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Do Charter Schools Receive Their Fair Share of Funding? School Finance Equity for Charter and Traditional Public Schools¹

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Abstract: U.S. charter schools are publicly funded through state school finance formulas that often mirror the traditional public school finance systems. While charter school advocates and critics disagree over whether charters receive an equitable share of funding, few discussions are based on rigorous analyses of funding and expenditures. Most prior analyses, especially those presented in policy briefs or white papers, examine average

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funding differences without exploring underlying cost factors between the two sectors. Our purpose is to demonstrate how careful analysis of charter school funding with appropriate methodological approaches can shed light on disagreements about charter school finance policy. Using detailed school finance data from Texas as a case study, we find that after accounting for differences in accounting structures and cost factors, charter schools receive significantly more state and local funding compared to traditional public schools with similar structural characteristics and student demographics. However, many small charter schools are actually underfunded relative to their traditional public school counterparts. Policy simulations demonstrate that on average, each student who transfers to a charter school increases the cost to the state by \$1,500. We discuss the implications of these findings for both school finance policy in Texas and nationally.

Keywords: Charter Schools; Educational Finance; Educational Equity (Finance); Resource Allocation; Texas; Teacher Supply and Demand; Teacher Salaries

¿Las escuelas charter reciben su parte justa de fondos? Equidad de financiación escolar para escuelas públicas charter y tradicionales

Resumen: Las escuelas charter de EE. UU. se financian con fondos públicos a través de fórmulas estatales de financiación escolar que a menudo reflejan los sistemas tradicionales de financiación de las escuelas públicas. Si bien los defensores y críticos de las escuelas charter no están de acuerdo sobre si las escuelas charter reciben una parte equitativa de los fondos, pocas discusiones se basan en análisis rigurosos de los fondos y los gastos. La mayoría de los análisis anteriores, especialmente los presentados en resúmenes de políticas o documentos técnicos, examinan las diferencias de financiación promedio sin explorar los factores de costo subyacentes entre los dos sectores. Nuestro propósito es demostrar cómo un análisis cuidadoso de la financiación de las escuelas autónomas con enfoques metodológicos apropiados puede arrojar luz sobre los desacuerdos sobre la política de financiación de las escuelas autónomas. Utilizando datos detallados de financiamiento escolar de Texas como un estudio de caso, encontramos que después de considerar las diferencias en las estructuras contables y los factores de costo, las escuelas autónomas reciben significativamente más fondos estatales y locales en comparación con las escuelas públicas tradicionales con características estructurales y demografía estudiantil similares. Sin embargo, muchas escuelas charter pequeñas en realidad no cuentan con fondos suficientes en comparación con sus contrapartes de las escuelas públicas tradicionales. Las simulaciones de políticas demuestran que, en promedio, cada estudiante que se transfiere a una escuela autónoma aumenta el costo para el estado en \$1,500. Discutimos las implicaciones de estos hallazgos tanto para la política de financiamiento escolar en Texas como a nivel nacional.

Palabras-clave: escuelas charter; finanzas educativas; equidad educativa (finanzas); asignación de recursos; Texas; oferta y demanda de maestros; salarios de maestros

As escolas charter recebem sua parcela justa de financiamento? Equidade financeira escolar para charter e escolas públicas tradicionais

Resumo: As escolas charter nos EUA são financiadas publicamente através de fórmulas de financiamento de escolas estaduais que geralmente refletem os sistemas tradicionais de financiamento de escolas públicas. Embora os defensores e críticos das escolas charter discordem sobre se os charters recebem uma parcela equitativa do financiamento, poucas discussões são baseadas em análises rigorosas do financiamento e das despesas. A maioria

das análises anteriores, especialmente as apresentadas em resumos de políticas ou documentos técnicos, examina as diferenças médias de financiamento sem explorar os fatores de custo subjacentes entre os dois setores. Nosso objetivo é demonstrar como uma análise cuidadosa do financiamento das escolas charter com abordagens metodológicas apropriadas pode lançar luz sobre divergências sobre a política financeira das escolas charter. Usando dados detalhados de finanças escolares do Texas como um estudo de caso, descobrimos que, depois de contabilizar as diferenças nas estruturas contábeis e nos fatores de custo, as escolas charter recebem significativamente mais recursos estaduais e locais em comparação com as escolas públicas tradicionais com características estruturais semelhantes e dados demográficos dos alunos. No entanto, muitas pequenas escolas charter são realmente subfinanciadas em relação às escolas tradicionais da rede pública. As simulações de políticas demonstram que, em média, cada aluno que se transfere para uma escola charter aumenta o custo para o estado em US \$1.500. Discutimos as implicações desses achados para a política financeira da escola no Texas e nacionalmente.

Palavras-chave: Escolas charter; Finanças educacionais; Equidade educacional (finanças); Alocação de recursos; Texas; Oferta e demanda de professores; Salários de professores

Introduction

Enrollment in U. S. charter schools has grown exponentially over the past two decades. Charter schools are publicly funded privately managed schools with fewer regulations than traditional public schools, especially for educator hiring, evaluation, and dismissal. States decide how to fund charter schools, giving rise to large variation in funding mechanisms around the country. In Arizona, for example, charters are funded using a formula similar to the one used for traditional public schools, with exceptions recently added for small district adjustments (Arizona Department of Education, 2015; Douglas, 2016). Charter schools in California receive formula funding but are capped in the amount of additional student poverty weighted funding they can receive (Ugo & Hill, 2018). In Texas, the state education agency adopted a method in which all charters receive the same base level funding rate, equal to the average base level of funding across all traditional public school (TPS) districts in the state (Rolle & Wood, 2012). This simplified allocation mechanism has led to a wide range of criticisms alleging that charter schools are underfunded or overfunded, or that particular charters are under-resourced (Mata, 2015; Reynolds, 2014). State legislators have limited empirical evidence of how the state's school finance system treats charter schools or whether adjustments are needed. More broadly, states are currently grappling with how charter schools should be funded vis-à-vis TPS districts.

Disagreements about charter school finance are sometimes based on ideological merits, or lack consideration of structural differences between charter and TPS district sectors (Henig, 2008). In particular, comparisons of funding levels between the two sectors are often based on raw statistics that can mislead policymakers. Our purpose here is to demonstrate how careful analysis of charter school funding with appropriate methodological approaches can shed light on disagreements about charter school finance policy. We use the case of Texas as an example, a state in which charter advocates and critics have distributed policy briefs and published opinion-editorials with conflicting claims (e.g., Dunn & Sadler, 2016; Lesley, 2015). For example, the executive director of the Texas Charter Schools Association argued in a Houston Chronicle opinion-editorial that charter schools in Texas receive between \$489 and \$4,624 less per student, compared to TPS districts (Dunn & Feinburg, 2014). Later, a charter school parent of a student attending KIPP Houston noted that charter schools in Texas receive “about \$1,000 less per student than what is provided to school districts” (Mata, 2015) and this claim has been repeated elsewhere (e.g., Dunn & Sadler, 2016; McGaughy, 2016). Conversely, Lesley (2015) notes that on average, Texas charter schools receive greater base funding than TPS districts and these additional resources cover the additional costs of facilities. These comparisons ignore differences in the student demographics and enrollment size between charter and TPS districts. We demonstrate how accounting for these important differences can explain how competing views develop and sustain.

In the first part of our analysis, we use regression-based methods to compare funding rates between charter school districts and otherwise similar TPS districts. We then explore district factors associated with differences in funding, focusing especially on district enrollment size, a primary factor contributing to differences in funding rates within the TPS district sector. We use these results to show how much funding charter school districts in Texas would receive if funded the same way as TPS districts. Differences in funding between sectors suggest that the total costs of K-12 education changes when students transfer between sectors. Thus, in the second part of our analysis, we conduct a policy simulation that demonstrates the cost to the state of Texas associated with students transferring from the TPS sector into the charter school sector.

In what follows, we provide background information on education policy pertaining to the charter school sector and school finance in Texas. We then explore extant literature related to our

research questions and explain how our study addresses an important gap within this research. Subsequent sections describe our data, analytic approach, findings, and recommendations for research and policy.

Policy Background

Charter School Finance in the US

State legislators are engaging with how to fund charter schools and how to track charter school finance data (Baker, Libby & Wiley, 2015). In many states, the majority of charter schools operate within a larger TPS district (Kirst, 2007). Under these scenarios, funding for charters passes through the TPS district and the TPS district shares many resources with the charter school, such as transportation, special education services, and facilities. The service and facility sharing agreements make it difficult to track whether charter or TPS districts are receiving an equitable share of resources (Epple, Romano & Zimmer, 2016; New York City Independent Budget Office, 2010). In other contexts, like Texas and Arizona, the majority of charter schools are independent school districts that are unaffiliated with a TPS district and receive funding directly from the state. These charter school districts can consist of a single campus, such as the Academy of Dallas Charter School, which serves 476 students in grades K-8 in 2017-18, or they may include multiple campuses. IDEA Public Schools operates schools around the country, including 51 in Texas, where it is classified as a single charter school district. Even in these cases, in which charter school district finance data are reported to the state separately from TPS districts, parsing out funding and expenditure streams that pay for school buildings or non-tracked resources like volunteers is difficult (Baker & Miron, 2015). In this study, charter school districts are those that have obtained a charter from the state of Texas, have their own state-generated unique district identification number, and must report finance data to the state. Many of the charter school districts in Texas and elsewhere are run by Charter Management Organizations such as the KIPP Foundation or IDEA Public Schools, which are nonprofit entities that provide services similar to a school district central office (Bifulco & Buerger, 2015). Below we present background on charter school policy and school finance specific to Texas, the setting of our study.

Charter School Finance and Policy in Texas

A major overhaul of the Texas Education Code in 1995 included a provision that enabled the establishment of charter schools. While states around the country passed similar charter-authorizing laws throughout the 1990s, charter school enrollment in Texas grew rapidly, and the state now ranks second in the number of charter schools and total charter school enrollment (National Center for Education Statistics, 2018). Texas law permits four types of charter schools: (a) open-enrollment, which represent 80% of all charter students in the state; (b) independent school district charters, which comprise just under 20% of all charter students, (c) university/college campus charters; and (d) home-rule school district charters (see Ausbrooks, Barrett, & Daniel, 2005). The state has only five university-based charters and no home-rule school district charters. Our analysis focuses on funding for open-enrollment charter schools because these school districts function as separate entities for funding purposes, a topic we turn to next.

Texas funds public school districts through a school finance formula called the Foundation School Program, which consists of two components (Knight, 2017; Texas Taxpayers and Research Association [TTARA], 2018). Tier 1 funding is a foundation formula that ensures all districts receive a base level of funding. Tier 2 funding is a guaranteed tax yield that ensures that if districts choose to raise local taxes, those tax increases will generate similar levels of funding, regardless of district property wealth. The building block of Tier 1 funding is the “Basic Allotment” of funding per

student in average daily attendance (ADA). The Basic Allotment is adjusted to the “Adjusted Allotment” based on each local district’s enrollment size, population sparsity, and an education cost index unique to Texas. Each district’s total Tier 1 funding – the majority of all funding – is the Adjusted Allotment multiplied by the number of students, with additional funding weights for students in enrollment categories such as special education, low-income, English language learners, and others. The Adjusted Allotment also affects the amount of Tier 2 funding. Tier 2 funding is based on local property tax increases set by school districts and voters in the residential area. As part of Tier 2 funding, the state provides matching funds for tax increases up to 1.06%, with lower matching funds up to 1.17%, to ensure that lower-wealth districts can raise a similar level of tax revenues for a given tax rate as higher-wealth districts.² TPS districts pay for facilities by passing local bonds with voter approval. In short, the Adjusted Allotment influences both Tier 1 and Tier 2 funding, and is therefore central to a district’s total funding level.

Funding for charter schools is based on a much simpler formula. Charter schools do not have a tax base from which to generate local revenues and can’t pass bonds for facilities funding. Instead, all charter schools, regardless of size, receive from the state the average Adjusted Allotment of all TPS districts. That is, the Adjusted Allotment for charter schools is calculated as the simple average of the Adjusted Allotment for all TPS districts, which in 2017-18 was \$6,519. As we discuss later, this figure is inflated upward by many small TPS districts that receive much larger Adjusted Allotments due to size and population sparsity adjustments. Because the average Adjustment Allotment is based on the average across all districts, placing equal weight on each district, rather than weighting districts by student enrollment, the typical charter school student is allocated a much higher Adjusted Allotment than the typical TPS student. Total Tier 1 funding is then calculated based on each charter district’s student population, in a similar fashion to TPS districts. For Tier 2, charters receive additional funding based on a simple averaging of the local tax rate of each district. Like TPS districts, charters are funded based on their ADA. This structure effectively creates two separate finance systems where funding for charter schools is based in part on the TPS sector formula and in part on new rules established just for charter schools. In the section below, we describe a theoretical framework for school finance equity that outlines how resources levels between the two sectors should be compared. The subsequent section describes empirical research on charter school finance.

Theoretical Framework

School finance scholars contend that school district funding rates should account for the costs a district faces to provide a given level of educational opportunity, and allow for local autonomy in the level of funds and how they are spent (Baker & Green, 2012; Duncombe & Yinger, 2005). This study uses two related concepts – horizontal and vertical equity – to compare funding rates of charter and TPS districts. Horizontal equity suggests that two otherwise similar school

² Matching funds are based on a district’s weighted average daily attendance or WADA. WADA is calculated by dividing the district’s Adjusted Allotment by the districts Basic Allotment. Charter and TPS districts with larger Adjusted Allotments will therefore have larger WADA and larger Tier 2 funding. The “total entitlement” for Tiers 1 and 2 – the base amount of funding guaranteed to each district through the state’s Foundation School Program – is funded by a combination of state and local dollars. If a district’s local maintenance and operations (M&O) tax collections are insufficient to cover the total entitlement, the state makes up the difference. If the district’s M&O collections are greater than its total entitlement, the district must remit the excess to the state in the form of a recapture payment. Recapture payments are deposited into the state’s general fund and now exceed \$2 billion annually.

districts should receive the same level of funding. For example, horizontal equity exists when a charter school district and a TPS district of similar size, student population, local labor market characteristics, and surrounding population density receive similar levels of resources.

Scholars use the concept of vertical equity – the idea that differences in funding should reflect differences in need – to describe why some schools require additional funding (Alemán, 2007; Baker, 2009; Berne & Stiefel, 1984). Schools face different costs because of external factors outside their control. Districts located in higher cost labor markets must pay higher salaries to attract educators of a given quality, other factors being equal. At the same time, neighborhood or city amenities might make it easier to attract employees (Taylor, 2018). Larger school districts benefit from economies of scale, because fixed costs such as central office and administrative services can be spread over a larger number of students. Although district size is potentially under control of district or state policymakers, in some cases, consolidating or splitting districts is not practical. Districts that serve a more sparsely populated geographic area may incur greater transportation costs, whereas districts in more densely populated areas might benefit from public transportation options for students or the ability for students to walk to school (Imazeki, 2008). Studies show that high school students can be more costly to educate if schools offer specialized or career and technical courses that require scientific labs or other supplies and equipment (Gronberg, Jansen & Taylor, 2012). Finally, particular students may be associated with higher costs (Duncombe & Yinger, 2005). Students identified as having special needs require special education aides and other services to promote inclusion and diversity in the general education setting. Educating English learners may require additional resources to pay for teacher professional development and for bilingual aides to help educators draw on students' assets including linguistic capital and cultural diversity (Gándara et al., 2003). Students from low-income families may not have the same level of resources available at home and better-resourced schools may be more equipped to provide low-income students with equitable learning opportunities.³

Analyses of school funding between two types of schools need to account for differences in cost. For example, most studies of income-based school finance equity compare funding rates between high-poverty and otherwise similar low-poverty districts using regression-based methods. Simple comparisons of high- and low-poverty districts, or of charter and TPS districts do not consider differences in cost. Below we describe in more detail how we apply the theoretical framework of vertical equity to our analyses.

Research on Charter School Finance

While most research on charter schools assesses the effects on student outcomes, a few studies specifically explore the inner workings of charter schools (Angrist, Pathak & Walters, 2013; Baude et al., 2014; Dobbie & Fryer, 2013; 2016; Harris, 2013). A limited number of studies explicitly examine funding patterns between charter schools and TPS districts, and the state school finance

³ Effective school finance systems also provide local school districts with autonomy to set their own local funding and tax rates. Wealthier districts are typically allowed to raise additional funding if desired. However, school districts serving areas with lower property values are not able to raise the same level of funding at a given tax rate as wealthier districts. Thus, in addition to addressing differences in cost, effective school finance systems must also address differences in the ability to raise local revenues. Our focus here is on the extent to which differences in funding rates between charter and TPS districts reflect inequity or whether they simply reflect differences in costs. For this reason, we do not assess the level of local autonomy or the extent to which district are able to raise equal levels of revenue (a concept referred to as fiscal neutrality, Odden & Picus, 2013).

systems that guide those funding patterns (Baker & Miron, 2015; New York City Independent Budget Office, 2010). Rolle and Wood (2014) compare funding rates between charter and TPS districts in Texas, based on data from 2004-05 to 2008-09. Their findings show that charter districts receive less funding per ADA than TPS districts. However, the authors present average differences in funding between sectors and do not adequately adjust for structural differences. Some rural TPS districts in Texas receive large amounts of state aid through the small scale and sparsity adjustments to alleviate the costs associated with serving a large, sparsely populated geographic area. To account for the fact that charter schools enroll fewer students, on average, compared to TPS districts, Rolle and Wood (2014) re-estimate mean differences for only those TPS districts enrolling fewer students than the largest charter school district. As we describe in the methods section below, this approach still does not explicitly compare funding rates between charter and TPS districts with similar enrollment size, student characteristics, and other cost factors.

A separate report published by the Texas-based Resource Center for Charter Schools used similar methods as Rolle and Wood (2014) and reached similar conclusions (Colbert, 2007). A third study in Texas accounts for differences in enrollment size and reporting standards between the two sectors but does not consider differences in student demographics (Moak, Casey and Associates [MCA], 2015). That study finds that larger charter schools receive more funding than TPS districts. The authors cite several additional studies of funding between the two sectors in Texas that focus on funding per weighted student in average daily attendance, or WADA, which biases downward estimated funding rates for charter schools. These previous studies (Taylor et al., 2011; Texas Center for Educational Research, 2007; 2008) find that charter districts in Texas receive less funding per WADA, yet MCA (2015) finds that charters in Texas receive more funding per student in Average Daily Attendance.⁴ None of these studies accounts for differences in cost factors such as differences in the cost of local wages, population density, or differences in other student populations served including English language learners or students enrolled in special education.

A large number of similar studies from other states compare funding rates between charter and TPS districts, but fail to account for cost differences between the two sectors (Batdorff, Finn et al., 2005; Batdorff, Maloney et al., 2014; DeAngelis et al., 2018a, 2018b; DeAngelis & DeGrow, 2018; Geheb & Owns, 2019; Wolf et al., 2017). One exception, Levin et al. (2018), examines charter school funding in Maryland, where charters receive authorization from school districts and all charter schools are considered district charters. The authors calculate the predicted funding for each non-charter school, based on student demographics and grade configurations and use those parameters to determine the amount of funding charter schools would receive if they were funded the same way as traditional public schools. Their study shows that while charter schools receive slightly greater formula funding to support operations, the lack of facilities funding ultimately equalizes funding between the two sectors.

Studies of charter school funding in Texas described above do not consider differences in cost between charter and TPS districts.⁵ If charter schools serve more or less advantaged students, or are located in higher or lower cost areas, then differences in funding may simply reflect differences in cost. But by comparing unadjusted funding rates for charter and TPS districts, this past work assumes districts in each sector face similar cost factors, and are otherwise comparable.

⁴ As noted in MCA (2015), Taylor et al. (2011) do not state whether the unit of analysis is fall enrollment, Average Daily Attendance, or WADA. Average daily attendance is a Texas-specific measure of the number of full-time equivalent students enrolled (based on student attendance) and WADA is a similar number with students in some special categories such as special education, low-income and other having greater weight.

⁵ One exception, Taylor et al. (2011), shows cost-adjusted comparisons of funding for charter and TPS districts.

Under this assumption, funding rates for the two education systems are equitable if they are equal. In other words, past work is atheoretical to the extent that authors do not adopt a specific theoretical or conceptual framework for comparing resource levels and measuring finance equity. Vertical equity suggests that if one group of school districts faces greater cost factors, then greater funding rates for those districts are warranted (Della Sala & Knoepfel, 2015; Knight, 2019; Knight & Mendoza, 2019). Similarly, tests of horizontal equity between the two sectors should compare districts with similar cost factors. Finally, past studies have not examined how a state's overall expenditure on K-12 education changes when a student transfers between sectors.

Whether charter schools receive an equitable level of funding as compared to TPS districts and how the cost of education to the state changes when students switch sectors are important policy questions. Nationally, states are working to reform charter school finance systems to be more equitable, provide some mechanism for financing school buildings and capital improvements, and avoid shortchanging the TPS district sector (Baker et al., 2015). Research on how the Texas system allocates funding between and within sectors is important because policymakers may use the state as a case for comparison or as an exemplar. To address current gaps in the literature, we pose the following two research questions: 1) How do funding levels compare between charter schools and otherwise similar TPS districts in Texas? And 2) how do total statewide expenditures on K-12 education change when a student transfers from one sector to the other. The following section describes the data and methods used to address these questions.

Data and Analytic Approach

Data

We construct a district-level panel dataset that draws on the Texas Education Agency's Public Education Information Management System (PEIMS) financial reports. The PEIMS data provide information about funding and student demographics for all TPS and charter school districts in the state. We merge these data with more detailed school finance data acquired through an open records request with other Texas Education Agency (TEA) data. These more detailed finance data include information about the Adjusted Allotment and other formula funding categories including payments made on behalf of TPS school districts to cover the cost of retirement and pension contributions. Finally, we merge these data with U.S. Census Bureau and NCES data that provide information about district urbanicity and the local cost of wages (Taylor, 2018; Taylor & Fowler, 2006). Our primary analyses are based on data from 2017-18, although we use a panel dataset for school years 2004-05 to 2017-18 to show that our results are generally consistent over time.

Our focus is on two key variables that shed light on the Texas school finance system and the amount of resources allocated to schools. First, the Adjusted Allotment, the basic building block of the school finance system, determines the amount of funding each charter and TPS district receives, prior to adjustments for student demographics, school facilities, and Chapter 41 recapture. Second, the state and local general funding per student, which is the actual amount of funding all districts receive from state and local sources to support basic operations. As described in MCA (2012), the Texas school finance and data systems are too complex to parse out facilities funding for charter schools or TPS districts. Some capital related revenue categories may be double counted, while others may be excluded from a district's reported revenues for facilities. We therefore focus on general funding that is used to pay for maintenance and operations and describe the potential limitations of this approach in our Discussion section. We subtract "on-behalf" payments that TEA makes for pension contributions, but which are categorized as TPS district state and local funding.

These payments average \$392 per student and their exclusion slightly increases estimates of charter school funding advantages, but overall results do not change substantially when they are included or excluded. The final analytic sample includes a total of 171 charter school districts and 1,019 TPS districts for the 2017-18 school year.

Texas provides a useful case study of charter school finance. First, school finance policy in Texas has historically informed policy reforms in other states. The decision in the school finance Supreme Court case, *San Antonio ISD v. Rodriguez* (1973), led other states to focus challenges to state school finance systems on the state constitution, rather than the U.S. constitution (Hinojosa, 2015). Second, the state has seen rapid increase in charter school enrollment and now has a greater number of students enrolled in charter schools than any other state besides California (5.8% of all K-12 students in the state, NCES, 2018). Last, charter school finance in Texas is a hotly debated issue with competing claims about equity (e.g., Lesley, 2015; McGaughy, 2016). Sorting through these claims may provide guidance for how to resolve disagreement about charter school finance in other states.

Analytic Approach

Our goal in this study is to present accurate comparisons of funding rates between charter and TPS sectors. In contrast to costing out studies that estimate an adequate level of funding, our analytic framework does not identify a specific cost of education from which to compare. Instead, we focus on whether charter schools are equitably funded compared to otherwise similar non-charter TPS districts. Our second research question explores how differences in funding between the two sectors drive changes in the overall state expenditure of K-12 education associated with students transferring between sectors.

Methods for research question 1. For research question 1, we begin by showing summary statistics and scatter plots that compare charter and TPS districts. As a complement to Table 1, these figures show how funding per student varies along a single dimension, enrollment size. Next, we regress resource measures for district d in county c , labeled Y_{dc} in equation 1, on an indicator for charter school, a set of district covariates, and county fixed effects. These models show how resources differ between charter and TPS districts that have otherwise similar characteristics and are located in the same county. The following model describes this analysis:

$$Y_{dc} = \beta_0 + \beta_1 \text{Charter}_d + X'\alpha + \varphi_c + \varepsilon_d \quad (1),$$

where charter is an indicator for whether the school district is a charter district (equal to zero if the district is a TPS district), X is a vector of school district characteristics, and φ_c represents county fixed effects, which allow us to compare charters with TPS districts in the same county. School district characteristics in X include the percentage of students enrolled in the federal free or reduced-price lunch program, classified as English language learners, enrolled in special education, or enrolled in grades 9 to 12, district urbanicity, indicators for district size, and a cost of wage index.⁶

⁶ We use fall enrollment to compute per-student figures. We use the following enrollment ranges as dummy variables, which align with past studies of cost as well as the state's small school funding adjustment: fewer than 250 students, equal to or more than 250 but fewer than 500 students, equal to or more than 500, but fewer than 1,600 students, equal to or more than 1,600 students but fewer than 5,000 students, and equal to or greater than 5,000, but less than 10,000 students, and equal to or greater than 10,000 students. We note that three separate sources are each inconsistent with respect to whether the state's small and mid-size funding adjustments (at 1,600 and 5,000 students) are inclusive of the end points (Texas Association of School Boards, 2008; Texas Education Agency, 2013; TTARA, 2018). We use the ranges reported in Texas

The cost of wage index measures differences in the local cost of labor (Taylor & Fowler, 2006). While Texas has 1,194 districts spread over 253 counties, only 40 counties include a charter school district and 97% of all charter school students are located in just 20 counties. The purpose of county fixed effects is to focus comparisons of funding between charters and TPS districts on counties that include at least one charter district, which further controls for geographic differences in the cost of education.

Finally, we estimate this same model for just TPS districts, and conduct an out-of-sample prediction for charter school districts, to examine the funding rates that charter school districts would receive if they were funded like TPS districts. Our primary analyses are based on data from the 2017-18 school year and all regressions are weighted by student enrollment. We extend this work by showing that results are fairly consistent when based on data from the past 10 years.

As noted earlier, district covariates allow us to compare charter districts to otherwise similar TPS districts. The theoretical framing of horizontal and vertical equity motivates our use of these control variables. For example, recognizing the higher costs associated with serving high school grade levels (Gronberg et al., 2012), the Texas school finance system allocates additional funds for high school students (TTARA, 2018). On average, charters enroll fewer high school students than TPS districts and as a result, receive less funding than they would if they served more high school students. Comparing average funding between the two sectors without accounting for grade level configurations will make charters appear “underfunded” relative to TPS districts, when in fact, this relative underfunding is warranted if charters serve a greater proportion of elementary and middle school students who are less costly than high school students. Similar arguments can be made for students in other enrollment categories associated with higher cost such as special education and English language learner, or for other structural differences such as size and population sparsity.

To demonstrate the importance of including covariates, we first estimate a model with no covariates and only the charter school indicator. We then add district covariates to show how estimates of differences in funding change when controlling for district cost facts. Finally, we add county fixed effect to compare funding between charter and otherwise similar TPS districts in the same county. Given the strong relationship between district size and per-student funding, we estimate models that interact enrollment dummy variables with the charter indicator, which allow differences between charter and TPS district funding rates to vary by enrollment size. Our study addresses horizontal and vertical equity by comparing otherwise similar school districts that differ only by their sector, charter or TPS district. Thus, in reporting our findings, our reference to charter districts being “underfunded” or “overfunded” is always relative to otherwise similar TPS districts.

Methods for research question 2. The second research question examines how the total cost of K-12 education in Texas changes when students transfer from one sector to the other. To address this question, we constructed a finance model that replicates the Texas school finance formula. We use our actual school finance dataset to confirm the accuracy of our calculations. We consider the transfer of an elementary or middle school student who is eligible for free and reduced-price lunch, since such students represent a majority of the student population, particularly among charter schools. For simplicity, we assume the student is not enrolled in special education or career and technical education, and is not eligible for the high school allotment. School districts and charter schools are reimbursed for free and reduced-price lunch student weights in the following year and we assume this one-year lag payment actually takes place immediately.

We first estimate the increase in state funding that a charter school would receive if one

Education Agency (2013). In practice, this does not affect our analysis since no districts have enrollment or ADA equal to 1,600 or 5,000. In alternate models, we use enrollment deciles instead of these categories.

additional low-income student attended the charter for a full year. Based on the school finance formula, this amount is \$8,883 per student per year in ADA for all charter schools. Next, we estimate the decrease in funding that each individual school district incurs when a low-income student leaves. This calculation is far more complicated because it depends on each district's current enrollment size and scale adjustment, local tax rates, cost of education index, and Chapter 41 recapture payments. Reductions in funding are smaller for districts with more students or lower values of the cost of education index. Conversely, wealthier districts make larger recapture payments when they lose a student. We account for each of these changes in our finance model.

Findings

We describe findings in two sections in line with our two research questions. We first present comparisons of per-student funding between charter and TPS districts. We replicate prior research by first reporting average funding differences, and then show how our regression-adjusted measures differ from these baseline results. We then show how the expense of K-12 education to the state changes when students transfer between sectors.

Comparing Charter and Traditional Public School District Funding

Table 1 shows summary statistics for charter and TPS districts. Districts in each sector are divided into small (fewer than 1,600 students), medium (equal to or more than 1,600, but fewer than 5,000 students), and large (equal to or greater than 5,000 students), corresponding the small and mid-size district adjustments in the school finance system. As shown in Table 1, the average Adjusted Allotment for charter and TPS districts is the same regardless of district size, \$6,518. Taking an unweighted average of state and local general fund revenues across districts, charters receive \$8,871 per student, compared to \$9,843 for TPS districts; however, allocations vary by district size especially for TPS districts. Smaller TPS districts receive significantly more state and local funding than similarly sized charter districts, \$10,668 compared to \$8,965 for charters, whereas larger TPS districts receive slightly less state and local funding per student than larger charter districts, \$7,968 compared to \$8,965.

The bottom two rows of Table 1 present the same averages, this time weighted by student enrollment. Texas school districts vary substantially in size, with the smallest 50% of districts serving 4% of all students statewide and the largest 1% of districts serving 21%. Taking an average funding rate across all districts is therefore misleading because a small proportion of students who attend small districts have a disproportionate effect on the statewide average. Not surprisingly, the overall differences in the Adjusted Allotment and state and local revenues differ immensely when averages are weighted by student enrollment. Using weighted averages, TPS districts receive \$820 lower Adjusted Allotment (\$5,698 compared to \$6,518) and receive \$493 per student less in state and local revenues (\$8,134 compared to \$8,627, final row of Table 1).⁷ Appendix Table A1 and A2 show that,

⁷ The \$493 per student figure is based on weighted averages using the Texas Education Agency's (TEA) PEIMS data for year 2017-18. TEA presents the same result through their online PEIMS system, but presents slightly different figures in their Summary of Finances (SOF) system. According to the SOF reports for school year 2017-18, general fund state and local revenues (removing non-M&O grants) is \$629 per student greater for charter schools than for TPS districts (and \$783 per student greater in Average Daily Attendance, or ADA). The prior year, 2016-17, the reported charter school funding advantage is \$536 per student (\$597 per ADA). In one other public document (TEA, 2018a), TEA reports a charter school funding advantage in 2016-17 of \$855 per ADA excluding facilities funding (M&O funding only), but a \$594 per ADA funding disadvantage when all funds are included. These differences in reported funding levels may, in part,

consistent with other studies (Cannata & Peñaloza, 2012; Miron, Urschel & Saxton, 2011; Wei, Patel, & Young, 2014), data show charter schools employ fewer teachers and other staff per student, but more administrators, offer lower teacher salaries, employ teachers with less experience, and have substantially higher teacher turnover.

Table 1

Resource levels in charter and traditional public school districts in Texas, 2017-18

	Charter School Districts				Trad. Public School Districts			
	All	Small	Mid.	Large	All	Small	Mid.	Large
Number of districts	171	137	25	9	1,019	681	178	160
Average enrollment	1,724	612	3,242	14,434	4,988	663	3,405	25,153
Unweighted Average								
Adj. Allotment	6,518	6,518	6,518	6,518	6,518	6,944	5,743	5,567
State & Loc. Rev.	8,871	8,965	8,471	8,551	9,843	10,668	8,373	7,968
Weighted Average								
Adj. Allotment	6,518	6,518	6,518	6,518	5,698	6,536	5,704	5,603
State & Loc. Rev.	8,627	8,714	8,575	8,604	8,134	9,563	8,331	7,944

Note. Small is defined as fewer than 1,600 students, mid. is defined as fewer than 5,000 but equal to or more than 1,600 students, and large is defined as equal to or more than 5,000 students. State & Loc. Rev. refers to state and local revenues for the general fund (excluding facilities funding) excluding “on behalf” payments. Adj. Allotment refers to the Adjusted Allotment, defined in the text. Appendix Table A1 shows total state and local revenues including facilities funding and “on behalf” payments, although estimates of facilities funding for charter schools should be interpreted with caution (see text and MCA, 2018).

Summary statistics in Table 1 are shown in Figure 1. Specifically, Figure 1 shows the Adjusted Allotment and state and local general funding rates per student for all charter and TPS districts for the 2017-18 school year, as a function of log enrollment. As shown in the first panel, all charter school districts receive an Adjusted Allotment of \$6,518, whereas the Adjusted Allotment for TPS districts is a function of district size, and other factors, described earlier. Charter schools serving fewer than approximately 1,200 students (about seven in log enrollment) generally receive a lower Adjusted Allotment compared to TPS districts of the same size, while those serving greater than 1,200 students receive a larger Adjusted Allotment than TPS districts. State and local funding per student, shown in the second panel of Figure 1 differs from the Adjusted Allotment because it includes additional funding from Tier 2 allotments and other add on funding programs (Tier 2 funding is a function of student demographics and local tax rates). While there is more variation in state and local funding for charter schools at a given enrollment level (compared to the Adjusted Allotment), a similar pattern emerges: smaller charter districts, those serving fewer than approximately 1,200 students, receive less funding than similarly sized TPS districts, while larger charter districts are generally overfunded relative to similarly sized TPS districts. While these comparisons hold constant district enrollment, they do not control for other district factors that affect cost such as the local cost of labor, the sparsity of the population served, or student demographics.

contribute to uncertainties in making comparisons between the charter school system and the system of TPS districts.

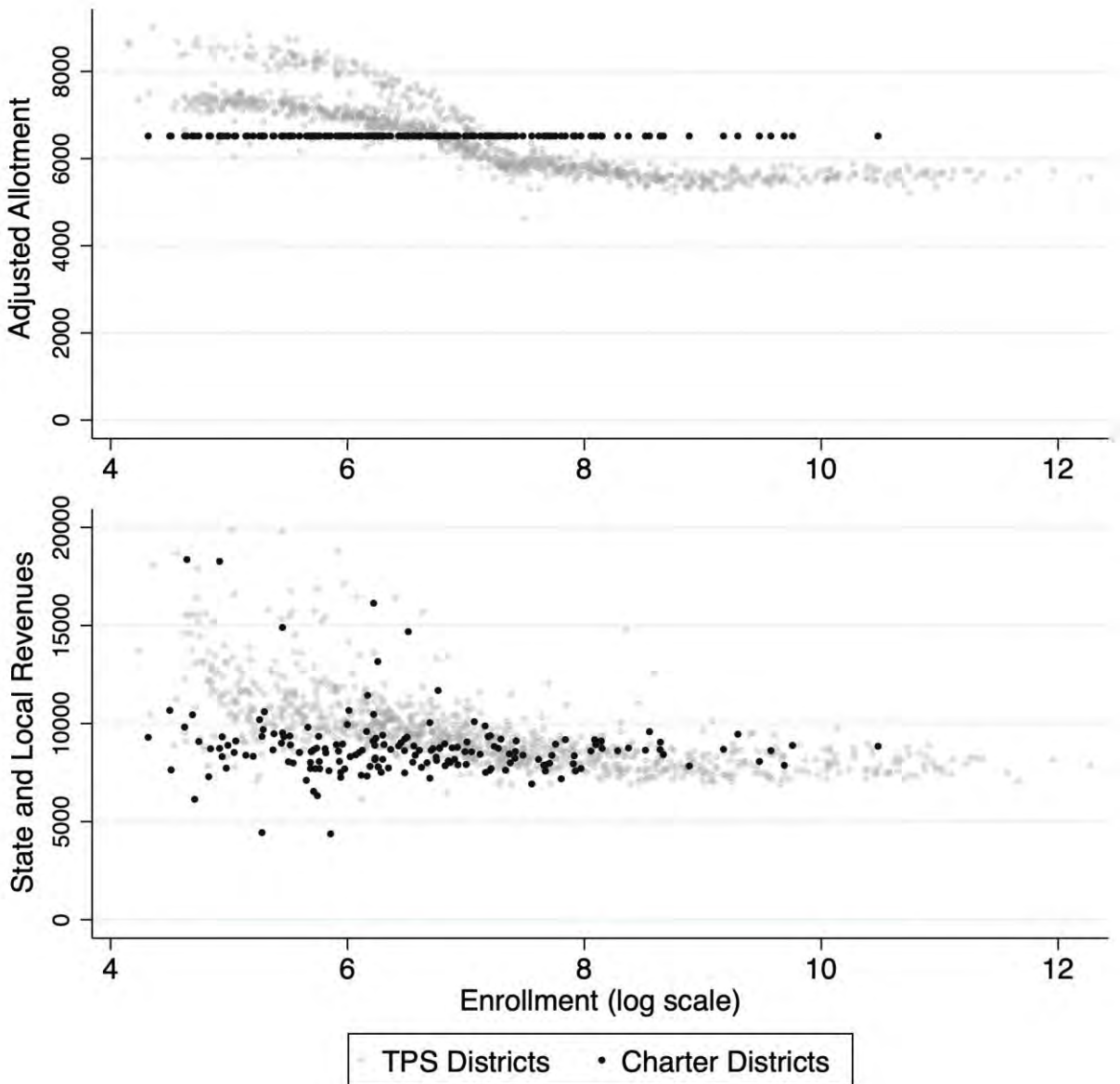


Figure 1. Adjusted Allotment and state and local general funding per student for charter and traditional public school districts in Texas, 2017-18

Note. Adjusted allotment (AA) is the funding rate prior to Tier 2 funding, which depends on student demographics and local tax rates. All charter schools receive the same AA of \$6,518. See text for additional details. The seven charters receiving greater than \$12,000 state and local revenues are not only small, but also serve a high proportion of students classified as having a behavior disability (65.1%), which generates a greater funding level.

The figures presented in Table 1 (and Figure 1) are raw average funding rates for charter and TPS districts and do not adjust for differences in cost. These types of comparisons give rise to disagreements about charter school funding equity. Comparing columns 1 and 5 of Table 1, one might conclude based on the unweighted averages that charter schools are underfunded relative to TPS districts. Conversely, comparisons of weighted averages suggest that, overall, charter schools receive more funding per student than TPS districts. At the very least, a simple way to nuance these assessments is to compare funding for similarly sized districts, as is done in Figure 1 and in columns

2 through 4 and 6 through 8 of Table 1; however, even those comparisons do not control for other cost factors such as population density or the cost of wages.

Table 2 shows the results of models that control for these other district characteristics. The first row shows coefficients for the charter indicator, which provides an estimate of the difference in funding between charter and otherwise similar TPS districts. Model 1 is a naïve estimate with no covariates, so the coefficient for charters represents the simple weighted average difference in funding between charter and TPS districts (models are weighted by school district enrolment). The coefficients in columns 1 and 4 suggest that the typical charter school student attends a charter district that receives \$820 and \$493 more per student in the Adjusted Allotment and in state and local revenue per student, respectively, compared to the typical student who attends a TPS district (the same raw differences shown in Table 1).

Table 2

Regression coefficients estimating differences in funding rates between charter and traditional public school districts, 2017-18

	Adjusted Allotment			State and Local Revenue		
	(1)	(2)	(3)	(4)	(5)	(6)
Charter	819.77*** (43.75)	584.15*** (26.41)	656.84*** (26.55)	492.98*** (118.10)	138.66 (101.11)	264.07* (107.74)
Constant	5698.23*** (10.24)	5553.75*** (13.58)	5569.58*** (28.71)	8134.13*** (27.65)	7640.67*** (52.02)	7767.16*** (116.66)
Dist. covar.	No	Yes	Yes	No	Yes	Yes
County FE	No	No	Yes	No	No	Yes
R-squared	0.228	0.768	0.869	0.015	0.404	0.622

Note. The reference group for charter school districts is traditional public school districts. Models are weighted by student enrollment. District covariates include enrollment, the percent of students classified as low-income, English learner, enrolled in special education, and in grades 9 to 12, urbanicity, and an education cost of wage index. Covariates that are continuous variables are mean-centered so the constant is the funding rate for the average urban traditional public school district with enrollment greater than 10,000. FE stands for fixed effects. * $p < .05$, *** $p < .001$, $n = 1,190$.

Charter school districts are typically smaller, located in urban areas with higher labor costs, serve higher poverty populations, on average, but serve fewer students with special needs. The models in columns 2 and 5 of Table 2 control for these district characteristics. After adjusting for these differences, we find that charters receive an Adjusted Allotment of \$584 more than otherwise similar TPS districts. The funding advantage of \$139 for state and local revenues for general funds (column 5) is not statistically significant. The decrease in the estimated funding advantage for charter schools after adding covariates suggests that on average, charters have higher cost factors than TPS districts. Models in columns 3 and 6 include county fixed effects, which allow us to compare charter and otherwise similar TPS districts *in the same county*. Results suggest that charters receive \$657 greater Adjusted Allotment and \$264 greater state and local general revenues per student.

Table 3
 Regression coefficients estimating differences in funding rates between charter and traditional public school districts, with enrollment size interactions, 2017-18

	Adjusted Allotment			State and Local Revenue		
	(1)	(2)	(3)	(4)	(5)	(6)
Charter	819.77*** (43.75)	868.14*** (34.11)	868.39*** (28.31)	492.98*** (118.10)	679.81*** (158.98)	667.56*** (151.86)
<i>Enrollment main effects</i>						
Less than 250		2005.83*** (66.20)	1801.25*** (59.61)		4308.89*** (308.57)	3934.91*** (319.82)
250 to 499		1785.49*** (45.99)	1617.40*** (43.06)		3241.46*** (214.38)	2829.33*** (231.45)
500 to 999		1299.12*** (31.98)	1253.21*** (31.82)		2011.23*** (149.10)	2025.76*** (171.20)
1,000 to 1,599		651.15*** (28.61)	621.48*** (27.61)		1066.12*** (133.99)	959.32*** (148.38)
1,600 to 4,999		173.51*** (17.69)	217.71*** (17.70)		520.68*** (82.71)	604.88*** (95.28)
5,000 to 10,000 (ref. > 10,000)		-87.89*** (16.41)	-48.21** (15.32)		32.08 (76.51)	159.64+ (82.21)
<i>Enrollment x Charter Interactions</i>						
Charter x less than 250		-1941.84*** (157.95)	-1734.01*** (128.24)		-3256.56*** (736.25)	-3087.62*** (687.97)
Charter x 250 to 499		-1715.07*** (104.63)	-1540.55*** (85.40)		-3245.27*** (487.70)	-2869.86*** (458.37)
Charter x 500 to 999		-1233.78*** (74.99)	-1183.25*** (62.52)		-1561.13*** (349.58)	-1554.56*** (335.66)
Charter x 1,000 to 1,599		-617.06*** (77.16)	-591.11*** (63.70)		-991.55** (359.91)	-812.06* (341.83)
Charter x 1,600 to 4,999		-126.95* (53.41)	-144.15** (44.13)		-463.51+ (249.06)	-405.40+ (236.83)
Charter x 5,000 to 10,000		104.49 (66.67)	147.82** (55.02)		-123.84 (310.76)	-23.99 (295.12)
Constant	5698.23*** (10.24)	5529.91*** (10.92)	5603.68*** (21.15)	8540.09*** (28.59)	7993.49*** (52.71)	8197.49*** (117.36)
Dist. covar.	No	Yes	Yes	No	Yes	Yes
County FE	No	No	Yes	No	No	Yes
R-squared	0.228	0.853	0.930	0.001	0.430	0.643

Note. The reference group for charter districts is TPS districts and the reference group for enrollment variables is school districts with greater than 10,000 students. Models are weighted by student enrollment. Models with district covariates include the main effects of enrollment variables, the percent of students classified as low-income, English learner, enrolled in special education, and in grades 9 to 12, urbanicity, and education cost of wage index. Covariates that are continuous variables are mean-centered so the constant in models with covariates is the funding rate for the average urban TPS district with enrollment greater than 10,000. FE = fixed effects. + $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

As noted earlier, given the funding mechanisms for charter school districts in Texas, whether charters are under or overfunded relative to TPSs is likely dependent upon enrolment size. In Table

3, then, we allow estimates of differences in funding for charter schools and otherwise similar TPS districts to vary by enrollment size. We use as a reference group charter school districts with enrollment greater than 10,000 students, which account for 36% of all charter school students in the state. The first and fourth columns of Table 3 are repeated from Table 2 for comparison. Row 1 of columns 2 and 5 show that charter schools with enrollment larger than 10,000 students receive \$868 and \$680 more per student in Adjusted Allotment and state and local revenue per student, respectively, compared to similarly sized and otherwise similar TPS districts.

Results are similar when we add county fixed effects in columns 3 and 6 of Table 3: Charter districts larger than 10,000 students receive \$868 and \$668 more per student in Adjusted Allotment and state and local revenue per student, respectively, compared to similarly sized and otherwise similar TPS districts in the same county. Charter districts serving 1,600 or fewer students receive a significantly lower Adjusted Allotment and significantly less state and local funding compared to otherwise similar TPS districts. While these smaller districts represent the majority of charters, they account for only 25% of charter school students. For this reason, it is unlikely that charter proponents will press for charter schools to be funded in the same manner as TPS districts. Appendix Figure A3 shows that these general trends are consistent over the past 13 years. Finally, we note that the proportion of variation explained by variables in the model is much larger for Adjusted Allotment than for state and local general fund revenues. The r-squared values are smaller for state and local revenues likely because the Texas school finance system includes many factors that affect a district’s revenues that are unrelated to cost (i.e., unrelated to covariates included in our models), such as hold harmless provisions, financial hardship grants, and local tax rates (TTARA, 2018). Wealthy districts in particular are not subject to Chapter 41 recapture for revenues raised from tax increases from 1.00 % to 1.06%.

The results from models 3 and 6 in Table 3 are displayed graphically in Figure 2. Smaller charter school districts receive significantly less funding per student than otherwise similar TPS districts, while larger charter districts – those with 1,600 more students, which represent 75% of all charter school students – receive significantly more funding per student than otherwise similar TPS districts.

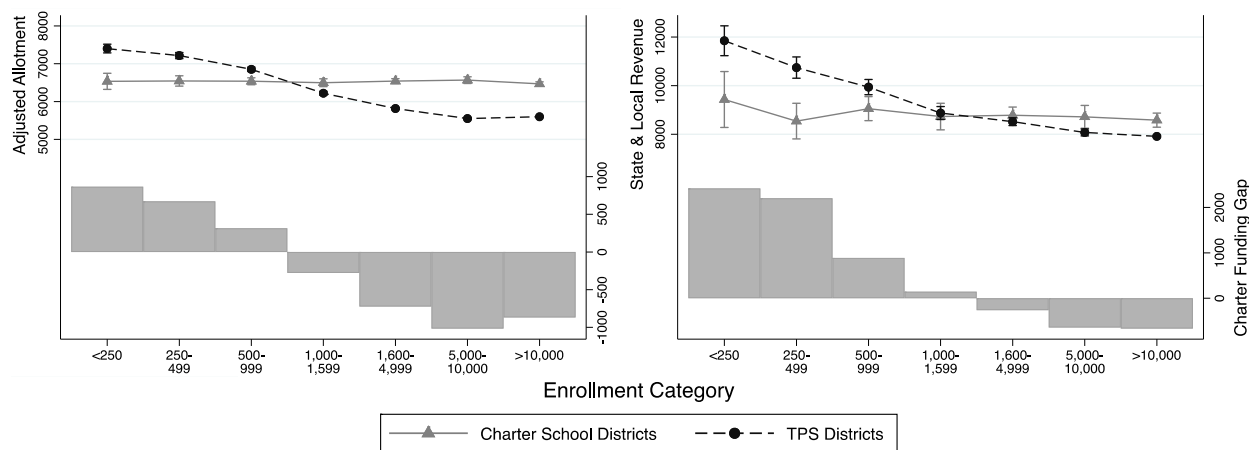


Figure 2. Adjusted funding per student for charter and traditional public school districts in Texas, 2017-18

Note. Graphs show regression-adjusted funding rates per student by enrollment category (models 2 and 5 of Table 2). Enrollment categories are shown in Table 2. Results are similar when we use alternate enrollment categories including deciles or other quantiles. A negative charter school funding gap, more common in larger districts, implies that charters receive more funding than traditional public school (TPS) districts.

We next estimate the amount of funding each charter district would receive if it were funded like a TPS district. Figure 3 plots specific examples for the 12 charter school districts with enrollment greater than 5,000 students (49.7% of all charter school students). The largest charter school districts would receive between approximately \$800 to \$1,000 less in Adjustment Allotment if they were funded the same way as TPS districts. The right panel of Figure 3 shows that 10 of the 12 largest charter districts receive more funding than they would under the TPS district funding model. We find that Premier High Schools and Texas College Preparatory Academies, would both receive more funding if their financing system was the same as TPS districts; however, all other charter districts shown in Figure 3 would receive less funding if funded the same way as TPS districts. In Appendix Figure A1, we show the estimated difference in actual and predicted funding rates for all charter schools in the state. While larger charter districts receive a funding advantage of approximately \$668 per student, on average, there is much wider variation in the funding gap for smaller charter districts, with some receiving over \$2,500 less per student than they would if funded like TPS districts and others receiving roughly the same amount as they would under a TPS district funding model.

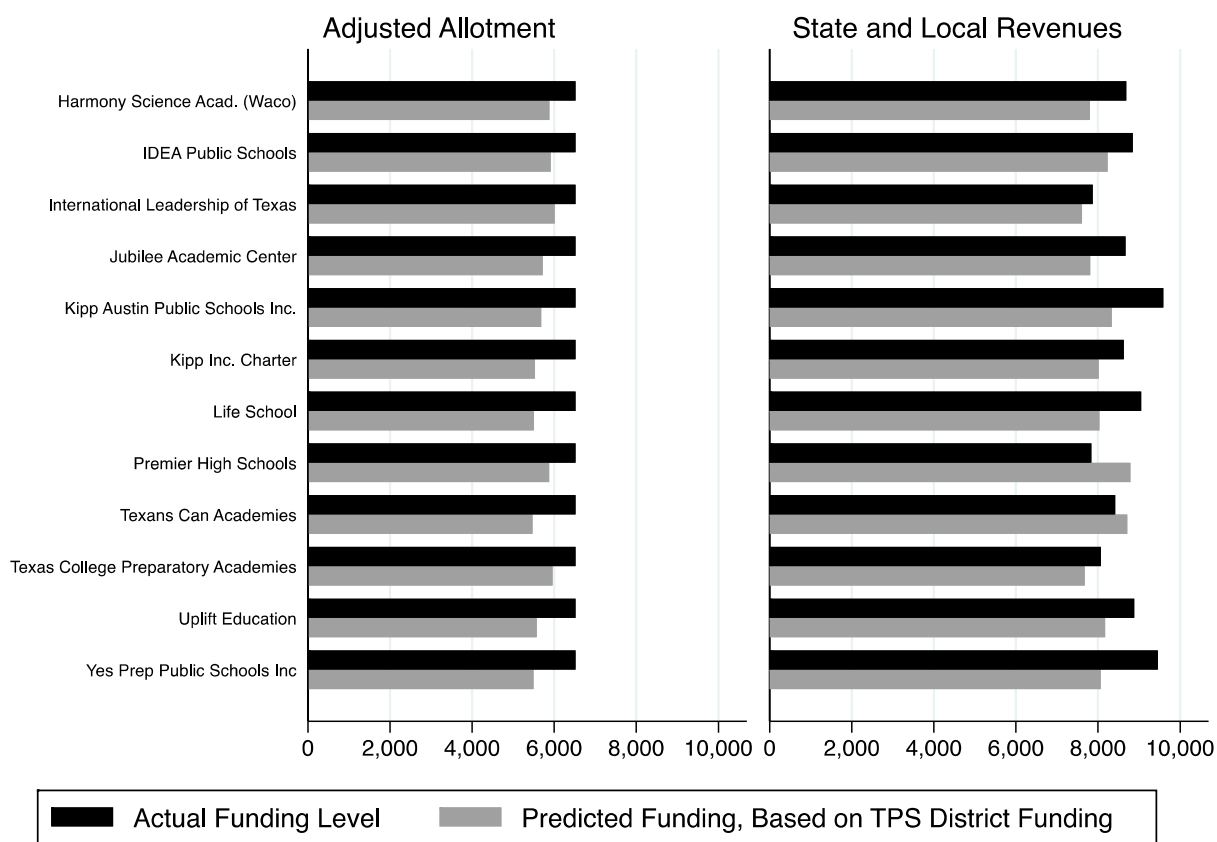


Figure 3. Current funding levels for the 12 largest charter school districts in Texas and their predicted funding if funded the same way as traditional public school districts in the state, adjusted allotment (left panel) and state and local per-student revenues (right panel), 2017-18

Note. Note. Graph shows the Adjusted Allotment and state and local general revenues per student that charter school districts in Texas receive (black shading) and the amount they would receive if funded in the same way as traditional public schools (TPS), estimated using regression-based predicted values (grey shading). All charter districts with enrollment equal to or greater than 5,700 students are shown (45% of all charter school students).

We pause here to examine how these findings fit within our framework of vertical and horizontal equity. As shown in Table 2, we find that the typical charter school district receives \$264 greater state and local general funding than otherwise similar TPS districts in the same county (about 3.4% more, based on the constant, which applies to the typical TPS district serving 10,000 or more students). This finding suggests there is only moderate horizontal inequity between the two sectors, on average. However, we show in Table 3 and Figure 2 that larger charter school districts receive a disproportionate amount of funding compared to both otherwise similar TPS districts and to smaller charters – suggesting a substantial gap in vertical and horizontal equity. This funding advantage for charter districts may help facilitate growth of charter schools in urban areas and may impact research comparing school quality between charter and TPS district schools. That is, lack of funding equity among large (mostly urban) TPS districts may present challenges for TPS districts to provide equitable educational opportunities as compared to neighboring charter schools.

Expense to the State When Students Transfer Between Sectors

State policymakers are often interested in how expenditures the state incurs change when a student transfers between the charter and TPS district sectors. If students in charter districts receive a greater level of state and local funding compared to students in otherwise similar TPS districts, then students who transfer from the TPS sector to the charter sector should increase the overall expenditure on K-12 education for the state. We conduct a policy simulation that models changes in state expenditures resulting from a TPS student transferring to a charter district.

The results of the simulation are shown in Table 4. We show results by county, for the 20 counties enrolling the largest number of charter school students, which comprise 97.4% of all charter school students in ADA statewide. An additional 20 counties enroll the remaining 2.6% of charter school students. Counties are ranked by the number of students attending charter schools. The first three columns show the number of charter school students, TPS district students, and the percent of students attending a charter school, for each county. The next two columns show the cumulative number of students in charter schools in that county and the cumulative percentage of charter school students statewide. The next column shows the increase in state aid associated with an increase in one low-income charter school student, which is \$8,883 for every charter school. Column 8 shows the decrease in state aid when a TPS district loses one low-income student. For Dallas County, this amount is \$7,510. This figure represents the average across each TPS district in Dallas County, weighted by the enrollment in each district. In other words, we assume for the purposes of computing county-level average changes in state aid, that a student in each district in Dallas County is equally likely to transfer to a charter school district. While this may not be the case, in practice the specific weighting across districts in Dallas County does not substantially change the county average, since all 14 TPS districts in that county have greater than 1,600 students and receive a similar level of state aid per student.

On average across school districts in Dallas County, each low-income student who transfers to a charter school from a TPS district increases net state expenditures by \$1,373. Charter student transfers are most expensive in Jefferson County, where a transfer of a low-income student increases state expenditures by \$2,338 per student. The expense is higher in Jefferson County because that county has a lower cost of education index and the average low-income student in that county's TPS districts generates only \$6,545 in state aid. In many cases, a TPS district receives more funding than

Table 4

Policy simulation of the average change in state expenditures associated with a low-income student transferring from a traditional public school to a charter district, by county, 2017-18

County	Charter district ADA	TPS district ADA	Charter ADA (%)	Cum. charter ADA	Charter ADA (cum. %)	Incr. in state aid to charters	Decr. in state aid to TPS districts	Difference (Add'l cost to the state)
Dallas	68,718	414,567	14.2	68,718	24.7	\$8,883	-\$7,510	\$1,373
Harris	52,477	800,828	6.1	121,195	43.5	\$8,883	-\$7,527	\$1,356
Hidalgo	37,909	187,729	16.8	159,104	57.2	\$8,883	-\$8,254	\$629
Bexar	29,682	299,993	9	188,786	67.8	\$8,883	-\$7,417	\$1,466
Travis	15,903	137,770	10.3	204,689	73.5	\$8,883	-\$7,259	\$1,624
Taylor	13,055	22,117	37.1	217,744	78.2	\$8,883	-\$7,029	\$1,854
McLennan	10,279	40,129	20.4	228,023	81.9	\$8,883	-\$7,416	\$1,467
Tarrant	7,974	331,261	2.4	235,997	84.8	\$8,883	-\$7,468	\$1,415
Erath	7,842	5,486	58.8	243,839	87.6	\$8,883	-\$7,838	\$1,045
El Paso	5,639	160,409	3.4	249,478	89.6	\$8,883	-\$7,540	\$1,343
Bell	4,193	65,026	6.1	253,671	91.1	\$8,883	-\$7,417	\$1,466
Tom Green	2,732	16,779	14	256,403	92.1	\$8,883	-\$7,178	\$1,705
Smith	2,479	34,115	6.8	258,882	93.0	\$8,883	-\$6,864	\$2,019
Ellis	2,414	33,155	6.8	261,296	93.9	\$8,883	-\$7,522	\$1,361
Denton	1,887	123,394	1.5	263,183	94.5	\$8,883	-\$7,198	\$1,685
Jefferson	1,797	36,893	4.6	264,980	95.2	\$8,883	-\$6,545	\$2,338
Williamson	1,791	112,637	1.6	266,771	95.8	\$8,883	-\$7,348	\$1,535
Ector	1,623	30,544	5	268,394	96.4	\$8,883	-\$7,555	\$1,328
Collin	1,425	198,106	0.7	269,819	96.9	\$8,883	-\$7,506	\$1,377
Galveston	1,307	76,653	1.7	271,126	97.4	\$8,883	-\$7,460	\$1,423

Note. Table shows only the 20 counties with the largest number of charter school students, which represent 97.4% of all charter school students in Texas.

the closest charter school, so the state saves money when students from those districts transfer to a charter school. However, on average, across all districts statewide, the average cost to the state of a student transferring to a charter school is \$1,491 per student per year.

Discussion

Policymakers in Texas, nationally, and around the world, face challenges in designing finance structures for the two parallel education sectors (Arsen & Ni, 2012; Mungal, 2016). The school finance theories of horizontal and vertical equity help policymakers make sense of differences in funding that are warranted or unwarranted. We describe below how our application of this theoretical framework sheds light on charter school finance policy challenges facing state legislators. We then discuss remaining policy challenges that may be addressed in future research.

Using Horizontal and Vertical Equity to Understand Charter School Finance Equity

Raw comparisons of state and local general funding for charter and TPS districts suggest that charter districts receive \$493 more per student in 2017-18 than the average TPS districts. Horizontal equity suggests that such comparisons should be adjusted so that charter districts are compared to otherwise similar TPS districts. When we make this adjustment, we find that charter districts receive \$139 per student more than otherwise similar TPS districts, and \$264 more than otherwise similar TPS districts in the same county (Table 2), although the \$139 figure is not statistically significant. These raw averages also mask important differences in the types of charters that receive more or less funding than TPS districts. The Texas school finance system has some policies in place that address vertical equity – the idea that districts facing greater costs to provide the same level of educational opportunity should receive greater funding. TPS districts receive extra funds if they are smaller, serve more sparsely populated geographic areas, are located in a higher salary labor market, or if they serve a lower-income or higher need student population. However, we find that funding for charter school districts is less differentiated and, as a result, smaller charter districts are relatively underfunded compared to TPS districts, while larger charter districts – which serve the majority of charter school students – are relatively over funded compared to otherwise similar TPS districts. While examination of why these inequities exist is beyond the scope of this paper, power structures within the charter sector in Texas may explain our main finding. Large charters like IDEA, Harmony, KIPP, and Uplift receive substantially greater funding than comparable TPS districts. These large charter districts benefit from the current system and may have the political capital to prevent reforms that would increase horizontal equity between the two sectors and increase vertical equity within the charter sector. In short, the Texas school finance mechanism that assigns each charter school district an Average Allotment equal to the average across all TPS districts disadvantages small charter districts, but provides larger charter districts with a funding advantage over TPS districts

These findings have implications for policymakers in Texas and elsewhere. State legislators may need to consider the extent to which charter school finance policy considers local context. Texas school finance policy includes additional funding for smaller TPS districts, to account for higher costs resulting from lack of economies of scale. TPS districts also receive additional funding if they serve sparsely populated geographic areas, which accounts for higher transportation costs. Texas legislators decided to exclude both of these funding adjustments for charter schools, but include additional funding based on student demographic weights. Other states have attempted to simply apply the TPS district sector school finance system to the charter sector, even though charter districts have important structural differences. Most charter districts are small, but located in urban, densely populated areas. Charter districts tend to serve a higher percent of low-income students, but fewer English language learners and students in special education, career and technical education, or gifted programs (Cremata et al., 2013; Rhim & McLaughlin, 2001). Directly applying a state's TPS district sector school finance model to the charter sector may not be appropriate, for reasons we describe below. Conversely, using a highly simplified system where all charters receive the same baseline funding rate (e.g., the same Adjusted Allotment, as is done in Texas), is likely to create winners and losers within the charter sector. By adopting the frame of vertical and horizontal equity, policymakers and researchers can highlight the extent to which charter and TPS districts are compensated for additional costs and make more appropriate comparisons of funding across schools. In the subsequent two sections, we expand on charter school finance policy challenges nationally, and then provide additional examples of finance policy challenges in Texas.

Policy Challenges for Charter School Finance Nationally

In most states (other than Texas), charter school districts are funded using a similar finance formula as districts in the TPS sector. However, transitioning the Texas charter school finance system to this more common approach would likely create new policy challenges. This relatively straightforward approach to funding charter schools can create unintended consequences that lead to distortions in funding for charter schools. We highlight three policy challenges for charter school finance nationally related to the present study: small school weights, special education, and student fees.

First, in most contexts, small school districts receive a small district adjustment that provides additional funding to compensate for the high costs of operating small school districts (Baker & Weber, 2016; Krop & Zimmer, 2005; Sugarman, 2002). Charter districts can manipulate this policy to gain additional state funding. Arizona provides an illustrative example. Prior to 2015, many charter school districts in Arizona that were affiliated with larger charter management organizations registered with the state as independent charter school districts in order to obtain the small school adjustment. In 2015-16, BASIS Schools Inc. served 8,451 students across 17 charter schools and was therefore not eligible for any small school weights. However, by registering many of those schools as independent charter districts, each of which enrolled between 100 and 800 students, BASIS Schools Inc. collected additional funding through the small school weight. Great Hearts Academies, Imagine Schools, Inc., EdKey Schools, and other charter school districts in Arizona engaged in similar practices (Faller, 2015; Olson, 2009). In 2015, the Arizona legislature passed regulations that prevented charters from benefiting from this small school adjustment (A.R.S. §15-185; Douglas, 2015). As the current study demonstrates, small school adjustments have important implications for charter school funding.⁸

Another challenge pertains to providing charter schools with funding for students with disabilities. Texas charter school districts receive the same weights for students in special education as TPS districts. These funding weights increase funding equity within the charter sector and between charter and TPS districts. However, in Pennsylvania, district affiliated charter schools receive funding for students in special education equal to the average cost of serving a student with a disability in the host TPS district, averaged across all disability categories (Pennsylvania Department of Education, 2018). This policy was initially written in 1997, when Pennsylvania legislators believed charter schools would serve only a small minority of students statewide (Hardy, 2015). Data show that charter schools in several states may be responding to incentives to enroll a greater number of students with mild, less costly disabilities such as a Specific Learning Disability or speech impediments (Baker & Levin, 2014). Pennsylvania charter schools, for example, tend to enroll fewer students with low-incidence, high-cost disabilities, compared to TPS districts, and therefore receive greater special education funding than reported expenditures (Baker & Levin, 2014). Charter schools in New Jersey show similar enrollment trends for special education sub-categories (Baker & Miron, 2015). In short, efforts to fold charter schools into the TPS district finance formula may backfire when there are important differences in the student population between the two sectors.

Regardless of the specific mechanisms for funding charter schools, regulations are sometimes required to increase charter school finance transparency or to ensure charter schools are not using increased autonomy to improperly enhance resources levels. California, Georgia, and

⁸ Some argue that certain small districts in Texas, particularly those in close proximity to other districts, are “small by choice” and should perhaps be consolidated (Gronberg, Jansen, Karakaplan, & Taylor, 2015). As the Arizona example demonstrates, smaller districts, especially small charters, may take steps to avoid consolidation.

North Carolina all prevent schools from requiring parents to volunteer as a condition of their child's enrollment. Charter Schools USA, which operates schools in many states, requires parents to volunteer in schools as a condition of their students enrolling (Guzman-Lopez, 2014; Lacireno-Paquet et al., 2002). While parent volunteers can be a useful resource for schools, some courts have found that requiring families to volunteer in school is illegal, in part because this practice excludes families in which parents work full-time or work night shifts that preclude volunteering (Ceasar, 2014). Relatedly, the Noble Network of Charter Schools in Chicago charges students fines for disciplinary actions and other charters levy registration fees or have mandatory donation requirements (e.g., Lee, 2013; Northern Kane Educational Corp.; Simon, 2013). These types of resources do not always appear in state datasets that track charter school revenues and expenditures. A related issue pertains to philanthropy and private investors. While state funding supports the operation of charter schools, growth is often dependent on external funding (Wohlsetter et al., 2011). External funds have played an important role in charter school growth nationally, and state legislators have taken steps to improve reporting and transparency of charter school fundraising (Hill & Lake, 2010; Kretchmar, Sondel & Ferrare, 2014; Reckhow & Snyder, 2014, Scott, 2009). Future research exploring charter school funding might explore how charter schools raise funds and the various types of resources they use, including parent volunteers or disciplinary fines.

Policy Challenges for Charter School Finance in Texas

One source of confusion about charter school finance in Texas stems from the calculation of the average Adjusted Allotment. In 2017-18, the sum of the total Adjusted Allotment across all TPS districts statewide was \$27.3 billion, and the total number of students in average daily attendance was 4,788,881, implying that the statewide average Adjusted Allotment was \$5,697. However, the average Adjusted Allotment across all districts, placing equal weight on each district, is \$6,518. To cover the costs of transportation and diseconomies of scale, smaller TPS districts receive much higher Adjusted Allotments. For instance, TPS districts with fewer than 1,000 students receive, on average, an Adjusted Allotment of \$7,560. While these districts represent over half of all districts in the state, they enroll only 4 percent of all TPS students statewide. Because charter schools receive an Adjusted Allotment equal to the average of all TPS districts, \$6,518, rather than the weighted average of \$5,697, the typical charter school student attends a school that receives a much higher Adjusted Allotment than a typical student who attends a TPS district with similar size and characteristics. Specifically, the weighted average Adjusted Allotment for charter school students is the same, \$6,518, compared to \$5,697 for TPS district students.

Whether policymakers correct this imbalance depends on a number of factors. Most importantly, legislators need to consider how charter school funding for facilities is managed and tracked. As other scholars have noted, the finance and data structure of school facilities funding for charter school districts make it difficult to measure how much funding charters receive for facilities or whether that amount is adequate (MCA, 2018). Charter district managers rarely own buildings and instead make lease payments. Those payments often come out of the general fund, but these types of expenditures are difficult to track and sometimes are reported as administrative costs. Texas lawmakers have passed several bills in recent years that provide additional facilities funding for charter districts (Texas Education Agency, 2018b). Other states have faced similar constraints. California charter schools rely on outside funding for facilities, but benefit from several state policies. A widely criticized policy requires TPS districts with extra school building space to make those facilities available to charter schools. The policy of "co-location" has been criticized for disrupting TPS schools, but research is mixed on its impact on TPS student outcomes (Bifulco & Ladd 2006; Cordes, 2018).

A third complicating factor is how total funding rates should be converted to per-student values. Quantitative school finance research typically assesses measures of spending or state and local funding *per student*. The number of students in each district is defined as fall membership, a variable available for all school districts nationally in the National Center for Education Statistics data and available for all Texas districts from the Texas Education Agency. Because some states, including Texas, use average daily attendance (ADA) to determine funding, some school finance studies use ADA as the denominator for measures of spending per student, rather than fall membership (e.g., Bruno, 2018; MCA, 2018). This approach may overstate funding for districts with poor attendance, relative to a district of equal size, but with higher attendance rates (Knight & Olofson, 2018). For example, according to 2015-16 NCES and TEA data, El Paso Independent School District serves 59,772 students based on fall enrollment, but had an ADA of 55,439. The total expenditures that year of \$564 million could be expressed as spending per student or spending per ADA, and these values would be \$9,438 or \$10,176, respectively.

Meanwhile, arguments that charters in Texas are underfunded are typically based on measures that use weighted ADA, or WADA as the denominator in per-pupil funding calculations. In general, this approach further understates funding in higher-poverty districts. A more fundamental problem with this approach is that the conversion of ADA numbers into WADA numbers is done very differently for charter schools as opposed to TPS districts. The precise method specified in the law for calculating state entitlements for charters and districts is not the same. The two different methods would give different dollar amounts of revenue entitlements to a charter school and a school district even if both had exactly the same number of students and the same mix of students carrying extra weights, such as the numbers who are economically disadvantaged or who are eligible for the same special education services. Furthermore, the difference in the entitlements results in a different WADA calculation for the charter school than it does for the school district. This means that the basic measure for comparing revenues per pupil is different for a charter school than it is for a school district. The measure is flawed, and results in inaccurate comparisons between revenues per weighted average daily attendance between charter schools and school districts.

Conclusion

Given the mounting evidence demonstrating the importance of school resources for students' short and long-term outcomes, policymakers are becoming more focused on whether schools have the necessary level of resources for success (e.g., Hinojosa, 2018). While policy discussions about charter schools have generally focused on their authorization, expansion, and effectiveness, there is growing concern in Texas and nationally for how these schools are funded and whether funding mechanisms are equitable within the charter sector and relative to neighboring TPS districts. Charter school advocates and critics disagree over whether charters are over- or under-funded compared to TPS districts. Policymakers are tasked with sorting through various claims, identifying credible analyses of resource level across sectors, and crafting policy that is beneficial for students in their state. Through careful analysis of funding between the two sectors, our hope is that policymakers will be better equipped to adopt school reforms that expand educational opportunity and improve the lives of students, especially those who have historically been marginalized by public institutions and structural barriers.

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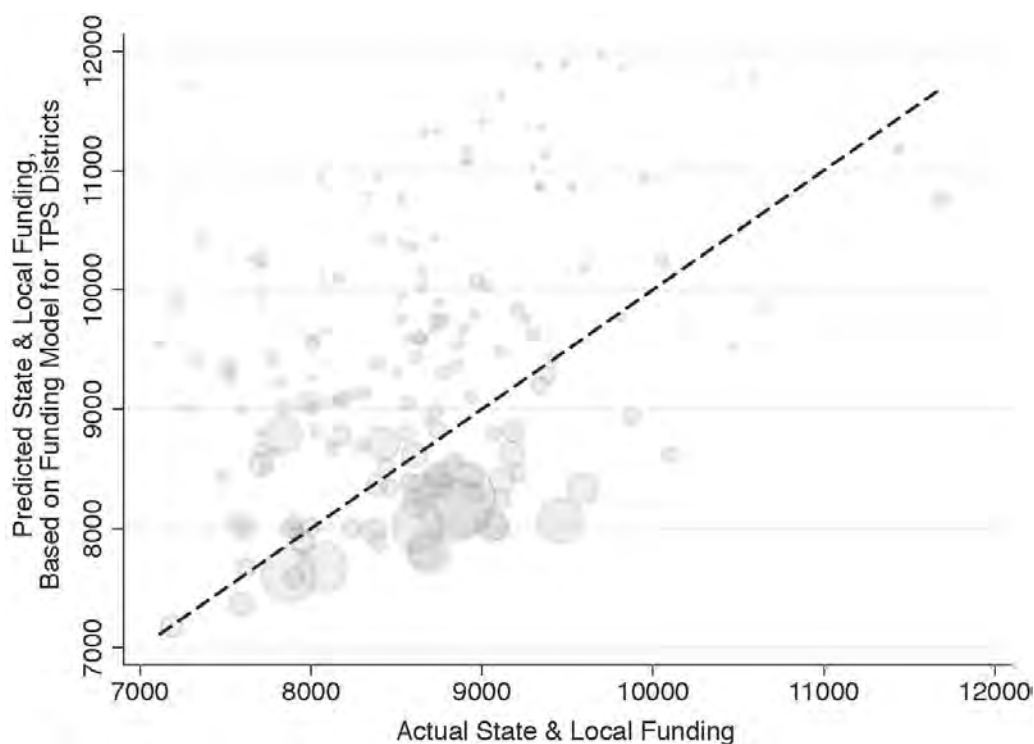
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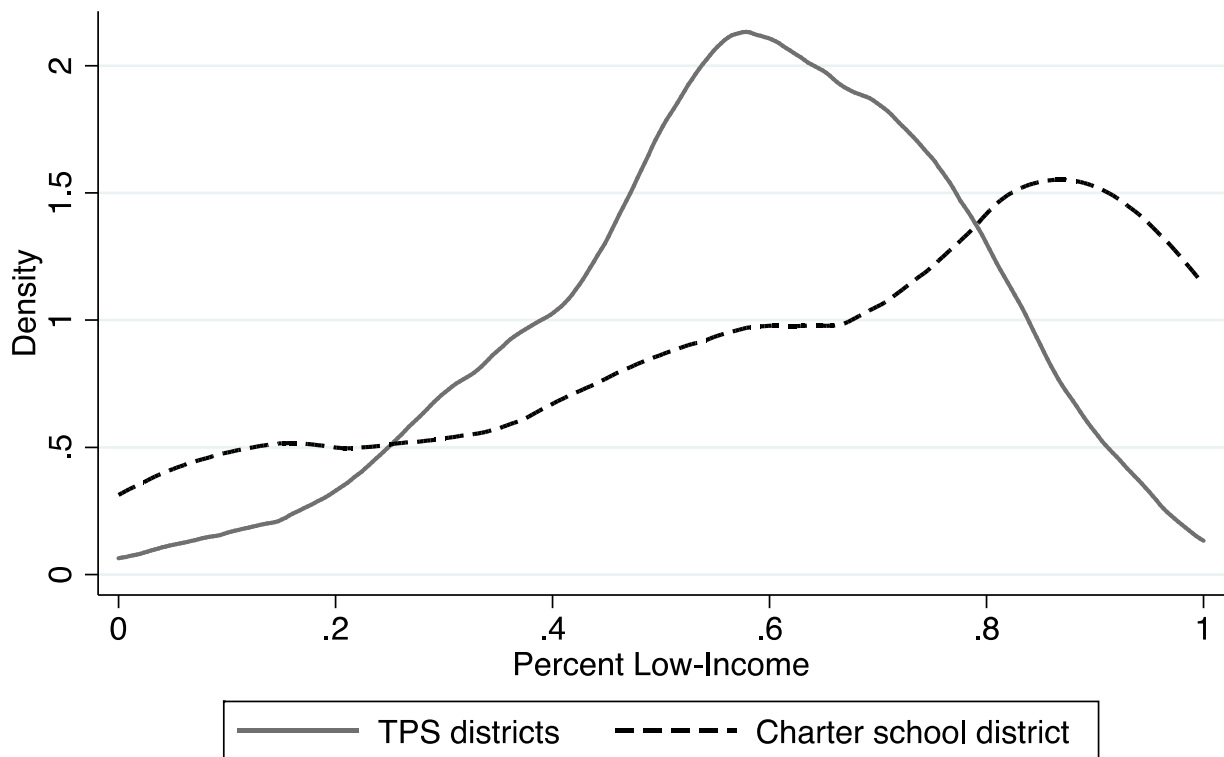
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Appendix Figures and Tables



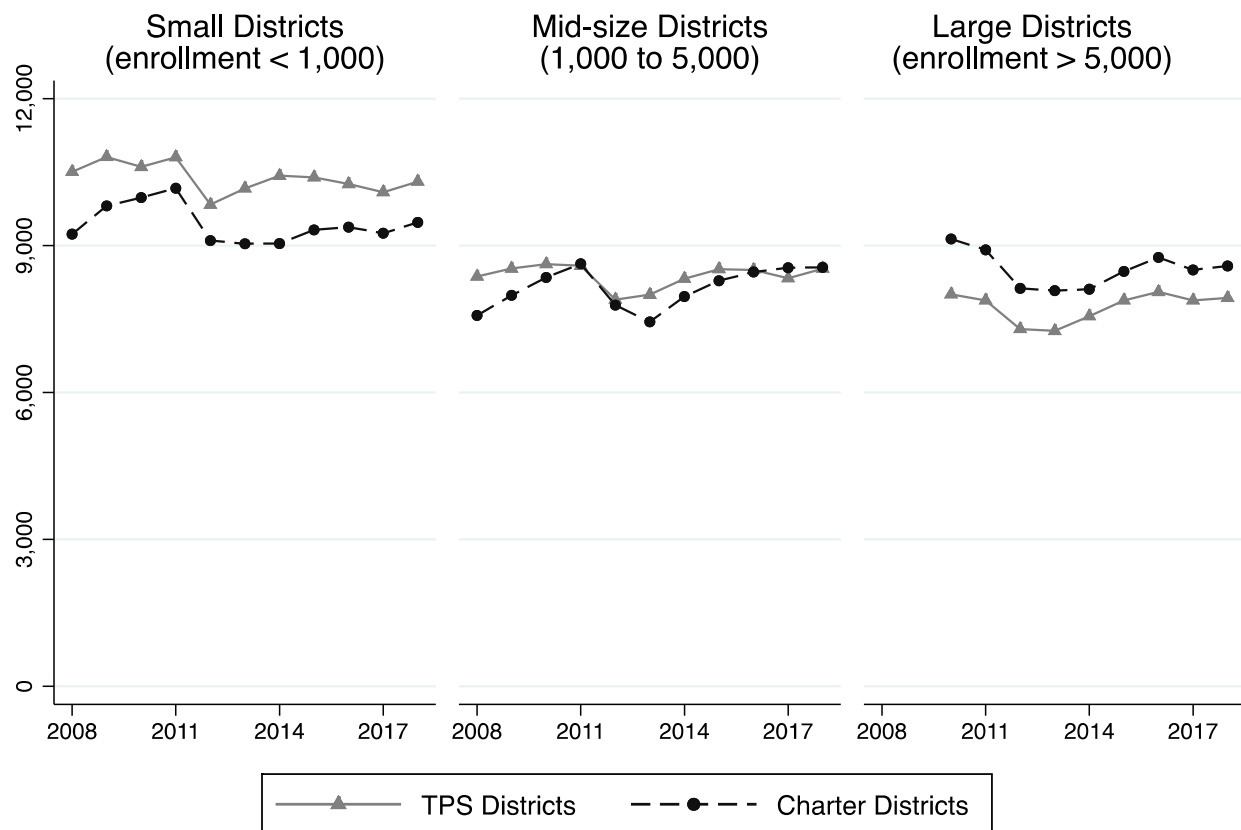
Appendix Figure A1. Actual state and local funding rates and predicted funding rates, based on funding of traditional public districts in Texas, 2017-18

Note: Each circle represents a charter school district with size proportionate to enrollment. Charter districts that fall on the dashed line receive the same level of funding as they would if they were funded the same way as traditional public school districts (those to the right of the dashed line are overfunded relative to TPS districts and those to the left of the dashed line are underfunded). For the purposes of this figure, we omit 8 charter school districts (4.7% of charter districts, 0.1% of charter school students) with actual or predicted funding exceeding \$12,000 per student.



Appendix Figure A2. Distribution of the percent of low-income students in charter and traditional public school districts in Texas, 2017-18

Note. TPS refers to traditional public school districts.



Appendix Figure A3. Adjusted state and local general funds revenues per student in Texas for charter and traditional public school districts, 2004-05 to 2017-18 (2018 dollars)

Note. Graph shows regression-based predicted values based on models identical to the one described in equation 1, except that the data are pooled from 2004-05 forward and the charter school dummy variable is interacted with year fixed effects. Models are run separately for small, mid-size and large districts (each panel is a separate regression). The panel for large districts starts in 2009-10 because prior to 2009-10, no charter school districts enroll more than 5,000 students.

Appendix Table A1

Resource levels in charter and traditional public school districts in Texas, 2017-18

	Charter School Districts				Trad. Public School Dist.			
	All	Small	Mid-size	Large	All	Small	Mid-size	Large
Districts	171	137	25	9	1,019	681	178	160
Avg. enrollment	9,745	935	3,632	19,247	43,982	1,019	3,779	54,859
Dollar Resources								
Adjusted Allotment	6,518	6,518	6,518	6,518	5,699	6,536	5,704	5,603
St. / Loc. Rev. (gen.)	8,627	8,714	8,575	8,604	8,134	9,563	8,331	7,944
St. / Loc. Rev. (gen.) with "on behalf"	8,627	8,714	8,575	8,604	8,538	10,012	8,730	8,343
Staffing Ratios (per 100 stud.)								
All teachers	5.32	6.19	5.39	4.73	6.62	8.11	6.80	6.43
Reg. Program	4.63	5.22	4.71	4.20	4.78	6.35	5.03	4.56
Special Ed.	2.74	2.63	3.21	2.54	5.81	5.55	5.58	5.87
Bilingual	2.06	2.91	1.02	2.15	4.04	0.85	2.97	4.56
All staff	9.54	10.96	9.28	8.78	13.30	15.64	13.78	12.96
Educ. aides	0.76	0.96	0.56	0.75	1.29	1.94	1.68	1.16
Support staff	2.86	3.06	2.63	2.86	4.87	4.77	4.68	4.91
Administrators	0.64	0.90	0.70	0.44	0.51	0.86	0.62	0.46
Salaries								
First year teachers	44,360	43,092	45,103	44,670	47,071	36,937	42,331	48,841
1-5 years	47,266	45,423	47,778	48,098	48,856	38,311	44,102	50,754
6-10 years	50,626	48,372	51,052	51,719	51,155	42,893	46,603	52,764
11-20 years	52,706	50,719	53,285	53,532	54,610	49,066	51,019	55,773
Over 20 years	59,526	55,307	57,368	63,162	61,956	54,640	58,167	63,345
Teacher experience (% of teachers)								
First year teachers	28%	25%	21%	34%	7%	7%	7%	7%
6-10 years	13%	17%	17%	9%	21%	18%	20%	22%
Over 20 years	3%	5%	3%	1%	16%	22%	19%	15%
Avg. experience	4.2	5.9	4.9	2.7	11.2	12.7	11.8	10.9
Avg. exp. at school	2.0	2.3	2.1	1.6	7.5	7.0	7.3	7.6
Teacher turnover	29%	31%	30%	28%	16%	20%	18%	15%

Note. Small is defined as fewer than 1,600 students, mid-size is defined as fewer than 5,000 but equal to or more than 1,600 students, and large is defined as equal to or more than 5,000 students. St. / Loc. Rev. (gen.) refers to state and local revenues for the general fund (excluding facilities funding). St. / Loc. Rev. (gen.) with "on behalf" includes payments made to teacher pensions on behalf of school districts. This table reports weighted averages across districts (Table 1 includes weighted and unweighted averages for selected variables).

Appendix Table A2

Resource levels in charter and traditional public school districts in Texas, 2017-18, unweighted averages

	Charter School Districts				Trad. Public School Dist.			
	All	Small	Mid-size	Large	All	Small	Mid-size	Large
Districts	171	137	25	9	1,019	681	178	160
Avg. enrollment	1,724	612	3,242	14,434	4,988	663	3,405	25,153
Dollar Resources								
Adjusted Allotment	6,518	6,518	6,518	6,518	6,518	6,944	5,743	5,567
St. / Loc. Rev. (gen.)	8,871	8,965	8,471	8,551	9,843	10,668	8,373	7,968
St. / Loc. Rev. (gen.) with "on behalf"	8,871	8,965	8,471	8,551	10,299	11,152	8,774	8,364
Staffing Ratios (per 100 stud.)								
All teachers	6.37	6.66	5.32	4.96	8.20	8.96	6.88	6.43
Reg. Program	5.50	5.73	4.67	4.32	6.41	7.18	5.12	4.61
Special Ed.	2.65	2.63	2.70	2.95	5.43	5.30	5.63	5.78
Bilingual	1.76	1.82	1.16	2.52	1.54	0.62	2.80	4.08
All staff	11.43	11.98	9.20	9.07	15.79	16.93	13.95	13.00
Educ. aides	1.02	1.12	0.60	0.70	1.87	2.06	1.72	1.24
Support staff	3.14	3.25	2.62	2.85	4.86	4.90	4.72	4.83
Administrators	0.97	1.05	0.66	0.55	0.89	1.05	0.64	0.49
Salaries								
First year teachers	42,588	42,039	44,754	44,129	39,040	35,843	41,988	47,528
1-5 years	44,972	44,399	47,189	47,273	40,245	37,144	43,584	49,576
6-10 years	48,403	47,768	50,759	50,729	44,402	42,205	46,177	51,575
11-20 years	50,862	50,353	52,993	52,139	50,026	48,690	50,795	54,800
Over 20 years	54,846	53,809	56,984	61,613	55,830	53,780	57,855	62,166
Teacher experience (% of teachers)								
First year teachers	25%	25%	22%	31%	8%	8%	7%	7%
6-10 years	16%	17%	16%	10%	18%	17%	20%	22%
Over 20 years	5%	6%	3%	1%	21%	23%	19%	15%
Avg. experience	5.9	6.3	5.0	2.9	12.3	12.7	11.8	11.0
Avg. exp. at school	2.5	2.6	2.1	1.7	7.0	6.8	7.3	7.3
Teacher turnover	31%	31%	32%	29%	19%	20%	18%	15%

Note. Small is defined as fewer than 1,600 students, mid-size is defined as fewer than 5,000 but equal to or more than 1,600 students, and large is defined as equal to or more than 5,000 students. St. / Loc. Rev. (gen.) refers to state and local revenues for the general fund (excluding facilities funding). St. / Loc. Rev. (gen.) with "on behalf" includes payments made to teacher pensions on behalf of school districts. This table reports unweighted averages across districts (Table 1 includes weighted and unweighted averages for selected variables).

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