According to Odden and Picus (1992), elasticities far below .5 indicate that the magnitude of the relationship between local property wealth the educational inputs being studied does not have a major policy significance. Applying this benchmark, yields the conclusion that the magnitude of the relationship between local property wealth and the degree of crowdedness is not of high policy significance. Similarly, the elasticity for IFAPS indicates that the magnitude of the relationship between local property wealth and IFAPS has only a moderate level of policy significance.

Table 9

Elasticity

	Crowdedness (sq. ft./pupil)	IFAPS
Assessed Valuation per Pupil	.1489	.3879

Jointly considering these correlations and elasticities reveal a moderate relationship between property wealth and the facilitates adequacy variables studied:

crowdedness and IFAPS. The correlations show a positive and statistically significant relationship between property wealth and the crowdedness (square feet per student) and the IFAPS variables, but those relationships are weak. The elasticities indicate that property wealth does not have a major relationship to differences in crowdedness and IFAPS. These statistics suggest that there was a moderately high degree of facilities neutrality in California's public schools in 1988.

Summary

The horizontal equity statistics demonstrate that assessed property valuation, instructional space, and adequacy of facilities are not equally distributed to each of 4,891,143 students in the data set. The statistical measures indicate that the level of horizontal inequities, with one exception, is not high. The exception is the high level of horizontal inequity for the index of facilities adequacy per student (IFAPS). This variable had the highest gini coefficient (.2628) and the lowest Mcloone index (.1578). The low value of the Mcloone index has important policy implications, because it means that the students in the bottom half of the distribution have a high degree of inequity in the adequacy of their school facilities.

The facilities neutrality statistics for crowdedness indicate a high level neutrality because: 1) there is a statistically significant positive, but low, relationship between a school district's property tax base and crowdedness of its facilities (.3262), and 2) the magnitude of the relationship is low (.1489). The facilities neutrality statistics for IFAPS indicate a moderate level of neutrality because: 1) there is a statistically significant positive, but low, relationship between a school district's property tax base and adequacy of its facilities (.2713), and 2) the magnitude of the relationship is moderate (.3879).

CHAPTER 5

CONCLUSIONS AND IMPLICATIONS

Horizontal Equity

Overall, there is a high degree of horizontal equity for the crowdedness variable. Although there are large disparities in square feet of instructional space per student when considering the extreme ends of the crowdedness distribution, the Gini coefficient of .0740 indicates a high degree of horizontal equity for the entire distribution. Similarly, for the bottom half of the crowdedness distribution, the Mcloone index of .7520 indicates a high degree of horizontal equity. Despite these indictors of high horizontal equity, it should be kept in mind that there are no absolute standards of acceptable horizontal equity and there are still quantifiable inequities between the most crowded districts and the least crowded districts. Additional research in this area may identify optimal per pupil space allocations needed to maximize student achievement.

The horizontal equity statistics for IFAPS indicate low horizontal equity. The restricted range ratio of 778.0 indicates a high level of disparity (and a low degree of horizontal equity) for facilities adequacy when comparing the district at the ninety-fifth percentile and the district

at the fifth percentile. The Gini coefficient is a more comprehensive horizontal equity measure than the restricted range ratio, because it considers all the districts in the data set. The computed Gini coefficient of .2628 indicates a low degree of horizontal equity. The Mcloone index is a third horizontal equity measure, which considers only the districts in bottom half of the distribution. The Mcloone index for IFAPS is .1578, which indicates a low degree of horizontal equity. This has significant policy implications because it means that the adequacy of facilities for students in bottom half of the distribution is much worse than the median district or any of the districts in the top half of the distribution.

Facilities Neutrality

The concept of facilities neutrality is a principle that says that, when comparing school districts, there should be no relationship between levels of facilities resources provided and the wealth of the school districts. From a theoretical perspective, perfect facilities neutrality would mean no relationship between the facilities resources available to students and the property wealth of the district where they attend school. To measure facilities neutrality, the correlation coefficients and the elasticities should be analyzed together.

For crowdedness, there is a low positive correlation (.3262) and low elasticity (.1489). The correlation indicates that there is a weak positive relationship between assessed valuation per student and crowdedness, so students in wealthy districts tend to have more space, and students in less wealthy districts tend to have less space. The low elasticity means that a one percent change in assessed valuation per student corresponds to only a .1489 percent increase in square feet of instructional space per student. Together the weak positive correlation and low elasticity can be interpreted to mean that there is a low degree of wealth related disparities in crowdedness and the magnitude of the relationship is low. Therefore neutrality is high.

The correlation and elasticity for the index of facilities adequacy per student (IFAPS) are .2713 and .3879, respectively. The .2713 correlation between assessed valuation per pupil and IFAPS indicates that higher levels of assessed valuation per student are associated with higher levels of facility adequacy per student. For IFAPS the elasticity of .3879 means that a one percent increase in assessed valuation per student corresponds to a .3879 percent increase in IFAPS. Although the correlation is not strong, it is in the positive direction, and together with the moderate elasticity, the statistics indicates a

situation with moderate policy implications. Specifically, the data and the analysis indicates that although assessed valuation and IFAPS are weakly linked, the magnitude of the link is moderate. Therefore, facilities neutrality is moderate.

Policy Implications

The foremost policy implication of this study is that additional financial support of $13 to $17.4 billion is needed to relieve existing over-crowding, to renovate antiquated facilities, and to meet the needs of the State's growing student population. To meet these needs three strategies are recommended: 1) increase local fundraising capability by lifting the two-thirds voter approval requirement for general obligation bonds, 2) devote sufficient State funds to school districts by channeling sufficient funds to school districts via the State School Building Program, and 3) federal support to the states to address the nationwide facilities crisis, with particular emphasis on improving the horizontal equity and facilities adequacy for the districts at the bottom half of the distribution.

To pass a general obligation bond in California, a school district must conduct an election, and the bond measure must be passed by at least two-thirds of the voters.

This requirement is mandated by Article XIII A of the State constitution, and poses a difficult hurdle for school districts to meet. By approving a constitutional amendment to change the two-thirds voter approval requirement to a simple majority of fifty percent plus one, it would be easier for school districts to generate local monies for school construction and renovation. Since 1982, 171 general obligation bond elections where held, which failed to attain a two-thirds "super majority," but they did attain a 50% plus one "simple majority" (School Services of California, 1995). If only a "simple majority" was required for approval, the 171 failed general obligation bond measures would have raised approximately $5.2 billion for school facilities projects (School Services of California, 1995). As a matter of comparison, the $5.2 billion is approximately one billion more than the $4.3 billion that was provided to school districts from the State School Building Program between its inception and 1989. A constitutional amendment to ease the voter approval requirement from a "super majority" to a "simple majority" would improve the adequacy of school facilities throughout the State, while maintaining the democratic principle of majority rule.

The effect of this change on horizontal equity and facilities neutrality is difficult to predict, so future

facilities equity studies should be undertaken to determine the effect of a relaxed voter approval requirement on horizontal equity and facilities neutrality. If the degree of facilities neutrality is diminished by relaxing the standard for the approval of local general obligation bonds, it can be offset and balanced by modifying the State School Building Program to give funding priority to those districts with the lowest facilities neutrality and by the proposed federal role to provide additional funding for those districts.

At the State level, the State should seek new funding sources to distribute local school districts through the State School Building Program. Then, to improve horizontal equity and facilities neutrality, funding priority should be given to those districts that have the least adequate facilities. This would help to bring more facilities neutrality to those districts in the bottom half of the IFAPS distribution, where the Mcloone index shows that facilities neutrality is low.

At the federal level, more involvement and financial commitment of federal dollars is both needed and appropriate. Historically, the federal role in public education has been limited by the tenth amendment to the US Constitution, which says, "The powers not delegated to the

United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people." Since the Constitution did not provide the federal level of government with the power or responsibility for public education, the federal involvement in education has been narrow. Nonetheless, the federal government has used the general welfare clause (Article 1, Section 8) to exercise its influence over education. The General Welfare Clause says that, "Congress shall have the power to lay and collect taxes, duties, imposts and excises, to pay the debts and provide for the common defense and *general welfare* of the United States." Legitimized through a broad interpretation of the General Welfare Clause and the pursuit of social justice, Congress passed legislation affecting public education. For example, in 1965 Congress enacted the Elementary and Secondary Education Act (PL 89-910), which provided federal financial aid toward educational programs for disadvantaged children. Other examples of this type of federal legislation for funding programs in public education are: the Education of the Handicapped Act (PL 94-142) in 1975; the Education for Economic Security Act (PL 98-377) in 1984; the Carl Perkins Vocational Education Act (PL 98-524) in 1984; the Anti-Drug Abuse Act (PL 99-570) in 1986;

the Omnibus Drug Abuse Prevention Act (PL 100-690) in 1988; and the Augustus F. Hawkins-Robert T. Stafford Elementary and Secondary School Improvement Amendments (PL 100-297) in 1988. The National Center for Educational Statistics estimates total federal support for education to exceed $100 billion in 1995 (National Center for Educational Statistics, 1995).

Congress began to recognize a legitimate role in addressing the nationwide facilities crisis with the Educational Infrastructure Act of 1994 (PL 103-333). This legislation appropriated $100 million to repair, renovate, and construct elementary and secondary school facilities. One of the criteria for determining eligibility for a federal grant, under this legislation, is that the number of low-income students served by the district must be at least 15%. Unfortunately, in 1995 Congress exercised its legislative prerogative by passing HR 845, which rescinded funding for the Educational Infrastructure Act.

If Congress makes significant future appropriations to fund the Educational Infrastructure Act of 1994, it will be making tangible strides in remedying the school facilities crisis in this country. Secondly, the provision to target the federal grant assistance to low-income school districts will help to improve the low horizontal equity indicated by

the Mcloone index. Recall that the Mcloone index focuses on the bottom half of the wealth distribution, measured in term of total assessed valuation per student. Presumably, low assessed valuation per student is positively correlated with low family income. Future studies can verify and quantify this presumed relationship. If this presumption is true, then the federal grant assistance will be provided to the school districts with low property wealth, low family income, and low composite scores for the index of facilities adequacy per student. As it is structured, an infusion of funding through the Educational Infrastructure Act of 1994 will lead to greater horizontal equity and facilities neutrality.

Future Studies

The quantitative equity measures from this study form a benchmark that can be used by other researchers to compare California to other states and to compare California's changes in horizontal equity and facilities neutrality over time. For example, the General Accounting Office (1995) recently completed a report on the condition of America's schools, which used data from approximately 10,000 schools in over 5,000 school districts. Researchers with access to the more detailed GAO data can use the methodology developed in this dissertation to study horizontal equity of

facilities and facilities neutrality with the more recent data, and they can analyze changes from 1988. If any of the policy recommendations, discussed above, are implemented, future facilities equity studies should be conducted to analyze their effect on horizontal equity and facilities neutrality.

References

Berne, R., & Stiefel, L. (1984). The measurement of equity in school finance: Conceptual, methodological, and empirical dimensions. Baltimore, MD: Johns Hopkins University Press.

Berne, R., & Stiefel, L. (1990, October). Measuring school finance equity in the 1990's: Old dogs or new tricks? Twelfth Annual Research Conference of the Association for Public Policy Analysis and Management.

Bowers, H. J., & Burkett, C. W. (1989). Effects of physical and school environment on students and faculty. CEFPI's Educational Planner, 27(1), 28-29.

California Education Code. (1994). West's annotated California codes. Saint Paul: West Publishing.

Cash, C. S. (1994). The relationship between building condition and student achievement and behavior. CEFPI's Educational Planner, 32(1), 19.

Chan, T. C. (1979). The impact of school building age on pupil achievement. Greenville, SC: Greenville County School District. (ERIC Document Reproduction Service No. 191 138)

Chan, T. C. (1980). Physical environment and middle grade achievement. Greenville, SC: Greenville County School District. (ERIC Document Reproduction Service No. ED 198 645)

Chastain, G. (1990). The facilities dilemma: Why the courts may solve it. Journal of School Business Management. 55(2), 30-31.

Childs, T. S. & Shakeshaft, C. (1986). A meta-analysis of research on the relationship between educational Expenditures and student achievement. Journal of Education Finance. 12(2), 249-263.

Coons, J. E., Clune, W. H., and Sugarman, S. D. (1970). Private wealth and public education, Cambridge, MA: Belknap Press, Harvard University Press.

BEST COPY AVAILABLE

Dunteman, G. H. (1989). Principal Components Analysis. Sage University Paper series on Quantitative Applications in the Social Sciences, 69. Beverly Hills: Sage Publications.

Edgewood Independent School District v. Kirby. No. 362,516 (District Court of Travis County, 250th Judicial District of Texas, June 1, 1987).

Education Writers Association. (1989). Wolves at the schoolhouse door. Washington, DC: Author.

General Accounting Office. (1995). School Facilities: Condition of America's Schools (GAO Publication No. GAO/HEHS-95-61).

Guthrie, J. W., Kirst, M. W., Hayward, G. C., Odden, A. R., Koppich, J. E., Adams, J. E., Jr., & Webb, F. R. (1990). Conditions of Education in California 1989. Berkeley, CA: Policy Analysis for California Education.

Hanushek, E. A. (1989). The impact of differential expenditures on school performance. Educational Researcher. 18(4), 45-51.

Hanushek, E. A. (1994). Making Schools Work: Improving Performance and Controlling Costs Washington, D.C.: Brookings Institution.

Hanushek, E. A. (1994a). Money might matter somewhere: A response to Hedges, Laine, and Greenwald. Educational Researcher. 23(4), 5-9.

Hedges, L. V., Laine, R. D., & Greenwald, R. (1994) Does money matter? A meta-analysis of studies of the effects of differential school inputs on student outcomes. Educational Researcher. 23(3), 5-14.

Hedges, L. V., Laine, R. D., & Greenwald, R. (1994a) Money does matter somewhere: A reply to Hanushek. Educational Researcher. 23(4), 9-10.

Hertert, L. (1995). Does equal funding for districts mean equal funding for classroom students? Evidence from California. In Picus, L. O. and Wattenbarger, J. L. (eds). Where does the money go? Resource Allocation in Elementary and Secondary Schools. Thousand Oaks, CA: Corwin Press, Inc.

Honeyman, D. S. (1989). A growing concern for school buildings. CEFPI's Educational Planner, 27(2), 4-6.

Kozol, J. (1991). Savage inequalities: Children in America's schools. New York: Crown.

Legislative Analyst (1995). K-12 Education Overview.

Let the voters decide about school bonds. (1995, September 11). Tri-Valley Herald, p. A-18.

National Center for Educational Statistics. (1995). Federal Support for Education: Fiscal Years 1980 to 1995 (NCES Report No. NCES 95-215). Washington, DC: U.S. Government Printing Office.

Odden, A. R. & Picus, L. O. (1992). School Finance a policy perspective. New York: McGraw-Hill.

Pauley v Kelly, 255 S.E.2d 859, (W. Va. 1979); later changed to Pauley v Baily, 324 S.E.2d 128 (1892); Pauley v Gainer, 353 S.E.2d 318.

Picus, L. O. (1992). An Update on California School Finance 1992-93: What does the future hold? (Working Paper Number 21). Los Angeles: University of Southern California, Center for Research in Education Finance.

Pedhauser, E. J., & Schmelkin, L. P. (1991). Measurement, design, and analysis: An integrated approach. Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Ruley, C. (1995, December 4) How bad must schools get before legislature acts? Valley Times, pp. 11A.

Rubin, J. H., (1994, September 23). U.S. deficit at $207 billion in 11 months. The Press-Enterprise, pp. A-7.

School Services of California. (1995). Unsuccessful General Obligation Bond Elections. Sacramento, CA: Author.

School Services of California. (January 5, 1996). March school facility bond measure on Governor's desk as negotiations continue. Fiscal Report. Sacramento, CA: Author.

School Services of California. (January 10, 1996). Governor's Proposals for the 1996-97 State Budget and K-12 Education. Sacramento, CA: Author.

Scornaienchi, A. (1995, January 4). Were our schools forgotten? Valley Times, p. 13A.

Serrano v Priest. 487 P.2s 1241 (1971). (Serrano I)

Serrano v Priest. 557 P.2s 929 (1976). (Serrano II)

Stewart, K. G. (1989). Facility Planners and Policy Development. CEFPI's Educational Planner, 27(2), 19-21.

Summers, A. A., & Wolfe, B. L. (1977). Do schools make a difference? The American Economic Review, 67(4), 639-652.

Thompson, D. C. (1989). Financing facilities: A perilous legal path for the future. Educational Facility Planner, 27(2), 9-11.

Verstegen, D. A. (1994). The new wave of school finance litigation. Phi Delta Kappan, 76 (3), 243-250.

Westbrook, K. C. (1989). Equity, adequacy, efficiency - What do they mean to facility planners? Educational Facility Planner. 27(2), 13-15.

Where Children Learn Project CEFPI's Research Initiative. (March 1994). CEFPI Communication, pp. 1.

Witt, T. (1994). School bonds get second chance in November. California Association of School Business Officials Journal of School Business Management. 59(3), 6, 27.

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Appendix

SCHOOL FACILITIES INVENTORY BUILDING & CLASSROOM WORKSHEET

Use one of these forms for every building on the site. Enter the CDS (County District Site Code) for this site. See the enclosed list for the CDS code for each site in your district. Please number each building from 1 to 99 and identify each building with a descriptive name that will help uniquely identify the building for future reference. A help line is available at 800-527-4127.

CDS (COUNTY-DISTRICT-SITE) CODE

BUILDING NUMBER

BUILDING NAME

Answer the following questions as accurately as possible. If the buildings gross square footage is not known it can be determined by "stepping off" the length times the width.

A. This building is (check one).

- ☐ 1. Owned and controlled by the district include facilities built under the Lease-Purchase Law.
- ☐ 2. Owned but leased to others.
- ☐ 3. Leased or rented (Exclude leased buildings that are owned by another school district).

B. Enter the approximate year this building was originally completed.

C. Is this building air conditioned?

- ☐ 1. No
- ☐ 2. Yes

D. This building is (check one).

- ☐ 1. Permanent
- ☐ 2. Relocatable (designed for relocation)

E. Enter the approximate gross square footage of this building.

Enter the number of rooms for the building that were originally designed to be used as one of the following codes. Rooms designed for an instructional purpose not listed below should be coded as 98. Rooms designed for non-instructional purposes not listed below should be coded as 99.

- ☐ 01 - Classroom, Kindergarten
- ☐ 02 - Classroom, Grades 1-3
- ☐ 03 - Classroom, Grades 4-6
- ☐ 04 - Classroom, Grades 7-8
- ☐ 05 - Classroom, Grades 9-12
- ☐ 06 - Classroom, Grades 10-12
- ☐ 07 - Arts/Crafts Instruction
- ☐ 08 - Athletic Instruction
- ☐ 09 - Computer Instruction
- ☐ 10 - Drama Instruction
- ☐ 11 - Home Economics Instruction
- ☐ 12 - Journalism Instruction
- ☐ 13 - Language Laboratory
- ☐ 14 - Music Instruction
- ☐ 15 - Science Laboratory
- ☐ 16 - Shop, Instructional
- ☐ 17 - Special Education
- ☐ 18 - Typing Instruction
- ☐ 19 - Administrative Office
- ☐ 20 - Auditorium
- ☐ 21 - Food Service (Except Kitchen)
- ☐ 22 - Gymnasium
- ☐ 23 - Kitchen
- ☐ 24 - Lavatory, Staff
- ☐ 25 - Lavatory, Student
- ☐ 26 - Library
- ☐ 27 - Lounge, Staff
- ☐ 28 - Lounge, Student
- ☐ 29 - Maintenance Facility/Shop
- ☐ 30 - Multipurpose Room
- ☐ 31 - Shower/Locker Room
- ☐ 98 - Other Instructional Purpose
- ☐ 99 - Other Non-Instructional Purpose

Form Completed by (please print): _____ Signature: _____

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