HOW DOES DISTRICT RESOURCE ALLOCATION CHANGE IN RESPONSE TO CHARTER SCHOOL COMPETITION?

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1. Introduction

A central issue in the school choice policy debate turns on whether the performance of traditional public schools (TPSs) improves in response to the competition such policies introduce. School choice advocates generally anticipate that choice policies will spur public school administrators to reallocate resources from less productive to more productive activities. Recent empirical evidence on the competitive effects of school choice on achievement and efficiency in traditional public schools is quite mixed, with some studies finding positive competitive effects, while others find no or negative effects (Arsen & Ni, 2008; Bettinger, 2005; Bifulco & Ladd, 2004; Booker, et al., 2008; Buddin & Zimmer, 2005; Holmes et al., 2003; Hoxby, 2003; Ni, 2009; and Sass, 2006). Previous quantitative empirical research tends to treat school organizations as black boxes, by simply looking for statistical linkages between changes in the degree of competition and changes in school efficiency. Yet changes in school resource allocation represent an essential dimension of any coherent competitive response.

This paper looks inside the black box by examining the impact of choice competition on several aspects of district resource allocation. We also consider whether resource allocation adjustments are related to districts' success in stemming further enrollment loss to choice competitors. The empirical work focuses on Michigan, where two statewide choice policies—charter schools and an inter-district choice policy—have been in effect since 1994 and 1996, respectively. The study uses panel data covering 13 years along with fixed effects techniques. It separates the competition effect of charter schools from that of Michigan's inter-district school choice policy. Our analysis also controls for the short- and long-run effects of charter competition on TPS resource

allocation. Our results show, among other things, no shift in resources to instructional activities in response to charter competition. Indeed, in areas with sustained, high-levels of charter school competition, we find a significant negative impact on TPS instructional spending.

2. Theoretical Discussion

Traditionally the study of educational resource allocation has focused on the distribution of state and federal revenues among school districts. Much less is known about what happens to resources once they reach districts and are allocated internally across alternative instructional and non-instructional functions. In the mid-1990s, a series of studies sponsored by the CPRE Educational Finance and Productively Center utilized bivariate statistical analyses to document patterns in school resource allocation across alternative functions (Monk, et al., 1996; Nakib, 1996; Odden, et al., 1996). Recently Roza (2008) has conducted case studies of how district organizational features such as decision-making autonomy influence resource allocation. Yet theory to explain observed patterns in districts' internal resource allocation (e.g., among regular classroom instruction, special needs instruction, instructional support, administration, or operation and maintenance) remains limited. One notable exception is Monk and Hussain (2000) who offer insights regarding the influence of district size and socioeconomic characteristics on which we will draw.

An important argument in support of school choice policies is that the competition generated by these policies will compel public school personnel to utilize their resources more effectively lest their schools lose funding as students choose more efficient schools. The precise nature of these resource allocation adjustments is seldom specified.

Certainly the most common prediction, however, is that increased competition will induce districts to focus their resources more intensively on instructional activities that raise student achievement. A shift of resources from non-instructional to instructional uses is expected to increase school efficiency (measured by student outcomes per dollar spent) which in turn is important to families making school choices (e.g. Hoxby, 2003).[1] Indeed one could predict that schools will shift resources towards instruction even if this fails to improve school efficiency, because such a shift (revealed, for instance, in smaller class size or specialized instructional programs) ought to be appealing to families evaluating alternative school options. There is yet another and quite distinct argument that also predicts an increase in instruction's share of total spending in response to school choice competition. When schools are forced to trim budgets due to the loss of revenue to competing schools, teachers may be better organized through their unions to avoid cuts in staffing or compensation than other school employees.

Nevertheless, the prediction that choice competition will spur broadly consistent or uniform responses among schools (such as an increase in instruction's share of total spending) is not unambiguous even in theory. If one accepts that families have diverse preferences regarding alternative types of schooling services and that competing schools will have an incentive to serve niche markets, then quite dissimilar shifts in resource allocation are possible among schools in a given local market. Some parents may place a very high value on clean, safe buildings which could elicit a shift in district resources to custodians and security services, to offer just one example. Other schools may seek to

[1] Empirical support for the view that non-instructional services, especially administration, diminish educational productivity remains limited and mixed. Brewer (1996), for example, fails to find consistent relationships between administrative inputs and standardized test scores, using a variety of statistical models.

compete by improving their communication with and accessibility to parents (more secretaries and marketing staff) or improved transportation services or athletic programs.

So in general, one can conceptualize at least three overarching ways in which increased school choice competition might affect district resource allocation. First, districts could systematically shift resources to certain functions or services while reducing spending on others. Here the most likely possibility—one consistent with conventional predictions of school choice policies' impacts—is that competition will lead traditional public schools to shift resources to regular classroom instruction and away from non-instructional spending. Second, no systematic patterns emerge, because districts respond to competition in dissimilar ways. And third, no patterns emerge in resource reallocation, because school districts by and large do not change their resource allocation in response to increased competition.

Any examination of resource reallocation in the public sector ought to account for the possibility that change may not unfold quickly. Economists anticipate that the positive long-run effects of competition on resource allocation and school quality will be more substantial than the short-run effects (Hoxby, 2003). In the short-run, an administrator who wants to raise school productivity has only limited options such as inducing the staff to work harder, getting rid of unproductive staff and programs, and allocating resources away from non-achievement oriented activities. However, in the long run, some general equilibrium mechanisms are available to an administrator. For instance, administrators can propose higher salaries in order to attract high quality teachers and thus draw people into teaching who would otherwise pursue other careers (Hoxby, 2003).

Thus far we have very little systematic information on the budgetary responses of school districts to choice competition. In order to help fill this void, we set out in the remainder of this paper to address two research questions. First, how does resource allocation change in districts experiencing sustained choice competition? How does the share of spending, for example, devoted to various instructional and non-instructional functions change? How does class size change? How do districts' fund balances change? Second, among districts exposed to charter competition, what types of resource allocation shifts are most effective in stemming further enrollment loss to charter schools? Are there discernable differences in the resource allocation adjustments among districts once threatened between those that do and do not succeed in stemming further enrollment loss to charters?

3. School Choice Context in Michigan

In 1993, Michigan became the eighth state to adopt a charter school law. A charter school, officially designated a public school academy (PSA) in Michigan, is a state-supported public school that operates independently under a charter granted by an authorizing body. In Michigan, PSAs can be chartered by local school districts, intermediate school districts, the state board of education or the governing boards of public community colleges or universities. Charter schools have no geographic boundaries. Students are free to choose to go to any charter school in the state, on a space available basis.

Originally, no limit was imposed on the number of charters that could be issued by any of the authorizing boards. However, in 1996, following a proliferation of charters issued by the board of Central Michigan University, the state legislature imposed a cap

on the total number of schools that may be chartered by the Michigan's 15 public universities. This cap of 150 schools has limited new school development since 2000. However, there is no cap on the number of schools chartered by other organizations, and the number of charter schools has grown steadily in Michigan over the past decade. By 2006, Michigan had 226 charter schools enrolling about 98,000 students (or 6 percent of the state's public school population). In 2005, Michigan's charter enrollment was the third largest in the nation after California and Florida.

Michigan's school finance system, commonly known as Proposal A, greatly facilitated the charter school program's development. Approved in 1994, Proposal A shifted the responsibility for funding school current operations from local districts to the state. Besides state and federal categorical aid, school districts receive almost all their operating revenues from the state in the form of a per-pupil foundation grant, which was approximately $6875 in 2006.[2] That money goes directly to the school district that the students attend. Under Proposal A, local voters can no longer increase local taxes to support school operations.[3] Charter schools receive a per-pupil foundation grant equal to that of the district in which the school is located.[4] Thus, the amount of operating revenue that districts and charter schools receive depends almost exclusively on the number of students they enroll. Essentially the only way schools can increase their revenue is to

[2] A small set of hold-harmless districts, whose foundation in 1994-95 exceeded $6,500, are eligible to levy additional local property taxes up to a cap to sustain funding above the state basic foundation allowance.
[3] State law permits local districts within an Intermediate School District (ISD) to join together to seek voter approval of up to two mills. ISD enhancement millages are a form of property tax base sharing and must be approved by a majority of the voters in the ISD with the revenues shared among districts on an equal per-pupil basis (Arsen & Plank, 2003). Since 1997, only three ISDs have won approval for enhancement millages.
[4] However, there is a cap on the PSA foundation allowance, which limits their revenue below that of TPSs in the highest revenue school districts (Addonizio, Mills, & Kearney, 2000). In addition, charter schools receive federal and state categorical funding on the same basis as school districts.

attract more students. In this sense, the school finance system in Michigan creates an ideal competitive market for schooling and makes Michigan an especially important case for studying the effects of charter schools on traditional public schools.

In addition to the charter school program, in 1996, the Michigan Legislature created an inter-district choice program that allows students to choose public schools located outside their home districts. School districts can determine whether or not to accept nonresident students. However, they cannot prohibit students who live within their boundaries from attending public schools in another district that admits them. As of 2006, about three-fourths of Michigan's 555 local districts enrolled nonresident students under the inter-district choice program. The charter school and inter-district choice programs are designed so differently that they are likely to have a different impact on TPSs. In our analysis, we include measures of the intensity of inter-district choice as control variables to separate the effect of charter schools from that of inter-district choice.

4. Data and methods

4.1 Data sources

This analysis utilizes a statewide panel dataset of Michigan school districts from 1994 to 2006. The data were assembled from two main sources: the Michigan Department of Education (MDE) and the State of Michigan's Center for Educational Performance and Information (CEPI). The merged dataset includes information by district for school choice enrollment, school finance, student demographics, and other school level factors over the 13 years. Michigan's Single Record Student Database (SRSD), managed by

CEPI, for 2002-03 and 2003-04 were used in constructing the measure of charter competition.

4.2 Measures of competition

Competition from charter schools is measured at the district level since the loss of students to charter schools influences total district revenues forcing districts then to decide how to adjust resource allocation among individual schools. Thus, in the first instance, it is the school district that experiences and responds to competitive pressure from charter schools.

Charter competition is measured through two dimensions: the magnitude and the duration of the competition. We define the magnitude of charter competition faced by a district as the percentage of resident students in a district who have transferred out of a TPS and into a charter school.[5] It is impossible to identify the actual percentage of charter school students from each sending district before 2002 as student-level data were unavailable. We assume, therefore, that the percentage of students from each sending district in a given charter school for 1994-2002 is the same as in 2003. Based on the actual individual enrollment information in the 2003 SRSD data, we then imputed the percentage of students that each district lost to charter schools for 1994-2002.

To capture the second dimension of charter competition, its duration, we created three dummy variables that distinguish the effect of charter competition in the short-run, medium-run, and long-run. Accordingly, if a district lost students to charter schools for

[5] An alternative measure of charter schools' market share--total charter school enrollment in a district as a percentage of district enrollment—is a less desirable as an indicator of competition, since many students attend charter schools outside the district in which they live. Indeed, more than one-third of Michigan's charter schools draw the majority of their students from districts other than the district in which the charter school is located

no more than 3 years, we identified the charter competition as short-run. Likewise, the loss of students for 4 to 5 years is defined as medium-run competition, and for longer than 5 years as long-run competition. Then a vector of variables measuring both the magnitude and the duration of charter competition is obtained by interacting the percentage of students transferred to charter schools with the three duration dummy variables.

4.3 Measures of District Resource Allocation

District resource allocation will serve as the dependent variable in our first-stage analysis, and it is measured along several dimensions. First, we measure the percentage distribution of current operating expenditures across the following functional categories:

% Total instructional programs

% Basic programs

% Added needs

% Total support services

% Instructional support

% Business and administration

% Operations and maintenance

Each of these measures includes expenditures on employee salaries and benefits, supplies, and purchased services devoted to the respective function. Basic programs include classroom expenditures on pre-school, elementary, middle and high school basic instructional programs. Added needs include the classroom expenditures on special education, compensatory education, and vocational education instructional programs. Instructional support consists of expenditures on both pupil and instructional staff support

services, including, *inter alia*, speech therapists, guidance counselors, and curriculum specialists. Business and administration contains spending on school-level administration and central district administration and business services. Finally, operations and maintenance consists of spending to keep the physical plant clean and safe. It does not include capital outlays.

Theory suggests that charter competition will lead school districts to increase the share of their spending devoted instructional programs. Among instructional programs an increase in the share of spending devoted to basic programs is most unambiguous. It remains an open question whether TPSs will compete to attract special needs students whose instructional services are included in added needs programs. Conversely, we predict that districts will decrease the share of their spending devoted to administration and operations and maintenance in response to increases in the intensity of charter school competition.

In order to investigate changes in other dimensions of instructional spending, we also examine the impact of charter competition on TPSs' average pupil-teacher ratio (which proxies average class size), average teacher salary, and the share of current spending devoted to instructional salaries. This last measure is a subset of total instructional spending, which includes expenditures on salaries and benefits for instructional personnel, but excludes all non-personnel instructional spending. We expect charter competition to reduce pupil-teacher ratios, because administrators see this as a strategy to improve student achievement and because parents prefer small classes for their children. There are quite distinct reasons to anticipate that competition will increase both of the teacher compensation measures, especially in the long run. First, in order to

attract higher quality teachers, administrators may propose higher salaries. Second, districts losing students to competitors may be forced layoff teachers. If in accord with union contracts, dismissals start with the least senior (and typically lowest-paid) teachers, average compensation will increase.

Finally, we examine the impact of charter competition on districts' general fund balance. This standard bottom-line measure of district budgeting is widely taken by district budget administrators and state officials as indicating district fiscal health or alternatively fiscal stress. In Michigan, state officials closely monitor budgeting in local districts with low fund balances; districts in which the net fund balance turns negative must enter the state's mandatory deficit reduction program. We measure fund balance both as a percentage of current operating expenditures and on a per pupil basis. Both permit us to test whether sufficiently high levels of charter competition induce fiscal strain (lower fund balances) in school districts.

4.4 Estimation strategies

Our basic model for estimating the effect of charter competition on school district resource allocation takes the following form:

$$Y_{it} = \boldsymbol{CS}_{it}\,\mathbf{B_1} + \boldsymbol{SDstructure}_{it}\mathbf{B_2} + \boldsymbol{SDchar}_{it}\mathbf{B_3} + IDC_{it}\,\mathrm{B}_4 + I_t\,\delta + \theta_i + u_{it} \qquad (1)$$

where Y_{it} is the expenditure variable of interest in district *i* in year *t*. The focus variables in this analysis are included in $\boldsymbol{CS}_{it}$, which reflect both the magnitude and the duration of charter competition experienced by district *i* at time *t*. $\boldsymbol{SDstructure}_{it}$ is a vector of structural characteristics of district *i* at time *t* that have been found in previous research to affect districts' allocation of spending across alternative functions. Monk and Hussain (2000) distilled four key structural characteristics from previous research which in turn

their own work reinforced. We incorporate the same four here in $\boldsymbol{SDstructure}_{it}$, including district enrollment size (in logarithmic form), total operating expenditure per pupil (in logarithmic form), property wealth per pupil (in logarithmic form), and the percentage of students eligible for the free/reduced price lunch (FRL) program. District enrollment size controls for scale effects on resource allocation, especially the share of spending devoted to administration which *ceteris paribus* tends to be higher in very small districts. Operating expenditures per pupil is included to control for the fact that the share of spending devoted to support services tends to increase in districts with higher overall spending levels. Property wealth per pupil and the percent of student eligible for free and reduced priced lunch measure local residents' wealth and income. These variables control for some of the influence of local residents' needs and preferences on district resource allocation.

$SDchar_{it}$ is a vector of district student characteristics which serve as control variables, including the percent of students who receive special education services (which affects added needs instructional spending) and a vector of student racial characteristics that may affect family preferences or needs for different school services. IDC_{it} reflects inter-district choice competition by the percentage of students transferring out of a district through the inter-district choice program. A set of year dummies, I_t, is also included to capture any systematic influence not accounted for by the observable inputs that vary over time but are common to all schools. θ_i is an unobserved school fixed effect or heterogeneity that picks up all the unobserved characteristics of a school that are stable over time, including historical reasons that influence charter location. u_{it} is the unobserved error.

We estimate Equation (1) through FE transformation with standard errors robust both to serial correlation and heteroskedasticity. FE transformation can readily eliminate the unobserved school heterogeneity (θ_i) that affects district resource allocation, and allows for arbitrary correlation between θ_i and $\boldsymbol{CS_{it}}$, which means that the location of charter schools is allowed to be related to historical differences among schools. Consistency of the FE estimator requires that charter competition is strictly exogenous after accounting for the district heterogeneity (which means charter competition, $\boldsymbol{CS_{it}}$, must be uncorrelated with the idiosyncratic errors, u_{ir}, in all time periods r). However, how schools change their resource allocation in response to charter competition in the past might influence the magnitude of charter competition in the future. If this is the case, the strict exogeneity assumption will be violated, and the general FE estimator will be biased.

To account for the possibility that the charter competition intensity depends on past resources allocation patterns in school districts, we also estimated the expenditure models with a lagged dependent variable, Y_{it-1}, as a predictor. Another reason to include the lagged dependent variable is to control for inertia effects. That is, a variety of institutional features may constrain districts' ability to immediately alter portions of their budgets or policies in response to charter school competition even if they urgently want to do so. The estimated equations with the lagged dependent variables take the following form:

$$Y_{it} = Y_{it-1}\,\delta + \boldsymbol{CS}_{it}\,\mathbf{B_1} + \boldsymbol{SDstructure}_{it}\mathbf{B_2} + \boldsymbol{SDchar}_{it}\mathbf{B_3} + IDC_{it}\,B_4 + I_t\,\delta + \theta_i + u_{it} \quad (2)$$

where Equation (2) is identical to Equation (1), except it includes Y_{it-1}, the lagged variable for the district expenditure category of interest. This approach allows for the comparison of differences in school district policy before and after charter competition, controlling for the effect of inertia on district resource allocation and the dependency of

charter competition intensity on the past resource allocation behavior. As long as there is no residual autocorrelation, FE will give a consistent estimate of the effects of our variable of interest, CS_{it}.

5. Findings

Table 1 provides information on charter competition in Michigan from 1994 to 2006. The percentage of charter school enrollment statewide increased almost every year. In 2006, it reached 6.1 percent of all public school students. Although the first charter schools in Michigan were founded in 1994, no district experienced more than incidental charter competition before 1996.

[Table 1 about here]

Table 2 displays descriptive information for the variables used in the models, along with their means and standard deviations. The means are calculated across all years. Student participation in inter-district choice increased substantially in recent years. By 2006, 4.3 percent of all public students participated in inter-district choice. Statewide, students who are eligible for the FRL program account for 31 percent of all students across years. This percentage displays a clear upward trajectory between 1994 and 2006. In 2006, about 36 percent of students statewide were eligible for FRL. Black students comprise the largest minority group in Michigan public schools. Hispanic and Asian students combined account only for about 5 percent of all students. Statewide, the percentages of minority students increased 6 percentage points between 1994 and 2006.

[Table 2 about here]

Tables 3 through 5 show the impact of charter competition on our measures of district resource allocation. All three tables have the same format with the dependent variables across the top and the independent variables listed in the first column. For each dependent variable, two models are estimated, one corresponding to each of our two measures of charter school competition: the percentage of students living in a district who enroll in charter schools regardless of its duration (% CS enroll) and the set of variables representing districts that had lost students to charter schools for various durations (CS Short, CS Mid, and CS Long).

The models presented in Tables 3 through 5 were estimated without lagged dependent variables. Each of these models was also estimated with lagged dependent variables. While their inclusion substantially increased the equations' R^2s, it left the results for the study's focus variables substantially unchanged. We present the results of the models estimated with lagged dependent variables in Appendices A-1 through A-3, which are formatted identically with the corresponding Tables 3 through 5.

Table 3 displays the results of the fixed effect estimates pertaining to district instructional spending. Model 1 in Table 3 shows, unexpectedly, that charter competition has a significant *negative* impact on the percentage of spending devoted to instruction. Model 2 in Table 3 shows that this negative effect is driven by districts experiencing sustained or long run charter competition. Charter competition over the short- and medium-run meanwhile has no significant effect on the share of total spending devoted to instruction. On the whole, TPSs in Michigan show no indication of responding to charter competition by shifting resources to instructional uses. By contrast, districts respond to competition from other districts through inter-district school choice by significantly

increasing the share of total spending devoted to instruction. Finally, as previous researchers have found, instruction's share also declines as districts' total spending and property wealth increase.

[Table 3 about here]

In order to pursue these results further, we consider a number of more refined measures of TPS instructional spending. As noted, instructional spending is comprised of two major categories: basic instruction and added needs instruction (i.e., special education, compensatory and vocational education programs). In general, as indicated in Models 3 and 4 of Table 3, charter schools do not have a consistent or significant impact on the share of TPS spending devoted to basic instructional programs. Only in the case of medium-run charter competition do districts increase basic instruction's share of spending. Districts' long-run response to competition, however, though not statistically significant is to decrease the share of their spending allocated to basic instructional programs. Once again, the response of Michigan TSPs to inter-district choice competition appears to differ from their response to charter competition; as inter-district transfers increase, districts shift a higher share of their spending to basic instruction.

An interesting equity question turns on whether charter competition induces TPSs to allocate more or less resources to programs for special needs students. The results in Models 5 and 6 of Table 3 provide mixed evidence on this question. When charter competition is measured as a single variable without regard to its duration, it does not have a significant impact on the share of total spending that TPSs devote to added needs instruction. However, when we account for the duration of districts' exposure to charter competition (Model 6), Michigan TPSs devote a significantly smaller share of their

spending to added needs programs during the first five years of exposure to competition. Over longer periods, charter competition has no significant effect. There is some evidence to suggest, therefore, that initially charter competition leads districts to divert resources away from special needs programs serving high-cost students perhaps in an effort to better compete for regular education students. Finally, as one would expect, the share of district students who are eligible for free lunch or special education services have significant positive impacts on spending for added needs programs.

Table 4 displays the fixed effect estimates of charter competition's impact on additional indicators of resource allocation to instructional programs. Instructional salaries constitute the single largest object classification within instructional spending.[6] There has been a far amount of speculation about how competition might affect the structure of TPS employee compensation, including both the aggregate funds devoted to employee salaries as well as the distribution of salaries among employees. The Michigan experience suggests that TPSs respond to charter competition by devoting a declining share of their overall spending to teacher salaries (Model 1). This result, moreover, is primarily a consequence of adjustments in districts that have experienced long-term charter competition (Model 2). Interestingly, under all specifications, we find that charter competition had no significant impact on either average class size (pupil-teacher ratio) or average teacher salary.

[Table 4 about here]

We turn now to consider charters' competitive impact on TPS spending on support functions. Models 7 and 8 in Table 5 display the fixed effect estimates for the share of

[6] The other object classifications for instructional spending, besides salaries, include employee retirement, social insurance, and health benefits, purchased services, and supplies.

total spending devoted to support services by Michigan school districts. These results exactly mirror the estimates for the total instructional spending share (Models 1 and 2 in Table 3), since by definition expenditures for total instruction and total support services must sum to total expenditures. So charter competition is simultaneously associated with TPSs allocating a declining share of spending to instructional programs and an increasing share to support services. In an effort to decipher why the relative spending on support services increases, especially over the long-run, Models 1-6 in Table 5 disaggregate support service spending into its three major components: instructional support, business and administration, and operations and maintenance. In general, when charter competition is measured by a single, continuous variable without regard to duration, charter schools display no significant impacts on TPS expenditures for any of the support service functions. Only when the duration of competition is accounted for do we find any significant impact and even then only in the case of spending devoted to business and administration. That lone significant impact, moreover, contrasts with the conventional wisdom: with rising levels of charter competition sustained for at least five years, districts respond by allocating a *larger* share of their spending to administrative functions.

Once again, districts' response to rising levels of inter-district choice competition differs markedly from their response to charter competition. Inter-district competition brings forth a reduction in the share of TPS spending allocated to administrative functions. Several of the control variables are significant with expected signs. The share of spending devoted to administration declines with rising district size (Enroll), a frequently observed scale effect associated with spreading certain fixed administrative costs over larger numbers of students. The share of spending devoted to instructional

support and operations and maintenance increases in higher spending (TE/pupil) and wealthier (SEV/pupil) communities.

Finally we consider the impact of charter competition on school districts' overall financial position as reflected in their fund balances. The most common indicator of fiscal stress among school districts is a low fund balance. Professional guidelines among school business officials generally stipulate that districts should maintain fund balances of at least 20 percent of annual general fund expenditures. In Michigan, as elsewhere, districts with very low fund balances are closely monitored by state officials. Districts where the overall fund balance turns negative must enter a mandatory deficit reduction program monitored by the state department education. In recent years, a growing number of Michigan districts—including several with high rates of charter school participation—have been forced to enter the state's deficit reduction program.[7]

Models 5 and 6 in Table 6 indicate that higher levels of charter competition are strongly associated with declining district fund balances. This finding is consistent across both measures of charter competition. Rising levels of charter competition clearly generate financial pressure on Michigan's TPSs. As a matter of basic accounting, changes in fund balances reflect changes in revenues minus expenditure. On the revenue side, the incremental reduction in funds associated with a district's loss of a student to a choice school will vary depending on the design of a state's school finance system (Goldhaber, et al. 2005; Arsen & Ni, 2009). Our results in Model 5 and 6 imply that revenues decline more rapidly than costs in districts losing students to charter schools. Models 1-4 in Table 6 check this directly. These equations indicate that the loss of

[7] The Michigan Department of Education requires local districts that fall into its deficit reduction program to submit a plan to balance their budget, but the state does not prescribe the specific budgetary changes that districts must make in order to so.

students to charter schools has a significant negative impact on the revenues of Michigan school districts that is not accompanied by a corresponding decrease in their expenditures.

Taken as a whole, our findings do not indicate many strong or consistent impacts of charter competition on TPS resource allocation. The patterns that emerge, however, are not consistent with the conventional wisdom. Overall MI school districts respond to charter competition by devoting a smaller share of their spending to instructional services and a larger share to non-instructional support services. Charter competition, however, has no discernable impact on most of the more disaggregated measures of TSP resource allocation that we examined. We find some evidence that charter competition leads TPSs to reduce their relative spending on added needs instructional programs and increase their relative spending on administration. In addition, higher levels of charter competition, once it persists beyond the short term, clearly generates fiscal stress in districts—as revealed by a significant reduction in their fund balances.

Two quite different explanations are consistent with the failure to observe more widespread and significant resource allocation changes in TPSs. First, it may be that TPSs are so wedded to conventional ways of doing things that they do not respond much to charter competition. This could be the consequence of either insufficient imagination to envision better ways to allocate resources or an inability to overcome the constraints established by public schools' bureaucratic organizational structure. Second, schools may in fact adjust their resource allocation in response to charter competition but—as some market advocates predict--they might do so in quite dissimilar ways so one observes few consistent patterns in the changes. We pursue this second possibility in the next section.

6. Resource Allocation in Districts that Do and Don't Stabilize Enrollment Loss

Do the budgetary changes districts implement in response to charter competition influence their ability to stem further enrollment loss to charter schools? When TPSs in Michigan lose students to choice schools, they lose the entire per-pupil funding associated with those students. This loss in revenues generates pressure for expenditure cuts which makes it harder for districts to continue providing the same quality programs, let alone improve educational services. In highly competitive local education markets, how TPSs adjust their spending ought to shape their prospects for stemming further enrollment loss. TPSs that cut the wrong programs could spur the loss of additional students and resources, and trigger a downward spiral. Perhaps the muted impacts of charter competition on TPS resource allocation observed in Section 5 merely reflect the fact that districts modify their spending in quite dissimilar ways. Indeed, if certain budgetary changes are more successful in reversing the enrollment loss to charters than others, districts over the long run with the highest charter enrollment rates may tend to be those that have made misguided budgetary changes.

As a first step it is necessary to establish that the trajectories of district enrollment loss vary among districts once they have been subject to a significant level of charter competition. Do some districts stabilize or reverse their enrollment loss to charters while others continue to lose a growing market share? In fact we find both scenarios among Michigan school districts. Figure 1, for example, plots the share of resident students attending charter schools in six Michigan school districts since 1994. Between 1994 and 2001, the percentage of district residents attending charter schools increased sharply in all six districts reaching roughly ten percent in each. Thereafter the charter enrollment share

stabilized or declined in some districts (Boyne City, Hillsdale, and Lansing), while it continued to grow in Detroit, Flint and Flint. Are there systematic differences in the resource allocation adjustments between districts that regain their equilibrium in the face of competition and those that continue to spiral downward?

To assess this question we define groups of districts based on their intensity of charter competition in 2001, and then observe changes in their resource allocation and charter penetration over the following five years. In 2001, 379 of Michigan's 554 school districts had lost no students to charter schools. We define the intensity of competition as "Low" in the 142 districts where the percentage of resident students attending charters in 2001 was greater than zero and less than six ($0 < \%CS_{2001} < 6$). We follow Hoxby (2003) and Ni (2009) in defining competition as "Threatening" in districts where charter schools attract greater than six percent of resident students, a threshold surpassed in 33 Michigan districts in 2001. Finally, we disaggregate these threatened districts into the 18 districts in which the charter enrollment share did not increase between 2001 and 2006 ("Stabilizes") and 15 districts in which the charter share "Increases" over this subsequent five-year period.

As Table 7 shows, the intensity of charter competition in Michigan TPSs varies by community type. Central city districts are much more likely to be threatened by charter schools than TPSs in other types of communities. Seventy-nine percent of Michigan's central city school districts (11 of 14) were threatened by charter competition by 2001. By comparison, the intensity of charter competition was low or non-existent in most rural and high-income suburban districts. Among suburban districts, charter competition intensity varies inversely with community income. Among districts

threatened by charters by 2001, central city and low-income suburban districts were much less likely to stabilize or reverse their enrollment loss by 2006 than were rural or more affluent suburban districts.

Table 8 shows that the intensity of charter competition also varies by district student composition. The percent of students who are Black or Hispanic or from low-income families increases with the intensity of charter competition, and all these percentages are higher for threatened districts that fail to stabilize their enrollment loss than threatened districts that do.

Table 9 depicts resource allocation for school district groups, defined by intensity of charter competition in 2001, for three years: 1996 (at the start of Michigan's charter law implementation), 2001, and 2006. In each of the three years, resource allocation is very similar across all district groups with the exception of the declining school district group, that is those in which charters' share is Threatening by 2001 and continues to Increase through 2006. In 1996, when the level of charter participation was so low that it is unlikely to have had discernable budgetary impacts, districts that would subsequently experience the greatest challenges were already allocating their spending quite differently than other districts. In particular they devoted a significantly smaller share of spending to instruction, including 11.6 percentage points less for basic instruction than districts that by 2001 had lost no students to charters. On the other hand, these declining districts devoted significantly higher shares of their expenditures to added needs instruction, instructional support services, and operations and maintenance. The distinctiveness of this group's resource allocation—whether assessed relative to districts with no charter competition or to districts which were threatened and subsequently stabilized--did not

diminish over the next decade as charter competition intensified. They continued to spend a smaller share on basic instruction and more on added needs instruction and support services right up to the present as they lost ever larger shares of students living within their borders to charter schools.

These districts that have experienced sustained and growing losses to charters also have significantly larger average class size, a disparity that only worsens relative to other TPSs over the decade. Average teacher pay, however, is not significantly different in these declining districts at any point over the 1996-2006 period. Although they enjoy smaller fund balances on average throughout the period than districts experiencing less charter competition, it is only in 2006 that their fund balances fall significantly below the levels in other TPSs.

One interpretation of these results is that the leadership of these declining districts is largely responsible for their competitive failure. From the start, by this view, resources were misallocated which left them vulnerable to competition from charter schools that allocated resources more efficiently or in any case more in line with parents' preferences. Moreover, once serious charter competition arose, these districts failed to learn from the market signals and continued to allocate spending pretty much as they always had, which in turn led to further enrollment loss.

Such a view is unlikely to constitute an adequate account of the Michigan experience on at least two basic grounds. First, as revealed in Table 8, from the start of Michigan's charter policy, declining districts—those which would eventually lose progressively larger shares of their students—had higher concentrations of high-need, high cost students. Compared to other Michigan districts, these districts had higher percentages of

students who were poor and disabled. These distinctive characteristics of the students they serve would normally increase the share of their spending directed to compensatory and special education instructional programs as well as certain non-instructional support services. So the distinctiveness of their spending is largely a reflection of the distinctive needs of their students. Indeed the desire of parents to place their children in educational settings with fewer high-need students is likely an important consideration in their decision to move their children to choice schools.

Second, the success of districts that were threatened by charter competition by 2001 and then stabilized was not due to any distinctive changes in their resource allocation. As Table 10 shows, the changes in resource allocation between 2001 and 2006 among the Threatened/Stabilize districts did not differ significantly from the changes made by either threatened districts that lost progressively more students to charters on the one hand, or by districts that encountered no charter competition, on the other. Nor, once they encountered significant charter penetration, did the resource allocation of the Threatened/Stabilize districts become more similar to that in districts which had no charter competition. Resource allocation in these stabilizing districts was essentially indistinguishable from that in districts with no competition both before and after they themselves confronted competition.

7. Discussion

Michigan presents an interesting case of state with relatively high participation rates in choice policies that have been in place for over 15 years. In addition, Michigan's school finance system generates strong incentives for school to compete to for students.

In some states only part of the revenue follows students to charter schools when they leave TPSs, and districts have the authority to raise local revenue to replace funds lost to charter schools. In Michigan, however, students take the full amount of school funding with them to charter schools, districts cannot raise additional local tax revenue, and the state foundation allowance for K-12 education has remained at nearly the same nominal level over the past 6 years due to sustained weakness in the state's economy. The only way for schools to obtain more educational revenue is to compete aggressively for more students.

In general, our results do not support the hypothesis that competition from charter schools spurs regular public schools to shift resources to achievement-oriented activities. Charter competition has had relatively little impact on standard measures of district resource use in Michigan schools. In those instances where charter schools have influenced TPS resource allocation, the shifts do not conform to conventional predictions. Charter competition is associated with districts devoting a lower share of their spending to instruction and a higher share to non-instructional support services, such as administration. These are not short-run, transitory developments, but rather are most pronounced in districts that have been subject to long-run competition. Charter schools meanwhile have no significant effect on average teacher salaries or class size. In addition, changes in resource allocation cannot explain the differing trajectories of districts that do and do not turn back the competitive challenge. Districts exposed to long-run competition do, however, show a significant decline in their fund balances.

One potential limitation of our study is that our measures of resource allocation are too aggregate to distinguish some meaningful TPS adjustments. Further research

with more refined measures is warranted. We cannot be confident, moreover, that an identical analysis in other states would produce results similar to those from Michigan. The effects of charter competition are undoubtedly sensitive to important features of charter school policy as well as the local contexts in which the policies are implemented (Arsen & Ni, 2008; Goldhaber, Guin, Henig et al., 2005). Indeed, even within Michigan, the competitive effects of inter-district choice appear far more salutary than those of charter schools.

About half of Michigan's charter schools are located in Detroit and other central cities, attracting students from these areas and nearby low-income suburbs. Many traditional public schools in urban districts have experienced great charter competition and faced acute financial pressure due to the loss of students to charter schools. For example, about 44,000 students who live in Detroit attended charter schools in 2006. Together with 8,000 students attending suburban schools through inter-district choice, Detroit Public Schools has lost about one third of its students, amounting to an annual loss of about $400 million in educational revenue through both choice programs. Other central cities in Michigan, such as Flint, Pontiac, and Benton Harbor have experienced similar proportionate losses. Educators in these districts are operating in extraordinarily turbulent settings. Among Michigan's 15 districts with sustained and growing enrollment loss to charters, less than half the TPS students in 2002-03 attended the same school in 2003-04. These 15 districts enroll about 15 percent of all TPS students in Michigan, but 70 percent of TPS students statewide who are black and eligible for free and reduced price lunch. Large-scale closures of school buildings have been implemented, and teachers and administrators are being relocated from building to building.

There is little question, therefore, that charter schools are impacting resource allocation in Michigan's urban districts. We failed to uncover evidence, however, that these changes hold much promise for improving the quality of children's education.

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Table 1 TPSs Facing Charter Competition, by Year and Duration

Year	% of State Enrollment in Charter Schools	Districts Experiencing Charter Competition						Total # of Districts
		Short-Run		Medium-Run		Long-Run		
		Mean %	N	Mean %	N	Mean %	N	
1994	0.0	0.2	1	0	0	0	0	557
1995	0.0	0.2	14	0	0	0	0	556
1996	0.3	0.5	205	0	0	0	0	555
1997	0.8	0.8	276	2.0	1	0	0	555
1998	1.3	1.0	307	3.8	14	0	0	555
1999	2.1	1.2	160	1.9	194	7.1	1	555
2000	3.0	0.6	104	2.3	265	9.6	14	555
2001	3.6	0.7	69	2.3	126	5.0	195	554
2002	3.9	0.3	35	1.2	81	5.0	279	554
2003	4.0	0.2	13	1.1	64	4.9	321	553
2004	4.5	0.3	11	0.6	28	5.2	360	553
2005	5.5	0.6	44	0.5	10	6.1	369	552
2006	6.1	0.4	42	0.6	9	6.6	370	551

Table 2 Description of Variables

Variable	Description	# of Obs.	Mean	Std. Dev.	Min	Max
Independent variables						
Log(enroll)	Log of district enrollment	7202	7.26	1.35	0.69	12.07
Log(TE/pupil)	Per-pupil expenditure in logarithm form	7164	8.77	0.24	7.30	11.00
Log(SEV/pupil)	state equalized valuation per pupil in log form	7167	11.78	0.62	10.06	16.81
% FRL	% students eligible for free lunch	6925	0.31	0.17	0	1
%IDC_out	% students transferring out	7202	0.03	0.10	0	2.13
% spec ed	% special education students	7070	0.12	0.04	0	1
% Asian	% Asian students	7199	0.01	0.02	0	0.27
% Black	% black students	7199	0.05	0.15	0	1.00
% Hispanic	% Hispanic students	7199	0.03	0.05	0	0.58
Dependent variables						
% TE total instruction		7164	0.64	0.05	0.41	0.93
% TE basic instruction		7164	0.51	0.07	0.25	0.93
% TE added needs instruction		7164	0.12	0.04	0	0.34
% TE instructional salaries		7158	0.60	0.04	0.35	0.85
% TE total support services		7164	0.07	0.04	0	0.29
% TE business & administration		7163	0.13	0.03	0.02	0.46
% TE operations & maintenance		7164	0.11	0.02	0	0.25
% TE total instructional support		7164	0.36	0.05	0.07	0.59
Ln average teacher salary		7130	10.73	0.18	9.71	11.39
Pupil to teacher ratio		7133	20.59	3.32	2	38
Total expenditure per pupil		7164	6970	2261	1478	70486
Local & State revenue per pupil		7164	6720	2024	925	61551
Fund balance per pupil		7165	1379	2890	-4864	91042

Table 3 Charter School Effects on TPS Instructional Expenditures: Fixed Effects

	% TE total instruction		% TE basic instruction		% TE added needs instruction	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
% CS enroll	-.058** (.017)	--	-.013 (.024)	--	-.019 (.018)	--
CS Short	--	-.043 (.026)	--	.072 (.042)	--	-.10** (.034)
CS Mid	--	.002 (.034)	--	.088* (.039)	--	-.061** (.023)
CS Long	--	-.066** (.017)	--	-.03 (.024)	--	-.008 (.02)
Log(enroll)	.005 (.007)	.006 (.007)	.015* (.007)	.016* (.007)	-.001 (.005)	-.001 (.005)
Log(TE/pupil)	-.04** (.009)	-.041** (.009)	-.052** (.009)	-.054** (.009)	.006 (.005)	.007 (.005)
Log(SEV/pupil)	-.029** (.005)	-.029** (.005)	-.014* (.006)	-.014* (.006)	-.007 (.004)	-.007 (.004)
% FRL	-.015 (.009)	-.016 (.009)	-.019 (.011)	-.019 (.011)	.021** (.008)	.021** (.008)
%IDC_out	.041** (.011)	.042** (.011)	.027* (.013)	.029* (.013)	.004 (.008)	.003 (.008)
% spec ed	.1** (.021)	.101** (.021)	-.111** (.024)	-.108** (.024)	.201** (.02)	.199** (.02)
% Asian	.056 (.042)	.057 (.042)	.006 (.046)	.007 (.047)	.029 (.039)	.028 (.039)
% Black	-.018 (.016)	-.017 (.016)	.027 (.022)	.03 (.022)	.031* (.013)	.029* (.013)
% Hispanic	.042 (.024)	.044 (.024)	.153** (.04)	.158** (.04)	-.037 (.021)	-.041 (.021)
Obs #	6891	6891	6891	6891	6891	6891
R-square	0.14	0.14	0.14	0.15	0.18	0.18

Table 4 Charter School Effects on TPS Salaries and Class Sizes: Fixed Effects

	% TE instructional salaries		Ln average teacher salary		Pupil to teacher ratio	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
% CS enroll	-.057** (.02)	--	-.178 (.097)	--	-.278 (1.574)	--
CS Short	--	-.012 (.027)	--	-.116 (.117)	--	-1.248 (2.765)
CS Mid	--	.035 (.04)	--	.02 (.155)	--	-2.788 (1.961)
CS Long	--	-.071** (.02)	--	-.205 (.108)	--	.077 (1.651)
Log(enroll)	.005 (.008)	.006 (.008)	-.01 (.02)	-.009 (.02)	-.373 (.551)	-.393 (.552)
Log(TE/pupil)	-.052** (.01)	-.052** (.01)	.162** (.03)	.161** (.03)	-9.452** (.655)	-9.441** (.655)
Log(SEV/pupil)	-.021** (.005)	-.02** (.005)	-.018 (.018)	-.017 (.018)	.931* (.381)	.926* (.382)
% FRL	0 (.01)	0 (.01)	.068 (.045)	.067 (.045)	1.766* (.773)	1.78* (.774)
%IDC_out	.018 (.012)	.02 (.012)	-.106* (.053)	-.103 (.053)	.446 (.722)	.399 (.722)
% spec ed	.105** (.022)	.107** (.022)	-.045 (.073)	-.042 (.073)	-.267 (1.515)	-.309 (1.509)
% Asian	.072 (.048)	.073 (.048)	-.277* (.133)	-.275* (.132)	-9.046** (3.171)	-9.072** (3.186)
% Black	-.04* (.016)	-.038* (.016)	-.18** (.052)	-.176** (.053)	1.264 (1.343)	1.212 (1.348)
% Hispanic	.051* (.024)	.055* (.024)	-.059 (.07)	-.052 (.071)	-1.144 (1.429)	-1.236 (1.431)
Obs #	6889	6889	6867	6867	6867	6867
R-square	0.1	0.1	0.55	0.55	0.36	0.36

Table 5 Charter School Effects on TPS Support Service Expenditures: Fixed Effects

	% TE total instructional support		% TE business & administration		% TE operations & maintenance		% TE total support services	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
% CS enroll	.018 (.012)	--	.022 (.012)	--	.004 (.01)	--	.058** (.017)	--
CS Short	--	.026 (.021)	--	.002 (.03)	--	.01 (.018)	--	.043 (.026)
CS Mid	--	.015 (.017)	--	.006 (.025)	--	-.018 (.013)	--	-.002 (.034)
CS Long	--	.017 (.012)	--	.025* (.012)	--	.007 (.01)	--	.066** (.017)
Log(enroll)	.017** (.003)	.017** (.003)	-.02** (.006)	-.02** (.006)	.006* (.003)	.006* (.003)	-.005 (.007)	-.006 (.007)
Log(TE/pupil)	.023** (.004)	.023** (.004)	.007 (.009)	.007 (.009)	.015** (.004)	.015** (.004)	.04** (.009)	.041** (.009)
Log(SEV/pupil)	.008** (.003)	.008** (.003)	.004 (.003)	.004 (.003)	.011** (.003)	.011** (.003)	.029** (.005)	.029** (.005)
% FRL	-.007 (.005)	-.007 (.005)	.016* (.007)	.016* (.007)	.005 (.005)	.005 (.005)	.015 (.009)	.016 (.009)
%IDC_out	-.011* (.005)	-.011* (.005)	-.025** (.009)	-.025** (.009)	-.005 (.005)	-.006 (.005)	-.041** (.011)	-.042** (.011)
% spec ed	-.003 (.012)	-.003 (.012)	-.055** (.017)	-.055** (.017)	-.028* (.012)	-.028* (.012)	-.1** (.021)	-.101** (.021)
% Asian	.016 (.026)	.016 (.026)	-.064* (.028)	-.064* (.028)	-.016 (.018)	-.016 (.018)	-.056 (.042)	-.057 (.042)
% Black	.037** (.011)	.037** (.011)	-.03** (.009)	-.03** (.009)	-.009 (.007)	-.01 (.007)	.018 (.016)	.017 (.016)
% Hispanic	-.003 (.014)	-.003 (.014)	-.039 (.021)	-.04 (.021)	-.002 (.013)	-.002 (.013)	-.042 (.024)	-.044 (.024)
Obs #	6891	6891	6891	6891	6891	6891	6891	6891
R-square	0.11	0.11	0.07	0.07	0.05	0.05	0.14	0.14

Table 6 Charter School Effects on TPS Revenue, Expenditure, and Fund Balance: Fixed Effects

	Total expenditure per pupil		Local & State revenue per pupil		Fund balance per pupil	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
% CS enroll	-213.6 (1330.3)	--	-2678.0* (1099.8)	--	-3720.2** (1104.2)	--
CS Short	--	3626.2* (1460.9)	--	1108.2 (1270.1)	--	-1135.8 (1306.6)
CS Mid	--	-563.9 (962.2)	--	-1814.1* (808.8)	--	-3826.8** (843.6)
CS Long	--	-437.2 (1421.1)	--	-3037.1** (1163.4)	--	-3885.5** (1178.4)
Log(enroll)	-2215.5** (285.2)	-2207.1** (280.3)	-1457.1** (265.2)	-1439.7** (261.6)	-440.7 (326.5)	-434.1 (323.6)
Log(SEV/pupil)	1688.6** (320.0)	1692.1** (320.2)	1768.6** (305.3)	1772.9** (305.3)	1379.4** (321.2)	1381.9** (321.3)
% FRL	-2608.1* (1037.9)	-2612.3* (1040.5)	-1919.4* (869.8)	-1929.7* (871.4)	-2588.1** (949.8)	-2591.6** (952.0)
%IDC_out	6441.7 (3909.1)	6456.7 (3919.4)	5008.1 (3218.8)	5041.7 (3225.5)	5091.1 (3151.4)	5103.2 (3159.8)
% spec ed	1274.0 (1049.2)	1356.5 (1054.4)	1974.1 (1052.5)	2064.3 (1054.7)	493.3 (1356.5)	549.9 (1359.7)
% Asian	3370.1 (1992.8)	3369.6 (1992.8)	2337.8 (1666.7)	2350.3 (1667.8)	1172.4 (2026.8)	1173.1 (2033.2)
% Black	1829.8** (627.8)	1866.1** (640.2)	1142.1* (546.0)	1198.6* (555.3)	1380.9* (615.8)	1408.1* (624.8)
% Hispanic	4358.7** (1324.9)	4472.9** (1355.3)	3468.5** (1138.7)	3609.5** (1163.8)	4531.7** (1251.6)	4611.4** (1273.4)
Obs #	6891	6891	6891	6891	6892	6892
R-square	0.77	0.77	0.75	0.75	0.24	0.24

Figure 1 Percentages of students transferring to charter schools in selected Michigan school districts

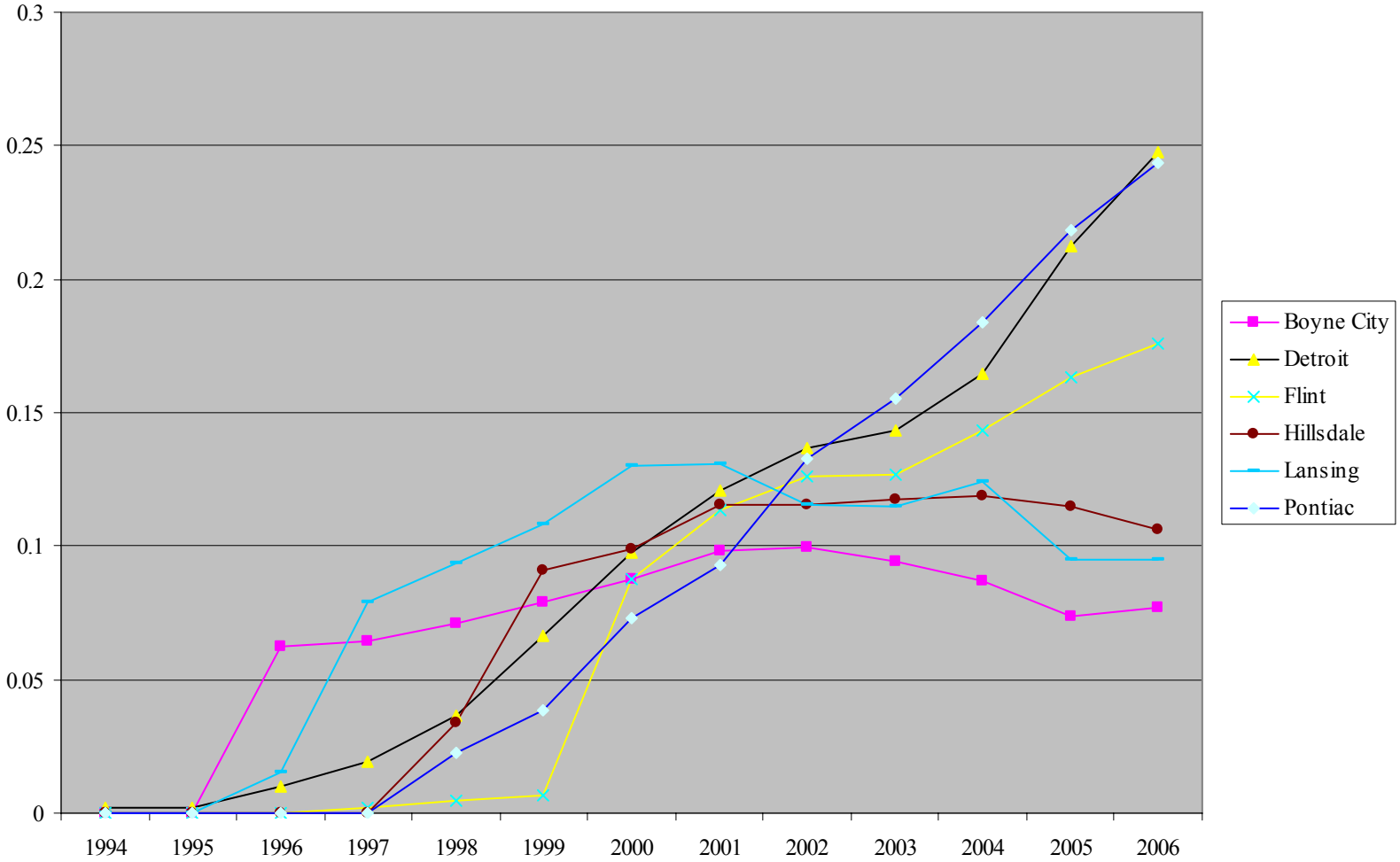

Table 7 Distribution of district charter competition intensity by district community type

Intensity of charter competition	Central cities	Low-income suburb	Middle-income suburb	High-income suburb	Rural	Total
None	0 (0%)	5 (24%)	110 (59%)	30 (86%)	234 (79%)	379 (68%)
Low	3 (21%)	13 (62%)	69 (37%)	5 (14%)	52 (17%)	142 (26%)
Threatening	11 (79%)	3 (14%)	7 (4%)	0 (0%)	12 (4%)	33 (6%)
Stabilizes (2001-06)	3	0	6	0	9	18
Increases (2001-06)	8	3	1	0	3	15

Notes: Low = $0 < CS_{2001} < 6\%$; Threatening = $CS_{2001} \geq 6\%$, Stabilizes = $CS_{2006} \leq CS_{2001}$; Further loss = $CS_{2006} > CS_{2001;}$ where CS = % of students residing in a district who attend charter schools. Numbers in parentheses display the percentage of districts in each community type by level of charter competition.

Table 8 District student composition by intensity of charter competition, 2001 and 2006

Intensity of charter competition	% Poor			% Special education		
	1994	2001	2006	1994	2001	2006
None	27.0	27.6	34.8	9.8	12.5	13.2
Low	29.3	30.3	38.2	10.7	13.8	14.5
Threatening	48.4	49.8	57.4	10.7	14.1	15.7
Stabilizes (2001-06)	38.3	38.8	47.1	10.1	14.3	15.5
Increases (2001-06)	61.4	63.0	69.8	11.3	13.9	15.9
	% Black			% Hispanic		
None	1.6	2.4	3.5	1.8	2.2	2.9
Low	6.2	8.1	10.4	2.8	3.6	4.5
Threatening	27.1	31.1	32.9	4.4	6.1	7.4
Stabilizes (2001-06)	10.9	13.8	15.9	2.9	3.8	4.8
Increases (2001-06)	46.5	51.9	53.2	6.1	8.8	10.5

Table 9 District resource allocation by intensity of charter competition (1996, 2001, 2006)

	Intensity of charter competition				Total	(3)-(4)	(1)-(4)
	None (1)	Low (2)	Threatening /stabilizes (3)	Threatening /increases (4)			
				1996			
% of Total exp							
Total instruction	66%	64%	65%	59%	65%	6.0%**	6.5%**
Basic instruction	54%	51%	51%	42%	52%	9.5%**	11.6%**
Added needs inst	11%	12%	13%	15%	11%	-2.4%	-4.3%**
Total support services	34%	36%	35%	41%	35%	-6.0%**	-6.5%**
Inst. support	6%	8%	7%	10%	7%	-2.5%	-3.7%**
Administration	13%	12%	13%	14%	13%	-0.4%	-0.8%
Operations & mainten	10%	11%	10%	12%	10%	-2.2%*	-1.7%**
Fund balance	19%	13%	9%	11%	17%	-2.2%	8.3%
Ave salary	41960	44727	45271	45028	42860	243	-3068
Ave pupil/teacher	21.0	22.3	21.5	23.3	21.4	-1.9	-2.3*
				2001			
% of Total exp							
Total instruction	65%	63%	64%	58%	64%	6.4%**	6.8%**
Basic instruction	52%	49%	49%	41%	51%	8.3%**	10.9%**
Added needs inst	12%	13%	14%	15%	13%	-1.0%	-3.5%**
Total support services	35%	37%	36%	42%	36%	-6.4%**	-6.8%**
Inst. support	7%	9%	8%	10%	7%	-1.6%	-2.9%
Administration	13%	13%	13%	15%	13%	-1.3%	-1.5%
Operations & mainten	10%	11%	10%	12%	10%	-2.1%**	-1.4%**
Fund balance	25%	16%	10%	11%	22%	-0.7%	14.1%
Ave salary	46376	48736	48896	48482	47120	414	-2105
Ave pupil/teacher	19.3	20.5	19.8	21.5	19.7	-1.5	-2.2**
				2006			
% of Total exp							
Total instruction	64%	63%	64%	56%	63%	8.5%**	7.9%**
Basic instruction	52%	50%	49%	40%	51%	8.9%**	11.4%**
Added needs inst	12%	13%	15%	15%	12%	-0.2%	-3.6%**
Total support services	36%	37%	36%	44%	37%	-8.5%**	-7.9%**
Inst. Support	7%	9%	8%	11%	8%	-3.5%*	-4.1%**
Administration	13%	13%	13%	15%	13%	-2.1%	-1.6%*
Operations & mainten	11%	11%	11%	12%	11%	-2.0%	-1.6%
Fund balance	20%	13%	12%	5%	18%	6.7%*	15.6%*
Ave salary	51979	54148	51237	52493	52531	-1257	-514
Ave pupil/teacher	20.9	22.1	21.5	23.7	21.3	-2.2	-2.8**

*p<.05, ** p<.01. Figures represent unweighted school district group averages.

Table 10 Shifts in district resource allocation between 2001 and 2006 by intensity of charter competition

	Intensity of charter competition				Total	(3)-(4)	(1)-(4)	(1)-(3)
	None (1)	Low (2)	Threatening /stabilizes (3)	Threatening /increases (4)				
				2006-2001				
% of Total exp								
Total instruction	-1.1%	-0.7%	0.3%	-2.1%	-1.0%	2.4%	1.0%	-1.3%
Basic instruction	-0.3%	0.6%	-0.1%	-0.8%	0.0%	0.7%	0.5%	-0.1%
Added needs inst	-0.2%	-0.4%	1.0%	0.0%	-0.2%	1.0%	-0.2%	-1.2%
Total support services	1.1%	0.7%	-0.3%	2.1%	1.0%	-2.4%	-1.0%	1.3%
Inst. Support	0.4%	0.0%	-0.5%	1.6%	0.3%	-2.1%*	-1.2%	0.9%
Administration	0.1%	0.0%	-0.5%	0.1%	0.0%	-0.7%	-0.1%	0.6%
Operations & Mainten	0.5%	0.6%	0.7%	0.7%	0.5%	0.0%	-0.2%	-0.2%
Fund balance	-4.3%	-2.7%	1.3%	-5.8%	-3.8%	7.1%	1.5%	-5.6%
Ave salary	5603	5412	2341	4012	5411	-1671	1591	3262
Ave pupil/teacher	1.6	1.6	1.7	2.3	1.6	-0.6	-0.7	-0.1

* p<.05, ** p<.01.

Appendix

Table A-1 Charter School Effects on TPS Instructional Expenditure:
Fixed Effects with Lagged Dependent Variable

	% TE total instruction		% TE basic instruction		% TE added needs instruction	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Lag	.514**	.514**	.491**	.489**	.519**	.518**
	(.019)	(.019)	(.020)	(.02)	(.021)	(.021)
% CS enroll	-.046**	--	-.024		-.016	
	(.015)		(.023)		(.017)	
CS Short	--	-.044		.016		-.04
		(.027)		(.038)		(.03)
CS Mid	--	.005		.049		-.04
		(.028)		(.038)		(.022)
CS Long	--	-.051**		-.033		-.012
		(.016)		(.024)		(.019)
Log(enroll)	.005	.006	.004	.005	.005	.005
	(.006)	(.006)	(.006)	(.006)	(.004)	(.004)
Log(TE/pupil)	-.027**	-.027**	-.04**	-.04**	-.008	-.007
	(.009)	(.009)	(.008)	(.008)	(.005)	(.005)
Log(SEV/pupil)	-.018**	-.017**	-.005	-.005	0	0
	(.004)	(.004)	(.005)	(.005)	(.004)	(.004)
% FRL	-.012	-.012	-.013	-.013	.012	.012
	(.009)	(.009)	(.009)	(.009)	(.007)	(.007)
%IDC_out	.025*	.025**	.019	.021*	.002	.001
	(.01)	(.01)	(.01)	(.01)	(.008)	(.008)
% spec ed	.077**	.077**	-.055*	-.054*	.12**	.119**
	(.021)	(.021)	(.023)	(.022)	(.017)	(.017)
% Asian	.043	.043	.007	.008	.043	.043
	(.033)	(.033)	(.039)	(.039)	(.031)	(.031)
% Black	-.005	-.004	-.003	-.002	.03**	.03**
	(.012)	(.012)	(.016)	(.016)	(.011)	(.011)
% Hispanic	.026	.028	.054	.058	-.011	-.012
	(.021)	(.021)	(.03)	(.03)	(.016)	(.017)
Obs #	6363	6363	6363	6363	6363	6363
R-square	0.38	0.38	0.38	0.38	0.38	0.38

Table A-2 Charter School Effects on TPS Salaries and Class Sizes:
Fixed Effects with Lagged Dependent Variable

	% TE instructional salaries		Ln average teacher salary		Pupil to teacher ratio	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Lag	.514**	.512**	.353**	.352**	.283**	.283**
	(.020)	(.020)	(.025)	(.025)	(.022)	(.022)
% CS enroll	-.031		-.039		.245	
	(.017)		(.099)		(1.475)	
CS Short		.006		.012		.623
		(.026)		(.135)		(2.705)
CS Mid		.048		.129		-1.762
		(.036)		(.167)		(1.917)
CS Long		-.04*		-.058		.419
		(.018)		(.107)		(1.534)
Log(enroll)	.007	.008	-.001	.001	-.516	-.534
	(.006)	(.006)	(.023)	(.023)	(.565)	(.566)
Log(TE/pupil)	-.038**	-.039**	.121**	.12**	-8.355**	-8.364**
	(.009)	(.009)	(.033)	(.034)	(.681)	(.68)
Log(SEV/pupil)	-.012**	-.012**	-.014	-.014	1.246**	1.247**
	(.004)	(.004)	(.019)	(.019)	(.399)	(.401)
% FRL	-.002	-.003	.029	.028	1.744*	1.756*
	(.009)	(.009)	(.043)	(.043)	(.79)	(.79)
%IDC_out	.012	.013	-.075	-.072	.761	.729
	(.01)	(.01)	(.051)	(.051)	(.709)	(.708)
% spec ed	.078**	.08**	.034	.037	.702	.692
	(.02)	(.02)	(.073)	(.073)	(1.518)	(1.511)
% Asian	.053	.054	-.127	-.126	-6.11*	-6.128*
	(.036)	(.037)	(.136)	(.135)	(3.036)	(3.04)
% Black	-.013	-.012	-.059	-.056	2.173	2.141
	(.012)	(.012)	(.049)	(.05)	(1.23)	(1.234)
% Hispanic	.023	.026	-.078	-.071	-.628	-.669
	(.021)	(.021)	(.066)	(.067)	(1.431)	(1.43)
Obs #	6361	6361	6318	6318	6318	6318
R-square	0.34	0.34	0.57	0.57	0.42	0.42

Table A-3 Charter School Effects on TPS Support Service Expenditures: Fixed Effects with Lagged Dependent Variable

	% TE total instructional support		% TE business & administration		% TE operations & maintenance		% TE total support services	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Lag	.599**	.599**	.372**	.370**	.440**	.440**	.515**	.515**
	(.021)	(.022)	(.032)	(.032)	(.027)	(.026)	(.019)	(.019)
% CS enroll	.011		.016		.006		.046**	
	(.011)		(.012)		(.009)		(.015)	
CS Short		.009		.01		.009		.044
		(.017)		(.029)		(.017)		(.027)
CS Mid		.004		-.002		-.011		-.005
		(.014)		(.024)		(.014)		(.028)
CS Long		.012		.018		.008		.051**
		(.011)		(.012)		(.009)		(.016)
Log(enroll)	.005*	.005*	-.015*	-.015*	.002	.002	-.005	-.006
	(.003)	(.003)	(.006)	(.006)	(.003)	(.003)	(.006)	(.006)
Log(TE/pupil)	.014**	.014**	.015	.015	.005	.005	.027**	.027**
	(.003)	(.003)	(.009)	(.009)	(.004)	(.004)	(.009)	(.009)
Log(SEV/pupil)	.001	.001	.003	.003	.01**	.01**	.018**	.017**
	(.002)	(.002)	(.003)	(.003)	(.002)	(.002)	(.004)	(.004)
% FRL	-.005	-.005	.019**	.019**	.004	.004	.012	.012
	(.004)	(.004)	(.007)	(.007)	(.004)	(.004)	(.009)	(.009)
%IDC_out	.001	.001	-.024**	-.025**	-.002	-.002	-.025*	-.025**
	(.005)	(.005)	(.009)	(.009)	(.005)	(.005)	(.01)	(.01)
% spec ed	.004	.004	-.047**	-.047**	-.024*	-.024*	-.077**	-.077**
	(.011)	(.011)	(.018)	(.018)	(.011)	(.011)	(.021)	(.021)
% Asian	-.025	-.025	-.037	-.037	-.015	-.015	-.043	-.043
	(.019)	(.019)	(.024)	(.024)	(.017)	(.017)	(.033)	(.033)
% Black	.015	.015	-.029**	-.029**	-.006	-.006	.005	.004
	(.008)	(.008)	(.008)	(.008)	(.006)	(.006)	(.012)	(.012)
% Hispanic	.001	.001	-.037*	-.038*	.002	.002	-.026	-.028
	(.011)	(.011)	(.019)	(.019)	(.012)	(.012)	(.021)	(.021)
Obs #	6363	6363	6363	6363	6363	6363	6363	6363
R-square	0.41	0.41	0.18	0.18	0.24	0.24	0.38	0.38