DOCUMENT RESUME

ED 066 541 UD 012 894

AUTHOR Owen, John D.
TITLE An Empirical Analysis of Economic and Racial Bias in the Distribution of Educational Resources in Nine Large American Cities.
INSTITUTION Johns Hopkins Univ., Baltimore, Md. Center for the Study of Social Organization of Schools.
SPONS AGENCY Office of Education (DHEW), Washington, D.C. Bureau of Research.
REPORT NO JHU-R-47
BUREAU NO BR-6-1610
PUB DATE Oct 69
GRANT OEG-2-7-061610-0207
NOTE 23p.

EDRS PRICE MF-$0.65 HC-$3.29
DESCRIPTORS Bias; Educational Facilities; Educational Finance; Educational Policy; *Educational Resources; Effective Teaching; Neighborhood; *Racial Discrimination; *Resource Allocations; *Social Discrimination; Socioeconomic Status; Teacher Characteristics; *Teacher Distribution; Teacher Placement; Urban Education

ABSTRACT

Empirical evidence is presented consistent with the hypothesis that instructional expenditures are distributed unequally, and that less is spent on non-white and poor students than on others in large American cities. The most experienced teachers are generally to be found in schools attended by the less poor white children. More important, the verbal ability of teachers, an important predictor of teacher effectiveness (although not highly correlated with salary or experience) is also higher in these schools. An analysis of the physical plant--as measured by age of building, size of grounds, and presence of special facilities--further suggests that the allocation of physical resources may also be influenced by the economic characteristics of the neighborhood. The results of such discrimination are, of course, that less-favored groups receive a lower quality education, on the average, than the average middle-class or white child. This unequal treatment might have been predicted on the basis that poor and non-white groups have least political power and social status; an analysis of the tensions that would be created by a system of equal expenditures in cities heterogeneous in social and economic makeup would further suggest the existence of such discriminatory education. (Author/JM)

AN EMPIRICAL ANALYSIS OF ECONOMIC AND RACIAL BIAS IN THE DISTRIBUTION OF EDUCATIONAL RESOURCES IN NINE LARGE AMERICAN CITIES

Program No. 61610-12-03
Grant No. OEG-2-7-061610-0207

John D. Owen

October 1969

Published by the Center for the Study of Social Organization of Schools, supported in part as a research and development center by funds from the United States Office of Education, Department of Health, Education, and Welfare. The opinions expressed in this publication do not necessarily reflect the position or policy of the Office of Education, and no official endorsement by the Office of Education should be inferred.

The Johns Hopkins University
Baltimore, Maryland

AN EMPIRICAL ANALYSIS OF ECONOMIC AND RACIAL BIAS IN THE DISTRIBUTION OF EDUCATIONAL RESOURCES IN NINE LARGE AMERICAN CITIES

It is frequently assumed in the literature on state and local finance that municipal expenditures for public services, including education, are equally distributed among the recipients.[1] On this hypothesis children in the various public elementary schools of the municipal system of the typical American city receive equal treatment in the city school system. Such an assumption--whether one means by it equality of expenditure per pupil, teacher quality, or of allocation of other educational resources--must be challenged both on analytical and on empirical grounds.

Analytically, one might expect equal treatment if cities were organized in accordance with the model of Charles Tiebout.[2] Here, citizens choose homes in municipalities whose residents are of incomes and tastes similar to their own. Hence, each resident pays approximately the same local tax and has roughly the same preference for educational services. Under these circumstances a local school system

---

[1] See, for example, the analysis of educational expenditures in W. Irwin Gillespie, "Effect of Public Expenditures on the Distribution of Income," in Essays in Fiscal Federalism, ed. by Richard A. Musgrave (Washington, D.C., The Brookings Institution, 1965), pp. 122-186; and in Dick Netzer, Economics of the Property Tax (Washington, D.C., The Brookings Institution, 1966), pp. 256-57. See also the use of the Gillespie data in Paul A. Samuelson, Economics (New York, McGraw-Hill, 1967), p. 167.

[2] Charles M. Tiebout, "A Pure Theory of Local Expenditures," The Journal of Political Economy, Vol. LXIV (October, 1956), pp. 416-424.

might well be designed to provide a homogeneous output of school services.

The Tiebout model may fit some small "one-class" suburban villages fairly well,[1] but it is inadequate to describe a large American central city. The population of the typical central city, unlike some of the suburbs surrounding it, is quite heterogeneous with respect to income, race, and other social characteristics.

One can accept the heterogeneous character of cities and still defend the equal-treatment hypothesis by making the assumption that conflicts between their socioeconomic classes and racial groups will focus on such issues as the aggregate level of expenditures on education, police protection, and other government services, and on the tax schedule (especially the extent to which it is progressive) designed to pay for the, rather than on the equality of their distribution.

But this is a naive view of how cities function. The demand for government services is generally positively related to income,[2] and absolute equality of expenditures would thus be an unlikely result of

---

[1] But see Paul Samuelson, "Aspects of Public Expenditure Theories," The Review of Economics and Statistics, Vol. XL, No. 4 (November, 1958), pp. 332-38, especially pp. 337-38 for a description of the difficulties in finding a community that would conform with the Tiebout model.

[2] See, for example, Harvey E. Brazer, City Expenditures in the United States, Occasional Paper 66 (New York, National Bureau of Economic Research, Inc., 1959); Solomon Fabricant, The Trend of Government Activity in the United States Since 1900 (New York, National Bureau of Economic Research, Inc., 1952); and James M. Henderson, "Local Government Expenditures: A Social Welfare Analysis," The Review of Economics and Statistics, Vol. I, No. 2, (May, 1968), pp. 156-163) for estimates of income elasticity of community demand for government services.

political bargaining over taxes and expenditures. For example, the income elasticity of demand for education has been measured as greater than zero: the higher the income level of the family (or community), the more it is generally willing to spend to educate its children.[1] Hence, complete equality in the allocation of educational resources might lead to tensions within a heterogeneous community. W. C. Stubblebine, in a discussion of the effects of equal expenditures in a public education system, argues that

> . . . public financing (of education) carries with it seeds of discontent. Voting does not secure for each his preferred position. Only those for whom the community choice corresponds to their preference will be satisfied by the results. For those who would have preferred more education at the public price, the body politic will appear niggardly and irresponsible. Those who would have preferred less education will castigate the body politic for its profligate and irresponsible behavior . . . Regardless of whether the level of education is optimal, there will be all the symptoms of pervasive social imbalance in education. All too often this basic characteristic of public decision-making is overlooked.[2]

In a more realistic situation, where neighborhood expenditures as well

---

[1] This can be confirmed at the community level by a number of cross-sectional studies of community demand for education. See Werner Z. Hirsch, "Income Elasticity of Public Education," International Economic Review, Vol. 2, No. 3, (September, 1961), pp. 330-39); Jerry Miner, Social and Economic Factors in Spending for Public Education (Syracuse, N.Y., Syracuse University Press, 1963); and Thomas H. James et al., Determinants of Educational Expenditures in Large Cities of the United States (Stanford, 1965, Technical Report to U.S. Office of Education, Cooperative Research Project No. 2389). At the individual level, higher income families give their children more years of education and are more likely to send them to expensive colleges. See John D. Owen, An Economic Analysis of Scholarship Policy (Baltimore, The Center for the Study of the Social Organization of Schools, 1968).

[2] W. C. Stubblebine, "Institutional Elements in the Financing of Education," Southern Economic Journal, Vol. 32 (July, 1965), p. 26.

as taxes are the subject of political bargaining, an unequal distribution--in which the schools used by the middle class are better than those used by the lower class--is the likely result.

If we hypothesize a situation of equal expenditures on every child--at some level between that preferred by the middle class and that preferred by the working class--and some given schedule of taxes, we would expect the middle-class family to be willing to be taxed at a higher rate in order to obtain greater educational expenditures and the lower-class family to have the opposite preference. We could predict that the middle-class family would be willing to pay more than one extra dollar in taxes to obtain an extra dollar of public educational expenditure, while the working-class family would be willing to sacrifice a dollar of such expenditure to obtain a tax reduction of less than a dollar. Hence, a shift of a dollar of expenditure from working-class to middle-class schools could be accompanied by an increase in total tax revenue (i.e. by an increase in taxes on the middle class accompanied by a smaller reduction in taxes on the poor), without any increase in voter dissatisfaction.

The concern of all citizens with the education of their fellow may be seen as a countervailing tendency towards equality. However, this tendency is unlikely to offset completely the tendency towards inequality--at least as long as individuals are willing to make greater sacrifices for

the education of their own children than for others.[1] It is likely, then, that a city composed of heterogeneous income groups bargaining over expenditures and taxes will allocate educational resources unequally.

Moreover, it would be sociologically naive to assert that political inequality in cities would express itself only on decisions over tax rates. One might also expect to find racial discrimination against Negroes, the lack of relevant information on the part of the poor, and so forth, to be reflected in less than equal provision of municipal services such as education, sanitation, police and fire protection, and the like.

Further, when one turns from the abstract issue of the underlying tendency towards inequality to the more concrete matter of the principles on which municipal school systems allocate services and expenditures, additional grounds are found for rejecting the hypothesis of equal treatment.[2] The major portion of current expenditures of city school systems

---

[1] See, for example, the discussion of this problem in Stubblebine, op. cit., and M. V. Pauly, "Mixed Public and Private Financing of Education," American Economic Review, Vol. 57 (March, 1961), pp. 120-130.

There may be even greater problems in getting parents to make this sacrifice at the local level than at the national level. A large proportion of local graduates may move to the suburbs, or out of the metropolitan area altogether. At the same time, a similarly large proportion of the poorly educated adults in a city may have been raised in a different section of the country. These "geographical spillovers" reduce the incentive to invest in the education of others. See B. A. Weisbrod, External Benefits of Public Education (Princeton, Princeton University Press, 1964).

[2] Cf. the very useful discussion in Henry M. Levin "Decentralization and the Finance of Inner-City Schools," Research and Development Memorandum Number 50; Stanford Center for Research and Development of Teaching, 1969.

is for instruction, for the most part on teachers' salaries.[1] Salary schedules are determined by the cities almost entirely on the basis of a teacher's experience. Ordinarily, no special rewards are offered either to teachers who are assigned to schools in an unattractive environment or to those of especially high teaching ability. Hence, a key element in understanding interschool variation in instructional expenditure is the average experience level of teachers in a given school system.

Much of this interschool variation in experience can be explained by the role of seniority in teacher assignment. Most American cities permit their experienced teachers to request transfer to what the teachers consider to be the most attractive schools. In granting these requests, the most experienced teacher usually takes precedence. In general, teachers find schools in white middle-class or upper working-class areas most attractive.[2] This preference may be due in part to the teacher's racial or class attitudes, to his fear or dislike or poor ghetto neigh-

[1] In the 91 largest school systems reporting expenditures data for 1958-59, teachers' salaries accounted for over 4/5 of the expenditures for instruction. Average instructional expenditures accounted for three quarters of average total current expenditures. See Gerald Kahn, "Current Expenditures Per Pupil in Public School Systems, Urban School Systems 1958-59," (Washington, D.C., United States Department of Health, Education, and Welfare, Circular No. 645, 1961), Tables 2, 3, pp. 15, 36.

[2] See, for example, the recent National Education Association pool results, "Teacher Opinion Poll, Teaching in Center-City Schools," NEA Journal, Vol. 56, No. 9 (December, 1967), p. 63. Only three percent of the teachers polled would choose to teach in a slum school. For a more detailed analysis of teachers' attitudes toward lower-class children, see Howard S. Becker, "The Career of the Chicago Public School Teacher," The American Journal of Sociology, Vol. LVII, No. 5 (March, 1952), pp. 471-72. For a recent study of teachers' preferences for white students, see James S. Coleman, Ernest Q. Campbell, Carol J. Hobson, James McPartland, Alexander M. Mood, Frederic D. Weinfeld, and Robert L. York, Equality of Educational Opportunity, National Center for Educational Statistucs (Washington, D.C., U.S. Government Printing Office, 1966), pp. 167 ff.

borhoods and working conditions, to his awareness that he is trained to teach upper working-class and middle-class children in a well-equipped classroom and hence can perform most effectively in such a school, to his simple preference for working near home,[1] or to other causes.

The combination of s single city-wide salary scale and a seniority preference system in teaching assignments, together with widespread teacher preference for white, non-poor schools, thus tends to result in a concentration of less experienced teachers in the poor, non-white areas.[2] With a salary scale based largely on experience, this assignment pattern ensures that the average teacher's salary--and hence the average expenditure per pupil--will be lower in these districts.[3]

---

[1] This teacher preference may be accompanied by an administrative practice of assigning teachers to schools near their homes whenever possible. (See Albert P. Blaustein, "Philadelphia," in Civil Rights U.S.A./Public Schools North and West 1962, The United States Commission on Civil Rights /Washington, D.C., U.S. Government Printing Office, 1962/, p. 155) When this rule is in effect, the administration apparently may choose a white teacher over a qualified black teacher for a post in a white neighborhood, even if the black teacher is willing to commute.

[2] This career pattern is described in Howard S. Becker, op.cit., pp. 470-77. See Also Albert P. Blaustein, op. cit., p. 172, and Kenneth B. Clark, Dark Ghetto (New York, Harper and Row, 1965), p. 134.

[3] Even if instructional expenditures were equalized among schools and school principals were permitted to offer salary differentials to attract qualified teachers, slum schools would probably continue to be staffed by teachers below the city-wide average in experience and other qualifications. After all, slum schools would still be unattractive in other ways. Hence, slum school principals would have to pay more to attract teachers of a given quality. However, it seems likely that the teacher quality in the slum schools would be higher under such a system than with the present arrangements.

At present, the assignment of teachers can be controlled by administrators, including school principals. However, there is little evidence that the net effect of administrative influence is to encourage experienced teachers to seek transfers to slum schools.

The discriminatory effects of this assignment system may be negated to a considerable extent if a sizeable proportion of school teachers are black, and if these teachers have different preferences than whites. If blacks are not prejudiced against teaching members of their own race, and if they have no wish to commute from a black to a white section of the city, then the role of the blacks could be to equalize teacher quality. There is, in fact, some empirical evidence that black teachers typically do not share white teachers' preference for white students.[1] Moreover, white parents generally have a stronger preference for white teachers than do black parents,[2] and white administrators frequently prefer to

---

[1] See, for example, James S. Coleman, et al., op. cit., p. 545. Henry M. Levin, Recruiting Teachers for Large City Schools (Washington, D.C., The Brookings Institution, 1968, forthcoming), presents further evidence of the difference between the racial preferences of black and white teachers in ghetto schools. David Gottlieb, "Teaching and Students: The Views of Negro and White Teachers," Sociology of Education, Vol. 37, No. 4 (Summer, 1964), pp. 345-353, found that while white teachers regard their black pupils as "talkative, lazy, high strung, and rebellious," black teachers find them to be "happy, cooperative, energetic, and ambitious," pp. 352-53.

[2] See A. Harry Passow, Toward Creating a Model Urban School System: A Study of the Washington, D.C. Public Schools (New York, Teachers College, Columbia University, 1968), p. 64; Supplemental Studies for the National Advisory Commission on Civil Disorders (Washington, D.C., U.S. Government Printing Office, 1968, pp. 16, 36; and Richard E. Day, Civil Rights U.S.A./ Public Schools Southern States, 1963/North Carolina, The United States Commission on Civil Rights, (Washington, D.C., U.S. Government printing Office, 1964), pp. 33, 53-59.

place black teachers in predominantly black schools (perhaps partially as an accommodation to the preferences of white parents). These community and adminstrative attitudes become important when principals and others divert the teacher assignment pattern from a straightforward seniority system. There is some evidence that they do modify it and, at least in some cities, that they modify it in the direction of encouraging black teachers to remain in predominantly black schools.[1]

Such racial discrimination against black teachers, together with the lower preference for white pupils by black teachers, could actually have an equalizing effect, because it would provide experienced teachers for black students, as black teachers are forced to remain in ghetto schools rather than transferring as they become experienced. However, this effect would be minimized if the number of black teachers in a city has recently increased, and an unusually large proportion of black teachers are relatively inexperienced. In such a case, the tendency to assign them to black schools will reduce the average experience level and thus the average salary paid in those schools.

A persistent tendency for the teacher-student ratio to be lowest in poor districts will also result in low per pupil instructional expenditures. However, this ratio need not be positively correlated with neighborhood economic levels. In Boston it was found that because of an

---

[1] See Albert P. Blaustein, op.cit., pp. 154-170, "Discrimination Against Teachers." Also see Howard S. Becker, op. cit.
The informal pressures on black teachers are varied. However, both Becker and Blaustein agree that an important factor is the black teacher's fear that if he does succeed in moving to a white school against the advice of the principal, the latter will interfere with his career by giving him low ratings, difficult classes, or the like.

open-enrollment policy which drew pupils from all areas to the better schools, the teacher-student ratio was lower in less disadvantated districts than in the slums.[1]

Taken together, these arguments suggest that there is little reason to accept a priori the notion that educational expenditures are equally distributed among children in large cities. One reason why the equal-treatment hypothesis has not been more widely challenged has been the paucity, until recently, of empirical data on the distribution of educational resources within cities. However, several recent studies of individual cities are now available.[2] Moreover, the Coleman Report, Equality of Educational Opportunity,[3] has now made available data on resource inputs in a large number of individual schools with a rather large number of schoolsystems. These data can now be used to explore the degree to which economic and racial factors affect the allocation of educational resources.

An analysis of the Coleman Report data here is also helpful for a secondary purpose. This report has been criticized for its neglect of

---

[1] See Martin Theodore Katzman, "Distribution and Production in a Big City Elementary School System," (unpublished Ph.D. dissertation, Yale, 1967).

[2] See Patricia Cayo Sexton, Education and Income (New York, The Viking Press, 1961); Jesse Burkhead, Thomas G. Fox, and John W. Holland, Input and Output in Large-City High Schools (Syracuse, N.Y., Syracuse University Press, 1967); and Martin Theodore Katzman, op. cit.

[3] See James S. Coleman, op. cit.

intra-city differences in per pupil expenditures.[1] In the present study an attempt is made to determine the importance of such differences, and especially, the extent to which they are the result of economic and racial pressures.

Data from the report were drawn from elementary schools and their students in nine large center cities.[2] They were supplemented with published data from census and other sources. An attempt was then made to measure the extent to which a school expenditure variable and a number of school quality variables were influenced by intra-city (as well as inter-city) variations in the economic and racial character of the families served by the school. In order to examine the influence of neighborhood economic level on the distribution of educational resources, average family income in the school attendance areas,[3] was introduced as an independent variable in the education expenditure and education quality regressions.

---

[1] The quality of the data themselves has also been criticized. (See Samuel S. Bowles and Henry M. Levin, "The Determinants of Scholastic Achievement--An Appraisal of Some Recent Evidence," The Journal of Human Resources, Vol. 3, No. 1, (Winter, 1968), pp. 3-24; and Samuel S. Bowles and Henry M. Levin, "Equality of Educational Opportunity - More On Multicollinearity and the Effectiveness of Schools," The Journal of Human Resources, Vol. 3, No. 3, (Summer, 1968, pp. 393-400. See also James S. Coleman, "Equality of Educational Opportunity: Reply to Bowles and Levin," The Journal of Human Resources, Vol. 3, No. 2 (Spring, 1968), pp. 237-246. In order to use these data for the present study, a number of corrections were made on the data tapes.

[2] In the Coleman sample all elementary schools in the chosen cities were studied. Center cities were defined by their political boundaries.

[3] Estimated from census tract data by using overlay transparencies. Census data were updated by using the Coleman response on consumer durables in the home to estimate the more recent neighborhood distribution of income.

In each case, the regressions were standardized for variations in city income.

The principal racial discrimination hypothesis examined here was that the higher the proportion of white students, the better the educational facilities. Thus expenditure per student (or some other measure of input of educational resources), might be estimated as a function of income in the school attendance area and of the percentage of white students:

$$(1) \quad I = a + bY_s + cW_s$$

This linear model would be consistent with giving a fixed weight to the value of each white child and another weight to that of each non-white child when allocating resources to a school or classroom. Similarly, it would be consistent with giving fixed weights proportionate to the income of the parents in the school. Since it is unlikely that "the system" allocates resources on such a rigid basis, the linear model should be regarded as only a useful approximation to a more complicated reality.

It has frequently been stated that the degree of discrimination against non-whites rises as the proportion of this group in the city population rises.[1] If the coefficient of discrimination can be approximated as a linear function of the percentage of white students in the city school system, $e + d + eW_c$ (where d might be expected to have a positive and e a negative value), them combining (1) and (2), expenditures could be estimated as:

$$(3) \quad I = a + bY_s + dW_s + eW_sW_c$$

[1] Cf. the discussion in H. S. Becker, The Economics of Discrimination. Becker found that this hypothesis was not supported in his study of earnings data.

Table 1 gives some statistical results from this model. In the first equation, expenditures per pupil for salaries, standardized for variation in city income by the use of constrained regression,[1] are regressed against income in the school and the measure of racial discrimination. Elasticities calculated at the means of the variables are given, along with estimates of the regression co-efficients. The elasticity estimates the percentage change in the dependent variable associated with a 1 percent change in the independent variable, holding the other independent variables constant.

Regression equation (1) suggests that there is significant descrimination against poor and non-white students in the allocation of instructional expenditures. The school income elasticity of salary expenditures (holding city income constant) of 0.43 is about one-half some estimates of intercity elasticities of educational expenditures.[2]

The elasticity of expenditures with respect to the proportion of white students in the school has a maximum value of about one-fifth. However, this comparison may tend to underestimate the relative importance of race, since the racial composition variable has a coefficient of variation that is more than five times that of neighborhood income. When the regression coefficients are standardized for this difference in relative variance, the influence of racial composition of the school appears to be to be greater than that of neighborhood income.

---

[1] City-wide values for the dependent variables in regression equations (1) - (3) were first regressed against average family income in the city. The regression coefficients thus obtained were then used to obtain values of the dependent variables net of the influence of city income. These were then used as dependent variables in regressions (1) - (3).

[2] See note 5, p. 3.

TABLE 1

		R^*	F
(1)	Real Teacher Salary Expenditures per Pupil (I)**		
	$I = -526.6 + .0173Y_s + 138.5\ W_s - 306.8\ W_sW_c$	.45	15.0
	(3.79) (4.29) (-5.19)		
	[.43] [.20] [-.22]		
(2)	Real Teacher Salary (S)**		
	$S = -1932 + .227\ Y_s + 1124\ W_s - 1870\ W_sW_c$	.46	15.1
	(4.21) (2.94) (-2.67)		
	[.20] [.06] [-.05]		
(3)	Teacher - Student Ratio (T)**		
	$T = .0288 + .144 \times 10^{-5}\ Y_s + .00425\ W_s - .0169\ W_sW_c$	.25	4.5
	(2.67) (1.11) (-2.42)		
	[.24] [.04] [-.05]		
(4)	Teacher Experience (E)		
	$E = 23.07 + .00123\ Y_s - .00273\ Y_c + 7.42\ W_s - 8.17\ W_sW_c$	.56	23.0
	(4.45) (-2.39) (3.34) (-1.96)		
	[.60] [-1.64] [.22] [-.12]		
(5)	Teacher Verbal Ability (V)		
	$V = -10.12 + .00044\ Y_s + .0038\ Y_c + 5.91\ W_s - 8.15\ W_sW_c - 4.86\ W_c$	.61	24.0
	(2.89) (6.09) (4.12) (-2.79) (4.12)		
	[.11] [1.20] [.10] [-.06] [.10]		
(6)	Proportion of White Teachers (W)		
	$W = -3.35 - .14 \times 10^{-5} Y_s + .0047\ Y_c + .714\ W_s - 1.21 W_sW_c + 1.32\ W_c$	.62	25.1
	(-.07) (5.41) (3.62) (-3.01) (8.14)		
	[-.01] [5.24] [.39] [-.32] [.97]		

*Correlation coefficients adjusted for degrees of freedom.

**Standardized for variations in city income level by the method of constrained regression.

t ratios for the regression coefficients are given in parentheses.

Elasticities calculated at the means are given in brackets.

Since there is typically a positive correlation between income and non-white population in city neighborhoods, these results, taken together, suggest that any comparison of the poorest with the more prosperous sections of a city which does not standardize for differences in racial composition may yield an observed intra-city income elasticity still closer to those observed between cities.

The measure of variation in instructional expenditure per student was next broken down into its two components--teacher salary and teacher-student ration--and estimated separately in regression equations (2) and (3). As expected, economic and social factors are more important determinants of salary than of the teacher-student ratio. Salary has a school neighborhood income elasticity of about one-fifth and a maximum elasticity with respect to the percentage of whites in the school of about one-sixteenth.

Equation (4) traces further the variation in instructional expenditures by examining experience as a function of racial and economic factors. Since city-wide data on experience of teachers were not generally available, an attempt was made to standardize for variations in city income here (and in the following regressions), by introducing average family income in the city, Y_c, as an independent variable.[1]

Teacher experience has a considerably stronger relationship to the economic and racial character of school neighborhoods than does salary

[1] Both the school income and the city income variables were deflated by the U.S. Bureau of Labor Statistics city cost of living index, which affords a more accurate measure of intercity variation in real income.

(see Equation (4)). This difference is perhaps the result of the fact that above a certain level of experienced teacher salary scales typically provide somewhat less than proportionate increases in pay. These results are consistent with a teacher assignment pattern in which a large proportion of teachers with more experience than is necessary for maximum salary are found in more affluent and white schools.

The results presented in equations (1) through (4) are consistent with the hypothesis that neighborhood economic and racial characteristics are a significant factor in determining instructional expenditures per student. Much of this effect appears to be due to the higher average experience level in the more favored schools. However, several recent studies have questioned the validity of using experience, and hence salary, or for that matter, expenditure per pupil, as an educationally relevant measure of resource input. In his report James Coleman found that a teacher's experience, salary, and the like were much less important than his verbal ability in determining effectiveness. But salary does not ordinarily depend on verbal ability (in fact, the two have a rather low correlation), so that variations in expenditures per student may reflect nominal, rather than real, discrimination.

There may be other features of the teacher assignment system which tend to concentrate less able teachers in poorer or non-white areas. For example, the more able have a stronger preference to teach middle-class or white students. If informal pressures were used to induce less able teachers to remain in slum schools, as suggested above, the same result would follow. In a system which gives an experienced teacher a choice

of assignment, or in which administrators influence the assignment of teachers, some inequality of educational opportunity may be introduced independently of any variations in per pupil expenditures.

Some evidence of the influence of racial and economic factors on the distribution of teacher verbal ability among schools is offered in regression equation (5). The dependent variable is the average score in a verbal ability examination given teachers by the Coleman research team. A fairly strong relationship between verbal ability and the racial and economic factors in the city and in a given school neighborhood was observed. There was an intercity income elasticity of 1.20. The school area income elasticity was much smaller, about one tenth, but was still almost three times the estimate of its standard error.[1]

The racial composition of the school is here seen to be a significant factor in the assignment of verbally able teachers, and it becomes more important as the proportion of non-whites in the city grows. The racial composition of the city's school was also a significant determinant of verbal ability, and is included in regression equation (5). This result suggests that a 10 percent increase in the proportion white in the city, holding the other factors constant, will be associated with a 1 percent increase in average verbal ability of its teachers.

---

[1] The smaller size of the school area income elasticity is not surprising, since the within-city variation is associated with a single labor market. Thus, interregional variations in supply of the able (perhaps positively associated with income levels) do not contribute to the interschool variation.

The hypothesis that white teachers are more likely to select or to be assigned to schools in white, less poor neighborhoods is examined empirically in equation (6), which shows the results of regressing percentage of white teachers in a school against the school and city income and race variables. As might be expected, the proportion of white teachers rises with the percentage of white students not only in the city, but also in a given school: an increase in a school's white population of 5 percent is associated with an increase in white teachers of up to 2 percent.

One might ask to what extent the tendency for municipal education systems to segregate black teachers and students is relevant to other allocative questions: the distribution of teachers high in verbal ability, experience, and salary. These questions were explored in two ways: first, by comparing average verbal ability, experience, and salary levels of white and non-white teachers in each city studied. If non-white teachers were rated lower on the average, and if they tended to be assigned to non-white students, then the lower experience, salary, and verbal ability averages in non-white schools is partially explained.

Second, by using the independent variables in equations (2) and (4) to explain the experience, salary, and verbal ability of black and white teachers. In the first comparison, the average non-white teacher had about 8 percent less experience than the average white teacher and hence was paid somewhat less. Moreover, his score on the verbal ability test was considerably lower: the average differential was 3.60 points. (This is greater than one standard deviation in the combined sample.)

The second method had equally striking results. Whether verbal ability, experience, or salary of white teachers or of non-white teachers are used as dependent variables (i.e., equations (2), (5), and (6) were run with racially separated teacher data), they showed no statistically significant relationship to the school-based independent variables (racial composition of students and average income in the school attendance area).[1]

Taken together, these results indicate that in these large cities a major explanation of the lower verbal ability and the lower experience and salary of the average schoolteacher in non-white areas is the high proportion of non-whites teaching there.

The key variables in any analysis of educational inequality are those associated with teacher quality--both because of their significance in the educational process and because of the importance of teachers' salaries in the educational budget. However, it is also useful to see to what extent, if any, non-white or poor students are compensated for lower expenditures on teachers by better physical facilities in their schools. After all, even if it does not make a critically importnat contribution to a student's educational progress, the quality of the school's physical plant and equipment can make his education a more pleasant experience.

---

[1] A partial exception was found in the case of experience level of white teachers, where a relationship with school area income was found to be significant at the 5 percent level.

Three measures of physical quality--age of the plant, acreage of school grounds per students, and special facilities available in the school[1]--were each regressed against the racial and economic determinants employed in equations (5) and (7). No relationship was found between the racial makeup of either the city of the school and these physical factors. In fact, there was a significant positive association between each of them and income in the school attendance area. The racial variables were then dropped from the regressions, and the results are presented in Table 3. Since average non-white income is typically lower than white, the table suggests that the physical resources of the city schools serving non-white areas may be of somewhat poorer quality. No basis can be found for the hypothesis that special physical facilities are provided to compensate children for unequal teacher assignments.

[1] Special facilities are a weighted average of auditorium, cafeteria and athletic facilities.

TABLE 2

(1) Age of School (A) R = .26 F = 8.1

$$A = 18.42 - .00509\ Y_s/P + .00713\ Y_c/P$$
$$(-3.84) \quad (1.09)$$
$$[-.75] \quad [+1.29]$$

(2) Acreage per Student (S) R = .46 F = 23.3

$$S = .0024 + .0000017\ Y_s/P - .0000012\ Y_c/P$$
$$(6.83) \quad (-2.52)$$
$$[+3.04] \quad [-2.80]$$

(3) Special Facilities (F) R = .19 F = 3.7

$$F = -81.29 + .00246\ Y_s/P + .0139\ Y_c/P$$
$$(1.81) \quad (2.08)$$
$$[.44] \quad [3.05]$$

Correlation coefficient adjusted for degrees of freedom.

t ratios for the regression coefficients are given in parentheses.

Elasticities calculated at the means of the variables are given in brackets.

Conclusions

The empirical evidence presented here is consistent with the hypothesis that instructional expenditures are distributed unequally, and that less is spent on non-white and poor students than on others in large American cities. The most experienced teachers are generally to be found in schools attended by the less poor white children. More important, the verbal ability of teachers, an important predictor of teacher effectiveness (although not highly correlated with salary or experience), is also higher in these schools. An analysis of the physical plant--as measured by age of building, size of grounds, and presence of special facilities--further suggests that the allocation of physical resources may also be influenced by the conomic characteristics of the neighborhood.

The results of such discrimination are, of course, that less-favored groups receive a lower quality education, on the average, than the average middle-class or white child. This unequal treatment might have been predicted on the basis that poor and non-white groups have least political power and social status; the foregoing analysis of the tensions that would be created by a system of equal expenditures in cities heterogeneous in social and economic makeup would further suggest the existence of such discriminatory education.

One must conclude, though, that the immediate cause of the economic and racial biases in the allocation of teaching resources lies in the teacher assignment system: the single city-wide salary schedule, the allocation of attractive teaching posts to the most experienced teachers; and, in some cities, the informal pressures that are apparently used to keep black teachers in black schools.