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For-profit milk in nonprofit cartons? The case of nonprofit charter schools subcontracting with for-profit education management organizations

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There is growing concern that some nonprofit public service providers may be nonprofit in name but not in fact. We consider this concern in the context of nonprofit charter schools, which sometimes subcontract their daily operations to for-profit management organizations. We use unique data from Ohio to study how nonprofit charter schools' reliance on for-profit operators affects student achievement and attendance. The results indicate that nonprofit charters that subcontract with for-profit operators tend to be more effective and equitable in promoting student achievement (but not attendance, a less salient outcome) than nearby traditional public schools serving similar students. However, nonprofit charters that subcontract with for-profit operators tend to be less effective (with regard to both achievement and attendance) and less equitable (with regard to attendance) than other nonprofit charters nearby. Further analysis comparing the administration and outcomes of for-profit and nonprofit operators suggests that the profit motive may help explain the inferior performance of nonprofit charters with for-profit operators. Our study offers theoretical insights for literatures on charter schools, contracting, performance monitoring, and sector boundaries, and it has immediate implications for education policy and management.

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For-profit milk in nonprofit cartons? The case of nonprofit charter schools subcontracting with for-profit education management organizations

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Abstract

There is growing concern that some nonprofit public service providers may be nonprofit in name but not in fact. We consider this concern in the context of nonprofit charter schools, which sometimes subcontract their daily operations to for-profit management organizations. We use unique data from Ohio to study how nonprofit charter schools' reliance on for-profit operators affects student achievement and attendance. The results indicate that nonprofit charters that subcontract with for-profit operators tend to be more effective and equitable in promoting student achievement (but not attendance, a less salient outcome) than nearby traditional public schools serving similar students. However, nonprofit charters that subcontract with for-profit operators tend to be less effective (with regard to both achievement and attendance) and less equitable (with regard to attendance) than other nonprofit charters nearby. Further analysis comparing the administration and outcomes of for-profit and nonprofit operators suggests that the profit motive may help explain the inferior performance of nonprofit charters with for-profit operators. Our study offers theoretical insights for literatures on charter schools, contracting, performance monitoring, and sector boundaries, and it has immediate implications for education policy and management.

Keywords: charter schools, contracting, for-profits, nonprofits, public services

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1. Introduction

Governments around the world increasingly contract with nonprofit organizations to provide public services (e.g., see Alaimo, 2018; Kim & Kim, 2015; Lu, 2015; Pettijohn et al., 2013; Zhang & Shao, 2021). Nonprofits' social missions, public values, public service motivation, and non-distribution constraint ostensibly make them more trustworthy than for-profits (Amirkhanyan, 2010; Bennett & Iossa, 2010; Brown & Slivinski, 2018; Faulk et al., 2020; Lazzarini, 2020; Moulton & Eckerd, 2012; Rainey et al., 2021; Witesman et al., 2022; Word & Carpenter, 2013). For example, public officials in the United States (U.S.) often prefer nonprofit over for-profit contractors for services that entail higher transaction costs and require more trust (Brunjes, 2023; O'Regan & Oster, 2000; Witesman & Fernandez, 2013).

What if, however, a contractor is a nonprofit organization in name but not so much in fact? This is an underexplored question in the contracting literature. A number of recent studies have voiced concerns over nonprofit organizations becoming more for-profit-like through various channels such as commercialization, hybridization, and conversion (Beaton, 2021, Beaton et al., 2021; Maier et al., 2016; Park et al., 2022; Suykens et al., 2019, 2023). Our study sheds light on another channel through which nonprofit public-service providers may become for-profit-like: by contracting with a for-profit management company for daily operations (e.g., see Burris & Cimarusti, 2021; Freeman, 2022; McDermott Will & Emery, 2023; Young, 2022).

Although it is common practice for nonprofits to contract or subcontract with for-profits, this type of cross-sector contracting has received little research attention and thus remains little understood (Alaimo, 2018). It is unclear whether contracting with a for-profit will help or hurt a nonprofit's ability to realize its mission. So long as the nonprofit can maintain the integrity of its public service mission and direct or incentivize its for-profit contractor to pursue this mission,

perhaps the contractor's for-profit status is of little consequence. Contracting with a for-profit may even be useful in this case, thanks to cross-sector learning and comparative advantages (e.g., see Murphy et al., 2012; O'Regan & Oster, 2000; Potoski et al., 2023). On the other hand, excessive dependence on a for-profit contractor—which may occur when nonprofits contract with for-profit management companies (e.g., see Burris & Cimarusti, 2021; Freeman, 2022; McDermott Will & Emery, 2023; Young, 2022)—may cause the nonprofit a host of problems such as value clashes, a drift in the nonprofit's public mission, and profit-motivated opportunism that leads to outcomes that diverge from that public mission (e.g., see Beaton, 2021; Hansmann, 1980; O'Regan & Oster, 2000). Even when cross-sector contracting has negative impacts, the extant literature has not identified the causes of such impacts. If contracting with a for-profit undermines a nonprofit's ability to realize its mission, for instance, is it because of the profit motive or the transaction costs endemic to all contracting? This is another issue on which our study sheds some light.

Nonprofits contracting with for-profit management companies has become a concern in various sectors, such as health care (e.g., see Young, 2022), foster care (e.g., see McDermott Will & Emery, 2023), community development (e.g., see Freeman, 2022), and especially public education (e.g., see Burris & Cimarusti, 2021). This study focuses on this last sector and considers the contracting arrangements of charter schools, which are privately operated but government funded to provide public elementary and secondary education. These schools are independent of traditional school districts and, instead, operate under a contract ("charter") with a government-approved authorizer. Charter schools are required to be nonprofit entities in every U.S. state except Arizona (Burris & Cimarusti, 2021) but their governing boards are often allowed to enter into sub-contracts with for-profit education management organizations (EMOs). These sub-contracts sometimes hand EMOs nearly all of a charter school's public funds as well as control over core operations, including

their management, personnel, and curriculum (Burris & Cimarusti, 2021). In Ohio, the focus of this study, we find that the median EMO-run charter school sends 94 percent of its annual budget to its EMO (hence this article's title "for-profit milk in nonprofit cartons").[2] These so-called "sweeps" contracts have raised concerns over the risks of marketizing public education and pursuing financial gains at the expense of student outcomes (e.g., see Burris & Cimarusti, 2021; Dykgraaf & Lewis, 1998; Miron et al., 2021; Paino et al., 2014).

In response to such concerns in the U.S., several states have banned (e.g., California) or considered banning (e.g., Ohio) for-profit businesses from the charter sector (Burris & Cimarusti, 2021), while the U.S. Department of Education (2022, p. 67) now requires nonprofit charter schools seeking federal funding to "exercise fiscal and operational transparency by disclosing their contractual relationships with for-profit management organizations." These concerns and reactions might be valid because, as state funding formulas provide fixed revenue amounts per pupil, a profit motive could lead for-profit EMOs to minimize spending and, consequently, lower educational quality.[3] On the other hand, the profit motive might incentivize for-profit EMOs to increase revenue by enrolling more students and realizing economies of scale—which requires satisfying the educational demands of parents who choose to enroll their children, as well as state regulators who monitor their performance. Thus, the extent to which the involvement of for-profit EMOs poses a problem for the performance of nonprofit charter schools—and for public schooling more generally—is an empirical question.

[2] See Figure A1 in the appendix.
[3] Recent research on the economics of education has established the positive and substantively significant causal impact of school spending on student achievement and attainment. See Jackson and Mackevicious (2023) for a meta-analysis of studies with plausibly causal designs.

Our study addresses this question by considering the subcontracting arrangements of nonprofit charter schools in Ohio—which, to our knowledge, is the only state with the data and empirical variation necessary for our analysis. In particular, Ohio is one of few states with a sufficiently large number of charter schools managed by for-profit organizations (80 percent of schools run by EMOs are in four states: Arizona, Florida, Michigan, and Ohio) and it is the only state that makes charter school sub-contracts with management companies publicly available (Burris & Cimarusti, 2021). To our knowledge, it is also the only state that collects sufficiently fine-grained financial data to examine how charter schools allocate their resources across functions—whether or not those functions are performed in-house. Using these data, we can measure how much charter schools rely on management companies—either for-profit EMOs or nonprofit charter management organizations (CMOs)—to perform core functions. Importantly, the sheer number of Ohio charter schools enables us to compare schools operating in the same geographic school district and serving similar students but with different subcontracting arrangements. Thus, combined with our access to student-level data, we can estimate how variation in charter schools' subcontracting practices corresponds to the plausibly causal effects of these schools on student cognitive and behavioral outcomes.

Our primary empirical strategy is to estimate the annual academic gains of students in grades 4-8 (grades for which we have annual outcome data) and to compare those gains between charter schools that do and do not subcontract with for-profit EMOs. In particular, we compare the gains of observationally similar students whose charter schools operate in the same geographic school district and, as we show, have comparable funding streams and student populations. We estimate impacts on annual gains in achievement (in math and English language arts) and absence rates (measured as the

proportion of instructional hours for which a student had an absence that was unauthorized[4]), as a growing literature has documented that these outcomes capture distinct dimensions of education and predict superior lifetime social and economic outcomes (e.g., see Gershenson, 2016; Gottfried & Hutt, 2021; Jackson, 2018; Rose et al., 2022). Examining multiple outcome dimensions is also crucial when assessing the performance of public service providers given the multi-dimensional nature of public goals and the potential for goal displacement when certain performance dimensions (like test-based achievement) figure disproportionately in performance management systems (e.g., see Boyne et al., 2006; Li, 2022; Rainey et al., 2021; West et al., 2016).

In addition to estimating average effects, we consider the equity implications of EMO-operated charters by estimating the extent to which they cause expansions or reductions in gaps between students who are in the top and bottom 30 percent in the geographic school district's achievement and attendance-rate distributions. Doing so is particularly important given concerns over the relative lack of focus on equity and the potential efficiency and equity tradeoffs with the marketization of public services (e.g., see Andrews & Van de Walle, 2013; Brown et al., 2018; Frederickson, 2015). Finally, in addition to conducting a number of sensitivity analyses that establish the robustness of our estimates, we examine whether the profit motive is a likely explanation for our results, as opposed to common transaction costs associated with contracting. We do so by exploring some potential mechanisms and by comparing charter schools that outsource to for-profit EMOs with nearby charter schools that outsource to nonprofit CMOs.

The results indicate that nonprofit charter schools operated by for-profit EMOs are more effective and equitable than nearby traditional public schools (TPSs) run by school districts with

[4] We focus on unauthorized absences because they better reflect behavioral issues than overall absence rates (e.g., see Gottfried, 2009). As we discuss below, counts of days or hours absent introduce a mechanical bias because of the variation in instructional hours across school types, though the results of overall absence rates are qualitatively similar.

regard to student achievement, but there is no statistically significant difference between EMO-operated charters and TPSs with regard to attendance rates. The achievement results are substantively significant, with EMO-run charters improving annual achievement gains by approximately 0.04 standard deviations compared to nearby TPSs. These benefits accrue primarily to students in the bottom 30 percent of the geographic school district's achievement distribution, who improve their performance by approximately 0.07 standard deviations annually. However, we find that nonprofit charter schools run by for-profit EMOs are less effective (with regard to both achievement and attendance) and less equity-enhancing (with regard to attendance) than the other nonprofit charter schools nearby.

Further analysis suggests that the profit motive is a likely culprit, as the results hold when comparing nonprofit charters that outsource to for-profit EMOs with nonprofit charters in the same district that outsource to nonprofit CMOs. In other words, by comparing charter schools that contract out to operators, we have good evidence that the mere act of contracting is not to blame. Moreover, the attendance results suggest that EMO-run charters focus more on test scores—the most salient outcomes that are at the center of Ohio's charter-school accountability system—than on outcomes for which they are not explicitly held accountable. This disparity is driven by EMO-run charters that send nearly all of their annual funds to their EMOs. We also observe that EMO-operated schools direct more funds toward instruction and that their students receive more instructional hours, which are consistent with their relative emphasis on student achievement. Finally, consistent with for-profit firms seeking to realize economies of scale, we found that EMO-run charters spend less on personnel, have larger student-teacher ratios, have more schools in their networks, and are more likely to control all aspects of school administration than their CMO counterparts.

It may very well be that these EMO-run nonprofit charter schools are fulfilling their functions as innovators. After all, that their impacts on achievement are superior to TPSs'—in spite of larger classrooms, fewer personnel, lower teacher pay, and higher teacher turnover—suggests that their approach could be emulated by TPSs, which spend $5,000 more per pupil annually (see Table A1 in the appendix). However, that they are outperformed by both sole-operated nonprofit charter schools and nonprofit charter schools operated by nonprofit CMOs—particularly on the less salient outcome that is not formally part of the state's school accountability systems—suggests that nonprofit charter schools may indeed be more trustworthy public service providers if they do not subcontract with a for-profit management organization.

2. Theoretical and Empirical Background

2.1. Cross-Sector Public Service Contracting

The literature on public service contracting typically adopts a principal-agent perspective, with the principal and the agent from different sectors (e.g., see Brown & Potoski, 2003; Brown et al., 2013, 2018; Heinrich & Marschke, 2010; Schillemans & Busuioc, 2015; Van Slyke, 2007). The benefits of cross-sector contracting lie in sectoral comparative advantages, since public service provision often requires a series of discrete tasks (e.g., financing, producing, and regulating) that certain sectors can do better or more efficiently (O'Regan & Oster, 2000; Potoski et al., 2023; Witesman & Fernandez, 2013). Via cross-sector contracting, for example, government can maintain its advantages in rulemaking and tax-based financing while utilizing a nonprofit contractor's advantages in trustworthiness and volunteerism or a for-profit contractor's advantages in equity financing and single-minded decision-making (O'Regan & Oster, 2000).

On the other hand, there are various potential transaction costs associated with a formal contracting relationship, including the costs of finding an agent, drafting and negotiating a

contract, monitoring agent performance, and, notably, agency loss enabled by the informational advantage of the agent—that is, divergence between the principal's preferred outcomes and the outcomes to which an agent's actions lead (Brown & Potoski, 2003). Although there are transaction costs common to all contracting relationships, agency loss is dependent on the congruence between the goals of the principal and the agent. So long as there is some information asymmetry between the principal and agent, the more an agent's goals diverge from a principal's, the more likely service provision will diverge from what the principal desires.

A common concern in public service contracting is that the goals of for-profit contractors diverge from public goals to a greater extent than the goals of nonprofit contractors (Amirkhanyan, 2010; Bennett & Iossa, 2010; O'Regan & Oster, 2000; Rainey et al., 2021; Witesman & Fernandez, 2013; Witesman et al., 2022). Thus, holding everything else constant (e.g., the competence of the agent, the performance monitoring mechanisms in the contract, the characteristics of the population to be served, and so on), contracting with a for-profit service provider should lead to greater agency loss for government (and, by extension, the public)—particularly on unmeasured performance dimensions. In that sense, for-profit contractors may be less trustworthy than their nonprofit counterparts (e.g., see Brown et al., 2013, 2018; Brown & Slivinski, 2018). Indeed, public officials in the U.S. tend to prefer hiring nonprofit contractors for public services that require more trust (Brunjes, 2023; O'Regan & Oster, 2000; Witesman & Fernandez, 2013).[5]

What if, however, a nonprofit organization contracted to provide public services in turn subcontracts its operations to a for-profit organization? In other words, what if a nonprofit becomes an "intermediary" principal (Faure-Grimaud & Martimort, 2001, p. 75) that links the

[5] Nonprofit and for-profit public service providers do not always perform differently, however. We review this literature below.

government principal with a for-profit agent? Although a for-profit subcontractor could bring benefits such as extra capital, expertise, and efficiency (Alaimo, 2018; O'Regan & Oster, 2000), there are multiple reasons why this arrangement might be more problematic than the classical principal-agent government contracting relationship, in which government contracts with one nonprofit or for-profit service provider.

First, there is now another set of transaction costs associated with introducing another contracting relationship (e.g., selecting another agent, drafting and negotiating another contract, and monitoring another agent's performance)—costs that could eat into resources otherwise used to provide services. In particular, there is more opportunity for agency loss now, as another agent has been added to the principal-agent accountability chain. Any initial information asymmetry between the government and its nonprofit contractor might be amplified by the additional information asymmetry of the new contracting relationship, allowing greater divergence from government (and public) goals (e.g., see Romzek & Johnston, 2005). Transaction costs might be further magnified if the for-profit organization is indeed (or is believed to be) more opportunistic.

A second, related reason that nonprofits subcontracting to for-profits might be problematic has to do with differences in institutional logics. Research has pointed out different prevailing logics within different sectors (e.g., see Beaton, 2021; Pache & Santos, 2013; Skelcher & Smith, 2015; Thornton et al., 2012; Trætteberg, 2015). For example, the public sector tends to have a "hierarchical political logic" involving utilitarianism and Weberian bureaucracy; the for-profit sector tends to have a "market logic" emphasizing market signals, managerialism, economic efficiency, and profit maximization; and the nonprofit sector tends to have a "civil society logic" underlining minority interests, voluntarism, and informality (Trætteberg, 2015, pp. 1623-1626). Logic incongruence and clash among these three sectors might arise if a nonprofit contractor

becomes an intermediary that links the government principal with a for-profit subcontractor, magnifying the transaction costs described above. Skelcher and Smith (2015, p. 440) coined the term "blocked hybrid" to define situations in which organizations underperform because of unresolvable conflicts between institutional logics. By way of illustration, a nonprofit originally focusing on helping a marginalized, underserved, and vulnerable community might struggle with a for-profit partner's demand for maximizing profits or a government partner's demand for serving a larger and more mainstream population.

Third, if a nonprofit organization contracts too much, they can become "hollowed out" (Milward & Provan, 2000, p. 360)—especially if they contract core functions as opposed to support functions (e.g., see Alaimo, 2018; Saunders et al., 1997). In other words, the nonprofit ceases to have the qualities of a nonprofit in any meaningful sense. This might occur over time as the nonprofit adopts the qualities of its for-profit contractor—such as via "mission drift" (Beaton, 2021, p. 55)—or because the for-profit gains too much power and can dictate the terms of the relationship (in other words, the agent effectively becomes the principal). An extreme form of the latter might occur if a for-profit management company drives the creation of a nonprofit so that it can be the subcontractor for that nonprofit. This dynamic could turn a nonprofit public-service provider into a puppet intermediary that appears deceptively trustworthy to its principals—the government and the public—such that it leads them to underinvest in monitoring service quality. This has become a matter of concern in the context of nonprofit charter schools (e.g., Burris & Cimarusti, 2021), in that some believe excessive subcontracting with for-profit EMOs could turn charter schools into "nonprofit cartons" filled with "for-profit milk."

2.2. Nonprofit Charter Schools Subcontracting with For-Profit EMOs

Charter schools are publicly funded but privately operated schools that deliver public education, open to all students and free of charge. State governments essentially contract with these organizations to deliver public education. Since the first charter school in the U.S. was established in the early nineties, the charter sector has expanded to about 7,700 schools with over 3.4 million students—roughly 7.2 percent of all public school students nationwide (White & Hieronimus, 2022). These schools are required to be nonprofit entities in every state except Arizona, which allows for-profit organizations to govern charter schools (i.e., a for-profit entity may hold a charter school's charter) (Burris & Cimarusti, 2021). Yet, states allow nonprofit charter schools to subcontract day-to-day operations to a management company, which can be a nonprofit or, in several states, a for-profit entity (Miron et al., 2021).

Charter schools subcontracting to management companies—often called "operators"—involves handing over the management of a school, such as performing back-office functions and hiring and firing school personnel. It also often involves outsourcing all of a school's core functions—including curriculum design and instruction—and might involve the management company getting most if not all of the school's public funds. Thus, contracting with a for-profit EMO or a nonprofit CMO is different from the type of contracting that all schools (including traditional public schools) engage in for various support functions (e.g., transportation, building maintenance, food service, and technological support). According to David (2018), about 65 percent of charter schools in the U.S. are independent schools that manage their own operations while 23 percent have outsourced their operations to nonprofit CMOs and 12 percent to for-profit EMOs.

There has been relatively little research investigating the performance of EMO-operated charter schools. The limited available research contradicts the implicit belief of many critics that charter schools subcontracting with for-profit EMOs is necessarily bad for students. Notably,

using a randomized experimental design, a 2018 study found that over 50,000 students attending charter schools operated by National Heritage Academies, a for-profit EMO, had greater achievement gains in mathematics than they would have had in TPSs, although there were no statistically significant effects on reading or attendance (Dynarski et al., 2018). It is unclear, however, how the same students would have performed in a nonprofit-operated charter school. A 2017 report by the Center for Research on Education Outcomes (CREDO) included a brief comparison of the educational impact of charter schools that subcontracted with for-profit and nonprofit operators. They found that, on average, nonprofit-operated charter schools realized greater student achievement gains in 2014-15 than for-profit-operated charter schools (CREDO, 2017). However, this analysis did not distinguish between site-based, brick-and-mortar charter schools and online "virtual" charter schools. Research makes clear that the average student experiences lower achievement growth in distance education (Darling-Aduana et al., 2022), and virtual charter schools are far more likely to be run by for-profit companies. Thus, CREDO's combining of schools with different modes of instruction—as well as its comparison of schools operating in very different environments—precluded apples-to-apples comparisons between for-profit and nonprofit operated charters.

Studies focused on Florida (Sass, 2006; Singleton, 2017) and Michigan (Hill & Welsch, 2009) found no difference in the achievement gains of students in charter schools operated by for-profit EMOs and nonprofit CMOs, although Singleton's (2017) school-level analysis indicated some efficiency advantages among for-profit-operated schools. Like CREDO's study, however, these studies focused on achievement impacts that were the focus of school accountability systems, did not consider the equity implications, and did not compare the performance of EMOs, CMOs, and TPSs serving similar students and operating in similar

environments (e.g., schools drawing from the same teacher labor markets). In contrast, our Ohio context enables us to compare nonprofit charters that are run by EMOs and CMOs but that are otherwise similar in their revenues, student bodies, and broader contexts.

2.3. Empirical Research Comparing For-profit and Nonprofit Service Providers

There is a significant body of research on the relative performance of for-profit and nonprofit public service providers. Witesman and Fernandez's (2013) comprehensive study surveying hundreds of local governments that contracted with private providers, for various types of public services, found no significant government-perceived performance differences between for-profit and nonprofit contractors. A comprehensive study by Brunjes (2023) examined federal contracting and found only one significant performance-related difference (i.e., the likelihood of early contract termination) between for-profit and nonprofit contractors. Most of the other studies in this line of research, however, have focused on a specific type of service—such as job training, crime prevention, healthcare, or higher education—when comparing for-profit and nonprofit performance.

Several studies of job training programs—including those by Heinrich (2000), Koning (2008), and Cockx and Baert (2015)—have compared publicly subsidized for-profit and nonprofit service providers and found that neither for-profit nor nonprofit providers consistently outperformed the other in terms of participant outcomes. Among studies examining crime prevention, Bayer and Pozen (2005) found that for-profit juvenile correctional facilities often had lower costs but higher recidivism rates than nonprofit facilities, while Beaty (2021) found that for-profit reentry programs often provided weaker rehabilitation than nonprofit programs. Studies focused on healthcare, the context in which there has been the most research comparing for-profit and nonprofit providers, suggest pronounced differences by sector. For example, according to

literature reviews by Devereaux et al. (2004) and Bos et al. (2017), most studies have found that for-profit hospitals and nursing homes have stronger financial performance but weaker employee and client well-being compared to their nonprofit counterparts. Finally, according to Cellini's (2021) review of sector differences in higher education, students in for-profit colleges often have worse outcomes in terms of future earnings and employment relative to similar students in nonprofit colleges.

2.4. Ohio Charter School Governance Context

Most U.S. states contract with public (and, sometimes, nonprofit) organizations to "authorize" nonprofit charter schools on its behalf; authorizers then contract with charter schools (typically nonprofit) by granting them those charters; and, ultimately, each charter school either manages its own operations or subcontracts with a management company (for-profit EMO or nonprofit CMO) to operate the school. These cascading contracts are further nested within a school accountability system that holds both authorizers and charter schools accountable for performance—particularly with respect to student achievement on state math and English language arts (ELA) exams. Ohio's governance system for charter schools works much like the typical state's system, but it is one of the few states where EMOs are so involved in charter school operations—a key to implementing the research design we describe below.

Between the 2015-16 and 2018-19 school years (the years of this study) Ohio's charter schools were held accountable using a variety of mechanisms. Most notably, the state held charter school authorizers accountable for the performance of the charter schools they authorized using a performance measurement system that graded authorizers based on the administrative practices, legal and regulatory compliance, and academic outcomes of their schools. The academic component included a weighted average of indicators on publicized school report

cards, which included measures of student achievement and attainment but, notably, not student attendance. The state could limit or even revoke an authorizer's authority if they performed poorly. In turn, and by state law, authorizers were required to hold their charter schools accountable for their academic performance.

Consistent with federal law, the state also identified schools in the bottom of the achievement distribution for administrative interventions and publicized academic performance via school report cards. In particular, schools in the bottom five percent of the statewide distribution of math and ELA achievement were identified as "priority" schools that were targeted for administrative interventions. The report cards could also affect parental decisions regarding which schools to choose. Again, notably, these academic performance metrics focused on student achievement measures and excluded attendance-based measures.[6] Thus, the information and accountability environment in Ohio were such that test-based achievement was at the center of principal-agent performance monitoring. If a charter school operator were focused exclusively on staying open—as opposed to meeting the broader educational needs of students—one might expect it to direct resources toward these measured outcomes as opposed to less salient outcomes, such as student attendance.

3. Research Design

3.1. Data

The Ohio Department of Education (ODE) provided student-level data recording each student's school of attendance for each grade and year, demographic characteristics (race, sex, economic status, and English-learner status), scale scores on statewide mathematics and ELA exams in grades

[6] There was also a law on the books that required the automatic closure of charter schools that failed to meet achievement benchmarks in math and ELA (Carlson & Lavertu, 2016), but that law was not enforced during the years of this study.

3-8, and the annual number of instructional hours for which the student was present. We normalized test data for grades 3-8 such that a student's scores captured their distance in standard deviation units from the statewide mean in a given subject, grade, and year. In the analysis below, we average math and ELA scores to get a single z-score for each student-year observation. To measure attendance, we focus on rates of unauthorized absences—specifically, the number of instructional hours students missed without permission divided by the total number of required instructional hours in their school. We focus on unauthorized absences to better isolate the behavioral dimension in which we are interested. We focus on an absence rate—as opposed to hours or days absent—because some schools (particularly charter schools) with more required instructional hours mechanically allow for longer absences. As we show in the appendix, other measures of attendance and absences yield comparable results—though estimates using unauthorized absences are more precise.

In addition to student-level academic data, we obtained from ODE school-level expenditure data; school-level budget forecast data (which we compiled from separate spreadsheets for each school in each year) that enabled us to determine a school's contracting relationships; restricted use staffing data that included teachers' salaries and years of experience; and ODE's federal EdFacts submissions to determine the for-profit or nonprofit status of school operators.[7] We provide additional descriptive statistics for these data in the appendix.

[Insert Table 1 about here.]

Table 1 provides counts of Ohio charter schools in operation during the 2018-2019 (2019) school year—the last pre-pandemic year for which complete student-level outcome data were

[7] We coded nonprofit and for-profit operators as CMOs or EMOs, respectively, regardless of the number of schools they operated. Many operated a single school. This helps the exposition, but it also allows us to bypass the problem that for-profit EMOs often create local LLCs to operate particular schools.

available. Our analysis concentrates on brick-and-mortar schools providing a general education.[8] As Table 1 shows, whereas 22.4 percent of Ohio's brick-and-mortar charter schools did not subcontract with an external entity to operate their schools, 26.2 percent subcontracted with nonprofit operators and 51.4 percent subcontracted with for-profit operators. Forty-one of the 47 sole-operated charter schools and 47 of the 55 CMO-operated schools served the elementary grades that are the focus of our analysis (grades 3-8), whereas all of the EMO-operated schools served these grades. We set aside online virtual schools, schools that focused on special-education students, and schools that focused on dropout prevention and recovery, as these schools have student populations and administrative structures that make comparisons across schools difficult. We leave out grades 9-12 because their administrative structures differ between charter schools and TPSs—making comparisons of school-level inputs more suspect—and there are additional analytic challenges, such as irregular testing schedules and student attrition.

[Insert Table 2 about here]

Table 2 provides descriptive statistics of student-level data in our analytic sample, which includes student-by-year observations for every public-school student observed between 2016 and 2019 in the 66 Ohio school districts in which brick-and-mortar, "general education" charter schools were located. The table presents averages of student-level variables across school types, as well as within-district differences in those averages between EMO-operated schools and TPSs, non-profit-operated charter schools, and CMO-operated charter schools. These within-district data reveal that EMO-operated charter schools served students that were very similar to those in nearby TPSs. Although EMO-operated charters appeared to serve students that had somewhat different demographics than those in nearby nonprofit-operated charters, these differences are not

[8] Table A2 in the appendix summarizes the number of schools of various types in districts that have both for-profit and nonprofit-operated charter schools.

worrisome because, as detailed below, our identification strategies depend not on identical student bodies at baseline but on common trends and independence conditional on covariates. Additionally, in a variety of sensitivity analyses, we demonstrate that our estimates are insensitive to controlling for schools' student demographics.

3.2. Empirical Strategy

Our primary empirical strategy is to estimate the annual academic gains of students in grades 4-8 and to compare those gains between charter schools that do and do not subcontract with for-profit EMOs. In particular, we compare the gains of observationally similar students whose schools operate in the same geographic school district and, as we show below, have comparable funding streams and student populations. To explore the extent to which a profit motive might explain our results, we compare CMO- and EMO-run schools on a salient outcome (achievement on state tests) to a less salient outcome (attendance), compare their spending and administrative practices, and examine whether the results are contingent on the extent to which they rely on their management companies to run their schools (e.g., the extent to which they may be "hollowed out").

Researchers have developed and validated econometric techniques for estimating school effectiveness. This literature reveals that observational "value-added models"—which capture year-to-year "gains" in student achievement based on math and reading exams administered in consecutive years—yield estimates of school effectiveness with minimal bias (Angrist et al., 2022). Consistent with this literature, our primary empirical approach consists of comparing education outcomes between students attending different school types, while controlling for students' prior-year outcomes and demographic characteristics. To help validate these one-year value-added estimates, we also conduct an event-study analysis for the subset of students we observe in a structural move (i.e., they have reached the terminal grade of their elementary

school and must transition to a new school) so that we can follow them in the years leading up to and after transitioning to different school types.

As we discuss further below, our value-added estimates yield plausibly causal estimates of school effectiveness in that the results are unlikely to be driven by student selection into different school types. Additionally, because we compare schools serving similar grades and located in the same geographic districts, our analysis of school inputs (e.g., spending per pupil, student-teacher ratios, teacher pay, instructional hours, and so on) accounts for much of the variation in teacher labor markets and the costs of various other inputs (e.g., real estate) across the state (e.g., see Bifulco, 2012). Finally, as we show below, the within-district comparisons are among schools (both TPS and charter) that serve similar student populations. Thus, although charter schools are strategic in deciding where to locate and which students to recruit—decisions which, in turn, have broader equilibrium effects for public schooling (e.g., see Singleton, 2022)—our analysis provides a plausible account of the relative educational effectiveness of nonprofit-operated and for-profit-operated charter schools.

3.2.1. Event Study Design

We begin by estimating the impact of EMO-run charter schools using an event-study design. We implement this design using a stacked regression, to avoid well-documented problems with two-way fixed-effects models when there are more than two time periods and the timing of treatment varies (see Roth et al., 2023). We first identified all students who were in the terminal grade of their elementary school in years 2015-2018 and, thus, transitioned to a new school the following year (2016-2019). We then created separate panel datasets of these "transition students" for each school-year by transition-grade combination (e.g., there is a panel for grade 6 transitions that occurred in 2017), and then we stacked those datasets such that all students are in the terminal

elementary grade at baseline (event time 0) and in their new school the following year (event time 1). In our preferred analysis, we include only those students for whom we can observe two periods before and after the baseline (from event time -2 to 2). Because achievement data are available for grades 3-8, that limits the analysis to students who transitioned to a new school for grades 6 or 7, and who did so between 2016 and 2018. We estimate attendance effects using the same timespan so that effect estimates are based on comparable samples.[9]

The event study analysis entails comparing changes in the outcomes of students who transitioned to a for-profit- (EMO-) operated charter school after their terminal grade to those of students who transitioned to a TPS, nonprofit-operated charter school (CMO or sole-operated), or CMO-operated charter school after their terminal grade. Specifically, we estimated the following Ordinary Least Squares (OLS) model for datasets that compare each of these three pairs of school types (EMO and TPS, EMO and nonprofit operator, or EMO and CMO):

$$y_{ik} = \sum_{k=-2}^{k=2} \tau^k EMO_i^k + \alpha_i + \sigma_k + \theta_{dy} + \mu_c + \epsilon_{ik} \quad (1)$$

The variable y_{ik} captures an outcome for student *i* at event time *k*. There are separate treatment variables EMO_i^k for each event year *k* (from -2 to 2, but not the baseline 0) indicating the students who transitioned (or would eventually transition) to an EMO-run charter, as opposed to students who transitioned to the other school type (TPS, nonprofit-operated charter, or CMO-operated charter). The regression also includes student fixed effects (α_i), event-time fixed effects (σ_k), district-by-year fixed effects (θ_{dy}), and cell fixed effects for each transition-grade-by-year panel in the stacked dataset (μ_c). In our preferred specifications we replace the district-by-year fixed effects with school-by-year fixed effects, so that comparisons are implicitly between

[9] Because attendance data are available no earlier than 2015, the analysis of absence rates does not allow the comparison of pre-treatment trends for both pre-treatment periods for students who transitioned to a new schools in 2016 and 2017.

students who attended the same elementary school before transitioning to middle schools of different types. Students who attended the same pre-transition elementary school were likely to be similar on many dimensions, and the structural move caused by the natural grade transition made it less likely that there were special circumstances that made students switch schools. Finally, we cluster standard errors at the school level.

The parameters τ^1 and τ^2 capture the causal impact of transitioning to an EMO-run charter school (as opposed to a TPS, nonprofit-operated charter, or CMO-operated charter) provided that post-transition trends in student test scores would have been parallel had students not transitioned to the EMO-run school—the plausibility of which we can begin to interrogate by checking for evidence of differential pre-trends using estimates of τ^{-2} and τ^{-1}. The primary threat to validity is that parents' selection into charter schools is nonrandom. For example, the more advantaged, motivated, and informed parents may be more likely to identify and select into alternative educational options while simultaneously motivating their children to improve their education outcomes after switching to the new school, which might explain the superior achievement gains those students might realize going forward (even in the absence of differential pre-treatment trends). However plausible one might consider this threat to validity, it is important to note that event-study designs such as this one (focusing specifically on test score gains after structural school transitions from the same elementary schools to different middle schools) have been found to provide nearly identical estimates of school effectiveness as those employing school lotteries that randomly assign students to charter schools (e.g., see Angrist et al, 2017, Angrist et al., 2022).

3.2.2. Lagged-Score Value-Added Models

The event-study design provides some comfort in terms of internal validity, but it has some significant limitations. The primary limitation is that it requires us to focus on a subset of students, schools, and educational outcomes, which has implications for the generalizability of our results, the statistical precision of our estimates, and our ability to measure school effectiveness on multiple dimensions. For example, as we show in the appendix (Table A3), 94 percent of EMO-run charters serve grades K-4, which means that most students do not transition to those schools during tested grades. And, as we note above, the event-study estimates are further restricted to students who transition in particular grades and years—so that we can observe both pre-transition and post-transition years. These problems are further compounded for absence rates, as we observe instructional hours going back to 2015 only. Thus, to assess the effectiveness—on both cognitive and behavioral dimensions—of the full range of public schools serving grades 4-8, we must use a different method.

Value-added regression models featuring lagged test scores allow us to address these problems, as they enable us to include in the analysis all students with valid scores in adjacent grades. Importantly, in spite of these models' selection-on-observables assumption, there is a "near consensus" on their validity in estimating the effectiveness of teachers (Koedel et al 2022; notably, see Chetty et al., 2014), and evidence shows that they also introduce minimal bias when it comes to estimating the effectiveness of both TPSs and charter schools (e.g., see Angrist 2017, Angrist et al., 2022, Bifulco, 2012; Deming 2014, Dobbie & Fryer, 2019). These models typically involve including a one-year lag of student test scores and controlling for a standard set of covariates common to most education datasets.

Consistent with this standard, we implement this model using the following OLS regression:

$$y_{it} = \tau EMO_{it} + OtherSchool_{it} + \alpha_g + \theta_d + \mu_t + X'_{it}\theta + \epsilon_{it} \qquad (2)$$

The variable y_{it} is an outcome for student i in school year t, and α_g, θ_d, and μ_t are grade, district, and year fixed effects, respectively. In the main specification, the vector X_{it} includes a series of control variables capturing student *i*'s demographic characteristics (race, sex, disability, economic status, and English-learner status), whether they had a disciplinary incident (besides truancy), and cubic polynomials of their test scores and absence rates, during the prior school year $(t-1)$. EMO_{it} indicates whether a student attended a for-profit EMO-operated charter school during the current school year and $OtherSchool_{it}$ captures whether a student attended a school type besides the omitted comparison group, which varies depending on the comparison at hand. Once again, we cluster all standard errors by school.

The parameter τ captures the causal impact of attending a for-profit-operated charter school on student achievement and behavior if attendance at a for-profit EMO-operated charter school (as opposed to attendance in other charters or TPSs) is as good as randomly assigned conditional on the covariates included in the model. In other words, the estimates are valid if our statistical controls account for all factors that explain both attendance at for-profit-operated charter schools (as opposed to the comparison school type) and year-to-year changes in the outcomes. This conditional independence assumption is not testable, but, as we note above, there are good reasons to believe that our estimates are a close approximation of the true causal effects of attending a for-profit-operated charter school.

Beyond citing work that clearly demonstrates the validity of these methods, we show that (1) the event study models (which take advantage of natural grade transitions and employ gain scores that Angrist et al. (2022) identify as yielding no discernable bias on average) yield qualitatively similar results and reveal no differential pre-treatment trends; and (2) the results are

similar using a wide range of alternative specifications, such as putting a first-difference "gain score" as the dependent variable, leaving out demographic control variables, including fixed effects capturing students' grade-3 schools (such that estimates are implicitly between students whose parents historically selected similar neighborhoods or schools), and controlling for the achievement and demographic characteristics of schools' student populations during the prior school year (see tables A4 and A5 in the appendix).

Although this last set of school-level controls in a sense also controls away part of a school's production process (for example, a schooling environment that might feature positive peer effects), it should capture whatever minimal selection bias might remain conditional on the standard covariates we include. Research has demonstrated that beyond proximity (which our district or grade-3 school fixed effects should capture), a school's average student achievement levels and demographic composition are key predictors of public-school selection (notably, see Abdulkadiroglu et al., 2020; see Harris and Larsen, 2023, for a review). That estimates from models that include school-level controls yield similar results as the wide range of specifications we present in the appendix (including specifications that include grade-3-school fixed effects) lends us confidence that any remaining selection bias is minimal and substantively unimportant.

In a sense, that our estimates are insensitive to these different model specifications is unsurprising. The difficulty of obtaining relevant school performance information and navigating school choice often prevents households from selecting the best schools for their kids (e.g., see Ainsworth et al., 2023; Walters, 2018; Bergman et al., 2020; Kapor et al., 2020). Moreover, most of our comparisons are between families that take advantage of school choice. They are merely selecting into one type of charter school or another, and it is highly unlikely that they are selecting those schools based on the method of operation (e.g., EMO vs. CMO) as that is not

apparent. Charter schools in Ohio are all labeled "community schools", regardless of the profit status of their operators.

Finally, although we do not report that analysis here, we estimated school-level value-added effects to determine whether a select few schools were driving our results. We found that school-level impact estimates were symmetrically and roughly normally distributed. Thus, we focus on reporting the analysis of student-level impacts.

4. Impact of EMO-Operated Charter Schools on Student Achievement and Absences

Figures 1 and 2 plot the event-study estimates of the impact of transitioning to an EMO-operated charter school (as opposed to a different school type) on test scores and absence rates, respectively, for students who reached the terminal grade of their elementary schools.[10] Specifically, the plots compare students who, upon reaching the terminal grade of their elementary schools, transitioned to nonprofit charter schools operated by EMOs to those who transitioned to TPSs; nonprofit charter schools that are self-operated or CMO-operated; or nonprofit charter schools operated by nonprofit CMOs. As we discuss above, self-operated and CMO-operated schools are both operated by nonprofit organizations, but we further focus on comparisons between EMO- and CMO-operated schools in an effort to account for confounders related to the subcontracting process.

[Insert Figures 1 and 2 about here.]

The figures reveal no differential trends in achievement or absences in the years leading up to students' school transitions. Two years after those transitions, students who transitioned to EMO-run charter schools had achievement gains that were 0.1 standard deviations greater than those of students who transitioned to traditional public schools, while their absence rates remained similar. However, among students who transitioned to charter schools, those who transitioned to EMO-

[10] Tables A6, A7, A8, and A9 in the appendix provide the full results of the event studies we conducted.

operated charter schools experienced immediate declines in achievement (0.09-0.11 standard deviations) and immediate increases in absence rates (0.008 percentage points) relative to those who transitioned to charters operated by non-profit organizations. Although these differences decrease in magnitude (and often become statistically insignificant) by the second post-transition year, we cannot rule out substantively large negative effects of attending charter schools with for-profit operators in those years.[11]

Tables 3 reports the results of our lagged-score value-added models. Panel A, which reports results for the restricted sample of students included in the event study analysis, reveals annual achievement gains that are 0.065 standard deviations greater among students who transitioned to EMO-operated charter schools as compared to those who transitioned to traditional public schools. This implies that if all students attended the EMO-run school and there is no decay in achievement impacts over time, by year two these students would have achievement advantages of approximately 0.13 standard deviations relative to those who attended traditional public schools. That is close to the year 2 estimate of 0.10 standard deviations from the event study. And, like the event-study estimates, there were no statistically significant differences in absence rates. The models comparing EMO-operated and nonprofit-operated schools also yield estimates that are comparable (though somewhat greater in magnitude) to those we obtained in the event-study analysis. Because there were students switching out of EMO-operated schools by year 2—

[11] Table A10 in the appendix provides the estimates of an alternative event-study design, which focuses on the case of Accel's (one large EMO) takeover of four charter schools run by other EMOs and seven charter schools run by CMOs in 2017. Our "triple difference" design entails estimating the impact of an Accel takeover (compared to no Accel takeover for schools run by CMOs or EMOs in 2017) and estimating the difference in Accel's impact between the seven schools that had been run by a CMO to the four schools that had been run by an EMO. Although imprecise due to the small sample size, Table A10's results suggest that Accel's takeover benefited students who had previously been in the EMO-run school relative to those who had previously been in the CMO-run schools, aligning with our main results.

and because impacts are likely to decay over time—these estimates may be even more comparable than they appear.

[Insert Tables 3 and 4 about here.]

Table 3 also presents estimates for the full sample of students for whom we observe test scores and absence rates from 2016 to 2019—a sample that is nearly six times larger than the one we used for the event-study analysis. It reveals that achievement gains in math and ELA were 0.044 standard deviations greater, on average, among students who attended EMO-operated charter schools than among similar students who attended traditional public schools in the same geographic school district. If one assumes that these gains accumulate with no decay as students progress through all grades—that is, if a student gained that much every year from grades 4 through 8—then this estimate equates to a total achievement gain of approximately 0.2 standard deviations by grade 8. As we discuss below, these are large effects. On the other hand, once again, there was no difference in absence rates between students in EMO-operated charter schools and those in TPSs.

Although EMO-operated schools outperformed TPSs—at least in basic math and ELA achievement—estimates based on our full sample also show that they fell short of nonprofit-operated charter schools when it comes to attendance. And, once again, this is true even if we compare EMO-operated schools to CMO-operated schools, to account for potential costs associated with contracting with a management company of any kind. Specifically, achievement gains were 0.054 standard deviations lower and absence rates were 0.005 percentage points higher in EMO-operated schools than in CMO-operated schools. Thus, it does not appear that the mere act of contracting out to a management company explains the lower achievement and

attendance effects among charter schools with for-profit operators as compared to those with nonprofit operators.[12]

Table 4 disaggregates these estimates for students who were in the top and bottom 30 percent of the achievement or attendance distributions in their geographic school district (including both charter and TPS students) during the prior school year. The first two columns present the estimated impact of attending an EMO-run school separately for students in the bottom and top 30 percent, respectively, and the third column pools those samples to estimate the difference in effects using an interaction term (EMO x Bottom30).

The results in Table 4 indicate that the benefits of EMO-operated schools, relative to TPSs, accrued primarily to low-achieving students. High-achieving students were not harmed, while low-achieving students benefited greatly with annual gains of 0.07 standard deviations. Thus, compared to TPSs, for-profit EMO-operated charter schools were equity enhancing. On the other hand, low-achieving students were relatively underserved if they attended an EMO-operated charter as opposed to a nonprofit-operated charter. Low-achieving students were less underserved (-0.4 standard deviations) than high-achieving students (-0.08 standard deviations) by attending EMO-operated schools as opposed to CMO-operated schools, but they were still worse off.

The story changes when we look at student absences—the less salient dimension that was not part of a formal monitoring mechanism used by the state and that was less likely to be monitored by a charter school's authorizer. Table 4 reveals that the relative increase in unauthorized absences among students in EMO-operated schools (as opposed to CMO-operated schools) was driven entirely by students whose attendance rates put them below the 30th percentile district-wide. Thus, it appears that EMO-operated schools were significantly less effective and less equitable than nonprofit-

[12] As we show in the appendix (Tables A4 and A5), the above results remain qualitatively similar if we use a wide range of alternative specifications.

operated schools when it came to promoting student attendance—a significant but relatively overlooked predictor of future student success.

Finally, we examined whether greater reliance on an EMO—as measured by whether personnel (the bulk of operational expenses) are employees of the EMO as opposed to the school—affects the results. As Table 5 indicates, charter schools that are more reliant on their EMO have greater achievement outcomes but much higher absence rates relative to those that are less reliant on their EMOs. Indeed, the higher absence rate among EMO-operated schools (relative to CMO-operated schools) is driven entirely by schools that contract for personnel and, thus, send nearly all of their funds to their operator. Importantly, the more pronounced differences in achievement and absence are driven primarily by students in the bottom 30th percentile of the achievement and attendance distributions in their local districts.[13]

[Insert Table 5 about here.]

5. Comparing the Administration of EMO- and CMO-Operated Charter Schools

That EMO-operated charter schools have achievement and attendance effects that are inferior to those of CMO-operated charter schools could be because they do not invest quite as much into their educational mission. Additionally, that the negative attendance effects are driven entirely by students with low prior attendance rates suggests that these schools may focus their efforts on easier-to-educate students. For example, it is arguably easier to focus on educating students who come to school than to invest resources in making sure more students come to school. These stories would be consistent with an opportunistic, for-profit operator seeking to minimize costs in order to maximize revenue. We further examine the plausibility of this explanation by examining schools' budget

[13] Figure A1 in the appendix illustrates the distribution of charter schools in terms of the proportion of their revenue they send to their operators.

allocations and administrative practices. Although the results in Table 6 compare EMO-operated schools to CMO-operated schools as well as all non-profit-operated schools, we focus on comparing EMO- and CMO-operated schools because the results are qualitatively similar and they enable us to control for the impact of contracting with a management company to run a school.

[Insert Table 6 about here.]

Table 6 reveals a number of significant differences in budgeting and administrative practices. First, EMO-operated schools seem to be more concerned with realizing economies of scale than CMO-operated schools, as they had more schools in their networks (16 as opposed to 12)[14], had more students per teacher (15 as opposed to 12), and spent less on administration ($1,000 less per pupil) which ostensibly allowed them to spend more in the classroom ($500 more per pupil). We do not know what these additional classroom expenditures purchased—it was not personnel (teaching or staff) as they spent about 5 percent less on that. Additionally, consistent with for-profits prioritizing the bottom line, EMO-run schools had more teacher turnover (about 43 percent of teachers were new every year, as opposed to 37 percent). However, the results do show that their students received approximately 25 more instructional hours annually, as compared to 1,040 instructional hours in the average CMO-operated school.[15]

6. Summary of Results and Benchmarking Effect Sizes

The results indicate that, on average, brick-and-mortar charter schools—whether operated by for-profit or nonprofit organizations—significantly outperform traditional public schools when it

[14] The actual difference is likely much larger, as we find that some large EMOs (but not CMOs) often create regional LLCs—with distinct state-assigned operator identification numbers—to run subsets of their affiliated schools. Consequently, we undercount the number of schools in each network.

[15] As we show in the appendix (Figure A1), charter schools with EMOs handed over more of their funds and control over personnel to their operators, which allowed EMOs to exert more control over resources and potentially direct those resources to vendors and functions that might also directly benefit the organization (e.g., classroom instructional technology)

comes to student achievement. We likely underestimate this impact, as the positive competitive effects of charter schools on TPSs have been well documented (e.g., see Figlio et al., 2021). Nonetheless, the magnitudes of our conservative estimates are substantively significant. The results imply that attending EMO-run charter schools for five years (grades 4-8) would, for the average student, lead to total achievement gains of 0.15-0.2 standard deviations relative to nearby TPSs. This rough extrapolation requires some strong assumptions.[16] But, given the results of the event-study analysis, it seems safe to say that, after a few years in charter schools operated by for-profit EMOs, students on average improve their achievement 0.1-0.2 standard deviations relative to what those scores would have been had they stayed in TPSs. Such an effect size is considered large compared to those linked to typical education interventions (Kraft 2020, 2023), though it is a common effect size in the charter school literature.

For example, taking into account how much students typically learn in grades 4-8 (see Hill et al., 2008), the estimated effect of attending for-profit-operated charter schools (as opposed to traditional public schools) equates to the average charter student getting approximately 15-20 days' worth of extra instruction annually—about one half of a year's worth of instruction if they attended EMO-run charter schools for all five grades. Even if achievement gains did not accumulate at all (which is implausible, as we showed with the event study), a total gain of 0.04 standard deviations (our one-year estimates) after four years of schooling is equivalent to the achievement gains that come from increasing public school spending by $1,000 for each of those four years

[16] This extrapolation assumes that effects are linear and additive across all grades, which is unlikely to be true. For example, in the event-study analysis we found that the impacts of non-profit-operated schools are immediate—all in year 1—whereas those of EMO-run charters increase between year 1 and 2. On the other hand, the impacts of many interventions decay over time. The literature also makes clear that students experience greater achievement gains in earlier grades than later grades (Hill et al., 2008), which implies that substantively significant estimates based on grades 6-8 should be smaller in magnitude than substantively significant estimates in grades 4-5 (i.e., 0.1 standard deviations in grades 6-8 is more impactful than 0.1 standard deviations in grades 4-5).

(see Jackson & Mackevicious, 2023). Importantly, the benefits for the lowest achieving students are almost twice as large as they are for the average charter school student. On the other hand, the achievement benefits are up to twice as large if students attend non-profit-operated charter schools instead of for-profit-operated ones.

There generally are no differences in absence rates between students attending EMO-run schools and TPSs. Students in EMO-run schools do receive more instructional hours than those in TPSs, but they generally receive the same fraction of total instructional hours.[17] In supplementary analyses, we do find a major decline in the probability of suspension for a serious disciplinary incident (excluding truancy) relative to TPSs.[18] Thus, there appear to be behavioral benefits to attending EMO-operated charter schools. But these benefits are contingent on the behavioral outcome on which we focus.

On the other hand, the relative behavioral benefits of attending CMO-operated charter schools (as opposed to EMO-operated schools or TPSs) are clear—and these benefits accrue almost entirely to the most underserved, lowest-achieving students. For every year a low-attendance student (one in the bottom 30 percent, whose attendance rate is around 92 percent of total instructional hours) attends a non-profit-operated charter school, their absence rate (the proportion of total available instructional hours they miss) declines by over 1 percentage point annually (about 10 instructional hours, or 2 days' worth of instruction) relative to students attending EMO-operated school.[19] If we

[17] See Table A15 in the appendix.
[18] See Figure A2 and Tables A11-17 in the appendix.
[19] Benchmarking against the impact of other interventions is difficult, as the few studies that examine the impact of teachers on absences tend to focus on high school grades (e.g., Wedenoja et al., 2020; Jackson et al., 2020) or primary school grades (e.g., Gershenson 2016), as opposed to middle school grades during which there is more potential to affect absences than in primary school but less potential than in high school. Additionally, these studies tend to focus on actual days absent, as opposed to equivalent instructional hours. Nevertheless, our estimates are on par with a one-standard deviation increase in "social value-added" reported among 9th graders (see Jackson et al., 2020) and more than doubles the

assume these benefits accumulate without decay across grades 4-8, these effects are large enough to close the gap in missed instructional time between low-attendance and high-attendance students if low-attendance students attend CMO-operated charter schools instead of EMO-operated charters or traditional public schools.

Finally, the analysis of charter school administration suggests that there are meaningful differences in how for-profit and nonprofit operators run charter schools. EMO-operated schools' greater number of instructional hours and higher classroom spending (relative to CMO-operated schools) are consistent with EMO-operated schools focusing their efforts on realizing better achievement outcomes—a key outcome if they wished to stay open—while trying to cut costs with more reliance on novice teachers and less spending on administration. We also find that greater reliance on an EMO—as measured by whether personnel (the bulk of expenses) are employees of the EMO as opposed to the school—is associated with greater achievement outcomes but much higher absence rates relative to CMO-operated schools. Indeed, the higher absence rate among EMO-operated schools (relative to CMO-operated schools) is driven entirely by schools that contract for personnel and, thus, send nearly all of their funds to their operator. Thus, the results seem consistent with the notion that, compared to CMO-operated schools, EMO-operated schools are more concerned with the bottom line: they are relatively less concerned with pursuing outcomes that are less salient to stakeholders (i.e., improved attendance) than those that are more salient (achievement) and they are relatively more concerned with realizing administrative efficiencies.

7. Discussion

benefits on attendance of increasing primary school teachers' effectiveness by one standard deviation (see Gernshenson, 2016).

The results indicate that nonprofit-operated and for-profit-operated charter schools significantly outperformed traditional public schools while expending significantly less money. On the other hand, charters operated by for-profit EMOs were less effective (in terms of achievement and attendance) and less equitable (in terms of attendance) than their nonprofit-operated counterparts. Our results also paint a picture consistent with the notion that EMO-operated charters operated according to a different model than CMO-operated charters—one that prized efficiency and that was less concerned with dimensions of performance for which schools were not held accountable. This appears particularly true for the (technically nonprofit) charter schools that outsourced almost everything to EMOs— those that we characterized as having "for-profit milk in nonprofit cartons."

In terms of contributions, this study provides insights for literatures on charter schools, public service contracting, performance monitoring, and sector boundaries. First, this study adds to the growing body of knowledge on the impacts of operators on nonprofit charter schools (e.g., CREDO, 2017; Dynarski et al., 2018; Hill & Welsch, 2009; Sass, 2006; Singleton, 2017). Besides corroborating previous findings that for-profit EMOs are relatively efficient and effective at improving student achievement, our study brings to light some unexplored aspects of EMOs such as their ineffectiveness when it comes to behavioral outcomes, their distinct administrative practices, and the extent to which they control the operations of charter schools.

Second, that nonprofit charter schools of all types outperform nearby traditional public schools lends credence to sector interdependence theory, which argues that governments can seldom provide public services effectively and efficiently on their own and that they must work with non-governmental organizations (e.g., through grants or contracts) to do so (AbouAssi et al., 2019; O'Regan & Oster, 2000; Salamon, 1987).

Third, although much research documents governments' increased contracting with nonprofit organizations to deliver public services, we know little about nonprofits' subsequent subcontracting arrangements (Alaimo, 2018). Our study contributes to this limited knowledge base by examining how a nonprofit's subcontracting arrangements with a for-profit firm could materially affect its performance. Our finding that nonprofit charter schools that subcontracted with for-profit EMOs fell short of those that did not (in almost every way) points to potentially hidden risks of nonprofits subcontracting.

Fourth, our finding that different types of public schools perform differently with respect to different student outcomes affirms the multi-faceted nature of public services and the importance of a multi-dimensional approach to evaluating public service performance. It is striking how for-profit-operated charter schools might be relatively successful in improving student achievement but not in enhancing attendance—two distinctly important educational outcomes. This may be because attendance receives less attention than achievement in school accountability systems, which might have incentivized for-profit EMOs to engage in "effort substitution (i.e., directing effort towards rewarded as opposed to unrewarded areas)" (Benaine & Kroll, 2020, p. 813). This finding also adds to the growing knowledge base about student attendance by identifying a school operator's sector status as a new school-level input in the student attendance production function (e.g., see Tran & Gershenson, 2021).

Fifth, this study also contributes to a burgeoning literature on nonprofit organizations becoming business-like. Previous studies in this line of research have shown how nonprofit organizations are becoming more business-like in various ways such as commercialization, hybridization, and conversion. By analyzing for-profit-operated nonprofit charter schools, our study has unveiled cross-sector contracting as another channel through which nonprofit

organizations may become more business-like. This also helps substantiate a related literature on sector blurring (e.g., see Bromley & Meyer, 2017; Child et al., 2016) by revealing how cross-sector contracting arrangements might augment the erosion of traditional sectoral boundaries—such that nonprofit organizations cease to be nonprofit in any meaningful sense.

As for practical implications, this study confirms that contracting out public education to charter schools can improve the achievement of students who otherwise would likely struggle in nearby TPSs, thus corroborating market-based reformers in general and charter school advocates in particular. Policies that ban, restrict, or limit funding for charter schools, including those that subcontract with for-profit EMOs, therefore could adversely impact the underserved students that these schools primarily serve. Of course, our study cannot speak conclusively as to what would happen if for-profit EMOs were limited or banned outright. We do not know what schools students would attend if their for-profit EMO-operated schools became unavailable. For instance, students originally attending for-profit-operated charter schools might end up in nearby TPSs with poorer performance or in nearby nonprofit-operated charter schools with greater academic advantages.[20]

On the other hand, the results raise concerns about the involvement of for-profit EMOs in public education, which aligns with existing research on the drawbacks of for-profit education

[20] There may be some less obvious costs to introducing charter schools, however. Research generally indicates that their introduction does not negatively impact district revenues per pupil, one study found that their introduction in Ohio may have led to reduced district revenues by lowering property values (Cook, 2018)—although we do not know if that is due to the initially poor performance of Ohio charter schools, as that study leverages early years of charter school implementation. Another potential cost is the modest increase in within-district racial segregation to which charter schools lead—including in Ohio (Monarrez et al., 2022)—and the apparent reduction in political participation in Ohio school district politics (Cook et al., 2020). That said, the negative segregation effects disappear when using other geographic boundaries, such as city boundaries or metropolitan statistical areas, and the adverse impact on participation in district school-board elections does not extend to elections for other local (or state or federal) elections. Finally, as we note above, the mere presence of charter schools is generally associated with improvements in the performance of nearby schools (Figlio et al, 2021; Zimmer et al., 2021). Thus, research has not clearly demonstrated costs to the opening of charter schools.

providers' emphasis on financial gains (e.g., see Baird et al., 2022; Dykgraaf & Lewis, 1998; Miron et al., 2021; Paino et al., 2014). In particular, charter schools subcontracting with for-profit EMOs (especially those that subcontracted out nearly all operations) fail, on average, when it comes to student attendance. This is undoubtedly a critical area for improvement for for-profit-operated charters, and it should serve as warning to governments that they should think carefully about the impacts of not just their contractors but also subcontractors involved in public service provision. This is relevant beyond the context of public education, given how for-profit management companies have raised concerns in other sectors, such as health care (e.g., see Young, 2022), foster care (e.g., see McDermott Will & Emery, 2023), and community development (e.g., see Freeman, 2022).

Future research should assess this study's generalizability. The analysis is limited to Ohio brick-and-mortar charter schools in operation prior to the COVID-19 pandemic. It would also be valuable to determine whether the findings generalize to other industries or types of contracting. It is reasonable, for example, to conjecture that the subcontracting effects we detect might apply only to the subcontracting of core functions and not support functions (e.g., see Alaimo, 2018; Saunders et al., 1997), or to industries with thick market demand (e.g., see Cleveland & Krashinsky, 2009). Our study also leaves some unanswered questions about what schools might have done differently that led to the differences in their performance (e.g., related to curriculum or technology), so it would be helpful if future inquiries could explore more mechanisms.

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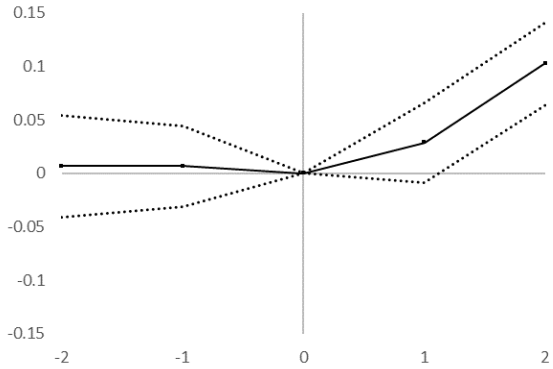
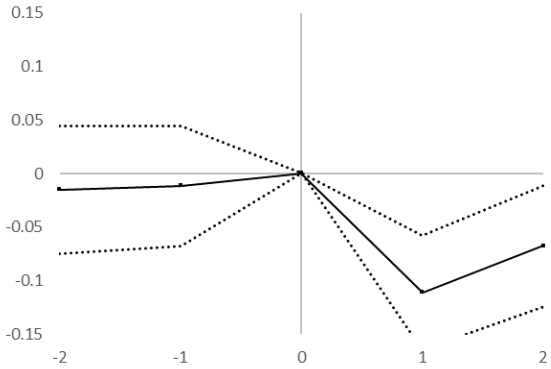
FIGURES

Figure 1. Impact of transitioning to an EMO-operated charter school on student achievement (in standard deviations)

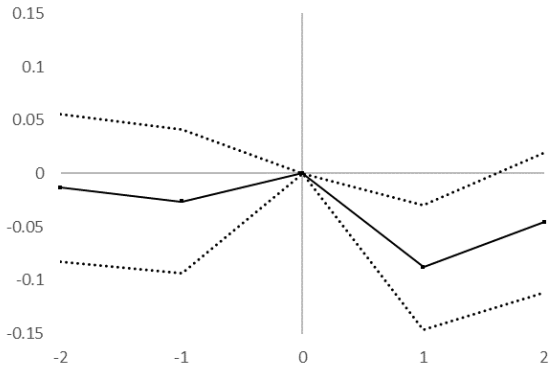
a. EMO-op. charters vs. TPSs



b. EMO-op. charters vs. nonprofit-op. charters

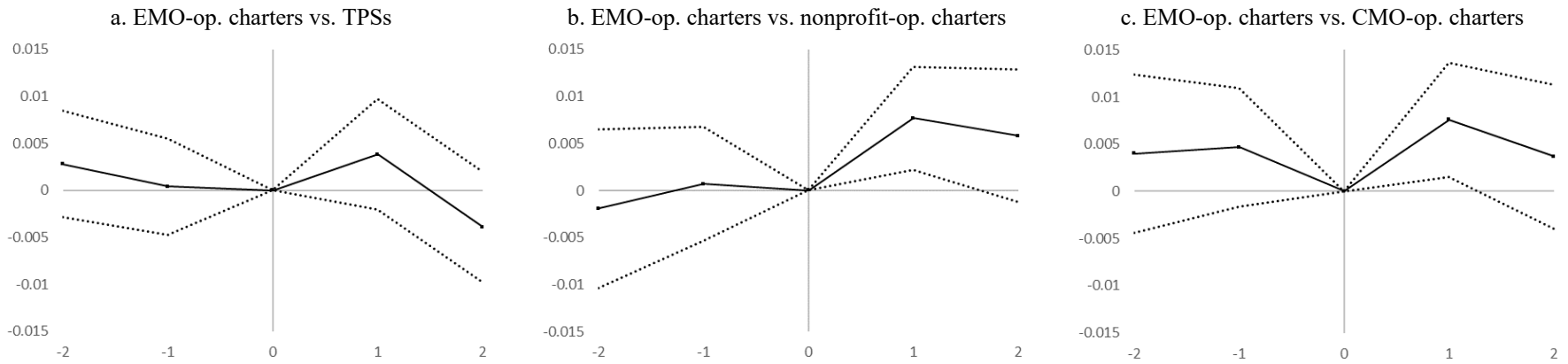


c. EMO-op. charters vs. CMO-op. charters



Note. The figure presents difference-in-differences estimates of student achievement (distance in standard deviation units from the statewide mean in math and reading scores), comparing within-student changes between those who transitioned to EMO-run charter schools in year 1 to students who transitioned to one of three school types (traditional public schools, nonprofit-operated charter schools, or CMO-operated charter schools) in that same year. The baseline year (0) is the year a student reached a school's terminal grade, just prior to a structural move to their new school. All models include student, cell, and event-time fixed effects, as well as school-by-year fixed effects based on the school students attended in the baseline year. The figure reports 95% confidence intervals based on errors clustered at the school level.

Figure 2. Impact of transitioning to an EMO-operated charter school on absence rates (fraction of total instructional hours)



Note. The figure presents difference-in-differences estimates of student absence rates (unauthorized absences as a fraction of total required instructional hours), comparing within-student changes between those who transitioned to EMO-run charter schools in year 1 to students who transitioned to one of three school types (traditional public schools, nonprofit-operated charter schools, or CMO-operated charter schools) in that same year. The baseline year (0) is the year a student reached a school's terminal grade, just prior to a structural move to their new school. All models include student, cell, and event-time fixed effects, as well as school-by-year fixed effects based on the school students attended in the baseline year. The figure reports 95% confidence intervals based on errors clustered at the school level.

TABLES

Table 1. Ohio charter school counts by type

	All Charter Schools	Nonprofit-operated charters *sole-operated*	Nonprofit-operated charters *CMO-operated*	For-profit-operated charters *EMO-operated*
Brick-and-mortar schools				
General education	*210*	*47*	*55*	*108*
Special education	30	6	22	2
Dropout prevention and recovery	60	20	7	33
Virtual charter schools				
General education	5	1	0	4
Dropout prevention and recovery	9	4	5	0
Total charter school count	314	78	89	147

Note. The table provides counts of charter schools by type during the 2019 school year. It includes all schools that operated for the entire 2018-19 school year and that submitted financial forecast data to ODE. Note that only 41 sole-operated and 47 CMO-operated brick-and-mortar "general education" schools served grades 3-8.

Table 2. Differences in student characteristics across school types

	Average student characteristics by school type (statewide averages)				EMO charters vs. other school types (OLS within district differences)		
	Traditional Public Schools	Nonprofit -operated charters	Nonprofit-operated charters: *CMO*	For-profit-op. charters: *EMO*	EMO vs. TPSs	EMO vs. Non-profit-op. charters	EMO vs. CMO charters
ELA/Math (z score)	-0.35	-0.47	-0.54	-0.52	0.0201 (0.0481)	-0.0821 (0.0594)	-0.0339 (0.0527)
Bottom 30th percentile (0,1)	0.30	0.23	0.25	0.28	-0.0171 (0.0176)	0.0453** (0.0212)	0.0321 (0.0218)
Attendance rate (proportion)	0.94	0.94	0.94	0.93	0.0009 (0.0021)	-0.0132*** (0.0029)	-0.0104*** (0.0032)
Unauthorized absence rate	0.03	0.04	0.04	0.05	0.0007 (0.0029)	0.0098*** (0.0035)	0.0075** (0.0038)
Chronically absent (0,1)	0.16	0.16	0.17	0.21	0.0069 (0.0114)	0.0599*** (0.0146)	0.0541 (0.0172)
Black (0,1)	0.35	0.71	0.71	0.56	0.0398 (0.0341)	-0.1392*** (0.0447)	-0.1397*** (0.0492)
Hispanic (0,1)	0.09	0.07	0.09	0.12	0.0116 (0.0155)	0.0502*** (0.0182)	0.0493** (0.0216)
Asian (0,1)	0.01	0.01	0.01	0.01	0.0007 (0.0050)	0.0039 (0.0055)	0.0018 (0.0055)
Female (0,1)	0.49	0.52	0.51	0.50	0.0065 (0.0063)	-0.0221** (0.0093)	-0.0098 (0.0067)
Econ. Disadvantage (0,1)	0.79	0.89	0.94	0.88	-0.0099 (0.0196)	0.0132 (0.0296)	-0.0309 (0.0233)
Limited Eng. Prof. (0,1)	0.04	0.06	0.08	0.05	0.0105 (0.0108)	0.0054 (0.0145)	-0.0135 (0.0170)
Disability (0,1)	0.16	0.12	0.12	0.15	-0.0134* (0.0076)	0.0361*** (0.0089)	0.0325*** (0.0086)
Disciplinary event (0,1)	0.16	0.19	0.23	0.19	-0.0188 (0.0129)	0.0098 (0.0192)	-0.0229 (0.0199)
N	487,101	42,660	23,018	43,288	601,761	601,761	601,761
School Count	718	87	47	108	1,061	1,061	1,061

Note. The table presents averages of student-level variables across school types, and within-district differences in those averages between EMO-operated schools and traditional public schools, non-profit-operated charter schools, and CMO-operated charter schools. Student- and school-level data were obtained from the Ohio Department of Education through a formal data request. The analytic sample consists of students who were in grades 4-8 during the 2016-2019 school years and who attended schools in districts with charter schools within their geographic boundaries. Averages for students attending charter schools not site-based, general ed, or in operation in 2019, are not presented (which is why observation totals are greater for the OLS models). All values are lagged such that they are from the year prior (2015-2018) to the years on which we focus, except for Grade 3 ELA/Match score, which captures achievement when students were in grade 3. Observation counts are based on the achievement data. Each estimated coefficient of within-district differences is from a separate OLS regression. Standard errors clustered at the school level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 3. Lagged-score models of the relative impact of EMO-operated charter schools on student achievement and absence rates

	ELA/Math Achievement (z score)	Absence Rate (fraction of required instructional hours)
Panel A: Event Study Sample (grades 6-8)		
EMO-operated charters VS.		
Traditional public schools	0.0651***	-0.0019
	(0.0206)	(0.0037)
Non-profit-operated charters	-0.0743***	0.0111**
	(0.0237)	(0.0045)
CMO-operated charters	-0.0662***	0.0132***
	(0.0232)	(0.0049)
N	106,082	106,082
Panel B: Full Sample (grades 4-8)		
EMO-operated charters VS.		
Traditional public schools	0.0440***	-0.0005
	(0.0101)	(0.0015)
Non-profit-operated charters	-0.0469***	0.0066***
	(0.0152)	(0.0018)
CMO-operated charters	-0.0537***	0.0053***
	(0.0172)	(0.0021)
N	599,779	599,779

Note. The table presents the estimated difference in annual, student-level "gains" in achievement and absence rates (unauthorized absences divided by required instructional hours) between EMO-operated charter schools and traditional public schools, all non-profit-operated charter schools, and CMO-operated charter schools, respectively. Student- and school-level data were obtained from the Ohio Department of Education through a formal data request. Each coefficient is from a separate OLS regression that controls for students' prior-year test scores, absence rates, and demographic characteristics, as well as for district-by-school-year fixed effects. Standard errors clustered at the school level are in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 4. Lagged-score models of the relative impact of EMO-operated schools on students in the bottom/top 30 percent of their district achievement and attendance-rate distributions

	Students in Bottom 30th Percentile	Students in Top 30th Percentile	Estimated Difference (pooled sample)
a. ELA/Math Achievement Gains (z score)			
EMO-operated charters			
VS.			
Traditional public schools	0.0726***	0.0117	0.0775***
	(0.0130)	(0.0134)	(0.0157)
Non-profit-operated charters	-0.0463**	-0.0539***	0.0264
	(0.0183)	(0.0196)	(0.0219)
CMO-operated charters	-0.0396**	-0.0804***	0.0595***
	(0.0199)	(0.0211)	(0.0226)
N	178,224	180,126	358,350
b. Absence Rate (fraction of required hours)			
EMO-operated charters			
VS.			
Traditional public schools	-0.0009	0.0007	0.0008
	(0.0025)	(0.0010)	(0.0019)
Non-profit-operated charters	0.0145***	0.0019	0.0087***
	(0.0033)	(0.0014)	(0.0023)
CMO-operated charters	0.0119***	0.0019	0.0060**
	(0.0038)	(0.0014)	(0.0025)
N	178,340	185,843	364,183

Note. The table presents the estimated difference in annual, student-level "gains" in achievement and absence rates (unauthorized absences divided by required instructional hours) between EMO-operated charter schools and traditional public schools, all non-profit-operated charter schools, and CMO-operated charter schools, respectively. Column 1 and column 2 limit the analysis to students whose lagged test scores (panel a) or attendance rate (panel b) put them in the bottom 30th percentile (test scores under approximately -1.0 standard deviations and attendance rates under approximately 0.92) or top 30th percentile (test score over approximately -0.2 standard deviations and attendance rate over approximately 0.97), respectively, of their geographic school district. Column 3 presents estimates of the differences in gains between students in the bottom 30th percentile to students in the top 30th based on pooling the samples in columns 1 and 2. Student- and school-level data were obtained from the Ohio Department of Education through a formal data request. Each coefficient is from a separate OLS regression that controls for students' prior-year test scores, attendance rates, and demographic characteristics, as well as for district and school-year fixed effects. Standard errors clustered at the school level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 5. Reliance on EMOs and Education Outcomes

	ELA/Math Achievement Gains (z score)	Absence Rate (fraction of required instructional hours)
A. All students in EMO and CMO-run charters		
Contract with EMO for nearly everything	-0.0438**	0.0068***
	(0.0174)	(0.0023)
Contract with EMO for management only	-0.0847***	0.0004
	(0.0237)	(0.0026)
Difference	0.0409*	0.0064**
	(0.0209)	(0.0026)
N	599,779	599,779
B. Students in bottom 30 percent of test/attendance distribution		
Contract with EMO for nearly everything	-0.0245	0.0147***
	(0.0204)	(0.0041)
Contract with EMO for management only	-0.0977***	0.0021
	(0.0301)	(0.0051)
Difference	0.0732**	0.125***
	(0.0286)	(0.0047)
N	178,224	178,340
C. Students in top 30 percent of test/attendance distribution		
Contract with EMO for nearly everything	-0.0736***	0.0028*
	(0.0216)	(0.0015)
Contract with EMO for management only	-0.0973***	-0.0008
	(0.0304)	(0.0020)
Difference	0.0237	0.0037*
	(0.0285)	(0.0021)
N	180,126	185,843

Note. The table presents the estimated difference in annual, student-level "gains" in achievement and absence rates (unauthorized absences divided by required instructional hours) between EMO-operated charter schools and CMO-operated charter schools, depending on whether or not a charter school contracts with its EMO for personnel (indicating that it sends nearly all of its funds to its for-profit operator). Panels B and C limit the analysis to students whose lagged test scores (column 1) or attendance rate (column 2) put them in the bottom 30th percentile (test scores under approximately -1.0 standard deviations and attendance rates under approximately 0.92) and top 30th percentile (test score over approximately -0.2 standard deviations and attendance rate over approximately 0.97), respectively, of their geographic school district. The third row of each panel indicates the difference in estimated effects between charters that contract for nearly everything and those that contract primarily for management functions. Student- and school-level data were obtained from the Ohio Department of Education through a formal data request. Each pair of coefficients (indicating the two types of contracting relationships) are from a separate OLS regression that controls for students' prior-year test scores, attendance rates, and demographic characteristics, as well as for district and school-year fixed effects. Standard errors clustered at the school level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 6. Budget allocations and administrative practices (EMO-operated vs. Nonprofit- or CMO-operated)

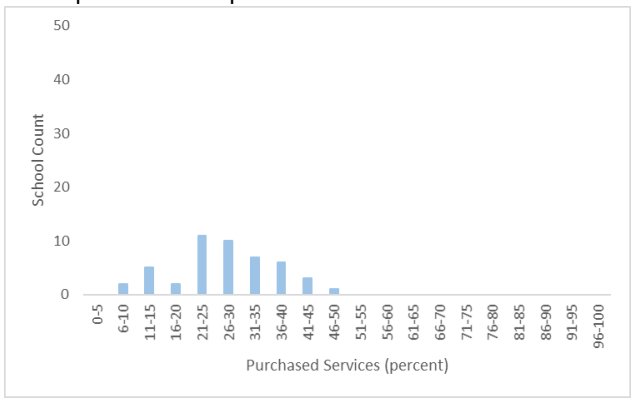
Characteristic	Nonprofit-operated Average	Coef. for EMO vs. Nonprofit-operated	CMO-operated Average	Coef. For EMO vs. CMO	N
Schools in operator network	7 schools	8.63*** (1.58)	12 schools	3.65** (1.57)	84,949
School age (years)	12 years	0.26 (0.70)	11 years	1.13 (0.72)	84,949
Student count	476 students	-40.66 (41.12)	419 students	14.26 (38.79)	84,821
Total expenditures per student	$10,612	207.91 (214.73)	$10,933	-86.14 (228.86)	84,821
Classroom expenditures per student	$5,772	630.01** (253.47)	$5,849	516.04* (269.44)	84,821
Administrative expenditures per student (dollars)	$1,451	-765.28*** (137.32)	$1,770	-1,054.01*** (168.97)	79,330
Percent of expenditures on salary/benefits	61 percent	-9.90*** (1.36)	55 percent	-5.13*** (1.91)	84,949
Student-teacher ratio (from forecast data)	12 students/teacher	3.34*** (0.75)	12 students/teacher	2.84*** (0.85)	84,599
Percent of teachers in their first year	36 percent	6.77*** (1.92)	37 percent	6.13*** (2.08)	83,882
Average teacher experience (years)	4 years	-0.49* (0.27)	4 years	-0.20 (0.28)	83,882
Percent of teachers with a master's degree	22 percent	1.47 (2.32)	22 percent	2.01 (2.39)	83,882
Teacher annual pay (dollars)	$38,271	-1,231.05 (762.07)	$37,195	-337.82 (840.70)	83,809
Annual instructional hours per student	1,033 hours	33.08*** (12.19)	1,040 hours	24.85* (14.73)	84,949

Note. The table compares characteristics of charter schools serving grades 4–8 that subcontract with for-profit EMOs compared to nearby charters in the same district that subcontract with nonprofit CMOs. Data are from the Ohio Department of Education's publicly available school-level spending files (available online), charter schools' budget forecasts (obtained via a formal request to ODE), and restricted-use teacher data (obtained via a formal request to ODE). Spending data for 2016-2019 were inflated to 2019 dollars using the Bureau of Economic Analysis's Personal Consumption Expenditure price index. Each coefficient is from a separate OLS regression estimating the difference between an EMO-operated charter and all non-profit-operated charter schools (second column) and CMO-operated charter schools (column 4). Estimates are weighted by student enrollment. Standard errors clustered at the school level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

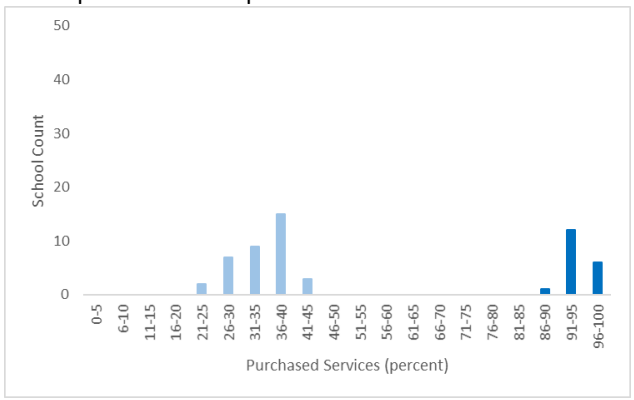
APPENDIX

Figure A1. Percent of charter school funds going toward purchased services

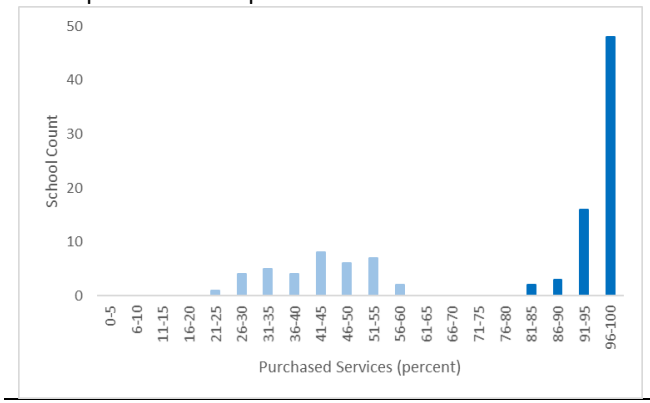
a. Nonprofit – Sole-operated



b. Nonprofit – CMO-operated



c. For-profit – EMO-operator

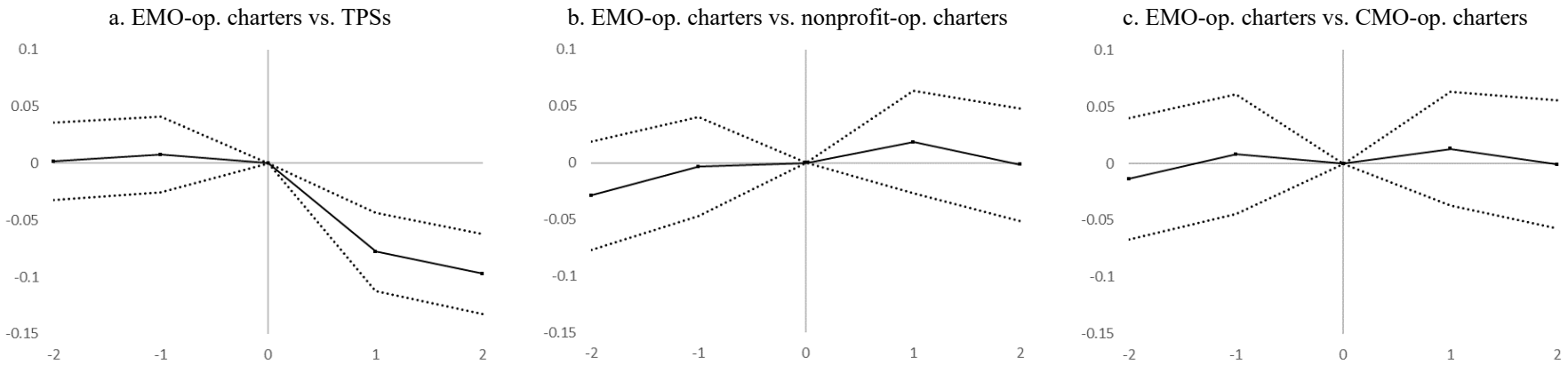


Dark blue: Schools that contract for personnel.

Light blue: Schools that do not contract for personnel.

Note. The figure presents the extent to which brick-and-mortar charters schools serving general student populations purchase services, depending on whether the Ohio Department of Education identified them as not working with a management company (Nonprofit – Sole-operated), working with a nonprofit management company (Nonprofit – CMO-operated), or working with a for-profit management company (For-profit – EMO-operated).

Figure A2. Impact of transitioning to an EMO-operated charter school on disciplinary incidents (besides truancy)



Note. The figure presents difference-in-differences estimates of student disciplinary incidents leading to suspension (other than truancy), comparing within-student changes between those who transitioned to EMO-run charter schools in year 1 to students who transitioned to one of three school types (traditional public schools, nonprofit-operated charter schools, or CMO-operated charter schools) in that same year. The baseline year (0) is the year a student reached a school's terminal grade, just prior to a structural move to their new school. All models include student, cell, and event-time fixed effects, as well as school-by-year fixed effects based on the school students attended in the baseline year. The figure reports 95% confidence intervals based on errors clustered at the school level.

Table A1. School-level spending data based on audited ODE data

Input	Traditional Public School (TPS) Averages	Difference from TPS in same district		
		Nonprofit Sole-Operated	Nonprofit CMO-operated	For-profit EMO-operated
Grades 4-8 Schools				
Student count per school (FTE)	580	-17	-70	**-108***
Expenditures per pupil				
Total (2019$)	13,546	**-5,099***	**-5,055***	**-4,798***
Classroom personnel/activities (2019$)	8,576	**-3,563***	**-3,611***	**-2,916***
Classroom personnel/activities (percent)	63	**-4***	**-5***	0
Classroom instruction/non-support (pct)	54	0	0	**+3***
Teachers				
Students per teacher (FTEs)	19	+4	-1	+1
Avg. years of experience	13	**-7***	**-8***	**-7***
Percent in first year	18	**+11***	**+13***	**+19***
Percent with a master's	62	**-37***	**-38***	**-36***
Avg. annual salary	64,465	**-25,130***	**-29,059***	**-28,964***

Note. Descriptive statistics in this table are from 2019 and are weighted by the number of students we observe in our analytic sample in that year. Differences are between charter and traditional-public schools in the same district. Stars indicate that differences between charter schools and traditional public schools in the same district are statistically significant ($p<0.10$ using a two-tailed test and clustering errors at the school level).

Table A2. School counts in districts with both for-profit-operated (EMO) and nonprofit-operated (CMO or sole-operator) charter schools

	Traditional public schools	Nonprofit-operated charters (CMO/sole-op.)	CMO-operated charter schools	For-profit-operated (EMO) charter schools
Akron City	45	3	1	5
Cincinnati Public	57	6	1	9
Cleveland Municipal	72	18	13	32
Columbus City	102	22	14	19
Dayton City	28	10	6	5
Euclid City	9	1	1	2
Lorain City	15	1	1	5
Mansfield City	5	1	0	1
Parma City	17	1	0	1
Toledo City	52	11	5	9
Warrensville Heights City	3	1	0	1
Youngstown	13	2	1	3

Note. Charter school data are from the Ohio Department of Education's annual report on "community schools" (available online) and profit status is based on ODE's 2019 EdFacts report (obtained via a formal data request). The table presents counts of schools serving grades 4-8 in districts that featured both site-based for-profit-operated charter schools and nonprofit-operated charter schools in the analytic sample. Counts of charter schools are for those site-based charter schools in operation in 2019.

Table A3. Characteristics of "brick and mortar" charter schools providing a general education, based on school financial forecast data (unweighted, each school observed once; * → school-level averages)

	Nonprofit Sole-Operated	Nonprofit CMO-operated	For-profit EMO-operated
Structure			
Percent of schools with elementary entry grades *(grades K-4)*	79	81	94
Percent of schools with high school terminal grades *(grades 11-12)*	35	15	8
Number of years schools in operation*	12	10	10
Number of schools in operator network*	N/A	10	15
Revenues & expenditures*			
Receipts per pupil (2019 dollars)	10,930	11,490	10,841
Percent of receipts from state per pupil funds	78	74	78
Percent of receipts from federal grants	14	17	17
Percent of receipts from donations	2	3	1
Percent of operating expend. for personnel	64	53	51
Fund balance as percent of operating expend. (i.e., cash on hand)	21	12	5
Personnel*			
Ratio of students to instructional staff	12	13	13
Ratio of students to administrative staff	69	105	80
Teacher pay (2019 dollars)	36,983	37,450	36,314
Students*			
Student count	336	334	292
Percent minority	70	86	81
Percent economically disadvantaged	83	94	93
Percent with individual education plan (IEP)	14	12	17
Percent limited English proficient (LEP)	5	11	7

Note: The table presents descriptive statistics for the 210 brick-and-mortar charter schools serving a general student population in 2019. These statistics are disaggregated based on whether the Ohio Department of Education identified schools as having no operator, as contracting with a nonprofit operator, or as contracting with a for-profit operator. Note that finance and staffing data are from school budget forecast data, as opposed to the state-provided finance and FTE data in the main body of the paper. The former have been validated by the state, whereas the latter have not.

Table A4. Sensitivity analysis for lagged-score models for student achievement

	1	2	3	4	5	6	7	8	9	10
EMO-operated charters										
VS.										
Traditional public schools	0.0440***	0.0410***	0.0353***	0.0365***	0.0349***	0.0377***	0.0304***	0.0313***	0.0292***	0.0319***
	(0.0101)	(0.0105)	(0.0099)	(0.0097)	(0.0097)	(0.0087)	(0.0074)	(0.0086)	(0.0082)	(0.0075)
Non-profit-operated Charters	-0.0469***	-0.0433***	-0.0635***	-0.0605***	-0.0604***	-0.0296**	-0.0385***	-0.0337***	-0.0453***	-0.0361***
	(0.0152)	(0.0144)	(0.0167)	(0.0165)	(0.0166)	(0.0127)	(0.0130)	(0.0128)	(0.0145)	(0.0132)
CMO-operated charters	-0.0537***	-0.0457***	-0.0675***	-0.0642***	-0.0653***	-0.0367***	-0.0419***	-0.0419***	-0.0528***	-0.0408***
	(0.0172)	(0.0163)	(0.0174)	(0.0172)	(0.0174)	(0.0137)	(0.0127)	(0.0148)	(0.0152)	(0.0134)
N	599,779	601,761	552,917	551,186	551,186	596,646	548,348	601,761	551,186	548,348
Fixed Effects										
district-by-year	X	X	X	X	X	X	X	X	X	X
grade	X	X	X	X	X	X	X	X	X	X
grade-3 school			X	X	X		X		X	X
Lagged student-level covs.										
achievement (cubic)	X	X	X	X	X	X	X			
demographics	X		X	X	X	X	X	X	X	X
absence rate (cubic)	X			X	X	X	X		X	X
discipline	X				X	X	X		X	X
Lagged school-level covs.										
achievement						X	X			X
demographics						X	X			X
Model										
lagged score	X	X	X	X	X	X	X			
gain score								X	X	X

Note. The table presents the estimated difference in annual, student-level achievement gains between EMO-operated charter schools and traditional public schools, all non-profit-operated charter schools, and CMO-operated charter schools, respectively. Student- and school-level data were obtained from the Ohio Department of Education through a formal data request. The "gain score" model uses as a dependent variable the difference between a student's test score and their previous year's test score. Each coefficient is from a separate OLS regression. Observation counts decline in some models because of our inability to identify students' grade-3 schools. Standard errors clustered at the school level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A5. Sensitivity analysis for lagged-score models for absence rates

	1	2	3	4	5	6	7	8	9	10
EMO-operated charters										
VS.										
Traditional public schools	-0.0005	-0.0010	0.0017	0.0017	0.0019	0.0005	0.0026*	-0.0006	0.0008	0.0012
	(0.0015)	(0.0016)	(0.0016)	(0.0016)	(0.0016)	(0.0014)	(0.0015)	(0.0012)	(0.0018)	(0.0020)
Non-profit-operated charters	0.0066***	0.0068***	0.0095***	0.0090***	0.0090***	0.0046**	0.0070***	0.0030**	0.0053**	0.0040*
	(0.0018)	(0.0019)	(0.0018)	(0.0018)	(0.0018)	(0.0019)	(0.0018)	(0.0015)	(0.0021)	(0.0022)
CMO-operated charters	0.0053**	0.0050***	0.0079***	0.0075***	0.0077***	0.0042**	0.0065***	0.0024	0.0040*	0.0032
	(0.0021)	(0.0022)	(0.0022)	(0.0022)	(0.0022)	(0.0021)	(0.0022)	(0.0016)	(0.0022)	(0.0023)
N	599,779	599,779	551,186	551,186	551,186	596,646	548,348	599,779	551,186	548,348
Fixed Effects										
district-by-year	X	X	X	X	X	X	X	X	X	X
grade	X	X	X	X	X	X	X	X	X	X
grade-3 school			X	X	X		X		X	X
Lagged student-level covs.										
achievement (cubic)	X			X	X	X	X		X	X
demographics	X		X	X	X	X	X	X	X	X
absence rate (cubic)	X	X	X	X	X	X	X			
discipline	X				X	X	X		X	X
Lagged school-level covs.										
achievement						X	X			X
demographics						X	X			X
Model										
lagged score	X	X	X	X	X	X	X			
gain score								X	X	X

Note. The table presents the estimated difference in annual, student-level changes in absence rates between EMO-operated charter schools and traditional public schools, all non-profit-operated charter schools, and CMO-operated charter schools, respectively. Student- and school-level data were obtained from the Ohio Department of Education through a formal data request. The "gain score" model uses as a dependent variable the difference between a student's absence rate and their previous year's absence rate. Each coefficient is from a separate OLS regression. Observation counts decline in some models because of our inability to identify students' grade-3 schools. Standard errors clustered at the school level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A6. Event study of student achievement: Transitions to new schools in grades 6-7

	2 years prior	1 year prior	0	1 year after	2 years after	N
Model 1: district-by-year FEs						
EMO-operated vs. TPS	-0.0025	-0.0049	--	0.0681**	0.1514**	261,679
	(0.0231)	(0.0208)		(0.0206)	(0.0228)	
EMO-operated vs. nonprofit-op.	-0.0451	-0.0453	--	-0.1106***	-0.028	15,010
	(0.0292)	(0.0282)		(0.0289)	(0.0322)	
EMO-operated vs. CMO-op.	-0.0392	-0.0591*	--	-0.0808***	-0.009	11,712
	(0.0327)	(0.033)		(0.0298)	(0.0349)	
Model 2: school-by-year FEs						
EMO-operated vs. TPS	0.0067	0.0068	--	0.0287	0.1026***	261,956
	(0.0244)	(0.0192)		(0.0191)	(0.0196)	
EMO-operated vs. nonprofit-op.	-0.0152	-0.0114	--	-0.1112***	-0.0677**	15,045
	(0.0305)	(0.0286)		(0.0273)	(0.029)	
EMO-operated vs. CMO-op.	-0.0133	-0.0262	--	-0.0878***	-0.0456	11,734
	(0.0353)	(0.0344)		(0.0297)	(0.0333)	

Note. The table presents difference-in-differences estimates of student achievement, comparing within-student changes between students who transitioned to EMO-run charter schools in year 1 to students who transitioned to one of three school types (traditional public schools, nonprofit-operated charter schools, or CMO-operated charter schools) in that same year. Each row of coefficients is from a separate OLS regression focusing on one of three comparisons. The baseline year (0) is the year a student reached a school's terminal grade, just prior to a structural move to their new school. All models include student, cell, and event-time fixed effects. Model 1 also includes district-by-year fixed effects, whereas model 2 includes school-by-year fixed effects based on the school students attended in the baseline year. Standard errors clustered at the school level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A7. Event study of student achievement: Transitions to new schools in grades 5-8

	1 year prior	0	1 year after	N
Model 1: district-by-year FEs				
EMO-operated vs. TPS	0.0046 (0.0210)	--	0.0213 (0.0234)	276,158
EMO-operated vs. nonprofit-op.	-0.0036 (0.0262)	--	-0.1044*** (0.0325)	19,805
EMO-operated vs. CMO-op.	-0.0225 (0.0291)	--	-0.0915** (0.0355)	16,074
Model 2: school-by-year FEs				
EMO-operated vs. TPS	-0.0013 (0.0187)	--	0.0019 (0.0207)	276,221
EMO-operated vs. nonprofit-op.	-0.0055 (0.0250)	--	-0.1085*** (0.0298)	19,813
EMO-operated vs. CMO-op.	-0.0186 (0.0289)	---	-0.0994*** (0.0329)	16,080

Note. The table presents difference-in-differences estimates of student achievement, comparing within-student changes between students who transitioned to EMO-run charter schools in year 1 to students who transitioned to one of three school types (traditional public schools, nonprofit-operated charter schools, or CMO-operated charter schools) in that same year. Each row of coefficients is from a separate OLS regression focusing on one of three comparisons. The baseline year (0) is the year a student reached a school's terminal grade, just prior to a structural move to their new school. All models include student, cell, and event-time fixed effects. Model 1 also includes district-by-year fixed effects, whereas model 2 includes school-by-year fixed effects based on the school students attended in the baseline year. Standard errors clustered at the school level are in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A8. Event study of student absence rate: Transitions to new schools in grades 6 or 7 (excludes pre-treatment periods for 2016 and 2017 transitions because of limited data)

	2 years prior	1 year prior	0	1 year after	2 years after	N
Model 1: district-by-year FEs						
EMO-operated vs. TPS	0.0045	-0.0012	--	-0.0001	-0.0085***	211,502
	(0.0029)	(0.0028)		(0.0033)	(0.0031)	
EMO-operated vs. nonprofit-op.	-0.0048	-0.0042	--	0.0073**	0.0043	12,3345
	(0.0040)	(0.0030)		(0.0032)	(0.0033)	
EMO-operated vs. CMO-op.	-0.0031	0.0013	--	0.0066*	0.0020	9,698
	(0.0045)	(0.0032)		(0.0034)	(0.0037)	
Model 2: school-by-year FEs						
EMO-operated vs. TPS	0.0028	0.0004	--	0.0038	-0.0039	211,541
	(0.0029)	(0.0026)		(0.0030)	(0.0030)	
EMO-operated vs. nonprofit-op.	-0.0019	0.0007	--	0.0077***	0.0058	12,335
	(0.0043)	(0.0031)		(0.0028)	(0.0036)	
EMO-operated vs. CMO-op.	0.0040	0.0047	--	0.0076**	0.0037	9,698
	(0.0043)	(0.0032)		(0.0031)	(0.0039)	

Note. The table presents difference-in-differences estimates of student absence rates (hours of unauthorized absence divided by total required instructional hours), comparing within-student changes between students who transitioned to EMO-run charter schools in year 1 to students who transitioned to one of three school types (traditional public schools, nonprofit-operated charter schools, or CMO-operated charter schools) in that same year. Each row of coefficients is from a separate OLS regression focusing on one of three comparisons. The baseline year (0) is the year a student reached a school's terminal grade, just prior to a structural move to their new school. All models include student, cell, and event-time fixed effects. Model 1 also includes district-by-year fixed effects, whereas model 2 includes school-by-year fixed effects based on the school students attended in the baseline year. Standard errors clustered at the school level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A9. Event study of student absence rate: Transitions to new schools in grades 5-8 (excludes pre-treatment period for 2016 transition because of limited data)

	1 year prior	0	1 year after	N
Model 1: district-by-year FEs				
EMO-operated vs. TPS	0.0007 (0.0020)	--	-0.0073*** (0.0023)	254,236
EMO-operated vs. nonprofit-op.	-0.0032 (0.0020)	--	0.0005 (0.0024)	18,396
EMO-operated vs. CMO-op.	-0.0019 (0.0019)	--	-0.0006 (0.0025)	14,997
Model 2: school-by-year FEs				
EMO-operated vs. TPS	-0.0013 (0.0016)	--	0.003 (0.0022)	254,239
EMO-operated vs. nonprofit-op.	-0.0026 (0.0021)	--	0.0042* (0.0022)	18,396
EMO-operated vs. CMO-op.	0.0013 (0.0023)	---	0.0028 (0.0023)	14,997

Note. The table presents difference-in-differences estimates of student absence rates (hours of unauthorized absence divided by total required instructional hours), comparing within-student changes between students who transitioned to EMO-run charter schools in year 1 to students who transitioned to one of three school types (traditional public schools, nonprofit-operated charter schools, or CMO-operated charter schools) in that same year. Each row of coefficients is from a separate OLS regression focusing on one of three comparisons. The baseline year (0) is the year a student reached a school's terminal grade, just prior to a structural move to their new school. All models include student, cell, and event-time fixed effects. Model 1 also includes district-by-year fixed effects, whereas model 2 includes school-by-year fixed effects based on the school students attended in the baseline year. Standard errors clustered at the school level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A10. Event study of student achievement: Transitions to Accel in 2018 and 2019

	2 years prior	1 year prior	0	1 year after	2 years after	N
Test Scores						
ACCEL x EMO	0.0936	0.0810	--	0.0179	0.0696	26,520
	(0.1025)	(0.0916)		(0.0915)	(0.0958)	
ACCEL	0.1401**	0.1107*	--	0.0494	0.0973	
	(0.0583)	(0.0626)		(0.0754)	(0.0837)	
Unauthorized Abs Rate						
ACCEL x EMO	-0.0034	-0.0161	--	-0.0117	-0.0055	26,473
	(0.0117)	(0.0135)		(0.0093)	(0.0127)	
ACCEL	-0.0127	-0.0099**	--	-0.0028	0.0121	
	(0.0078)	(0.0045)		(0.0072)	(0.0088)	

Note. The table presents the results of a "triple difference" event-study analysis comparing outcomes of schools that were taken over by Accel Schools—a for-profit EMO—depending on whether the schools had been run by a CMO or EMO prior to the takeover. This is the only time we observe a clear switch from a CMO to an EMO in the middle of our panel (between 2017 and 2018). Each model employs student fixed effects as well as operator-type-by-year-by-district fixed effects. The coefficient for ACCEL capture the pre- and post-transition effect for schools operated by CMOs prior to the takeover (as compared to other CMOs), whereas the interaction *ACCELxEMO* captures the difference in this affect for schools that had been EMO-operated prior to the Accel takeover. The analysis is limited to students we observe all five years (2015-2019) so that estimated effects are not due to changes in student composition. Standard errors clustered at the school level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A11. Event study of disciplinary reports: Transitions to new schools in grades 6 or 7

	2 years prior	1 year prior	0	1 year after	2 years after	N
Model 1: district-by-year FEs						
EMO-operated vs. TPS	-0.0103 (0.0181)	0.0005 (0.0161)	--	-0.0618*** (0.0177)	-0.0698*** (0.0180)	245,517
EMO-operated vs. nonprofit-op.	-0.0003 (0.0244)	0.0037 (0.0207)	--	0.0132 (0.0239)	-0.0106 (0.0235)	14,196
EMO-operated vs. CMO-op.	0.0301 (0.0259)	0.0252 (0.0235)	--	0.0155 (0.0266)	-0.0055 (0.0262)	11,105
Model 2: school-by-year FEs						
EMO-operated vs. TPS	0.0017 (0.0174)	0.0077 (0.0169)	--	-0.0777*** (0.0175)	-0.0972*** (0.0180)	245,683
EMO-operated vs. nonprofit-op.	-0.0290 (0.0245)	-0.0035 (0.0223)	--	0.0183 (0.0232)	-0.0017 (0.0255)	14,215
EMO-operated vs. CMO-op.	-0.0135 (0.0273)	0.0082 (0.0270)	--	0.0130 (0.0255)	-0.0007 (0.0288)	11,121

Note. The table presents difference-in-differences of disciplinary reports leading to suspension (except truancy), comparing within-student changes between students who transitioned to EMO-run charter schools in year 1 to students who transitioned to one of three school types (traditional public schools, nonprofit-operated charter schools, or CMO-operated charter schools) in that same year. Each row of coefficients is from a separate OLS regression focusing on one of three comparisons. The baseline year (0) is the year a student reached a school's terminal grade, just prior to a structural move to their new school. All models include student, cell, and event-time fixed effects. Model 1 also includes district-by-year fixed effects, whereas model 2 includes school-by-year fixed effects based on the school students attended in the baseline year. Standard errors clustered at the school level are in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A12. Event study of disciplinary reports: Transitions to new schools in grades 5-8

	1 year prior	0	1 year after	N
Model 1: district-by-year FEs				
EMO-operated vs. TPS	0.0071 (0.0096)	--	-0.0612*** (0.0101)	276,275
EMO-operated vs. nonprofit-op.	-0.0043 (0.0146)	--	-0.0196 (0.0192)	19,810
EMO-operated vs. CMO-op.	0.0044 (0.0172)	--	-0.0380* (0.0230)	16,079
Model 2: school-by-year FEs				
EMO-operated vs. TPS	0.0074 (0.0095)	--	-0.0723*** (0.0117)	276,338
EMO-operated vs. nonprofit-op.	-0.0152 (0.0173)	--	0.0047 (0.0169)	19,818
EMO-operated vs. CMO-op.	-0.0076 (0.0212)	---	-0.0118 (0.0210)	16,085

Note. The table presents difference-in-differences estimates of disciplinary reports leading to suspension (except truancy), comparing within-student changes between students who transitioned to EMO-run charter schools in year 1 to students who transitioned to one of three school types (traditional public schools, nonprofit-operated charter schools, or CMO-operated charter schools) in that same year. Each row of coefficients is from a separate OLS regression focusing on one of three comparisons. The baseline year (0) is the year a student reached a school's terminal grade, just prior to a structural move to their new school. All models include student, cell, and event-time fixed effects. Model 1 also includes district-by-year fixed effects, whereas model 2 includes school-by-year fixed effects based on the school students attended in the baseline year. Standard errors clustered at the school level are in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A13. Lagged-score models of the relative impact of EMO-operated charter schools on disciplinary incidents and chronic absenteeism

	Disciplinary Report (0,1)	Chronic Absenteeism (0,1)
Panel A: Event Study Sample (grades 6-8)		
EMO-operated charters VS.		
Traditional public schools	-0.1011***	-0.0030
	(0.0197)	(0.0147)
Non-profit-operated charters	-0.0227	0.0480***
	(0.0247)	(0.0183)
CMO-operated charters	-0.0317	0.0568***
	(0.0262)	(0.0176)
N	106,082	105,942
Panel B: Full Sample (grades 4-8)		
EMO-operated charters VS.		
Traditional public schools	-0.0266***	0.0116*
	(0.0093)	(0.0061)
Non-profit-operated charters	0.0088	0.0330***
	(0.0168)	(0.0088)
CMO-operated charters	-0.0347**	0.0330***
	(0.0176)	(0.096)
N	599,779	598,858

Note. The table presents the estimated difference in annual, student-level "gains" in disciplinary incidents leading to suspension (except truancy) and chronic absenteeism (missing 10 percent or more of instructional hours) between EMO-operated charter schools and traditional public schools, all non-profit-operated charter schools, and CMO-operated charter schools, respectively. Student- and school-level data were obtained from the Ohio Department of Education through a formal data request. Each coefficient is from a separate OLS regression that controls for students' prior-year test scores, absence rates, and demographic characteristics, as well as for district-by-school-year fixed effects. Standard errors clustered at the school level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A14. Lagged-score models of the relative impact of EMO-operated schools on students in the bottom/top 30 percent of their district's attendance-rate distributions

	Students in Bottom 30th Percentile	Students in Top 30th Percentile	Estimated Difference (pooled sample)
a. Disciplinary reports (0,1)			
EMO-operated charters			
VS.			
Traditional public schools	-0.0361***	-0.0164*	-0.0252***
	(0.0117)	(0.0089)	(0.0074)
Non-profit-operated charters	0.0220	0.0006	0.0086
	(0.0222)	(0.0142)	(0.0146)
CMO-operated charters	-0.0416*	-0.0275*	-0.0268
	(0.0226)	(0.0166)	(0.0164)
N	178,340	185,843	364,183
b. Chronic absenteeism (0,1)			
EMO-operated charters			
VS.			
Traditional public schools	0.0297***	0.0034	0.0305***
	(0.0098)	(0.0033)	(0.0093)
Non-profit-operated charters	0.0693***	0.0059	0.0614***
	(0.0142)	(0.0051)	(0.0130)
CMO-operated charters	0.0694***	0.0052	0.0541***
	(0.0166)	(0.0049)	(0.0142)
N	178,340	185,843	364,183

Note. The table presents the estimated difference in annual, student-level "gains" in disciplinary reports and chronic absenteeism between EMO-operated charter schools and traditional public schools, all non-profit-operated charter schools, and CMO-operated charter schools, respectively. Column 1 and column 2 limit the analysis to students whose lagged attendance rate put them in the bottom 30th percentile (attendance rates under approximately 0.92) or top 30th percentile (attendance rate over approximately 0.97), respectively, of their geographic school district. Column 3 presents estimates of the differences in gains between students in the bottom 30th percentile to students in the top 30th based on pooling the samples in columns 1 and 2. Student- and school-level data were obtained from the Ohio Department of Education through a formal data request. Each coefficient is from a separate OLS regression that controls for students' prior-year test scores, attendance rates, and demographic characteristics, as well as for district and school-year fixed effects. Standard errors clustered at the school level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A15. Relative impact of EMO-operated charter schools on student attendance (linear lag)

	Attendance Rate [proportion]	Absence from instruction [hours]	Unauthorized absence [hours]	Unauthorized absence [log(1+hours)]	Total Instruction [hours]
EMO-operated charters					
VS.					
Traditional public schools	-0.0004	2.0691**	3.5355**	0.0938*	63.2039***
	(0.0018)	(0.9631)	(1.6107)	(0.0479)	(7.2609)
Non-profit-operated charters	-0.0092***	1.1705	7.5240***	0.1616**	11.8946
	(0.0023)	(1.2162)	(2.0596)	(0.0672)	(9.8815)
CMO-operated charters	-0.0084***	1.6915	6.6283***	0.1286*	5.8629
	(0.0027)	(1.2066)	(2.4416)	(0.0769)	(10.2946)
N	598,858	599,779	599,779	599,779	598,859

Note. The table presents the estimated difference in annual, student-level attendance gains between EMO-operated charter schools and traditional public schools, all non-profit-operated charter schools, and CMO-operated charter schools, respectively. Student- and school-level data were obtained from the Ohio Department of Education through a formal data request. Each coefficient is from a separate OLS regression that controls for students' prior-year test scores (cubic polynomial), attendance rate (linear), and demographic characteristics, as well as for district-by-school-year fixed effects. Standard errors clustered at the school level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A16. Sensitivity analysis for lagged-score models for disciplinary reports (0,1)

	1	2	3	4	5	6	7	8	9	10
EMO-operated charters										
VS.										
Traditional public schools	-0.0266***	-0.0233**	-0.0350***	-0.0353***	-0.0374***	-0.0229**	-0.0323***	-0.0157***	-0.0205***	-0.0174***
	(0.0093)	(0.0108)	(0.0097)	(0.0096)	(0.0096)	(0.0095)	(0.0096)	(0.0049)	(0.0064)	(0.0063)
Non-profit-operated charters	0.0088	0.0095	0.0173	0.0123	0.0073	0.0029	0.0002	0.0031	0.0063	0.0038
	(0.0168)	(0.0165)	(0.0166)	(0.0167)	(0.0169)	(0.0171)	(0.0170)	(0.0092)	(0.0113)	(0.0111)
CMO-operated charters	-0.0347**	-0.0372**	-0.0350*	-0.0389**	-0.0432**	-0.0410**	-0.0499***	-0.0243**	-0.0310*	-0.0336**
	(0.0176)	(0.0180)	(0.0181)	(0.0182)	(0.0182)	(0.0190	(0.0182)	(0.0104)	(0.0119)	(0.0116)
N	599,779	601,761	552,917	552,917	551,186	596,646	548,348	601,761	551,186	
Fixed Effects										
district-by-year	X	X	X	X	X	X	X	X	X	X
grade	X	X	X	X	X	X	X	X	X	X
grade-3 school			X	X	X		X		X	X
Lagged student-level covs.										
achievement (cubic)	X			X	X	X	X		X	X
demographics	X		X	X	X	X	X	X	X	X
absence rate (cubic)	X				X	X	X		X	X
discipline	X	X	X	X	X	X	X			
Lagged school-level covs.										
achievement						X	X			X
demographics						X	X			X
Model										
lagged score	X	X	X	X	X	X	X			
gain score								X	X	X

Note. The table presents the estimated difference in annual, student-level changes in disciplinary reports (except truancy) between EMO-operated charter schools and traditional public schools, all non-profit-operated charter schools, and CMO-operated charter schools, respectively. Student- and school-level data were obtained from the Ohio Department of Education through a formal data request. The "gain score" model uses as a dependent variable the difference between a student's current disciplinary record and their previous year's disciplinary record. Each coefficient is from a separate OLS regression. Observation counts decline in some models because of our inability to identify students' grade-3 schools. Standard errors clustered at the school level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.