Central city school administrative policy: systematically passing undeserving students

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Received 26 August 1997; accepted 23 March 1998

Abstract

Local public schools must satisfy the electorate to pass tax levies and re-elect school board members. Central city schools seem to pursue these goals differently than suburban or non-metropolitan schools. While something about Ohio’s central city schools depresses standardized test scores, that same something raises graduation rates, all else constant. This paper argues that social promotion may be the cause. It therefore seems that central city school districts perform poorly independent of school and neighborhood factors, yet they consciously choose to pass students through the system. The results are obtained using both weighted least squares and 2SLS analysis. [JEL D73, H40, I21] © 1999 Elsevier Science Ltd. All rights reserved.

1. Introduction

An oft-told tale says that central city schools are bloated, inefficient, ineffective institutions that pass students through the system with little regard for students’ performance. This study lends credence to the tale. Voters elect school board members who set local public school policy through the bureaucracy, administrators and teachers. Policy choices include teacher quality selection and student retention rates. If the school system fails to deliver what the electorate wants, voters will not pass school funding levies, and they will replace the current school board.

I find that central city school systems behave differently than suburban and non-metropolitan school systems. All else equal, central city schools depress student test scores; however, they also keep students from dropping out as much as one would expect. This may be evidence that the central city school board is giving the voters what they want: high school diplomas for many students whose academic achievement would otherwise preclude a degree. Other possible explanations include racial composition, social promotion to cut costs and lower academic rigor in central city schools.

I first model the education process. Then, using an education production function approach, I examine the effect of location on proficiency test results and attrition rates.

2. Theoretical model

A model is formulated which reveals a distinction between a student receiving knowledge and a student receiving a diploma. The model also incorporates omitted environmental influences to provide an important link to the empirical analysis.

A social planner maximizes parent utility, $u$, which is a function of student success, $x$, and cost, $\phi$:

$$u = u(x, \phi); u_x > 0, u_\phi < 0. (1)$$

Student success is a function of knowledge, $k$, and degree completion, $d$: 
\[ x = x(k,d); \ x_k > 0, x_d > 0. \] (2)

Cost is a function of teacher quality, \( Q \). Next, regardless of how many variables a researcher includes, there will always be some effects that the variables simply cannot capture. I therefore let \( E \) represent other, unmeasurable environmental influences in a school district. These harmful effects are assumed to increase the costs of running a school district through items like increased security costs, damage repair costs, and possible premia needed to attract and retain teachers of a certain quality. Also included in the cost is \( p \), the holdback rate; the propensity for teachers to fail students and make them repeat a grade. The immediate effect of holding a student back is to raise costs because the student will consume school resources for an additional year. Callan and Santerre (1990) estimate the marginal cost to a district of an additional student in the classroom for a school year is \$231 for a primary school and \$609 for a high school. There is another effect of increasing \( p \), the degree completion variable. Students who are held back are more likely to drop out before completing a degree (Rumberger, 1995; Roderick, 1994). Fewer students means lower total costs to the school district. Therefore the total effect of \( p \) on \( \phi \) is ambiguous. Finally, the more students that stay in school to complete their degree, the higher the costs are to the district:

\[ \phi = \phi(Q,E,p,d); \ \phi_Q > 0, \ \phi_k > 0, \ \phi_p > 0, \ \phi_d > 0. \] (3)

Student knowledge is a function of teacher quality, degree completion, the holdback rate and parent factors, \( A \). The holdback rate has an ambiguous effect on knowledge because on the one hand it makes a student repeat material that he did not learn the first time, but on the other hand holding him back makes it more likely that he will drop out of school and will cease adding to his knowledge:

\[ k = k(Q,d,p,A); \ k_Q > 0, k_d > 0, k_p > 0, k_A > 0. \] (4)

Degree completion depends on the holdback rate. The more students are forced to repeat grades, the more likely they are to drop out. Also, getting a diploma depends on the harmful environmental influences in the district. The more oppressive the atmosphere, the more incentive there is for students to drop out. On the other hand, the more favorable parent factors there are, the more likely the student is to complete a degree:

\[ d = d(p,E,A); \ d_p < 0, d_E < 0, d_A > 0. \] (5)

After substituting, Eqs. (1)–(5) yield the following simplified model:

\[ u = u(x,\phi); \ u_x > 0, u_\phi < 0, \] (6)

\[ x = x(Q,p,E,A); \ x_Q > 0, x_p > 0, x_k < 0, x_A > 0, \] (7)

\[ \phi = \phi(Q,p,E,A); \ \phi_Q > 0, \ \phi_p > 0, \ \phi_k < 0, \ \phi_A > 0. \] (8)

The choice variables are teacher quality, \( Q \), and the holdback rate, \( p \). Utility maximization produces the following first-order conditions:

\[ \frac{\partial u}{\partial x} + \frac{\partial u}{\partial \phi} = 0, \] (9)

\[ \frac{\partial u}{\partial x} + \frac{\partial u}{\partial p} = 0. \] (10)

Eq. (9) shows the tradeoff between the utility value of increased student success resulting from increased teacher quality and the disutility of the increased cost of teacher quality. Eq. (10) shows the tradeoff between the utility value of a change in student success resulting from increased student success resulting from increased teacher quality and the utility value of a change in cost due to a higher holdback rate.

It is desirable to find the effect of \( E \) on the choice variables. Using Cramer’s Rule, I derive comparative statics on teacher quality and the holdback rate; however, the signs are inconclusive.\(^1\)

The effect of \( E \) on getting a diploma and student knowledge can be found by totally differentiating Eqs. (5) and (4):

\[ \frac{\partial d}{\partial E} = \frac{\partial d}{\partial p} \frac{\partial p}{\partial E} + \frac{\partial d}{\partial E}, \] (11)

\[ \frac{\partial k}{\partial E} = \frac{\partial k}{\partial Q} \frac{\partial Q}{\partial E} + \frac{\partial k}{\partial d} \frac{\partial d}{\partial E} + \frac{\partial k}{\partial E} \frac{\partial E}{\partial E} + \frac{\partial k}{\partial p} \frac{\partial p}{\partial E}. \] (12)

Because \( \partial p/\partial E \) and \( \partial Q/\partial E \) are of indeterminate sign, I cannot unequivocally determine the effect of \( E \) on degree completion and knowledge. Nevertheless, if the direct effect in Eq. (11) dominates the indirect effect, then \( \partial d/\partial E < 0 \). This means the total effect of having more unmeasurable, harmful environmental influences is to lower degree completion. Next, most of the terms in \( \partial k/\partial E \) are of ambiguous sign. These are the indirect effects on \( k \) that occur when changing \( E \) alters the optimal choice of \( p \) and \( Q \). The direct effect, \( \partial k/\partial d \), is unambiguous. It reflects the impact of \( E \) on knowledge acting through degree completion. If the direct effect dominates the indirect effect, then \( \partial d/\partial E < 0 \). In other

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\(^1\) The outcome depends on a long string of terms with competing signs. Exact results are available in Brasington (1997). Explicit functional forms were tried without success.
words, if the effect of $E$ on the choice variables has a
less positive effect on $k$ than $\frac{d\ln(\text{PER})}{d\ln E}$ has a negative
effect on $k$, then $d\ln(\text{PER})/d\ln E < 0$. This means the total effect
of having more harmful, unmeasurable environmental influences is to lower student knowledge. If the above
conditions hold, $d\ln(\text{PER})/d\ln E < 0$ and $d\ln(\text{PER})/d\ln E < 0$.

Central cities have the most harmful, unmeasurable environmental effects; therefore, even after controlling
for observed characteristics, I expect central city schools
to have lower proficiency test scores and graduation rates
than suburban schools or schools outside metropolitan
areas. These are testable hypotheses. I test them using
an education production function approach.

3. Education production functions

The first education production function appeared in
the government-mandated *Equality of Educational
Opportunity* (Coleman et al., 1966). This study viewed
school performance as a function of school factors, family
background, peer factors, individual attitude and community factors. The controversial finding of this
study was that individual attitude was the most important
factor. While family background variables were highly
important, school inputs had relatively little impact on
student performance.

A review by Hanushek (1986) of the hundreds of
ensuing studies emphatically concludes that there is no
systematic relationship between student performance and
school expenditures as measured by the teacher/pupil
ratio, teacher education, teacher experience, teacher salary or expenditure per pupil. Hanushek’s review
confirms that family background is a highly significant
determinant of student performance. However, certain
more recent studies have found links between student achievement and school factors, including expenditure
per pupil (Margo, 1986; Ferguson, 1991), the
pupil/teacher ratio (Ferguson, 1991; Sander, 1993; Grimes and Register, 1991), teacher experience
(Ferguson, 1991) and teacher pay (Sander, 1993).

Although the relationship between many factors and
school quality has been investigated, one factor which
has not been examined in great detail in the education
production function literature is the impact of the degree
of urbanity. Margo (1986), in his study of Alabama
schools in the first half of this century, includes the percent
of students from urban areas and the percent of students from rural non-farm areas as explanatory variables
for the literacy rate. He finds the percent of students from
urban areas significantly raised the literacy rate for both
black and white schools during the study’s time frame; however, the percent of students from rural non-farm
areas had no significant effect on student achievement.

Stern (1989) rigorously examines the manner in which
per-pupil spending on teacher salary affects school outcomes. Stern notes in passing that the smaller the cohort
in a grade level, the higher student achievement seems
to be: large grade-level enrollment is strongly and consis-
tently detrimental to student test scores regardless of
classroom size. In the sample used in this study, the
Pearson correlation between central city school districts
and fall enrollment is 0.85. This suggests that Stern may
actually be picking up the effect of central city school
districts on student performance. So perhaps central city
school districts in and of themselves do poorly in educating
their students. If this is true, there are obvious policy
implications. This study attempts to gage how well cen-
tral city school districts and suburban school districts
perform compared to non-metropolitan school districts,
holding traditional variables like parent characteristics
and school inputs constant.

4. Data description

This study examines 602 school districts in Ohio. The
state of Ohio has a balance of urban and rural areas that
is ideal for this study. No single metropolitan area domi-

ates Ohio. The major metropolitan areas in Ohio along
with their populations are Akron (658 000), Cincinnati
(1 560 000), Cleveland (2 200 000), Columbus
(1 350 000), Dayton (951 000) and Toledo (614 000).
Population figures are for the 1990 primary metropolitan
statistical areas. The size of the central cities is also use-
ful information because it is an approximation of how
big Ohio’s central city school districts are compared to
the rest of the nation. Central city populations and rank-
ings among U.S. cities in 1994 are as follows: Akron
(222 000; 75th), Cincinnati (358 000; 46th); Cleveland
(493 000; 20th); Columbus (636 000; 16th); Dayton
(179 000; 100th); Toledo (323 000; 50th). The data are

Ohio’s high school students must pass a 9th-grade pro-
icency test to receive a full high school diploma. All
students must take the test, so sample selection bias is
not an issue (Hanushek and Taylor, 1990). The pro-
icency test contains four sections: reading, writing,
math and citizenship. My measures of school outcome
are the percent of 9th-grade students who pass each por-
tion of the 9th-grade proficiency test on their first attempt
in 1992. The year 1992 is used because Ohio began using

\[ \begin{align*}
2 & \text{ Students who fail the test but still pass their courses receive a certificate of attendance instead of a diploma.} \\
3 & \text{ Only students assessed to have a learning disability are exempt. Only if a student’s team leader determines that the student has a learning disability each year and exempts that student every year of his or her high school career will that student not be required to take the proficiency test.}
\end{align*} \]
Table 1
Percentage of students passing each section

<table>
<thead>
<tr>
<th>District type</th>
<th>Math</th>
<th>Reading</th>
<th>Citizenship</th>
<th>Writing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central city</td>
<td>26</td>
<td>59</td>
<td>46</td>
<td>52</td>
</tr>
<tr>
<td>Suburban</td>
<td>63</td>
<td>82</td>
<td>78</td>
<td>75</td>
</tr>
<tr>
<td>Non-metropolitan</td>
<td>59</td>
<td>81</td>
<td>74</td>
<td>68</td>
</tr>
</tbody>
</table>

the proficiency test in 1990, and using 1992 scores allows a small adjustment period, potentially providing more representative scores than the initial testing years provide.

Of the 611 Ohio school districts, 602 reported their 1992 proficiency test results. Six of these are central city districts. School districts surrounding the central city that have over 100 persons per square mile are counted as part of the metropolitan area. I label these suburban districts; a listing is available in Brasington (1997). The final category of school districts I label non-metropolitan, encompassing both rural districts and districts in cities that are not part of Ohio’s six major metropolitan areas. There are 134 suburban districts and 462 non-metropolitan districts. Dollar values are deflated using a metropolitan-area deflator for each of the six metropolitan areas and a rural area deflator (ACCRA, 1991, 1992). A table of means for proficiency test results is shown in Table 1.

5. Empirical model

The education production function takes the following form:

\[ \Phi_{ij} = \Phi(\sigma, \pi_j, \eta_j, \psi_j), \]  

where \( \Phi \) is the percentage of students passing the  \( i \)th component of the proficiency test in jurisdiction  \( j \),  \( \sigma \) represents student characteristics,  \( \pi \) signifies parent characteristics,  \( \eta \) stands for neighborhood attributes, and  \( \psi \) represents school-specific inputs.

It is difficult in practice to distinguish between student and parent attributes. A common shortcoming of education production function studies is the paucity of student characteristics. One student variable present in my dataset is the percentage of students living with both parents.\(^4\) This variable is highly positively correlated with percentage of persons in the school district who are married, and it is highly negatively correlated with the percent of students who are nonwhite. This strong correlation makes it difficult to measure the independent effect of marital status or race; therefore, I can only estimate the separate effect of either presence of both parents, percent of community residents who are married or student racial composition. Of the three possibilities, I choose PERCENT WITH BOTH PARENTS as a student characteristic.\(^5\) The other student factor I use is NEWCOMER, which measures the percentage of parents of school-aged children who have lived in the district for 1 year or less. Changing school districts is often difficult for children; therefore I include this variable in the production of education, expecting it to be negatively related to performance.

Education and income are the included parental factors. Specifically, PARENT NO DIPLOMA is the percentage of school-aged children whose parents have no high-school diploma, PARENT HIGH SCHOOL ONLY is the percentage of school-aged children whose parents have only a high-school diploma, and INCOME is median family income of school-aged children.

Neighborhood attributes include POVERTY RATE and the focus variables measuring the impact of geographic area. CENTRAL CITY is a dummy variable for whether the school district is the central city, and SUBURBAN reflects whether the school district falls within the metropolitan area but is not the central city school district.

Finally, several school district-specific variables are included. PUPIL/TEACHER is the pupil/teacher ratio, TEACHER OVER B.A. is the percentage of teachers who have more than 150 h beyond the bachelor’s degree but have no master’s degree, TEACHER MASTERS PLUS is the percentage of teachers who have a master’s degree or higher, and TEACHER EXPERIENCE is average teacher experience in years. Table 2 contains means and data sources for each of these variables.

Data for expenditures per pupil and teacher salary levels were also available and tried. Due to legitimate reviewer concerns about multicollinearity, these variables are excluded from the results shown. However, experimentation showed that the combination of school-specific inputs used makes little difference.

\(^4\) Other student characteristics include self-esteem, attitude toward school and IQ, but none of these measures are available for my sample.

\(^5\) In an unreported regression, I substituted race for PERCENT WITH BOTH PARENTS and achieved the same results.
If there is a dichotomous outcome at the individual level (pass or fail) but the result is aggregated to the district level, and each district has a different number of students, then using OLS will result in heteroskedasticity (Kennedy, 1992). I address the heteroskedasticity problem by using a minimum chi-square method of weighting (Maddala, 1983). 6

6. Empirical results

Table 3 shows the full results of the weighted least squares regression.

Endogeneity is a concern. School-specific factors are chosen by the voters through the school board, so a two-stage least squares framework is also presented using instrumental variables for PUPIL/TEACHER, TEACHER OVER B.A., TEACHER MASTER’S PLUS and TEACHER EXPERIENCE. This is an extension of Akerhielm (1995), who treats class size as endogenous. The results are found in Table 4.

The results in Tables 3 and 4 conform closely to Hanushek (1986) and the Coleman Report (Coleman et al., 1966). Parents’ education levels and the presence of two parents in a household significantly affect student performance. Poverty depresses scores, but recent moves and income have no consistent, independent effect on test scores. None of the school inputs has a consistently significant impact on student scores. 7

The focus variables are the central city and suburban dummies. Table 5 summarizes the sign and significance level for each of the proficiency test sections.

The signs of the central city and suburban dummies are almost uniformly negative across the test sections. For math, reading and citizenship, these dummies are soundly significant. Only for writing are the dummies insignificant, although the signs are almost all negative. Writing is the only section not graded by multiple choice bubble-sheet scanning. The scores may be biased because they are sent to a subcontractor in North Carolina grouped by district, by building, and they are not randomized before they are graded. This sequential grad-

6 For example, for the math section regression, the weight is \( \text{[fall enrollment/(Math)(1 – Math)]}^{1/2} \).

7 Aggregation bias is a potential concern (Hanushek et al., 1996). It is possible that at the classroom level the school inputs would be statistically significant (Summers and Wolfe, 1977), but the current study attempts to capture unmeasured environmental effects due to the type of school district. District-level or school building-level analysis seems appropriate for the current study’s purposes. School building-level analysis would be preferable to school district-level analysis to capture unmeasured harmful environmental effects; however, this data is unavailable. Using building-level data instead of district-level data may not influence the results because only 32 of the 602 school districts have multiple high school buildings (Ohio Department of Education, 1993). Further study is warranted.
Table 3
Proficiency test results: weighted least squares

<table>
<thead>
<tr>
<th>Variable</th>
<th>Math</th>
<th>Citizenship</th>
<th>Reading</th>
<th>Writing</th>
</tr>
</thead>
<tbody>
<tr>
<td>CENTRAL CITY</td>
<td>-0.048**</td>
<td>-0.094**</td>
<td>-0.058**</td>
<td>-0.032</td>
</tr>
<tr>
<td></td>
<td>(2.00)</td>
<td>(4.00)</td>
<td>(3.39)</td>
<td>(0.94)</td>
</tr>
<tr>
<td>SUBURBAN</td>
<td>-0.029**</td>
<td>-0.027**</td>
<td>-0.024**</td>
<td>-0.0029</td>
</tr>
<tr>
<td></td>
<td>(2.57)</td>
<td>(2.15)</td>
<td>(2.35)</td>
<td>(0.19)</td>
</tr>
<tr>
<td>PARENT NO DIPLOMA</td>
<td>-0.45**</td>
<td>-0.36**</td>
<td>-0.20**</td>
<td>-0.17*</td>
</tr>
<tr>
<td></td>
<td>(6.16)</td>
<td>(5.31)</td>
<td>(4.61)</td>
<td>(1.68)</td>
</tr>
<tr>
<td>PARENT HIGH SCHOOL ONLY</td>
<td>-0.28**</td>
<td>-0.21**</td>
<td>-0.22**</td>
<td>-0.23**</td>
</tr>
<tr>
<td></td>
<td>(4.99)</td>
<td>(4.15)</td>
<td>(6.35)</td>
<td>(3.24)</td>
</tr>
<tr>
<td>PERCENT WITH BOTH PARENTS</td>
<td>0.63**</td>
<td>0.34**</td>
<td>0.36**</td>
<td>0.27**</td>
</tr>
<tr>
<td></td>
<td>(10.22)</td>
<td>(5.91)</td>
<td>(8.95)</td>
<td>(3.17)</td>
</tr>
<tr>
<td>INCOME</td>
<td>0.11 × 10^{-5***}</td>
<td>0.52 × 10^{-6}</td>
<td>0.30 × 10^{-6}</td>
<td>0.12 × 10^{-5}</td>
</tr>
<tr>
<td></td>
<td>(1.99)</td>
<td>(1.01)</td>
<td>(0.88)</td>
<td>(1.92)</td>
</tr>
<tr>
<td>POVERTY RATE</td>
<td>-0.33***</td>
<td>-0.28**</td>
<td>-0.17**</td>
<td>-0.34**</td>
</tr>
<tr>
<td></td>
<td>(3.32)</td>
<td>(3.09)</td>
<td>(2.63)</td>
<td>(2.60)</td>
</tr>
<tr>
<td>NEWCOMER</td>
<td>-0.080</td>
<td>-0.14</td>
<td>-0.21**</td>
<td>-1.4</td>
</tr>
<tr>
<td></td>
<td>(0.84)</td>
<td>(1.57)</td>
<td>(3.38)</td>
<td>(1.15)</td>
</tr>
<tr>
<td>PUPIL/TEACHER</td>
<td>0.00032</td>
<td>0.0019</td>
<td>0.0016</td>
<td>0.0056**</td>
</tr>
<tr>
<td></td>
<td>(0.15)</td>
<td>(0.99)</td>
<td>(1.14)</td>
<td>(1.96)</td>
</tr>
<tr>
<td>TEACHER OVER B.A.</td>
<td>0.040</td>
<td>0.066</td>
<td>0.057</td>
<td>0.0037</td>
</tr>
<tr>
<td></td>
<td>(0.70)</td>
<td>(1.31)</td>
<td>(1.61)</td>
<td>(0.05)</td>
</tr>
<tr>
<td>TEACHER MASTERS PLUS</td>
<td>0.038</td>
<td>0.00078</td>
<td>0.012</td>
<td>0.071</td>
</tr>
<tr>
<td></td>
<td>(0.78)</td>
<td>(0.02)</td>
<td>(0.36)</td>
<td>(1.07)</td>
</tr>
<tr>
<td>TEACHER EXPERIENCE</td>
<td>0.0038*</td>
<td>0.0015</td>
<td>0.0026*</td>
<td>0.00012</td>
</tr>
<tr>
<td></td>
<td>(1.70)</td>
<td>(0.75)</td>
<td>(1.81)</td>
<td>(0.04)</td>
</tr>
<tr>
<td>INTERCEPT</td>
<td>0.21***</td>
<td>0.58**</td>
<td>0.61**</td>
<td>0.51**</td>
</tr>
<tr>
<td></td>
<td>(2.23)</td>
<td>(6.91)</td>
<td>(10.43)</td>
<td>(4.16)</td>
</tr>
<tr>
<td>Adjusted R-squared</td>
<td>0.69</td>
<td>0.56</td>
<td>0.62</td>
<td>0.33</td>
</tr>
</tbody>
</table>

Notes: Number of observations = 602. Dependent variable = percent passing the specified portion of proficiency test in 1992. Parameter estimates are reported with t-ratios in parentheses below. ** = significant at 0.05, * = significant at 0.10.

ing by cohort may color the scores the subcontractor gives the students, so that inadvertently students may be compared to other students in the same building or district, but not to students in other districts. Thus, it is likely that the writing section does not accurately measure student performance across districts. Table 1 also shows less differences in the writing section passage among central city, suburban and non-metropolitan districts. In contrast, suburban and non-metropolitan districts outpace central city students to a much larger extent on the math, reading and citizenship sections of the test.

The results indicate that holding all other included factors constant, central city schools’ students perform worse than non-metropolitan schools’ students. The same holds true for suburban schools’ students. Note that this is a different argument than saying large classrooms hurt student performance: the student/teacher ratio has an insignificant effect on test scores. In addition, this is a different argument than saying that school consolidation depresses school outcomes. The significantly negative dummy variables suggest that there is something about being in an urban area, either in a central city or its suburbs, that depresses students’ scores independent of the remaining explanatory variables. This is $E$: the unmeasurable, harmful environmental influences. The central city dummy parameter estimates in Table 5 are consistently much more negative than the suburban dummy parameter estimates. The empirical test thus suggests that $E$ is highest in central city schools, second-highest in

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8 In unreported regressions, I include district enrollment and an approximation of high school building enrollment. The results are qualitatively identical. A similar analysis is presented in Brasington (1998).
### Table 4
Proficiency test results: 2SLS

<table>
<thead>
<tr>
<th>Variable</th>
<th>Math</th>
<th>Citizenship</th>
<th>Reading</th>
<th>Writing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CENTRAL CITY</strong></td>
<td>(-0.071^{**})</td>
<td>(-0.11^{***})</td>
<td>(-0.064^{**})</td>
<td>(-0.090^{**})</td>
</tr>
<tr>
<td></td>
<td>(2.34)</td>
<td>(4.00)</td>
<td>(3.26)</td>
<td>(2.01)</td>
</tr>
<tr>
<td><strong>SUBURBAN</strong></td>
<td>(-0.035^{**})</td>
<td>(-0.022^{*})</td>
<td>(-0.026^{**})</td>
<td>0.013</td>
</tr>
<tr>
<td></td>
<td>(2.42)</td>
<td>(1.78)</td>
<td>(3.03)</td>
<td>(0.63)</td>
</tr>
<tr>
<td><strong>PARENT NO DIPLOMA</strong></td>
<td>(-0.39^{**})</td>
<td>(-0.32^{**})</td>
<td>(-0.18^{**})</td>
<td>(-0.094)</td>
</tr>
<tr>
<td></td>
<td>(4.72)</td>
<td>(4.37)</td>
<td>(3.80)</td>
<td>(0.77)</td>
</tr>
<tr>
<td><strong>PARENT HIGH SCHOOL ONLY</strong></td>
<td>(-0.19^{**})</td>
<td>(-0.15^{**})</td>
<td>(-0.18^{**})</td>
<td>(-0.12)</td>
</tr>
<tr>
<td></td>
<td>(3.01)</td>
<td>(2.65)</td>
<td>(4.83)</td>
<td>(1.30)</td>
</tr>
<tr>
<td><strong>PERCENT WITH BOTH PARENTS</strong></td>
<td>0.67^{**}</td>
<td>0.40^{**}</td>
<td>0.38^{**}</td>
<td>0.40^{**}</td>
</tr>
<tr>
<td></td>
<td>(8.39)</td>
<td>(5.68)</td>
<td>(8.08)</td>
<td>(3.53)</td>
</tr>
<tr>
<td><strong>INCOME</strong></td>
<td>(0.52 \times 10^{-6})</td>
<td>(0.26 \times 10^{-6})</td>
<td>(0.62 \times 10^{-7})</td>
<td>(0.14 \times 10^{-5})</td>
</tr>
<tr>
<td></td>
<td>(0.74)</td>
<td>(0.41)</td>
<td>(0.15)</td>
<td>(1.53)</td>
</tr>
<tr>
<td><strong>POVERTY RATE</strong></td>
<td>(-0.33^{**})</td>
<td>(-0.26^{**})</td>
<td>(-0.17^{**})</td>
<td>(-0.20)</td>
</tr>
<tr>
<td></td>
<td>(2.85)</td>
<td>(2.60)</td>
<td>(2.53)</td>
<td>(1.26)</td>
</tr>
<tr>
<td><strong>NEWCOMER</strong></td>
<td>(-0.080)</td>
<td>(-0.097)</td>
<td>(-0.20^{**})</td>
<td>0.050</td>
</tr>
<tr>
<td></td>
<td>(0.58)</td>
<td>(0.81)</td>
<td>(2.34)</td>
<td>(0.26)</td>
</tr>
<tr>
<td><strong>PUPIL/TEACHER</strong></td>
<td>(-0.0061^{*})</td>
<td>(-0.0015)</td>
<td>(-0.00095)</td>
<td>0.0070</td>
</tr>
<tr>
<td></td>
<td>(1.80)</td>
<td>(0.50)</td>
<td>(0.45)</td>
<td>(1.41)</td>
</tr>
<tr>
<td><strong>TEACHER OVER B.A.</strong></td>
<td>0.0098</td>
<td>(-0.084)</td>
<td>0.061</td>
<td>(-0.96^{**})</td>
</tr>
<tr>
<td></td>
<td>(0.03)</td>
<td>(0.31)</td>
<td>(0.32)</td>
<td>(2.21)</td>
</tr>
<tr>
<td><strong>TEACHER MASTERS PLUS EXPERIENCE</strong></td>
<td>0.37</td>
<td>0.11</td>
<td>0.15</td>
<td>(-0.23)</td>
</tr>
<tr>
<td></td>
<td>(1.54)</td>
<td>(0.49)</td>
<td>(0.90)</td>
<td>(0.69)</td>
</tr>
<tr>
<td><strong>TEACHER EXPERIENCE</strong></td>
<td>(-0.0014)</td>
<td>0.0011</td>
<td>0.00065</td>
<td>0.0095</td>
</tr>
<tr>
<td></td>
<td>(0.17)</td>
<td>(0.15)</td>
<td>(0.12)</td>
<td>(0.81)</td>
</tr>
<tr>
<td><strong>INTERCEPT</strong></td>
<td>0.21</td>
<td>0.58^{**}</td>
<td>0.59^{**}</td>
<td>0.55^{**}</td>
</tr>
<tr>
<td></td>
<td>(1.40)</td>
<td>(4.39)</td>
<td>(6.56)</td>
<td>(2.56)</td>
</tr>
<tr>
<td>Adjusted R-squared</td>
<td>0.63</td>
<td>0.52</td>
<td>0.59</td>
<td>0.09</td>
</tr>
</tbody>
</table>

Notes: Number of observations = 602. Dependent variable = % passing the specified portion of proficiency test in 1992. Parameter estimates are reported with t-ratios in parentheses below. ** = significant at 0.05, * = significant at 0.10. ^ = endogenous variable. Instruments: state revenue per pupil, community unemployment rate, % at-risk students, % community living in district 31+ years, residential property value per pupil, commercial property value per pupil, population density, community dropout rate, community education level, % single in community.

### Table 5
Locational effects summary

<table>
<thead>
<tr>
<th>Variable</th>
<th>Math</th>
<th>Citizenship</th>
<th>Reading</th>
<th>Writing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CENTRAL CITY</strong></td>
<td>(-0.048^{**})</td>
<td>(-0.094^{**})</td>
<td>(-0.058^{**})</td>
<td>(-0.032)</td>
</tr>
<tr>
<td></td>
<td>(-0.029^{**})</td>
<td>(-0.027^{**})</td>
<td>(-0.024^{**})</td>
<td>(-0.0029)</td>
</tr>
<tr>
<td><strong>CENTRAL CITY</strong></td>
<td>(-0.071^{**})</td>
<td>(-0.11^{***})</td>
<td>(-0.064^{**})</td>
<td>(-0.090^{**})</td>
</tr>
<tr>
<td></td>
<td>(-0.035^{**})</td>
<td>(-0.02^{*})</td>
<td>(-0.026^{**})</td>
<td>0.013</td>
</tr>
</tbody>
</table>

Notes: Parameter estimates shown. ** = significant at 0.05, * = significant at 0.10. Dependent variable = percent passing each section in 1992. 1From weighted least squares regressions. 2From 2SLS regressions.
suburban schools and lowest in non-metropolitan districts.

Even though test scores may be lower ceteris paribus in central city and suburban districts, suburban schools still outperform central city schools on the proficiency tests. This occurs because suburban school districts have parent and community characteristics that are more favorable to learning than central city school districts. Furthermore, the regression results suggest that if the suburban school districts retained the same student/parent mixture but were transported to a rural district, students’ test scores would be even better than they currently are.

The results support the theoretical model’s prediction that $\frac{dd}{dE} < 0$. Given this result, I now investigate the effect of $E$ on graduation rates, expecting to find $\frac{dd}{dE} < 0$, that with more $E$, central city districts in particular will depress graduation rates, all else equal.

7. Graduation rates

The Ohio Department of Education’s definition of graduation rate is flawed. However, the attrition rate has a clear definition: the number of current dropouts divided by current grade 7–12 enrollment, including joint vocational schools. The mean annual attrition rate is 0.03. Over the 6 years, then, the cumulative dropout rate is approximately 18% for the sample. The attrition rate is used as a dependent variable to test whether $\frac{dd}{dE} < 0$. Table 6 summarizes the results of this weighted least squares regression.

Table 7 shows results of the companion two-stage least squares regression, also using the attrition rate as the dependent variable.

The results of these regressions conform fairly well with the regressions of proficiency test scores. A critical exception is the central city dummy. Something about central city school districts makes students not drop out as much as one would expect holding constant the parent variables, student variables, community and school-specific variables. The proficiency test regressions showed that central city districts consistently have a negative significant effect on student outcomes, all else constant. The attrition rate regressions show that central city districts consistently have a negative effect on student attrition rates, all else constant. Attrition rates are higher at central city schools (6.0%) than suburban (3.0%) or non-metropolitan schools (2.7%), but much of the difference can be attributed to parent and neighborhood influences. Nevertheless, holding these measured influences constant, there is something that makes the attrition rate lower than one would expect in central city schools. Because of the relationship between the 1 year attrition rate and the graduation rate, central city school districts can be said to have higher graduation rates than one would expect holding student, community and school-specific inputs constant.

Taken together, the following story can be told: students at central city school districts perform poorly on proficiency tests, ceteris paribus; however, they graduate from high school at a higher rate than students in non-metropolitan school districts, ceteris paribus. This supports the hypothesis that central city school districts do poorly at educating their students but graduate them anyway.

The suburban dummy is positive and significant in the attrition rate regressions. Thus, suburban districts conform to the expectations of the theoretical model. They appear to have more $E$ than non-metropolitan districts, which, all else equal, depresses student performance and graduation rates.

Similar results are found in Brasington (1998). Brasington (1998) examines the effect of high school size and district size on proficiency test passage and graduation rates. He finds high school size depresses both graduation rates and proficiency test passage. He finds school district size is also negatively related to proficiency test passage but is positively related to graduation rates. Due to the high correlation between central city schools and school district size, Brasington may also be capturing the same tendency of central city schools to pass many students who would not graduate from other types of school districts.

As far as the other variables are concerned, low parental education depresses graduation rates as expected. Two-parent households encourage graduation also as expected. No school-specific variable is significantly related to student graduation rates.

What are the locational dummy variables capturing? There are many possible explanations which are discussed in the conclusion. One of these explanations, based on Eq. (11), is that it is a conscious choice by central city school administrators and/or teachers to pass under-performing students. Many people have rec-

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9 It defines the graduation rate as the number of regular graduates divided by 9th-grade enrollment 4 years prior. However, due to this definition it is very possible that there will be greater than 100% graduation rates in fast-growing school districts. For example, in 1994 suppose 125 students graduate from a school district. Suppose this is a school district in which enrollment increased over the last 4 years. Enrollment in 1990 was, say, 100. The official graduation rate the Department of Education would report is 125%. Similarly, districts with a net outflow of population will have a deceptively low graduation rate.

10 It is true that the decision to drop out is typically the student’s, but schools can have a dramatic influence on this possibility through grade retention (Rumberger, 1995; Roderick, 1994).
Table 6
Attrition rate results: weighted least squares

<table>
<thead>
<tr>
<th>Variable</th>
<th>Parameter estimate</th>
<th>T-Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>CENTRAL CITY</td>
<td>-0.021**</td>
<td>4.39</td>
</tr>
<tr>
<td>SUBURBAN</td>
<td>0.0041**</td>
<td>1.98</td>
</tr>
<tr>
<td>PARENT NO DIPLOMA</td>
<td>0.083**</td>
<td>5.70</td>
</tr>
<tr>
<td>PARENT HIGH SCHOOL ONLY</td>
<td>-0.0080</td>
<td>0.82</td>
</tr>
<tr>
<td>PERCENT WITH BOTH PARENTS</td>
<td>-0.082**</td>
<td>6.67</td>
</tr>
<tr>
<td>INCOME</td>
<td>-0.19 × 10^{-6}***</td>
<td>2.08</td>
</tr>
<tr>
<td>POVERTY RATE</td>
<td>-0.16</td>
<td>0.90</td>
</tr>
<tr>
<td>NEWCOMER</td>
<td>0.026</td>
<td>1.47</td>
</tr>
<tr>
<td>PUPIL/TEACHER</td>
<td>0.000028</td>
<td>0.07</td>
</tr>
<tr>
<td>TEACHER OVER B.A.</td>
<td>-0.014</td>
<td>1.40</td>
</tr>
<tr>
<td>TEACHER MASTERS PLUS</td>
<td>-0.0083</td>
<td>0.95</td>
</tr>
<tr>
<td>TEACHER EXPERIENCE</td>
<td>0.000084</td>
<td>0.21</td>
</tr>
<tr>
<td>INTERCEPT</td>
<td>0.092**</td>
<td>5.40</td>
</tr>
</tbody>
</table>

Notes: Observations = 602, adjusted R-squared = 0.33. ** = significant at 0.05. Dependent variable = attrition rate.

Table 7
Attrition rate results: 2SLS

<table>
<thead>
<tr>
<th>Variable</th>
<th>Parameter estimate</th>
<th>T-Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>CENTRAL CITY</td>
<td>-0.019**</td>
<td>3.36</td>
</tr>
<tr>
<td>SUBURBAN</td>
<td>0.0051**</td>
<td>2.03</td>
</tr>
<tr>
<td>PARENT NO DIPLOMA</td>
<td>0.079**</td>
<td>5.11</td>
</tr>
<tr>
<td>PARENT HIGH SCHOOL ONLY</td>
<td>-0.013</td>
<td>1.17</td>
</tr>
<tr>
<td>PERCENT WITH BOTH PARENTS</td>
<td>-0.082**</td>
<td>5.70</td>
</tr>
<tr>
<td>INCOME</td>
<td>-0.10 × 10^{-6}</td>
<td>0.88</td>
</tr>
<tr>
<td>POVERTY RATE</td>
<td>-0.012</td>
<td>0.59</td>
</tr>
<tr>
<td>NEWCOMER</td>
<td>0.034</td>
<td>1.37</td>
</tr>
<tr>
<td>PUPIL/TEACHER</td>
<td>0.00059</td>
<td>0.98</td>
</tr>
<tr>
<td>TEACHER OVER B.A.</td>
<td>-0.019</td>
<td>0.37</td>
</tr>
<tr>
<td>TEACHER MASTERS PLUS</td>
<td>-0.042</td>
<td>1.06</td>
</tr>
<tr>
<td>TEACHER EXPERIENCE</td>
<td>0.0014</td>
<td>0.93</td>
</tr>
<tr>
<td>INTERCEPT</td>
<td>0.075**</td>
<td>2.80</td>
</tr>
</tbody>
</table>

Notes: Observations = 602, adjusted R-squared = 0.30. ** = significant at 0.05. Dependent variable = attrition rate; ** = endogenous variable. Instruments: state revenue per pupil, community unemployment rate, % at-risk students, % community living in district less than 31 years, residential property value per pupil, commercial property value per pupil, population density, community dropout rate, community education level, % single in community.

I recommend that I include gang activity in the school, the discipline rate and student motivation levels to eliminate the influence of CENTRAL CITY and SUBURBAN. These are fine suggestions if I had the data. However, any variable I include must not only explain why central city school students perform poorly on proficiency tests, but it must also explain why these same central city students graduate at a higher rate than students in other school districts. Poor student motivation in central city schools, for example, may depress test scores, but it is unlikely to simultaneously raise the graduation rate.

8. Conclusion

I have presented a theoretical model of the production of education. I tested two hypotheses derived from it. One, central city schools, which have more unmeasured, harmful environmental influences, should have an additional depressing effect on student proficiency test scores compared to other districts. Two, central city schools should have an additional depressing effect on graduation rates compared to other types of schools.

I tested these hypotheses using an education pro-
duction function approach. Holding student, family, community and school factors constant, central city school districts have significantly lower proficiency test scores than school districts in non-metropolitan areas. This result is robust to the section of the test used as a dependent variable, and it is robust to changes in explanatory variables. However, holding those same factors constant, central city school districts have lower attrition rates than their non-metropolitan counterparts. Possible explanations include social promotion in central city schools, racial concerns, communities desiring student diplomas over student knowledge, social promotion for cost reasons and less challenging curricula in central city schools.

Higher than expected central city graduation rates and lower than expected central city test scores are consistent with the notion that central city school districts do poorly at educating their students but school administrators and/or teachers consciously graduate them anyway. Thus, in Eq. (11) the choice of the holdback rate differs systematically in central city schools.

Ronald E. Marec (1997), president of the Ohio Federation of Teachers, complains,

Schools should not be pressured to promote children who are not working at grade level. When there is social promotion, which is not based on academic performance, a ripple effect sets in. Kids just can’t keep up with the next grade’s material. Extra help should be offered during the school year or the summer for children not reaching established standards. If that doesn’t help, then the child should be held back. It’s for the child’s own good. Some say acknowledgment of poor achievement and repeating a grade will cause self-esteem to plummet. I say, what about the 16-year old who can’t read a newspaper, make change at the grocery store, or locate New York on a map?

It therefore seems that social promotion, if it occurs systematically more often in central city schools, may explain the curious proficiency test/graduation rate finding.

Further evidence of the social promotion theory comes from American Teacher magazine (American Teacher, 1997). The American Federation of Teachers surveyed 85 of the 820 largest school districts, each having between 10 000 and 1 000 000 students, to examine the formal policies that guide school district student promotion policies. Their report, “Passing on Failure: District Promotion Policies and Practices,” concludes that 78 of the 85 districts have written policies on promotion. These policies support social promotion in the following ways: declaring retention as an option of the last resort; having vague academic standards for students; “denying teachers, who have the most knowledge of students, significant authority in retention decisions”; “mandating, under certain conditions, that students be moved ahead, regardless of performance”; and doing little to prevent students from falling behind in the first place.

Grant and Johnson (1997) also investigate social promotion. They say “a small but significant number of students get high school diplomas while reading, writing, and doing arithmetic at elementary levels.” They also claim the decline in test scores may be a result of social promotion, and that educators realize that social promotion is a problem. Grant and Johnson also investigate the financial incentives of social promotion, saying “financial pressures combined with ideological inflexibility have resulted in more than a few cases of forced social promotion, in which parents and teachers who believed grade-level retention would be effective for individual students were overruled by administrators determined to implement no-retention policies.”

One could also speculate that central city districts engage in this behavior because they care about students’ success: if a substandard student at least has a high school diploma, he or she will be more likely to secure employment. In suburban and non-metropolitan districts, conditions like resource availability, school environment or teacher involvement may be such that teachers and administrators will hold a student back to make the student learn the material. In contrast, in central cities, holding a student back is less likely to make the student learn the material and more likely to make him drop out of school.

Race may play a role as well. At the present time, blacks do worse on average than whites on the SAT (D’Souza, 1995). It is therefore likely that blacks do worse in the classroom than whites, on average. Social promotion is passing students whose performance might merit grade retention. Social promotion is probably more prevalent a phenomenon with black students, then. Central city schools generally have a larger proportion of black students than suburban and rural schools. Social promotion is therefore probably more prevalent in central city schools than in other types of school districts. The current study shows central city districts passing students at a higher rate than other schools, despite lower performance. Therefore, race may be one possible contributor to social promotion. This argument is bolstered by the observation that groups like the NAACP watch central city school behavior closely and complain in Ohio newspapers like The Cincinnati Post, The Cincin-
nati Enquirer and The Columbus Dispatch when African-American students are disciplined at higher rates than other students. Perhaps administrators and/or teachers in central city schools, in an effort to avoid charges of differing holdback rates, are lenient in passing both African-American and other students. Suburban and non-metropolitan schools, which have fewer minority students, have less political need for social promotion. They also probably have less academic and behavioral need to pass undeserving students, given the more favorable parent and student factors.

Eagerness to avoid media problems and please parents is intricately linked to the political process. Voters elect school boards, who control school policy through administrators, the bureaucracy and teachers. The school system has a vested interest in pleasing the community to make school levy passage more likely. After all, students’ parents are the most likely constituency to support higher school taxes, so the school system needs to be able to count on their votes. Avoiding public controversy and giving students diplomas are ways for the school system to maintain goodwill with parents, pass tax levies and maintain the current school board in elections. Further studies with a larger sample of central cities may help shed additional light on the true explanation and verify the contradictory effect of central city schools on proficiency tests and graduation rates.

The current study shows a relationship consistent with social promotion in central city schools, although other explanations are possible. For example, lower course rigor in central city schools may explain the low proficiency test scores and lower-than-expected attrition rate. This study also reinforces the claim of Hanushek (1986) that most school inputs are not consistently related to school performance, but that student, parent and community factors are. Further study could examine a state with more central cities, use a value-added approach, and examine school building-level performance.

Acknowledgements

Thanks to Don Haurin, Lucia Dunn, Gene Mumy, Hazel Morrow-Jones, Pok-Sang Lam, and participants at the OSU I.O./Applied Micro Lunch. Thanks also to the editor and the referees for their help. I achieved all remaining errors independently.

References

ACCRA (formerly American Chamber of Commerce Researchers Association) (1991) Cost of Living Index 24, 1.7–1.8.

American Teacher (1997) Few districts offer alternatives to social promotion, says AFT. American Teacher 82, 3.
Grant, J., & Johnson, B. (1997). Students need help with higher standards. The Education Digest, 63, 11.
