Is there a Difference Between For-Profit Versus Not-For-Profit Charter Schools?

Cynthia D. Hill
Department of Economics
Idaho State University
hillcynt@isu.edu

David M. Welsch
Department of Economics
University of Wisconsin – Whitewater
welschd@uww.edu

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Contact Author's Information:

David M. Welsch
Department of Economics
Carlson, Room 4048
University of Wisconsin – Whitewater
800 West Main Street
Whitewater, WI 53190-1790
welschd@uww.edu

For-Profit Versus Not-For-Profit Charter Schools: An Examination of Michigan Student Test Scores

The role of for-profit educational organizations in the predominantly public and not-for-profit K-12 U.S. schooling system is being fiercely debated across our nation. Little empirical research is available to help policy makers develop informed decisions regarding the educational value that for-profit schools provide to our students. This paper fills in part, for the first time in detail, this void. This paper uses a four year panel of charter schools from the state of Michigan and a random effects model that controls for student and district characteristics. Results indicate that for-profit charter schools have lower math test scores than not-for-profit charter schools. Interestingly, this result holds even when expenditure per pupil is controlled for. The analysis developed in this paper takes the debate one step further as well, and examines the role that the size of for-profit firms plays in the associated outcomes.

Introduction

Although the vast majority of K-12 schools in our nation are operated by public, non-profit organizations, a movement toward for-profit educational organizations is on the rise[1] and this movement is quite contentious. A 2004 National Education Association Today cover story argues that corporate profit, not student success, drives the bottom line in for-profit educational organizations, therefore students pay the price when profits are on the line (Loschert, O'Neil, and Winans 2004). Economic market theory, on the other hand, suggests the opposite; competition is expected to lead to the most efficient outcomes including high levels of quality at the lowest possible price. Because profits are on the line, for-profit educational organizations are predicted to be more responsive to consumers (parents) with higher quality outcomes as the expected result. There is little practical guidance to be found in other industries to help shed light on this divisive question.

[1] Evidence of the increase in the charter school movement is found in Wohlstetter et al. (2004) where school experts in 37 states find that organizations from the for-profit, not-for-profit, and public sectors were all involved in alliances with charter schools.

Few industries exist where for-profit and not-for-profit firms operate side-by-side. The health care industry is one primary example where these two types of firms do both exist, however the most appropriate and/or efficient role of for-profit institutions in the health care sector is also persistently debated. The role of profit oriented educational entities has recently gained momentum due to the demand-side interest by school districts as well as the supply-side activity by contractors. At this beginning juncture of the educational debate, the need for robust assessment, detailed analysis, and empirical evidence between for-profit and not-for-profit educational entities is vital for appropriate policy determination. Lacking at this time is any serious empirical outcomes research which compares output or quality of output for for-profit and not-for-profit educational organizations. This paper fills in part, for the first time in detail, this void.

Using a four year panel from the state of Michigan and a random effects model, this paper provides a significant examination of student outcomes (i.e., student standardized test results) in for-profit versus not-for-profit charter schools. The analysis developed in this paper takes the debate one step further as well, and examines the role that the size of for-profit firms plays in the associated outcomes.

Specific empirical and/or theoretical literature focused on the comparison of for-profit versus not-for-profit educational organizations is somewhat limited. Comparisons may be drawn however from fields such as health economics, labor economics (i.e., labor theory), market economics (i.e., market theory), and related educational topics.

Property rights theory within the health care literature suggests that in similar health care settings (e.g., hospitals with similar sizes and roles) quality of care is expected to be lower in for-profit organizations compared to not-for-profit organizations. The

theory purports that because quality of care is difficult to measure and monitor, for-profit entities may be more likely to cut corners and limit services, therefore leading to lower quality outcomes. On the other hand, due to the attenuation of property rights within not-for-profit entities, these organizations face a much smaller incentive to sacrifice quality in order to increase profits. Consequently, property rights theory suggests that for-profit firms will have lower quality outcomes compared to not-for-profit firms.

The majority of the empirical research within the health care realm does not support this theory however. Sloan et al. (2001) find no discernable quality difference between hospitals with different ownership forms. Moreover, a majority of studies tend not to find efficiency differences across hospitals with different ownership types.[2]

Regarding K-12 educational entities in particular, labor theory provides us with some additional food for thought. Because education is an extremely labor-intensive industry, where wages make up 80 percent or more of the school budget, a majority of cost-cutting strategies of for-profit schools may need to be through personnel cost cuts. For-profit schools may use more part-time teachers and staff, more inexperienced teachers with lower salaries, increased class sizes, shorter school days, or substitute capital (computers) for labor to a much larger degree (Levine 2001). Although the evidence is scant, these cost-cutting strategies may in fact reduce student learning outcomes. Carnoy and McEwan (2000) examine the schooling system in Chile where for-profit and not-for-profit schools have resided side-by-side for over two decades; they provide evidence that for-profit schools have indeed used these cost-cutting strategies. Carnoy and McEwan also find that for-profit schools have hired greater numbers of part-time teachers, paid lower salaries, and enlarged class sizes with the result of some slightly

[2] See Sloan (2000) for a review of these studies.

lower student learning outcomes. However, since their costs are also lower, Carnoy and McEwan claim these for-profit Chilean schools tend to be slightly more cost-effective.

An alternate outcomes theory comes from the discipline of market economics. Generally, market theory suggests that competition leads to the most efficient outcomes including high levels of quality at the lowest possible price. Specifically, with regard to education, market theory suggests that competition and limited restrictions to market entry encourage for-profit schools to streamline bureaucracies, reward and retain highly effective teachers and administrators, and raise student achievement, learning, and productivity (Levin 2001). Because profits are on the line, for-profit schools are more responsive to consumers and higher quality outcomes are the result.

The empirical research pertaining to for-profit versus not-for-profit K-12 educational entities is limited. In addition, Lieberman (2005) points out that due to the incentive and reward structure for educational research this lack of empirical work is not expected to change in the near future. However, two articles provide some evidence, and mixed findings, for comparison. Utilizing student-level longitudinal data for the state of Florida, Sass (2006) develops value-added and restricted-value-added fixed effects models, and although not the primary focus of his study, he finds that there is no difference (i.e., that he cannot reject the hypothesis that there is no difference) in student test performance between nonprofit and for-profit management companies. Miron and Nelson (2002) employ a relative gains analysis which compares charter school pass rates on the Michigan Educational Assessment Program (MEAP) to the pass rates of their host districts. Miron and Nelson generally conclude that not-for-profit schools performed

better than for-profit schools; however, the analysis included no controls and no tests for statistical significance.

A corollary to the for-profit versus not-for-profit debate is: do student outcomes depend upon the size of the educational organization? In other words, is a larger educational entity more effective, or at least more cost effective? Historically, economies of scale in education at school sites or in multi-school endeavors have not held (Levin 2001). Those large for-profit schools with national and regional ambitions must advance themselves through marketing and brand identity in order to penetrate their markets, ultimately using resources for promotion rather than instruction (Levine 2001). The literature that does exist suggests that economies of scale are present for both instructional and administrative costs for districts increasing in size to approximately 2000-4000 students. Per-pupil costs are further expected to fall until an enrollment of 6000 students is reached, at this point, diseconomies of scale begin to set in (Andrews, Duncombe, and Yinger 2002).

Finally, to the extent that for-profit entities have a greater incentive to select a less costly group of students, for-profit organizations may be expected to attempt to bias their selection process.[3] Cobb and Glass (1999) show that there exists a biased selection process within charter schools. These schools provide selectivity through practices such as requiring charter-initiated parent contracts and the need for parents to provide transportation. Lacireno-Paquet (2004) finds that small for-profit educational organizations enroll a significantly lower percentage of minority students, yet large for-profit firms show no significantly different minority student enrollment. Given the

[3] Note: in Michigan, charter schools are not allowed to pick which students they want to attend. If more students apply than the school plans on enrolling, the school must select students via a random lottery.

expected selection bias and evidence listed above, albeit limited, it is clearly important for all empirical research in this arena to control for both student income and student minority status.

The primary purpose of this research is to compare for-profit educational organizations to not-for-profit educational organizations in terms of student outcomes. This analysis uses a Random Effects Model in a multivariate setting in which a number of known determinants of educational outcomes (test scores) are controlled for. In particular, minority student representation, female student representation, low-income student representation (percentage of students that are eligible for free or reduced lunch is used as a proxy), total enrollment, and educational expenditure in the school and the district are used as control variables.

Data

The data used for this analysis are school level data from Michigan charter schools obtained through the Michigan Department of Education. All Michigan charter schools which had students taking either the required 4^{th} and/or the 8^{th} grade state level math exam, referred to as MEAP scores (Michigan Educational Assessment program), are included in the analysis. Four years of data are included, 2001-2002 through 2004-2005. Michigan altered their testing and evaluation procedures in the 2001-2002 academic year, therefore due to inappropriate and incomplete comparison, data prior to this time are not included.

The Michigan Department of Education evaluates each student's exam at one of four levels: level 1 through level 4. A level 1 rating is the highest rating that a student can

earn, alternatively a level 4 rating is the lowest rating that a student can earn. The state of Michigan describes level 1 as “Exceeded Michigan Standards”, level 2 as “Met Michigan Standards”, level 3 as “At Basic Level”, and level 4 as “Apprentice”. For greater context, in high school, levels 1 and 2 are also described as “Endorsed”, level 3 as “Endorsed at Basic level”, and level 4 as “Not Endorsed”. For the greatest precision this paper uses separate models which evaluate the percentage of students scoring at each level as the dependent variable.

Molnar, Wilson, and Allen (2004) systematically examine the Michigan charter school system (and all charter schools nationwide) in order to establish which EMOs (educational management organizations) are for-profit, which are not-for-profit, and the size of the EMO in terms of the number of schools which they operate. These profit structure and size determinations developed by Molnar, Wilson, and Allen are utilized in our analysis.

Admittedly this data set has a few minor limitations. The number of students eligible for free or reduced lunch (FLE), used as a proxy for the number of low-income students in the school, was not reported by many charter schools. Models were analyzed both with and without the FLE variable due to this limitation. Also, test scores were not reported if fewer than 10 students took the test. Over the entire panel, 25 observations for the grade 4 math test and 60 for the grade 8 math test were excluded because fewer than 10 students took each of these tests. This, along with schools entering part way through the 4 year period and some schools closing during the panel (10 schools had early observations with missing subsequent observations) makes it an unbalanced panel. We

correct for the groupwise heteroskedasticity caused by the unbalanced panels using the adjustment recommendation by Green (1997).

Table 1 shows the means and standard deviations for several variables in our model. It displays the mean for pertinent variables for all charter schools, and it also divides charter schools into two groups: those run by not-for-profit EMOs and those run by for-profit EMOs. Schools run by for-profit EMOs are further divided into those run by large EMOs and small EMOs, where large EMOs are defined as organizations that run 10 or more charter schools nationwide. One interesting finding is that for-profit organizations have a lower percentage of students scoring at levels 1 and 2 and a larger percentage of students scoring at levels 3 and 4 than not-for-profit schools. These results are in agreement with those of Miron and Nelson (2002), yet one must interpret these results with caution because these organizations have different average student populations. For instance sample means of the characteristics of children in these schools show that for-profit charter schools enroll a greater percentage of minority students (over 10% more) and a similar percentage of students who are eligible for a free or reduced lunch than not-for-profit schools.

Another interesting finding from this table is that while for-profit schools spend fewer dollars per student they also collect fewer dollars in revenue per student. In fact, when expenditure per pupil is examined as a percentage of revenue per pupil the for-profit charter schools actually spend more, 98.6% versus 96.8%, than the not-for-profit schools. The fact that not-for-profit schools collect more revenue helps to corroborate the theoretical results of Glaeser and Shleifer (2001) that not-for-profit firms will collect more donations. Their model shows that there will be larger donations to not-for-profit

firms, because donors get to exert more influence per dollar donated. An additional finding relating to expenditure per pupil and revenue per pupil is that the standard deviation is substantially higher for not-for-profit schools, indicating that not-for-profit schools may differ more from each other than for-profit schools do in fund raising.

When we further divide the for-profit charter schools into those run by large organizations and those run by small organizations we find some stark differences. There is a difference not only in their test scores but also in the population of students they serve. Brown et al. (2004) survey charter schools in Arizona, Michigan, Pennsylvania, and Washing DC; they find that schools run by EMOs tend to be larger. In addition, our data shows for-profit schools run by large EMOs have a larger percentage of minorities (confirming the findings of Lacireno-Paquet (2004)), are larger schools, and have a smaller percentage of students who are eligible for a free or reduced lunch than for-profit schools run by small EMOs.

Table 2 shows a list of the EMOs in Michigan. This table reveals several interesting things. First, there is no one EMO that runs the majority of the schools either overall or in a subgroup such as for-profit schools, so there is no need to worry about a "firm effect". Second, many schools are run without EMOs (no provider); we consider these not-for-profit schools in our analysis. Third, most schools offer grades 4 and 8, which is not surprising since it is usually less expensive to run schools that offer grades K through 8 versus high school grades.

Empirical Strategy

In order to model for-profit and not-for-profit charter school differences we employ a standard random effects model. A random effects model is selected over a fixed effects model or a pooled OLS model for important reasons. Although a fixed effects model is a popular model to use with panel data, our key explanatory variables do not vary over time so a fixed effects model cannot be employed. A random effects model is selected over a pooled OLS model for several reasons. First, in general a random effects model is usually more efficient than pooled OLS. Pooled OLS ignores the fact that because a_i is the composite error in each time period, $a_i + u_{it}$ are serially correlated across time. Pooled OLS treats each observation as a distinct observation and T observations on n schools is not the same as nT different schools. Second the Breusch-Pagan Lagrange Multiplier Test found at the bottom of tables 2-6 overwhelmingly rejects pooled OLS versus random effects in every specification.

The random effect regression takes the form:

$$\%\text{Level}I_{it} = \alpha + \beta\,\text{Profit}_i + \boldsymbol{\gamma}\mathbf{X}_{it} + \boldsymbol{\psi}\mathbf{Z}_{it} + a_i + u_{it} \qquad (1)$$

where $\%\text{Level}I_{it}$ is the percentage of students that score at the level we are concerned with (level 1, level 2, level 3, or level 4); α is the constant term or intercept; Profit_i is a dummy variable, equal to 1 if the school is run by a for-profit organization and zero if it is run by a not-for-profit organization; $\mathbf{X}_{it}$ is a vector of other school specific characteristics, including years a school has been in operation, a weighted average of the percentage of minority students in grades 4 and 8 (the two grades in which the school testing occurs), a weighted average of the percentage of females in grades 4 and 8, the number of students tested in grade 4 as well as grade 8, the total enrollment in the charter school, the percentage of students who are eligible for a free or reduced lunch (included

only in some specifications of the model), and expenditure per pupil in the charter school is also included in other specifications; β is the main coefficient of interest since it captures the effect of a charter school which is run by a for-profit organization; $\mathbf{Z}_{it}$ is a vector of characteristics from the district where the charter school is located, including the percentage of students in that district scoring at the same level as the model's dependent variable (i.e. if the dependent variable is the percentage of the charter school's students scoring at level 1, then one of the independent variables is the percentage of students in the district scoring at level 1), the percentage of the students in the district that are eligible for free or reduced lunch, the percentage of students in the district that are minority students, and expenditure per pupil in the district; and a_i is the unobserved effect, it captures the unobserved time constant factors that affect our dependent variable (it is constant across time), which is the individual school heterogeneity. In order for the specifications associated with the random effects model to hold, it must be assumed that a_i is uncorrelated with each explanatory variable. Finally, u_{it} is the time-varying error or idiosyncratic error; it captures unobserved factors that affect the dependent variable which vary over time.

The model for comparing for-profit schools run by large organizations to those for-profit schools run by small organizations, to those run by not-for-profit organizations is similar:

$$\%\text{Level}I_{it} = \alpha + \rho\,\text{ProfitLargeEMO}_{\text{i}} + \delta\,\text{ProfitsmallEMO}_{\text{i}} + \boldsymbol{\gamma}\mathbf{X}_{it} + \boldsymbol{\psi}\mathbf{Z}_{it} + a_i + u_{it} \qquad (2)$$

where all the variables are the same as equation (1) above with the following two exceptions: $\text{ProfitLargeEMO}_{\text{i}}$ is a dummy variable, equal to 1 if the school is run by a

large for-profit organization and zero if it is run by a small organization or a not-for-profit organization; $ProfitsmallEMO_i$ is a dummy variable, equal to 1 if the school is run by a small for-profit organization and zero if it is run by a large organization or a not-for-profit organization.

A possible concern with this model is that observations are different sizes which could lead to heteroskedasticity. To correct for this heteroskedasticity, the Huber-White adjustment of the standard errors is used; this is often referred to as robust standard errors. Another possible concern is that the panel is unbalanced since some schools entered part way through the panel. This unbalanced nature causes groupwise heteroskedasticity. To correct for this heteroskedasticity the adjustment recommended by Green (1997) is used. A second correction for an unbalanced random effects model, the Swamy-Arora method derived from Baltagi and Chang (1994) was also utilized in this analysis. Estimating the models using the Swamy-Arora method did not affect the sign or the significance of any of the relevant independent variables; it did not even have a substantial effect on the size of the coefficients of the independent variables of interest and therefore the results are not specifically elucidated in the tables presented but are available from the authors.

Results

We first present results that examine the difference between charter schools run by for-profit EMOs versus those run by not-for-profit EMOs (estimating equation 1). This is followed by the model which separates for-profit charter schools into two groups,

those run by large for-profit EMOs and charter schools run by small for-profit EMOs (estimating equation 2).

Tables 3 and 4 display the difference between charter schools run by for-profit EMOs and those run by not-for-profit charter EMOs. They provide the regression results at each of the four MEAP exam testing levels. Each table contains two sets of results for the separate four regressions; the second set of four results (on the right hand side) also contains the percentage of students eligible for free or reduced lunch (FLE). Table 4 adds expenditure per pupil, which is an attempt to see if for-profit schools are still performing differently when we adjust for spending.

Consistent with expectations, schools with a larger percentage of minority students and a larger percentage of students that are eligible for free or reduced lunch (FLE) have fewer students scoring at level 1 and 2 and a larger percentage of students scoring at level 3 and 4. These results are statistically significant regardless of the model specification. Percentage of students in the district scoring at the level we are examining is usually a good predictor of the percentage of charter school students who will score at that same level. Years a charter school has been operating was entered into the model in a similar fashion as in Sass (2006) with dummies for 0, 1, 2, 3, and 4 years of previous operation, and 5 or more years of operation as the reference group.

The top row of each table shows the effect of a charter school being run by a for-profit EMO. In both tables there is significant evidence that for-profit schools are less likely to have students scoring at a level that meets Michigan standards (level 2) and when percentage of students that are eligible for free or reduced lunch is included are more likely to have students scoring at the lowest possible level (level 4); this suggests

decreased student performance within for-profit compared to not-for-profit school student performance. Specifically, schools which are operated by for-profit firms have approximately 4-5% fewer students scoring at a level 2 (the second highest level) standard and approximately 3-4% more students scoring at a level 4 (the lowest level) standard.

The findings enumerated in Tables 3 and 4 suggest that even when adjusting for numerous school and district characteristics there is decreased student performance in the for-profit sector of the Michigan Charter School System. Table 3 findings are consistent with the Property Rights Theory discussed above. The indication of the Property Rights Theory is that for-profit firms will cut corners in an attempt to reduce costs in order to pursue a profitable outcome with potential quality ramifications. Our results delineated in Table 3 suggest in general that for-profit schools have lower student test scores; one indication of quality. Table 3 findings are also consistent with some of the Chilean school system evidence presented by McEwan and Carnoy (2000). Over the past two decades Chilean for-profit schools have shown lower test score results compared to the other educational structures in Chile suggesting the use of cost-cutting strategies in these for-profit schools. Our results indicate that the Michigan for-profit schools are behaving in the same manner as those found in the for-profit sector of Chile. However since our results do not change in Table 4 which controls for expenditure per pupil its results indicate that for-profit schools' lower performance may be due to reasons beyond cost

cutting.[4] Thus our results are not indicating that for-profit charter schools are more "cost effective".

Tables 5 and 6 provide some additional detail regarding the size of the for-profit educational entities running the schools. Compared to not-for-profit charter school organizational structures, small for-profit educational organizations are statistically more likely to have students obtaining test scores which result in level 3 outcomes and are statistically less likely to have students scoring at a level 1. This indicates that students at these small for-profit educational entities are simply earning lower test scores on average than not-for-profit organizations. Specifically, when controlling for school and district characteristics a for-profit charter school run by a small EMO will have approximately 6-8% fewer students scoring at a level 1, and 6-7% more students scoring at a level 3 compared with charter schools that are not-for profit. Large for-profit organizations are also consistently less likely to have students scoring at a level 2 and when the free and reduced lunch (FLE) variable is included in the model more students score at level 4.

Although not a focus of this study, one additional finding of particular note is that associated with the female students in Michigan charter schools. There is significant evidence to suggest that a smaller percentage of girls than boys perform at the bottom level (level 4) of standardized math tests. Additionally, a larger percentage of girls than boys meet Michigan standards (level 2) on these same standardized math tests. These results are significant; girls score better than boys in all specifications. This is a particularly noteworthy finding because girls are often found to be deficient in math skills and not well represented in mathematics and the hard sciences in their later years in life

[4] The "R-square" reported in tables 3-6 is in quotes because it is not the typical OLS R^2 and does not have all of the properties of the OLS R^2. Rather it is a correlation square or a R^2 from a second round regression. This still provides some idea of the fit of the model.

(professions and college in particular). It is important to recognize that the findings of this paper show girls to be ahead of boys to a large extent in their early years. Moreover, this research suggests that math deficiencies are simply not present in the Michigan Charter School System.

Conclusions

The results of this paper show evidence of decreased student attainment in schools run by for-profit entities. A further contribution our paper makes over previous studies is that our findings show that the difference between for-profit and not-for-profit may be due to policies other than for-profit charter schools spending less per pupil, since our findings remain constant whether or not we control for expenditure per pupil. We further find that there are differences between charter schools run by small for-profit entities and those run by large for-profit entities.

Although the results obtained through this analysis provide insight and necessary illumination into the debate regarding the role of for-profit entities in the educational arena, we have analyzed only one outcome measure. Clearly additional measures of educational quality such as tests of critical thinking, and of course measures such as success in the arts and long-term student success (to name only a few additional outcome measures) would also be important to examine if one wanted to truly make appropriate comparisons. Given the limitations in terms of available data in particular, this is a first step in beginning to provide some evidence in the for-profit versus not-for-profit educational debate. It is our hope that this paper is the first of many rigorous empirical examinations of this burgeoning educational issue.

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Table 1: Descriptive Statistics

Variable	All Charter Schools	Charter Schools run by For-Profit EMOs	Charter Schools run by Not-For-Profit EMOs	For-Profit Run by Large EMOs	For-Profit Run by Small EMOs
% Students scoring at Level 1	16.8	15.8	18.9	16.3	13.2
	(14.6)	(13.5)	(16.4)	(14.0)	(9.7)
% Students scoring at Level 2	30.5	29.8	31.9	29.6	31.1
	(12.7)	(12.5)	(13.2)	(12.1)	(14.5)
% Students scoring at Level 3	30.5	31.1	28.4	31.0	32.0
	(11.2)	(10.9)	(11.6)	(10.9)	(10.7)
% Students scoring at Level 4	22.4	23.2	20.9	23.1	23.8
	(18.0)	(17.9)	(18.2)	(17.9)	(18.2)
% K-12 Students that are Minorities	52.9	57.2	46.4	61.1	40.0
	(39.7)	(39.9)	(38.6)	(38.3)	(42.7)
% K-12 Students that are Female	49.3	49.6	48.8	49.6	49.8
	(7.5)	(6.2)	(9.2)	(4.3)	(11.3)
Total Enrollment in the School	385.2	466.3	263.2	503.4	301.5
	(288.1)	(313.4)	(188.3)	(321.5)	(206.8)
% of Students who are eligible for Free or Reduced Lunch	58.3	57.0	60.4	56.3	66.1
	(25.9)	(26.8)	(24.4)	(27.1)	(21.1)
Total Expenditure per Pupil	8342.1	8052.6	8776.0	8014.8	8219.3
	(2581.7)	(1673.7)	(3488.3)	(1582.0)	(2033.1)
Total Revenue per Pupil	8527.4	8167.1	9067.4	8191.3	8060.4
	(2614.8)	(1408.6)	(3694.9)	(1469.1)	(1104.6)
Pupil to Teacher Ratio	19.3	20.1	18.1	20.3	18.9
	(9.2)	(10.3)	(7.1)	(11.1)	(5.2)

Number in () is the standard deviation

Table 2

Provider		Number of schools run in Michigan Over the panel	Number of schools With grade 4 or grade 8 math results[τ] in at least one year in the panel
For-profit EMOs			
Chancellor Beacon Academies*		15	12
Choice Schools Associates		7	5
Charter School Administrative Services*		10	6
Edison Schools*		4	4
Global Education Excellence		2	1
Helicon Associates*		10	9
Innovative Teaching Solutions		1	1
Leona Group*		18	13
Mosaica Schools*		12	10
National Heritage Academies*		26	23
ORBIS Management Group, LLC		1	1
SABIS Educational Systems, Inc		1	1
Smart Schools		3	2
Schoolhouse Services and Staffing, Inc.		3	1
Synergy Training Solutions		2	0
Not-for profit EMOs			
American Institutional management system		3	3
Alpha-Omega educational management		1	0
Advance Staff Leasing Inc		1	1
Chatfield management foundation		1	0
Educare		4	4
Eightcap		1	0
Foundation for behavior resources		2	0
Hamadeh Educational Services Inc		2	2
Learning facilitators Inc.		1	1
Midland charter initiative		1	1
Northstar Education		1	1
777 Management company		1	1
The Romine Group, LLC		2	0
No provider		59	32

* Indicates an EMO that ran 10 or more schools nationwide during the 2003-2004 school year

[τ] Not having a grade 4 or grade 8 test results indicates that either: the school did not offer grade 4 and grade 8, or that they had fewer than 10 students in grade 4 or grade 8 to take the test

Table 3: Math Scores (Profit dummy only)

	Level 1	Level 2	Level 3	Level 4	Level 1	Level 2	Level 3	Level 4
Individual school effects								
Profit (dummy variable)	-2.102	-3.619**	2.562	2.586	-0.880	-5.231***	1.535	4.060*
	(1.831)	(1.830)	(1.657)	(2.270)	(2.90)	(1.677)	(1.734)	(2.052)
0 Previous years of operation	9.267***	5.110	-21.850***	12.198	5.473	16.785***	-10.903***	-3.793
	(2.829)	(7.045)	(6.081)	(10.805)	(4.627)	(4.022)	(3.495)	(4.667)
1 Previous year of operation	-6.565	-7.949*	-4.244	20.569**	-3.766	2.739	-0.954	4.318
	(4.056)	(4.069)	(8.247)	(8.100)	(5.188)	(4.260)	(7.394)	(6.237)
2 Previous years of operation	-4.245**	-3.252	1.313	6.028**	-4.166*	-1.470	0.460	5.420*
	(1.802)	(2.321)	(2.358)	(2.966)	(2.301)	(2.416)	(2.084)	(3.137)
3 Previous years of operation	-3.512***	-0.616	0.907	3.211*	-3.872***	-0.618	2.330	2.615
	(1.314)	(1.382)	(1.448)	(1.918)	(1.421)	(1.433)	(1.581)	(2.225)
4 Previous years of operation	-1.341	0.771	0.238	0.259	-0.876	0.298	0.419	0.351
	(1.432)	(1.228)	(1.356)	(1.512)	(1.586)	(1.229)	(1.353)	(1.654)
% Minorities in grade 4 and grade 8	-0.141***	-0.600**	0.086***	0.106***	-0.109***	-0.048*	0.075***	0.078***
(weighted average)	(0.029)	(0.027)	(0.027)	(0.28)	(0.031)	(0.025)	(0.027)	(0.27)
% Females in grade 4 and grade 8	0.104	0.185***	0.003	-0.280***	0.190	0.147*	-0.162*	-0.213**
(weighted average)	(0.079)	(0.057)	(0.069)	(0.821)	(0.119)	(0.76)	(0.093)	(0.100)
Number of Students tested in grade 4	0.149***	0.126***	-0.019	-0.238***	0.113***	0.095***	-0.014	-0.200***
	(0.037)	(0.036)	(0.038)	(0.054)	(0.043)	(0.036)	(0.041)	(0.050)
Number of Students tested in grade 8	0.012	-0.128***	-0.027	0.146***	0.022	-0.116***	-0.040	0.125***
	(0.028)	(0.30)	(0.027)	(0.035)	(0.280)	(0.027)	(0.028)	(0.032)
Total Enrollment	-0.011**	0.003	0.001	0.006	-0.011**	0.002	0.002	0.008
	(0.004)	(0.005)	(0.004)	(0.006)	(0.004)	(0.004)	(0.004)	(0.006)
% FLE					-0.129**	-0.133***	0.062*	0.214***
					(0.058)	(0.330)	(0.036)	(0.042)
District Effects								
(district charter school is located in)								
% of students in district scoring at that level	0.206**	0.382***	0.279**	0.555***	0.274**	0.201	0.278*	0.530***
	(0.089)	(0.135)	(0.138)	(0.161)	(0.124)	(0.152)	(0.152)	(0.188)
% FLE in district	-0.151**	-0.79	0.145**	-0.009	0.042	0.008	-0.018	-0.100
	(0.065)	(0.066)	(0.069)	(0.77)	(0.080)	(0.062)	(0.069)	(0.080)
% of students in district that are minorities (K-	0.115***	0.030	-0.113***	-0.065	0.097**	0.057	-0.062	-0.128*
12)	(0.044)	(0.050)	(0.042)	(0.063)	(0.044)	(0.048)	(0.040)	(0.064)
District average total revenue	-0.0004	-0.001	0.000	0.002	-0.001	-0.001	0.001	0.002
	(0.0012)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
District expenditure per pupil	-0.0004	0.001	0.001	-0.001	-0.001	0.000	0.002	-0.001
	(0.0013)	(0.001)	(0.001)	(0.006)	(0.001)	(0.001)	(0.001)	(0.002)
Fit Statistics								
"R-square"	0.39	0.39	0.20	0.51	0.45	0.48	0.30	0.59
Breusch-Pagan Lagrange Multiplier	120.85	51.74	28.56	91.37	60.72	24.47	15.96	30.52

Number in parenthesis is the heteroskedasticity-robust standard error

*** signifies that the coefficient is significantly different from zero with a 0.01 or less probability of a type I error for random Effects (robust) estimate

** signifies that the coefficient is significantly different from zero with between a 0.01 and 0.05 probability of a type I error for random Effects (robust) estimate

* signifies that the coefficient is significantly different from zero with between a 0.05 and 0.10 probability of a type I error for random Effects (robust) estimate

All regressions also include a constant term and dummy variables for each year minus 1

First set of regressions has 458 observations with 136 groups, the second set of regressions has 314 observations with 97 groups

Table 4: Math Scores (Profit dummy only) with Expenditure per Pupil

	Level 1	Level 2	Level 3	Level 4	Level 1	Level 2	Level 3	Level 4
Individual school effects								
Profit (dummy variable)	-2.246	-3.574*	2.506	2.720	-0.855	-4.832***	1.298	3.838*
	(1.832)	(1.848)	(1.680)	(2.264)	(2.035)	1.645	1.732	2.069
0 Previous years of operation	10.670***	4.618	-21.357***	10.894	5.213	13.026***	-8.546**	-1.710
	(2.921)	(7.138)	(6.292)	(11.004)	(4.362)	(4.388)	(3.688)	(5.001)
1 Previous year of operation	-6.693	-7.882**	-4.302	20.804**	-3.857	1.190	0.067	5.130
	(4.213)	(3.954)	(8.295)	(8.454)	(5.187)	(3.921)	(7.686)	(6.044)
2 Previous years of operation	-4.125**	-3.274	1.361	5.916**	-4.127*	-1.051	0.189	5.144*
	(1.850)	(2.325)	(2.367)	(2.995)	(2.295)	(2.314)	(2.066)	(3.076)
3 Previous years of operation	3.470***	-0.617	.919	3.170	3.878***	-0.737	2.383	2.673
	(1.337)	(1.386)	(1.452)	(1.930)	(1.426)	(1.437)	(1.581)	(2.218)
4 Previous years of operation	-1.378	0.798	.222	0.302	-0.858	0.530	0.260	0.210
	(1.428)	(1.231)	(1.361)	(1.513)	(1.568)	(1.186)	(1.359)	(1.626)
% Minorities in grade 4 and grade 8	-0.138***	-0.060**	0.087***	0.104***	-0.109****	-0.054**	0.078****	0.081***
(weighted average)	(0.029)	(0.027)	(0.027)	(0.029)	(0.032)	(0.024)	(0.027)	(0.028)
% Females in grade 4 and grade 8	0.090	0.189***	-0.002	-0.266***	0.191	0.152**	-0.165*	-0.216**
(weighted average)	(0.080)	(0.057)	(0.069)	(0.080)	(0.119)	(0.075)	(0.093)	(0.100)
Number of Students tested in grade 4	0.144	0.127***	-0.020	-2.34***	0.114***	0.100***	-0.017	-0.204***
	(0.037)	(0.036)	(0.037)	(0.054)	(0.043)	(0.036)	(0.041)	(0.051)
Number of Students tested in grade 8	0.010	-0.127***	-0.027	0.148***	0.023	-0.109***	-0.045	0.121***
	(0.028)	(0.030)	(0.028)	(0.035)	(0.028)	(0.028)	(0.027)	(0.033)
Total Enrollment	-0.011**	0.003	0.001	0.006	-0.011**	0.002	0.002	0.008
	(0.004)	(0.005)	(0.004)	(0.006)	(0.004)	(0.004)	(0.004)	(0.005)
% FLE					-0.130**	-0.145***	0.069**	0.221***
					(0.056)	(0.033)	(0.035)	(0.042)
Expenditure per Pupil	-0.000	.000	-0.000	.000	0.000	0.001**	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
District Effects								
(district charter school is located in)								
% of students in district scoring at that level	0.206**	0.381***	0.279**	0.557	0.274**	0.206	0.271*	0.531***
	(0.089)	(0.135)	(0.137)	(0.161)	(0.124)	(0.150)	(0.151)	(0.187)
% FLE in district	-0.147**	-0.080	0.146**	-0.014	0.041	-0.001	-0.011	-0.094
	(0.064)	(0.067)	(0.069)	(0.076)	(0.081)	(0.061)	(0.069)	(0.080)
% of students in district that are minorities (K-12)	0.113**	0.030	-0.113***	-0.063	0.098**	0.068	-0.068*	-0.134**
	(0.044)	(0.050)	(0.042)	(0.063)	(0.045)	(0.048)	(0.040)	(0.064)
District average total revenue	-0.001	-0.001	0.000	0.002	-0.001	-0.001	0.000	0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
District expenditure per pupil	-0.000	0.001	0.000	-0.001	-0.000	-0.000	0.002	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Fit Statistics								
"R-square"	0.39	0.39	0.20	0.51	0.45	0.50	0.30	0.60
Breusch-Pagan Lagrange Multiplier	122.20	50.44	28.33	93.23	57.41	19.34	14.73	25.00

Number in parenthesis is the heteroskedasticity-robust standard error

*** signifies that the coefficient is significantly different from zero with a 0.01 or less probability of a type I error for random Effects (robust) estimate

** signifies that the coefficient is significantly different from zero with between a 0.01 and 0.05 probability of a type I error for random Effects (robust) estimate

* signifies that the coefficient is significantly different from zero with between a 0.05 and 0.10 probability of a type I error for random Effects (robust) estimate

All regressions also include a constant term and dummy variables for each year minus 1

First set of regressions has 458 observations with 136 groups, the second set of regressions has 314 observations with 97 groups

Table 5: Math Scores (Dividing up Profit Run by Large Companies and Profit Run by Small Companies)

	Level 1	Level 2	Level 3	Level 4	Level 1	Level 2	Level 3	Level 4
Individual school effects								
Profit Run by Large EMOs (dummy variable)	-0.782	-3.635*	1.670	2.118	-0.248	-5.461***	0.832	4.346**
	(1.870)	(1.901)	(1.725)	(2.414)	(2.092)	(1.732)	(1.742)	(2.105)
Profit Run by Small EMOs (dummy variable)	-7.744***	-3.576	6.328***	4.644	-5.890**	3.505	6.660***	1.831
	(2.333)	(2.631)	(2.368)	(3.123)	(2.873)	(2.618)	(2.313)	(3.543)
0 Previous years of operation	11.266***	5.091	-23.153***	11.571	4.983	16.928***	-10.062***	-3.923
	(4.029)	(7.095)	(7.316)	(10.221)	(4.639)	(4.069)	(3.438)	(4.705)
1 Previous year of operation	-5.109	-7.955*	-5.244	20.112**	-4.195	2.900	-0.295	4.153
	(3.668)	(4.103)	(8.198)	(7.910)	(5.367)	(4.331)	(7.627)	(6.326)
2 Previous years of operation	-4.149**	-3.239	1.239	5.993**	-4.171*	-1.457	0.439	5.423*
	(1.817)	(2.326)	(2.321)	(2.976)	(2.317)	(2.444)	(2.040)	(3.150)
3 Previous years of operation	-3.541***	-0.606	0.945	3.212*	-4.005***	-0.545	2.547	2.544
	(1.314)	(1.384)	(1.464)	(1.923)	(1.435)	(1.436)	(1.578)	(2.224)
4 Previous years of operation	-1.400	0.781	0.299	.268	-0.970	0.355	0.585	0.295
	(1.414)	(1.228)	(1.340)	(1.512)	(1.586)	(1.233)	(1.342)	(1.654)
% Minorities in grade 4 and grade 8	-0.149***	-0.059*	0.091***	0.109***	-0.114***	-0.046*	0.082***	0.075***
(weighted average)	(0.029)	(0.027)	(0.026)	(0.029)	(0.031)	(0.025)	(0.026)	(0.027)
% Females in grade 4 and grade 8	0.096	0.185***	0.010	-0.277***	0.193	0.145*	-0.167*	-0.212**
(weighted average)	(0.079)	(0.057)	(0.070)	(0.082)	(0.119)	(0.075)	(0.094)	(0.099)
Number of Students tested in grade 4	0.135***	0.126***	-0.008	-0.233***	0.110**	0.096***	-0.010	-0.202***
	(0.037)	(0.037)	(0.038)	(0.055)	(0.043)	(0.036)	(0.041)	(0.050)
Number of Students tested in grade 8	0.009	-0.128***	-0.023	0.147***	0.019	-0.114***	-0.036	0.124***
	(0.028)	(0.030)	(0.027)	(0.036)	(0.029)	(0.027)	(0.029)	(0.032)
Total Enrollment	-0.011**	0.003	0.001	0.006	-0.010**	0.002	0.002	0.008
	(0.004)	(0.005)	(0.004)	(0.006)	(0.004)	(0.004)	(0.005)	(0.006)
% FLE					-0.121**	-0.137***	0.052	0.218***
					(0.059)	(0.034)	(0.036)	(0.044)
District Effects								
(district charter school is located in)								
% of students in district scoring at that level	0.217**	0.382***	0.289**	0.558***	0.269**	0.201	0.274*	0.534***
	(0.088)	(0.135)	(0.138)	(0.161)	(0.121)	(0.152)	(0.150)	(0.190)
% FLE in district	-0.172***	-0.079	0.160**	-0.001	0.013	0.019	0.014	-0.113
	(0.064)	(0.068)	(0.069)	(0.077)	(0.083)	(0.064)	(0.069)	(0.083)
% of students in district that are minorities (K-12)	0.135***	0.029	-0.127***	-0.072	0.111**	0.052	-0.079**	-0.122*
	(0.043)	(0.051)	(0.042)	(0.064)	(0.044)	(0.050)	(0.039)	(0.065)
District average total revenue	-0.000	-0.001	0.000	0.002	-0.001	-0.001	0.001	0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
District expenditure per pupil	-0.001	0.001	0.001	-0.001	-0.001	0.000	0.002	-0.001
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)
Fit Statistics								
"R-square"	0.41	0.38	0.22	0.51	0.46	0.48	0.31	0.59
Breusch-Pagan Lagrange Multiplier	114.47	51.74	25.69	90.92	59.70	24.21	13.31	29.68

Number in parenthesis is the heteroskedasticity-robust standard error

*** signifies that the coefficient is significantly different from zero with a 0.01 or less probability of a type I error for random Effects (robust) estimate

** signifies that the coefficient is significantly different from zero with between a 0.01 and 0.05 probability of a type I error for random Effects (robust) estimate

* signifies that the coefficient is significantly different from zero with between a 0.05 and 0.10 probability of a type I error for random Effects (robust) estimate

All regressions also include a constant term and dummy variables for each year minus 1

First set of regressions has 458 observations with 136 groups, the second set of regressions has 314 observations with 97 groups

Table 6: Math Scores (Dividing up Profit Run by Large Companies and Profit Run by Small Companies) with Expenditure per Pupil

	Level 1	Level 2	Level 3	Level 4	Level 1	Level 2	Level 3	Level 4
Individual school effects								
Profit Run by Large EMOs (dummy variable)	-0.945	-3.577*	1.578	2.285	-0.217	-5.052***	0.576	4.122*
	(1.870)	(1.923)	(1.751)	(2.411)	(2.071)	(1.703)	(1.742)	(2.124)
Profit Run by Small EMOs (dummy variable)	-7.730***	-3.589	6.330***	4.605	-5.869**	-3.216	6.477***	1.669
	(2.346)	(2.647)	(2.389)	(3.166)	(2.847)	(2.533)	(2.294)	(3.489)
0 Previous years of operation	12.458***	4.618	-22.552***	10.370	4.677	13.188***	-7.615**	-1.870
	(4.077)	(7.155)	(7.515)	(10.474)	(4.396)	(4.432)	(3.629)	(5.037)
1 Previous year of operation	-5.256	-7.873**	-5.323	20.382**	-4.304	1.358	0.785	4.952
	(3.738)	(3.984)	(8.275)	(8.262)	(5.377)	(3.990)	(7.928)	(6.134)
2 Previous years of operation	4.044**	-3.261	1.300	5.888**	-4.124*	-1.041	0.159	5.151*
	(1.870)	(2.330)	(2.329)	(3.006)	(2.309)	(2.343)	(2.019)	(3.091)
3 Previous years of operation	-3.503***	-0.606	0.961	3.172	-4.012***	-0.668	2.603*	2.602
	(1.335)	(1.388)	(1.468)	(1.934)	(1.440)	(1.441)	(1.576)	(2.218)
4 Previous years of operation	-1.430	0.807	0.282	0.309	-0.949	0.582	0.422	0.157
	(1.410)	(1.232)	(1.347)	(1.512)	(1.567)	(1.191)	(1.347)	(1.627)
% Minorities in grade 4 and grade 8	-0.146***	-0.060**	0.092***	0.106***	-0.115***	-0.051**	0.085***	0.078***
(weighted average)	(0.029)	(0.027)	(0.027)	(0.029)	(0.032)	(0.025)	(0.027)	(0.028)
% Females in grade 4 and grade 8	0.084	0.189***	0.003	-0.264***	0.193	0.151**	-0.171*	-0.215**
(weighted average)	(0.079)	(0.058)	(0.070)	(0.080)	(0.119)	(0.075)	(0.094)	(0.100)
Number of Students tested in grade 4	0.132***	0.127***	-0.010	-0.229***	0.110**	0.101***	-0.013	-0.205***
	(0.138)	(0.037)	(0.037)	(0.055)	(0.043)	(0.036)	(0.041)	(0.051)
Number of Students tested in grade 8	0.007	-0.127***	-0.024	0.149***	0.020	-0.107***	-0.040	0.120***
	(0.028)	(0.030)	(0.028)	(0.035)	(0.029)	(0.028)	(0.028)	(0.033)
Total Enrollment	-0.011**	0.003	0.001	0.005	-0.010**	0.002	0.002	0.008***
	(0.004)	(0.005)	(0.004)	(0.006)	(0.004)	(0.004)	(0.005)	(0.005)
% FLE					-0.122**	-0.148***	0.060*	0.225
					(0.057)	(0.034)	(0.035)	(0.043)
Expenditure per Pupil	-0.000	0.000	-0.000	0.000	0.000	0.001**	-0.000*	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
District Effects								
(district charter school is located in)								
% of students in district scoring at that level	0.217**	0.381***	0.289**	0.559***	0.269**	0.207	0.267*	0.534***
	(0.088)	(0.135)	(0.137)	(0.161)	(0.121)	(0.150)	(0.149)	(0.188)
% FLE in district	-0.168***	-0.080	0.163***	-0.007	0.012	0.009	0.022	-0.108
	(0.064)	(0.068)	(0.069)	(0.077)	(0.084)	(0.063)	(0.069)	(0.083)
% of students in district that are minorities (K-12)	0.133***	0.030	-0.128***	-0.069	0.111**	0.062	-0.085**	-0.128*
	(0.043)	(0.051)	(0.042)	(0.064)	(0.046)	(0.050)	(0.039)	(0.066)
District average total revenue	-0.001	-0.001	0.000	0.002	-0.001	-0.001	0.000	0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
District expenditure per pupil	-0.000	0.001	0.001	-0.001	-0.001	-0.000	0.002	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Fit Statistics								
"R-square"	0.41	0.39	0.22	0.51	0.46	0.50	0.32	0.60
Breusch-Pagan Lagrange Multiplier	115.62	50.44	25.32	92.64	56.30	19.12	12.09	24.27

Number in parenthesis is the heteroskedasticity-robust standard error

*** signifies that the coefficient is significantly different from zero with a 0.01 or less probability of a type I error for random Effects (robust) estimate

** signifies that the coefficient is significantly different from zero with between a 0.01 and 0.05 probability of a type I error for random Effects (robust) estimate

* signifies that the coefficient is significantly different from zero with between a 0.05 and 0.10 probability of a type I error for random Effects (robust) estimate

All regressions also include a constant term and dummy variables for each year minus 1

First set of regressions has 458 observations with 136 groups, the second set of regressions has 314 observations with 97 groups