Public-Sector Leadership and Venture Philanthropy: The Case of Broad Superintendents

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Abstract

Major philanthropic initiatives that incorporate features of venture-capital practices have become increasingly prominent, particularly in K-12 public education. In this study, we provide empirical evidence on the reach, character, and impact of the Broad Superintendents Academy, a prominent and controversial venture-philanthropic initiative designed to transform leadership in the nation's largest school districts. Using a novel dataset on all Broad trainees and a linked panel data set of all large school districts over 20 years, we find that Broad superintendents have had extensive reach (e.g., serving nearly 3 million students at their peak). We also show that, within districts that hired Broad trainees, Broad superintendents were 40 percent more likely to be Black than their non-Broad peers, but also had tenures that were 18 percent shorter. Panel-based estimates provide evidence that Broad-trained leaders had no clear effects on several district outcomes such as enrollment, school closures, per-pupil instructional and support-service spending, and student completion rates. However, Broad-trained leaders initiate a trend towards an increased number of charter schools and higher charter-school enrollment.

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1 Introduction

Philanthropy has long played a prominent role in the establishment and support of prominent institutions in U.S. society. Several contemporary observers posit that modern philanthropy is providing wealthy plutocrats with undue (and tax-advantaged) political influence that is corroding democratic governance (Tompkins-Stange, 2016; Reich, 2018). The emergence of so-called "venture philanthropy" has become a focal point for such criticism. This term broadly encompasses the application of venture-capital practices to charitable endeavors (Fleishman, 2007). In his 1969 Congressional testimony, John D. Rockefeller III introduced this term with an emphasis on the role of foundations in catalyzing innovative and risky ventures (Anheier and Toepler, 2010). The contemporary definition of venture philanthropy stresses a deep and sustained engagement with grantees and potentially disruptive experimentation with a longer-term focus on improving organizational performance rather than simply supporting particular projects (Letts et al., 1997).

Concerns about venture philanthropy are particularly prominent in K-12 education, where the scale of philanthropic engagement has grown dramatically in recent years. For example, in the 10 years between 2000 and 2010, annual grantmaking by the largest 15 educational foundations grew from \$486 million to \$843 million (Reckhow and Snyder, 2014).[1] Organizations such as the Gates Foundation and Broad Foundation have gained increasing influence over U.S. education policy through targeted and aligned funding of systemic reform efforts (Reckhow and Tompkins-Stange, 2015). Yet despite the growth and corresponding controversies associated with this form of philanthropy in public education, we have little empirical evidence on its character, its reach, and its effects. This study provides such evidence by examining novel data on a uniquely prominent and controversial philanthropic initiative that sought to improve public education through the recruitment, training, and support of reform- and equity-minded district leaders for the largest U.S. school districts.

In 2002, the Eli and Edythe Broad Foundation of Los Angeles founded the "Broad Superintendents Academy" (BSA). The BSA aims at finding dynamic leaders both inside and outside of education and placing them at the head of the nation's largest school districts.[2] Its recruitment

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[1]The fact that several major philanthropies have recently opened 501(c)(4) policy lobbying operations (e.g., Gangitano (2019)) is another leading indicator of this phenomenon (Reckhow, 2016).

[2]The Broad Foundation also supports a 2-year training program, the Broad Residency in Public Education, for high-level central office staff below the superintendent. Because our focus is on district superintendents, we do not report

and programming also seek to identify and cultivate talent that diversifies the existing pool of district leaders. At the same time, the BSA has come under intense scrutiny, with critics alleging that Broad-trained leaders use "corporate management techniques to consolidate power, weaken teachers' job protections, cut parents out of decision-making, and introduce unproven reform measures" (Samuels, 2011). The controversial nature of the BSA may also reflect the fact that the Broad Foundation is a prominent supporter of other K-12 reform movements such as charter school networks and school districts with reform-minded leadership (Reckhow and Snyder, 2014).

We base our analysis in part on a novel dataset of all BSA trainees since the program's start in 2002 through 2015. Our data identify key traits of Broad trainees and their careers as superintendents in the nation's school districts. This includes individual demographic attributes (i.e., race and gender), employment spells that allow for tracking individuals throughout their careers, as well as employer characteristics. We also constructed a national panel of the largest 300 U.S. school districts over a 20-year period (1996 through 2015) with data on enrollment (both in traditional public schools and in charter schools), school closures, spending by function, and high school completion. Merging these data with our data on Broad trainees allows us to characterize the types of districts hiring Broad-affiliated superintendents as well as how these leaders differ from the other superintendents hired by the same districts. Finally, the application of difference-in-differences and event-study frameworks allow us to examine the impact of those leaders on a variety of district outcomes.

We show that the reach of the BSA program was extensive, even though fewer than half of Broad trainees eventually became superintendents. Broad trainees led 31 of the largest 100 school districts and 62 of the largest 300 school districts at some point during our study window. Furthermore, school districts led by Broad superintendents served over 2.9 million students at their peak in 2012. Out of the pool of Broad-trained superintendents, at least two-thirds had prior experience as classroom teachers and eleven percent had military backgrounds. The large districts that hired Broad superintendents were significantly more likely to be in cities and to serve higher concentrations of Black students. Notably, we find that the Broad-trained leaders in these districts were more diverse. Specifically, within the districts that hired Broad superintendents, Broad

trainees were 40 percent more likely to be Black than their non-Broad peers. However, we also find that Broad-trained superintendents had completed tenures that were 18 percent *shorter* than those of non-Broad superintendents who led the same school districts. Our panel-based analysis of the effects of the BSA program suggests that Broad superintendents generally have few detectable effects on a wide range of outcomes including district enrollment (i.e., total and by race and ethnicity), school closures or openings, spending on instruction and support services, or student completion rates. However, we do find evidence that Broad-trained superintendents initiate a trend towards more charter schools and higher charter-school enrollment.

In addition to the literature on philanthropy, this study also contributes to the diffuse body of research on leadership and managerial practices.[3] The empirical literature on leadership suggests the important contributions of managerial quality to the productivity differences across organizations in both the private and public sectors (Bloom and Van Reenen, 2010; Bloom et al., 2013; McCormack et al., 2014; Rasul and Rogger, 2016; Bloom et al., 2016; Carter et al., 2019). Economic theories seeking to conceptualize the nature of effective leadership generally emphasize the role of information asymmetries. Individuals will follow leaders when they believe the leader is credible and has better information than they do (Hermalin, 2007). However, Lazear (2012) also emphasizes the role of a leader's skill set. He argues that effective leaders have strong communication skills and are generalists whose diverse skills match the unpredictability faced by the organization they lead. Treatises on successful management practices make similar arguments.[4]

Our study also contributes to the evidence on school-district leadership and public-sector leadership more generally. While ample research exists on classroom and school-level inputs (e.g., spending and teachers), there is very limited evidence on district-level inputs.[5] The literature that does exist has identified several important stylized facts about district leadership. In the U.S., the turnover of district superintendents, who have an average tenure of about 5 years, is surpris-

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[3]See Lazear (2012) and House and Aditya (1997) for reviews and discussions of leadership research.

[4]For example, in a book featured in the BSA curriculum, O'Toole (1996) argues for a leadership style grounded in articulating a shared, values-based vision of the future that motivates staff while recognizing their independence (i.e., in opposition to a more autocratic and singular leadership). Collins (2006) similarly argues that effective public-sector leaders combine both humility and will with an emphasis on identifying collaborative staff. Goldsmith and Kleiman (2017) also advocate for a form of motivational public-sector leadership that cultivates collaborative, distributed governance among staff and agencies instead of centralized, top-down authority.

[5]The literature on *school*-level leadership suggests that there is substantial variation in principal quality and practices that contribute to meaningful differences in student test scores and school outcomes (Grissom and Loeb, 2011; Branch et al., 2012; Bloom et al., 2015).

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ingly rapid (Natkin et al., 2003; The Broad Center, 2018). Superintendents tend to leave for higher salaries and higher-performing districts in more urban areas (Grissom and Mitani, 2016). Superintendent turnover is also more common when the governing school board is conflict-prone and when the superintendent was an external hire rather than "homegrown" (Grissom and Andersen, 2012). However, the implications of this turnover (and superintendents, in general) are unclear. Early cross-sectional studies find mixed evidence on the links between superintendent characteristics and district performance (Ehrenberg et al., 1988; Meier and O'Toole, 2002). A more recent study by Chingos et al. (2014) finds that district performance is unrelated to superintendent experience and, more generally, that superintendents account for less than one percent of the variation in student achievement. Our finding that Broad superintendents have shorter tenures and no clear effects on a variety of prominent district outcomes (e.g., enrollment, spending and school closings, completion rates) is generally consistent with this literature.

The limited impact of Broad superintendents that we find is also consistent with a long-standing result in leadership research that stresses the powerful, moderating role of institutional contexts (Mischel, 1973). Specifically, House and Aditya (1997) notes that desirable leadership traits have less salience in "organizations that are highly formalized and governed by well-established role expectations, norms, rules, policies and procedures." This description may well characterize most large school districts in the U.S. and correspondingly imply the narrowly bounded capacity of innovative district leadership to promote organizational improvement by itself.[6] Nonetheless, our evidence that Broad-trained leaders catalyze a trend towards increased charter schools and enrollment implies that these leaders have an important effect that lasts beyond their brief tenures.

2 District Leadership and the Broad Superintendents Academy (BSA)

The governance of public elementary and secondary education in the U.S. is embedded in a federalist system that includes over 13,000 local, independent school districts. The chief executive officer of each school district is the superintendent. Superintendents are typically appointed by an elected school board rather than directly elected themselves. As the top-ranking administra-

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[6]A long-standing literature has underscored the distributed nature of school systems, characterizing them as "loosely coupled and weakly controlled" (Gamoran and Dreeben, 1986). However, over the last two decades, the movement towards more prescriptive standards-based education policy that seeks to shape classroom practice may have encouraged tighter organizational coupling (e.g., Spillane et al., 2011).

tor, superintendents have a wide range of responsibilities. These include, but are not limited to, building a strategic vision for the school system, recruiting and assessing educators, evaluating curricula and district programs, overseeing district finances and other dimensions of operations, and managing relationships with stakeholders such as the teachers' union and the school board (Grissom and Mitani, 2016). The scale of these organizational responsibilities is uniquely daunting for the superintendents of the largest school districts. For example, the largest 300 school districts (i.e., only about 2 percent of all districts) enroll over one-third of all public-school students in the U.S.

Though the path to the superintendency is varied, once in the role, mobility is often defined by moves from smaller rural to larger districts, and from poorer to wealthier districts (Ehrenberg et al., 1988; Grissom and Mitani, 2016). Most superintendents have had experience as a classroom teacher (Kowalski et al., 2011), and few superintendents have had extensive experiences in a non-education sector. However, this is changing somewhat, as states increasingly remove job restrictions to accommodate non-traditional candidates such as those from the private sector or the military. The Broad Superintendents Academy has played a prominent role in cultivating such new paths to district leadership.[7]

2.1 Program Features

The Broad Superintendents Academy is a core program funded by the Eli and Edythe Broad Foundation, a 501(c)(3) founded in 1999 with the goal of supporting "entrepreneurship for the public good" including a commitment to transform K-12 public education.[8] By 2015, the foundation had assets totaling more than $3 billion. As it expanded both its endowment and reach, the foundation continues to make management and governance central pillars of its investment priorities in K-12 education. The way it operationalizes this focus is via leadership academies that constitute the foundation's largest and longest-running programs (The Broad Foundation, 2016). The BSA aims to identify and provide formal management training to promising leaders both inside and outside

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[7]Efforts to find leaders from non-traditional talent pools are not limited to the superintendency. For instance, New Leaders locates potential urban school principals from sectors outside of K-12 education in addition to more traditional sources, and many Teach for America corp members lack traditional certification when beginning their tenures as teachers. Notably, both of these non-profit organizations are grantees of the Broad Foundation.

[8]The foundation also has grantmaking priorities in the arts and sciences (e.g., art museums and genomics research; The Broad Foundation, 2016).

of education who can significantly improve the performance of large school districts. An accompanying program, the Broad Residency, targets management positions below top-level leadership positions.[9]

The BSA specializes in sourcing established talent from a variety of sectors (i.e., the private sector, military, nonprofits, as well as traditional education fields) and training them for the demands of the superintendency. It began in 2002 as a 10-month executive management program that gathered participants for six extended weekends of programming in different cities. Successful applicants were expected to demonstrate potential to drive excellence and equity in school systems. Because the focus was on established leaders who have not been superintendents in the past, the curriculum aimed at familiarizing participants with functional areas relevant to the superintendency. Examples of curricular topics include labor relations, targeted student interventions, data-management systems, and school board relations, operations, and public engagement. In addition to practical dimensions of the curriculum such as reading case studies of urban school districts and completing individual projects, participants also read texts on management theory and educational change (Samuels, 2011).[10] Program revisions in 2012 expanded the length of the training to nearly two years and placed a greater emphasis on transformative leadership that accelerates the impact of individual superintendents. In practice, this translated to a shift from building a talent pipeline solely for large urban school districts to a pipeline that also includes charter management organizations, turnaround and portfolio systems, and state and federal departments of education.

2.2   Data

We construct a novel dataset from multiple sources to document the number of participants in the Broad Superintendents Academy and their career trajectories. We identified the full list of BSA participants using both alumni profiles posted on the Broad Center website and archived press releases announcing each BSA cohort. Our roster includes the union of these two sources

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[9]Both the BSA and The Broad Residency in Urban Education are funded by the Broad Foundation but managed by the Broad Center. The two-year Broad Residency program began in 2003 and place primarily private-sector talent with master's degrees and several years of work experience into central-office functions such as operations, finance, and human resources. While we focus on the BSA program to study the highest echelons of district leadership, we also examined the characteristics and reach of the Broad Residency Program. These results are available upon request.

[10]According to Samuels (2011), select readings include the values-based management approach described in *Leading Change* by James O'Toole and the well-known treatise on educational change by Theodore R. Sizer: *Horace's Compromise*.

to ensure maximum coverage of all participants who enrolled in the program, regardless of completion.[11] Each individual's professional experiences come from the combination of data from LinkedIn.com, news articles, and press releases where available. Detailed work histories on the beginning and end dates of each employment spell tells us whether each individual was ever employed as a district superintendent, when they began, and the length of their tenure. Data collected on educational and employment histories enable us to identify individuals' age and professional experience (e.g., military).[12] We infer teaching experience based on information gathered through online searches. Because this source may sometimes miss Broad trainees with classroom experience, we consider estimates based on these data a lower bound on the true prevalence. Finally, we code gender using information from news articles complemented with photographs on the Broad Center website. We gathered race and ethnicity data using the same sources and then corroborated this information with the Broad Center.[13]

Next we construct a district-by-year panel dataset for public school districts using the National Center for Education Statistics Common Core of Data (CCD) from 1996 to 2015.[14] We focus on the top 300 districts by enrollment size because the BSA explicitly targeted the placement of their graduates in large urban school districts, and the preponderance of BSA graduates in our sample work in these top 300 districts. In order to identify district superintendents, we gather names and years employed from the *Patterson's American Education* directories spanning 1996-2015. We supplement this information with demographic characteristics and work history data, derived from extensive online searches of superintendents' start and end dates, gender, and race using district documentation, news sites, and LinkedIn profiles. The resulting dataset contains superintendent demographic and tenure attributes for the largest 300 districts over a two-decade period.

We examine outcomes along four dimensions to capture key aspects of the health and performance of school districts.[15] The first core measure is charter school enrollment, so that we can

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[11]We find that a small number of individuals (equivalent to 9% of the full participant roster) who begin the BSA do not complete it.

[12]In cases where birth year is not available, we approximate age using the year of undergraduate degree under the assumption that the individual is 22 during graduation.

[13]The Broad Center relied on confidential race and ethnicity information to verify our coding, but did not share any private individual data.

[14]This construction precedes and spans our collection of data on Broad trainees. Throughout this paper, a specified year refers to the fall of the school year unless otherwise noted. For example, 2015 refers to the 2015-2016 school year.

[15]Student achievement measures that are comparable across school districts are only available starting in the 2008-2009 school year through the Stanford Education Data Archive. Due to the limited panel, we are unable to examine achievement outcomes at this time.

examine whether Broad leadership directs enrollment towards or away from traditional public schools.[16] Detailed data on catchment areas and charter school location permits us to include charter schools that are based geographically within a public school district but are authorized by other entities.[17] Second, we have measures of school closures taken from the Common Core of Data. This enables us to examine whether districts headed by Broad superintendents are more or less likely to close traditional public schools.

Third, we construct a measure of each school district's annual per-pupil expenditures to assess how Broad leadership may influence district resources. Data for these measures derive from the annual local education agency finance survey (F-33). These survey data allow us to examine the allocation of this spending across particular functional areas (i.e., instruction, pupil support services, and capital expenditures).[18]. Finally, we rely on grade and year-specific enrollment data to measure high school completion as a student outcome measure. Specifically, we construct proxies for high school completion rates using the ratios of 12th grade enrollment to 8th grade enrollment 4 years prior and 10th grade enrollment two years prior, respectively.[19] We supplement these outcomes with data on district enrollment, overall and by race and ethnicity. A district's capacity to sustain or increase its enrollment provides an important indicator of the revealed preferences of the community it serves.

2.3 Traits of Broad Leaders

The BSA enrolled a total of 198 individuals between 2002 and 2015 (Table 1). In the early years of the BSA, annual cohorts included approximately 20 participants but the number fell to ten to 15 in recent years.[20] We begin examining these data by noting the demographic traits and professional

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[16]The Common Core of Data begins collecting charter school information in 1998, so we expect to have 600 fewer district-year observations relative to the other set of enrollment outcomes that begin in 1996.

[17]Because a superintendent may influence the prevalence of charter schools authorized by others in their area (e.g., through political opposition), we view this as our preferred measure. However, we found broadly similar, though less precise, results if we use only enrollment from charter schools directly managed by the public-school district.

[18]We express all expenditures on a per-pupil basis and in constant 2015 dollars. We also expect 600 fewer district-year observations relative to the first set of enrollment outcomes because we do not have F-33 data for 1996 or 2015.

[19]We elect to not use 9th grade enrollment due to the high prevalence of repeaters (Kennedy, 2017). We also do not focus on test-based measures of student achievement because they are not consistently defined for all districts over this long time period.

[20]See Table A1 for participants by cohort. Our list matches the number of BSA alumni listed on the Broad Center website every year in 2002-2015 except for 2004 and 2007-2011, when our cohort sizes modestly exceed what is officially reported. These differences reflect BSA trainees who did not complete the program. We code these individuals as Broad trainees though our findings are robust to not doing so.

experience of all BSA participants and how they compare to national data. Approximately 40%
of the full sample of BSA participants are female, as shown in Table 1. Half of group identifies
as white, while slightly over one-third identifies as Black. The analogous figure for Hispanic
Broad participants is 12%. BSA participants are notably more diverse than a cross-section of US
superintendents. Only 5% of approximately 850 superintendents surveyed by the 2015 American
Association of School Administrators (AASA) identified as African American or Hispanic and
only 27% as female (Finnan et al., 2015).

Data on work histories allow us to determine whether participants have teaching experience
and the primary sectors in which they were employed prior to enrolling in the BSA. Slightly over
half of BSA participants were coded as having teaching experience in our sample. This teaching
experience is less than the near universal levels reported by the 2010 AASA survey of nearly 1,900
superintendents (Kowalski et al., 2011), which is consistent with the Broad Foundation's stated
goals of bringing outside human capital into education leadership positions. One of the sectors
from which the BSA sources its talent is the military. Nearly one out of every five participants in
our sample have leadership experience in this sector. This estimate echoes previous estimates of
the prevalence of military leaders in the BSA (Samuels, 2011).

The second column of Table 1 focuses on the subset of BSA-trained individuals who ever
worked as a superintendent during our study window. This group includes more under-represented
minorities than the full BSA pool, with 54% coded as Black or Hispanic compared to 46% for the
entire group. Broad-trained superintendents are also more likely to have teaching experience than
other BSA participants. The statistic that two-thirds of the group have teaching experiences sug-
gests some selection into the superintendency based on professional background. As noted earlier,
this percent may be a lower bound on teaching experience among Broad superintendents due to
limited publicly available information on professional experience. The average age when begin-
ning as a BSA-trained superintendent is 48, while the mean completed tenure stands at 3.8 years.[21]
This measure aligns with an internal Broad Center study estimating the average superintendent
tenure length of Broad network members at 3.5 years (The Broad Center, 2018).[22] Among super-

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[21]Completed tenures refer to superintendencies that are no longer in process. This measure excludes current ongoing
tenures.

[22]The Broad Center measure includes all Broad-affiliated superintendents in the largest 100 school districts between
2003-2017 while our statistic of 3.8 years includes all districts led by BSA participants regardless of enrollment size.
The Broad Center (2018) shows that Broad-affiliated superintendents tend to remain on the job for significantly fewer

intendents who completed their tenure for whom we have data on subsequent jobs, we find that over half continued onto superintendencies in other public school districts, 8% became an assistant or regional superintendent or related central office position in another public school district, and 14% worked at a department of education at the federal, state, or local level. As such, their managerial expertise and human capital largely remained in the education sector.

3 The Placement of Broad Leaders

Our data show that the Broad Foundation enrolled and trained nearly 200 individuals for potential superintendencies between 2002 and 2015 (Table A1). However, a more complete assessment of their influence begins with tracking their subsequent leadership of school districts and the characteristics of the institutions they serve. Towards this end, we next address three specific elements of the Broad Foundation's role in public education. The first is simply the extent to which the Broad Foundation successfully places their trainees into school districts. For example, we document the reach of BSA in terms of both the initial and the cumulative hiring of Broad-trained superintendents by districts as well as by calculating the number of students served in a given year. In addition to assessing programmatic reach, we also examine which types of districts hire BSA-trained leaders. That is, we document how these districts vary on a variety of observed traits (e.g., student composition, urbanicity) from districts that never hire a Broad-trained superintendent. We assess how the demographic diversity of Broad-trained and conventional superintendents compares to the traits of the students they serve. Third, we investigate how BSA superintendents differ from non-Broad affiliated leadership, looking only among the select group of districts that hire at least one Broad-trained superintendent. This includes comparing their demographic profiles as well as tenure length with peers' characteristics. The differences observed in this selected set of districts allow us to assess the distinctiveness of Broad-trained leaders relative to the superintendents hired for the same positions.

years than their peers. The average completed tenure for non-Broad superintendents during 2003-2017 was 6.2 years in the largest 100 districts. This figure is consistent with other studies documenting average superintendent tenure as between 6 and 7 years (Natkin et al., 2003). As we discuss below, the difference in completed superintendent tenure is less stark, but still evident, when we compare Broad superintendents to other superintendents hired by the same districts.

3.1 How many districts and students do Broad leadership programs serve?

Table 2 examines the placement record of BSA participants shortly after graduation and their likelihood of working as a district superintendent, as an employee in a non-superintendent role in any public school district, or in a charter or education management organization. Of 198 individuals who participated in the BSA, 53% (n=104) worked in a public school district one year following the program's conclusion. However, only a third of these (n=37) were employed as a superintendent while the remaining two-thirds (n=67) worked in other leadership roles. The 37 Broad trainees who become superintendents within just one year of completing the program are less than half of the Broad trainees who ever become a superintendent in our study window (n=84, Table 1). Of all BSA participants, 6% (n=12) found employment in a charter management organization (CMO) or education management organization (EMO). As such, CMOs and EMOs make up a minority of non-public school district employment opportunities in the short-run.

In addition to aggregate counts, Table 2 also offers a view of how the short-term placement of Broad trainees has changed over time by documenting the outcomes of each BSA cohort from 2002 through 2015. A noticeable change coincides with the 2012 program redesign. The share of individuals who immediately work for a public school district dwindles from more than half for the 2002-2011 cohorts to no more than one-third starting in 2013. Most of this change is driven by fewer participants working in *non-superintendent* roles in these districts. This shift away from large public school districts is compensated by increased employment in charter management organizations, as evident in the nearly one-third of 2013-2015 cohorts who work in CMOs and EMOs.

Next we examine the reach of BSA over time. Table 3 tracks the cumulative number of school districts that ever hired a BSA-trained superintendent by year and enrollment size. The initial placement of BSA graduates in superintendencies began modestly with the program's first graduates in 2002. By 2015, Broad-trained superintendents had led 109 different school districts. Of these, 62 were districts in the top 300 by enrollment size (in 1996), and 31 were in the top 100.[23] Put differently, nearly one-third of the largest school districts in the United States have been served by

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[23]As shown in Table 1, 84 unique Broad-trained individuals worked as superintendents in 109 school districts. The full list of the 62 largest 300 districts that ever hired a Broad-trained superintendent is available in Appendix Table A2 with accompanying size rank and enrollment figures.

Broad-trained superintendents in the 13 years since the BSA became operational. However, these data also indicate that the placement of Broad superintendents reached well beyond the nation's largest school districts.

An alternative view measures the Foundation's reach in terms of students rather than districts served. Table 4 shows that while 216,000 students were enrolled in districts headed by the first Broad superintendents in 2002, that number peaked at 2.9 million in 2012. Even though the corresponding number decreased to 1.8 million by 2015, this reach is nevertheless equivalent to 4% of all students attending public schools in the United States. The pervasiveness of Broad-trained leaders is particularly pronounced among large school districts. By 2011, Broad superintendents served one out of every five students in the largest 100 districts. In 2015, this number decreased to one out of every 8 students as BSA participants began increasingly to work for organizations outside of traditional public school districts following the 2012 program redesign. Despite these shifts, this evidence shows that Broad leadership programs served a substantial number of school districts, and particularly a high share of large urban school districts, within just a dozen years of commencing operations.

3.2   What types of districts hire Broad superintendents?

While Broad superintendents have led districts of varying sizes, on a per-student basis their impact is concentrated as intended in the nation's largest school districts. However, less is known about the factors underlying Broad placements among these larger districts and how large districts employing Broad-trained leaders differ from those that do not. In this section we scrutinize the decision to hire BSA-trained leadership and relate it to district characteristics.

In Table 5 we present district and superintendent attributes for the largest 300 districts by enrollment in the United States. We define Broad districts as those who ever hired a Broad-trained superintendent, and non-Broad districts as those that did not. A comparison of enrollment data shows that Broad districts have somewhat larger student enrollment compared to non-Broad districts though this difference is not statistically significant. More pronounced (and statistically significant) differences are apparent for racial composition. Just under a third (i.e. 30%) of Broad district students in the largest 300 district samples are white, which is 16 percentage points lower

than non-Broad districts. Nearly two-thirds of students enrolled in Broad districts are either Black or Hispanic. Yet another point of difference is that 69% of Broad districts are situated in cities, relative to 54% of non-Broad districts. BSA-trained superintendents are therefore prevalent in large districts that have a distinctly more urban profile and that serve higher concentrations of Black and Hispanic students.[24]

The relative diversity of Broad districts prompts the question of whether their leadership ranks reflect their student demographics. The bottom panel of Table 5 shows some evidence of this match. Among the largest 300 school districts, Broad districts are nearly twice as likely (i.e., an increase of 15 percentage points) to hire African-American superintendents. Approximately one-third of Broad district superintendents in the largest 300 districts are Black, which closely mirrors the representation of Black students in these districts. There are no statistically meaningful differences among Broad vs. non-Broad districts in the share of superintendents who are Hispanic, although Hispanic superintendents are generally under-represented relative to same-ethnicity students. Broad districts are also 6 percentage points more likely to have female leaders.

The attribute in which Broad districts differ most markedly from non-Broad counterparts is tenure on the job. The final row shows that the average superintendent tenure in large districts that ever had a Broad superintendent is substantially shorter (i.e., 1.5 years) than in non-Broad districts. One possibility consistent with this stylized fact is that districts hiring BSA-trained superintendents may be meaningfully different in ways that lead to shorter leadership tenures. For example, large diverse districts with more contentious school board politics and relationships between school districts and local and state government may also be more prone to hiring Broad superintendents, although the very factors that may influence the propensity to hire can also make a long-lasting tenure more difficult. Yet, another explanation is that conditional on being in the same district, BSA-trained superintendents may face particular obstacles or experiences that shorten their expected tenure. To speak to these distinctions, we turn to comparisons only among superintendents in districts that ever hired a Broad-trained leader.

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[24]We also examined mayoral control as a potential mediator of Broad hiring. We compiled a list of 16 districts under mayoral control during our study window based on Wong and Shen (2013) and media reports. We find that 5 of these districts hired a Broad trainee while under mayoral control. Among the three districts that switched to mayoral control during this window, none hired Broad-trained superintendents.

3.3 How do Broad superintendents differ from alternative leaders?

In Table 6, we compare superintendent traits among large school districts where a Broad superintendent was at some point hired. Even within this selected group of Broad districts, Broad superintendents appear to diversify the leadership ranks meaningfully. Within the sample of the 300 largest districts, Broad-trained superintendents are 30 percent less likely to be white (i.e., a statistically significant difference of 17 percentage points) than non-Broad superintendents in districts that ever hired Broad graduates. Analogously, Broad-trained superintendents are 40 percent more likely to be Black. The literature on demographic match between teachers and students, as well as between principals and teachers, suggests benefits to racial and ethnic representation at levels below the superintendency in K-12 education (Dee, 2005; Williams and Loeb, 2012). Importantly, Broad trainees also have significantly shorter tenures as superintendents than other superintendents in the same districts. On average, Broad superintendents have tenures that are 18 percent shorter (i.e., 0.75 fewer years) than non-Broad superintendents.[25]

4 The Effects of Broad Superintendents

4.1 Empirical strategy

The descriptive data presented in the previous section allowed us to characterize Broad superintendents, their placements and tenures in school districts, and the characteristics of the districts that hired them. We now turn to using these panel data to examine the consequences of those superintendents for district outcomes. We begin with a static difference-in-differences (DD) specification before augmenting it in several ways (i.e., semi-dynamic and event-study specifications as well as a two-parameter specification capturing effects on the level and trends in outcomes). The static DD approach effectively compares the changes in district outcomes following the hiring of a BSA-trained superintendent to the contemporaneous changes in districts that did not make such hires. A key assumption of this approach is that the change observed in districts that did not make such hires is a valid counterfactual for what would have happened in the districts that

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[25]In results not shown, we also examine these differences using a regression framework where superintendent traits were the dependent variables and Broad participation is the key independent variable, conditional district and year fixed effects. We find similar results with respect to superintendent tenure in the largest 300 school districts.

did in the absence of this treatment. We estimate the following regression to implement this basic approach:

$$Y_{dt} = \alpha + \beta Hire_{dt} + \gamma_d + \delta_t + \epsilon_{dt} \qquad (1)$$

Y_{dt} is the outcome for district d at time t. $Hire_{dt}$ is an indicator variable that assumes a value of 1 for the year the district first hired a BSA-trained superintendent and all subsequent years.[26] We include fixed effects γ_d and δ_t in all specifications to account for common differences across districts and years, respectively. Several recent methodological studies have underscored how this static DD can be misleading in the presence of treatment heterogeneity or dynamic treatment effects. For example, the DD design effectively applies higher weights to observations with a higher conditional variance in the treatment indicator of interest. In our context, this implies the impact of BSA-trained leaders in districts that hired them in the middle of our study window are weighted more heavily than the effects in districts that hired toward the beginning or end of this period. Furthermore, in the presence of dynamic treatment effects, the static DD can even result in some treated units receiving negative weights. To examine these concerns, we follow the guidance and procedure developed by (de Chaisemartin and D'Haultfœuille, 2020). Specifically, we identified the relevant weights across all of the outcomes we study and found that none of them is negative. However, we do find some evidence for dynamic treatment effects using the specifications we describe below.

The static DD specification assumes that the effect of a BSA-trained superintendent is a one-time and constant change in the level of a given outcome. However, we might reasonably expect effects to fade over time given the short tenure of most superintendents and organizational inertia. Alternatively, the lags associated with adopting and fully implementing new policies suggest that the changes due to a Broad superintendent may only begin to manifest themselves after several years (e.g., closing traditional schools, possibly opening more charter schools and expanding their enrollment). We adopt several complementary approaches to examining these potentially dynamic effects. One is to examine semi-dynamic DD specifications in which we replace $Hire_{dt}$

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[26]In districts hiring two Broad superintendents, the treatment variable assumes a value of 1 starting from the year of initial hire. Among the 109 districts that hired a BSA-trained superintendent, only 12 did so more than once during our study window.

with several indicator variables denoting the number of years since the initial treatment:

$$Y_{dt} = \alpha + \sum_{k=0}^{4} \beta_k Hire_{dtk} + \gamma_d + \delta_t + \epsilon_{dt} \tag{2}$$

In this specification, β_0 is the coefficient corresponding to the year of Broad superintendent hire, β_1 corresponds to the year after the hire, and so on until β_4, which corresponds to four or more years after the initial hire. This unrestrictive specification allows us to separately identify immediate changes after the Broad hire and those taking time to manifest.

Second, we further supplement this analysis with an even more unrestrictive set of event study graphs. Specifically, we estimate equations of the following form:

$$Y_{dt} = \sum_{q=1}^{5} \lambda_q D_{d,t+q} + \sum_{p=0}^{6+} \eta_p D_{d,t-p} + \gamma_d + \delta_t + \epsilon_{dt} \tag{3}$$

Y_{dt} is the outcome for district d during time t. D are indicators denoting the timing of the superintendent hire relative to a given year, and covers the years leading up to and following the Broad hire.[27] We chose as the reference category districts that are observed 6 or more years prior to their first Broad hire (or never hired a Broad trainee). Then, to capture effects that precede the first Broad hire, we allow for five binary indicators (i.e., $D_{d,t+q}$), each of which assumes a value of 1 if the district hires a superintendent q years in the future. To model the lagging dynamic effects associated with the first Broad hire, we constructed seven binary indicators (i.e., $D_{d,t-p}$). These variables assume a value of 1 if an observation is observed p years since the district hired its first Broad leader. The final lagging indicator equals for districts observed 6 or more years after their first Broad hire. The estimated values of λ_q and η_p represent the changed outcomes unique to Broad districts in the years before and after their first hire of a BSA-trained leader.

A third and more parsimonious way of modeling dynamic treatment effects is a specification that allows both a level change in outcomes and a linear trend uniquely associated with the hiring of a Broad superintendent. Specifically, we estimate the following DD model, which includes both an indicator for hiring a BSA-trained leader (i.e., $Hire_{dt}$) and a variable measuring the years

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[27]In the case of multiple Broad hires within the same district, we center the data at the first time the district hired a Broad-trained superintendent. In several cases a district hired a superintendent who began BSA training during their tenure. For these districts we code the event as beginning the year of BSA training.

elapsed since the initial Broad hire (i.e., $YearsSinceHire_{dt}$):

$$Y_{dt} = \alpha + \theta Hire_{dt} + \pi YearsSinceHire_{dt} + \gamma_d + \delta_t + \epsilon_{dt} \tag{4}$$

We constructed $YearsSinceHire_{dt}$ so that it equals 0 in the year of the first Broad hire and increases up to 4 for 4 or more years since then. θ identifies differences in outcomes during the first year under a BSA-trained superintendent, while π captures additional trend changes.

We estimate all of these models using a panel of the 300 largest school districts observed annually for as many as 20 years (i.e., from 1996 through 2015). We defined the 300 largest school districts using enrollment at baseline (i.e., in 1996). Because a new superintendent can influence multiple dimensions of district policies, we examine several sets of outcomes. These include charter school enrollment, the number of charter schools, the closure of traditional public schools, per-pupil expenditures, student completion rates, and overall and by racial subgroup student enrollment.[28] Due to limitations in data availability, some of these outcomes are observed over 18 rather than 20 years.

4.2 Difference-in-differences results

We begin by examining the effect of Broad superintendents on the size of the charter school sector using two measures: charter enrollment and the number of charter schools.[29] Because the BSA is focused on system changes and distributed governance, we might expect to see a growth in charter schools that operate independently of many of the institutional structures relevant to traditional public schools. It is well recognized that the Broad Foundation invests heavily in charter schools and aims to accelerate the charter sector footprint through fundraising and public awareness campaigns (Blume, 2015). The foundation funneled more than $144 million into developing and scaling public charter management organizations by 2016 (The Broad Foundation, 2016). As such, Broad-trained superintendents are often perceived as both reform-minded and amenable to

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[28]For highly skewed outcome variables like enrollment and counts of schools, we use the natural log transformation as our dependent variable. In cases where the count is zero, we rely on an imputation of 0.5 and also condition on an indicator for this imputation. Our results are robust to the use of inverse hyperbolic sine transformations for zero-valued observations (CITE). The latter results are available upon request.

[29]We match districts to charter schools within their catchment area regardless of whether the district administers the charter school.

growth in the charter sector. While these associations are prevalent in the public domain, empirical evidence on the influence of Broad-trained leaders on the charter sector is still lacking.

Figure 1 focuses on the two measures of charter presence (i.e., charter enrollment and the number of schools) and presents results from the event-study approach. The year of the first Broad superintendent hire is indexed at 0, while the omitted category is 6 or more years prior to the Broad hire. We show coefficients up to 6 years before and after the hire to accommodate the expected length of superintendent tenures and provide sufficient time for any policies undertaken by new superintendents to take effect.[30] The estimated coefficients for both enrollment and the number of charter schools are relatively flat in the years leading up to a Broad superintendent hire but trend consistently upwards afterwards. In Table 7, we present the key results from static and dynamic DD specifications. The static DD specifications suggest that a Broad hire led to large but statistically insignificant increases in charter enrollment (i.e., nearly 14 percent) and in the number of charter schools (i.e., nearly 10 percent). The semi-dynamic specifications in columns 2 and 5 suggest that these charter measures grew at a fairly constant rate following a Broad, becoming weakly significant by years 4 and later. The dynamic specifications in columns 3 and 6 impose the assumption of a distinct linear trend following a Broad hire. These statistically significant results indicate that charter enrollment and the number of charter schools grew, respectively, by about 6% and 4% for each additional year after the Broad hire.[31] Overall, these results provide strongly suggestive evidence that hiring a Broad superintendent led to an expanded charter sector in the largest U.S. school districts.

The scope of superintendent responsibilities extends to discretion over accountability-based interventions such as school closures. We examine whether the hiring of a Broad superintendent induces changes in the likelihood of such closures, and find small and imprecise estimates. Event study results in Figure 2 suggest that the hiring of a Broad superintendent had no clear, sustained effects of the number of traditional public schools that were closed annually. The results from our static and dynamic DD specifications (i.e., Table 8) provides further evidence that Broad-trained superintendents are not substantially impacting the likelihood of school closures.[32] However, we

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[30] As Table 6 shows, the average completed tenure for Broad district superintendents is over 4 years.

[31] In our panel dataset, the mean charter enrollment is 2,756 and districts have an average of 7.5 charter schools (Table A3).

[32] A similar analysis of school openings provides no evidence of differential patterns around when Broad-trained superintendents assume leadership of school districts (see Table A4).

do note that our event-study results suggest that, in the fourth year following the hiring of a Broad superintendent, the number of traditional public schools closed jumped by about 14 percent (i.e., a weakly significant effect). Because such school closures are more likely to be one-time events than a sustained year-to-year change, this finding may reflect the impact of Broad leaders.

Another key dimension of superintendent responsibility involves district budgets. In order to realize transformative change as sought by venture-philanthropic organizations such as the Broad Foundation, BSA superintendents may seek to modify expenditures in ways that align with their strategic priorities. To examine this, we rely on spending data defined both overall and for broad functional areas. Specifically, Figure 3 presents event-study results for four sets of per-pupil spending: overall expenditures, instructional expenditures, expenditures on support services, and capital outlays. Panel a) shows a pace of overall per pupil expenditure that remains close to the reference period throughout years leading up to and immediately following the Broad hire (but possibly increasing 4 or more years after the hire). Next we disaggregate overall expenditures into the three core components. Approximately half of overall spending goes into current expenditures on instruction, nearly 30% into current expenditures on support services, and a little over 10% into capital outlays (Table A3). Panel b) of Figure 3 shows that instructional spending maintains a relatively flat profile both before and after the hiring year. Spending on support services remains steady prior to hire and through at least the first two years after the Broad superintendent hire. However, the event-study results suggest a weakly significant increase in spending on support services by year 4 and later (Table A7). However, neither the static nor the dynamic DD results (Table 9) suggest a statistically significant impact on support services. In contrast, the event-study and DD evidence suggest that the hiring of a Broad leader led to a new pattern in capital expenditures. Specifically, we document a significant decrease in the level of per-pupil expenditures on capital outlays of $262 per student during the year of the Broad hire (Table 9). This decline persists through the first three years, and then is followed by a trend towards increased capital spending. Therefore, the delay and subsequent recovery of capital outlays could reflect the desire of new leadership to redirect, though not ultimately reduce, investments in the district's infrastructure.

Unfortunately, we do not have access to a comprehensive set of student outcome measures for this study. To gauge student outcomes, we rely primarily on districts' student completion rates. Figure 4 examines secondary schooling completion rates, using the ratio of 12th grade enrollment

to both 8th grade and 10th grade enrollment as proxies for high school graduation. In both cases we see no evidence of either a pre-trend or a post-trend following a Broad superintendent hire. High school completion rose steadily across the nation during this period, with the public high school average freshmen graduation rate increasing from 73.9 in 2002-2003 to 81.9 in 2012-2013 (Snyder, 2016). Analogous estimates using U.S. Census, American Community Survey, and GED Testing Service data estimate adjusted status completion rates increased by over 6 percentage points within a 10-year period spanning the 1990s and 2000s (Murnane, 2013). However, both our event-study and DD designs suggest that the hiring of Broad superintendents did not contribute to these increases. According to both Figure 4 and Table 10, completion rates do not show observable discontinuities or trend breaks around the time of hire.[33]

Another available variable that might reflect the effectiveness of the district leader is district enrollment, a measure of students' and families' revealed preferences for the district. The event-study results in Figure 5 suggest that the enrollment in Broad districts was in moderate decline prior to the Broad hire and that the hiring of a Broad leader did little to change this trend. However, disaggregating enrollment by student race/ethnicity reveals a more nuanced view. In particular, the declining enrollment in Broad districts is more modest, in percent terms, for white and Hispanic students and larger for Black students. These overall trends imply that the *share* of white and Hispanic students grew in Broad-hiring districts while the share of Black students fell.[34] Regardless, these results suggest that the hiring of a Broad superintendent had no clear effect on enrollment or its racial-ethnic composition. As a complement to these enrollment results, we also examined the impact of Broad leadership on the extent of racial segregation in the district. We compute the Theil Index as an entropy-based measure of how diverse individual schools are relative to the diversity of the school district as a whole on a 0 to 1 scale, with 1 denoting complete segregation by racial group. Table A12 shows no evidence that the hiring of Broad leadership significantly affected the extent of segregation in our observed school districts.

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[33]Event study results corresponding to Figures 1 through 4 are available in Appendix Tables A5 through A8.

[34]Appendix Table A9 shows that at t=0, the number of enrolled Black students declined by 1.8 percentage points relative to base observations. These trends persist during the five years post Broad hire, such that the Black student population and share of overall enrollment decrease by 19.4% and 2.6 percentage points relative to the reference district-year observations.

5   Conclusion

The recent and growing influence of venture philanthropy in civil society has understandably attracted considerable, and often critical, attention. The case in favor of venture-philanthropic initiatives turns on their unique capacity both to encourage risky innovations and to drive meaningful improvements in the performance of the organizations in which such efforts are embedded (e.g., Letts et al., 1997). However, their influence also raises legitimate questions about both transparency and the character of accountability in philanthropy (e.g., Fleishman, 2007; Reich, 2018). These governance concerns are uniquely salient when venture philanthropies engage with democratically governed entities like U.S. school districts. In this study, we have sought to bring new empirical evidence to this debate by examining the reach, character, and impact of a particularly prominent and controversial venture-philanthropic initiative: the Broad Superintendents Academy (BSA).

The BSA has sought to source, develop, place, and support innovative and reform-minded new leaders at the head of the largest U.S. school districts. We find that, though only 42% of the participants in the superintendent training program worked as a superintendent during our 20-year study window, the reach of the program was still considerable. BSA-trained superintendents have, at some point, led roughly one-fifth of the largest 300 school districts in the U.S. (and one-third of the largest 100 districts). At the peak of the program's reach in 2012, Broad superintendents led school districts serving nearly 3 million students (and one out of every five students in the largest 100 districts).

We find that the observed traits of Broad-trained leaders are distinctive. Unlike conventional superintendents, Broad trainees are commonly viewed as having managerial experience outside of traditional public schools. Our evidence is consistent with this characterization. For example, we show that 19% of participants in the superintendent training program have spent extensive time in the military. However, at least half of participants have previous teaching experience, even though BSA organizers often target skilled executives outside of public education (Samuels, 2011). Our evidence also indicates that Broad superintendents contributed substantially to the diversity of district leadership. Among large districts hiring Broad superintendents, Broad trainees were 40 percent more likely to be Black their non-Broad peers. However, we also find that, on average,

Broad superintendents serve a comparatively short 3.8 years in a given district.

Using a unique panel dataset on the 300 largest school districts over as many as 20 years, we examined the impact of Broad superintendents on a broad array of district outcomes. Our results indicate that the hiring of a Broad superintendent had no clear effects on outcomes such as student completion rates, enrollment, the closure of traditional public schools, and per-pupil spending on instruction or on support services. However, one exception to this pattern is particularly notable. We do find evidence that the hiring of a Broad superintendent results in a growing charter-school sector. Specifically, we find that the hiring of a Broad superintendents is associated with a trend towards increased charter-school enrollment and a growth in the number of charter schools that extends beyond the short tenure of the typical Broad trainee.

We view the overall implications of these findings as nuanced. On the one hand, this Broad Foundation initiative was successful in placing new leaders with distinctive traits and training in a substantial number of U.S. school districts. However, we also find that these leaders had unusually short tenures and no clear effects on a variety of district outcomes. Given the shorter tenure of Broad superintendents and the complex nature of the large school districts they typically lead, their apparent lack of impact is not necessarily surprising. It also accords with a longstanding theme in leadership research which argues that high-quality leaders have less scope to be effective in highly institutionalized and rule-bound organizations. However, we should also express some caveats about our general findings. In particular, we cannot rule out the hypothesis that the Broad-trained leaders are shaping public education in other meaningful ways. For example, our finding that Broad superintendents appear to catalyze a longer-term trend towards charter schools suggests they may have other longer-term (and not easily detectable) effects. Furthermore, the development of these new leaders and support of their subsequent advocacy may exert an ongoing influence on both federal and state education-policy agendas that is outside the scope of our study. Regardless, the apparent lack of direct, organizational impact implied by these venture-philanthropic leaders suggests future efforts to improve the performance of U.S. school districts should focus not only on leaders but also on how district governance and institutional design either amplifies or attenuates efforts at organizational improvement.

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Table 1: Average Attributes of Program Participants

	All	Ever worked as superintendent
	(1)	(2)
Female	0.40	0.39
White	0.50	0.42
Black	0.34	0.42
Hispanic	0.12	0.12
Teaching experience	0.51	0.66
Military background	0.19	0.11
Age at first superintendency	-	47.94
Length of superintendent tenure	-	3.78
Observations	198	84

Notes: The sample in the first column includes all individuals observed participating in the BSA up to the 2015 cohort. The sample in the second column includes all individuals who worked as BSA-trained superintendents or interim superintendents at a public school district from 2002-2015. Six percent of full BSA sample is missing data on teaching experience, while one percent of the superintendent sample also has missing teaching experience. Age is taken during the first year they are observed as a Broad-trained superintendent. Nineteen percent of age data is missing for the superintendent sample. There are 84 unique individuals working as superintendents in 109 districts for all variables except for superintendent tenure. Tenure is measured at the superintendent-spell level. We have tenure for 73 unique individuals spanning 102 spells because we only include those with completed tenures.

Table 2: Average Placement Record One Year After BSA by Cohort

| Cohort | Cohort size | % working in public school district as: | | | % working in: |
| | | Any role | Superintendent | Non-supt | CMOs or EMOs |
	(1)	(2)	(3)	(4)	(5)
2002	23	61	26	35	0
2003	19	58	16	42	0
2004	22	50	14	36	5
2005	20	50	17	39	0
2006	18	72	29	47	0
2007	13	69	8	62	8
2008	12	58	17	42	0
2009	13	54	23	31	0
2010	14	50	14	36	0
2011	8	50	38	13	0
2013	11	27	18	9	27
2014	10	30	20	10	20
2015	15	33	13	20	33
Total	198	53%	18%	35%	6%

Notes: Sample includes all individuals who participated in the BSA from 2002-2015. Professional experiences are tabulated the year after the conclusion of the BSA. For instance, jobs data comes from 2006 for graduates of the 2005 cohort, and 2015 for graduates of the 2013 cohort since the latter spans two years.

Table 3: Cumulative Districts Led by Broad Superintendent

	All districts (1)	Top 300 (2)	Top 100 (3)
2001	0	0	0
2002	7	3	2
2003	12	8	5
2004	17	12	7
2005	29	17	9
2006	41	24	12
2007	46	27	13
2008	55	34	15
2009	69	44	20
2010	73	46	20
2011	84	53	25
2012	93	56	27
2013	98	57	28
2014	102	57	28
2015	109	62	31

Notes: District-level sample in the first three columns tabulates the cumulative number of unique districts that ever hired a BSA-trained superintendent. Column (1) includes all districts while remaining columns restrict to the top 300 and 100 largest districts by enrollment, respectively.

Table 4: Students Served by Broad Superintendent in Given Year

	All districts		Top 300 districts		Top 100 districts	
	Count (1000s)	%	Count (1000s)	%	Count (1000s)	%
2001	0	0	0	0	0	0
2002	216	0	192	1	164	2
2003	476	1	454	3	363	3
2004	690	1	649	4	521	5
2005	1037	2	938	6	728	7
2006	1286	3	1127	7	860	8
2007	1360	3	1214	7	864	8
2008	1494	3	1349	8	842	8
2009	1895	4	1720	10	1119	11
2010	1543	3	1406	8	925	9
2011	2863	6	2674	16	2153	21
2012	2934	6	2754	16	2324	22
2013	2600	5	2403	14	2064	20
2014	2235	4	2112	13	1840	18
2015	1829	4	1686	10	1385	13

Notes: This table shows the total number of students in a given year served by BSA-trained superintendents, and the share of students relative to the total number of students in public schools. The second and third sets of columns restrict to the top 300 and 100 largest districts by enrollment, respectively.

Table 5: District and Superintendent Attributes by District Broad Status

	All	Broad Districts	Non-Broad Districts	Difference
	(1)	(2)	(3)	(4)
District characteristics:				
Student enrollment	55053	71094	50869	20225
	(4518)	(11704)	(4787)	(12576)
Percent white	0.42	0.30	0.46	-0.16***
	(0.01)	(0.03)	(0.02)	(0.03)
Percent Black	0.25	0.34	0.22	0.11***
	(0.01)	(0.03)	(0.01)	(0.03)
Percent Hispanic	0.26	0.30	0.25	0.05
	(0.01)	(0.03)	(0.02)	(0.03)
Percent charter	0.01	0.02	0.01	0.00
	(0.00)	(0.00)	(0.00)	(0.00)
City	0.57	0.69	0.54	0.16**
	(0.03)	(0.06)	(0.03)	(0.07)
Superintendent characteristics:				
Female	0.23	0.28	0.22	0.06**
	(0.01)	(0.03)	(0.01)	(0.03)
White	0.68	0.55	0.72	-0.18***
	(0.02)	(0.04)	(0.02)	(0.04)
Black	0.21	0.32	0.17	0.15***
	(0.02)	(0.04)	(0.02)	(0.04)
Hispanic	0.10	0.12	0.09	0.03
	(0.01)	(0.02)	(0.01)	(0.03)
Tenure	5.22	4.14	5.58	-1.45***
	(0.13)	(0.17)	(0.16)	(0.24)

Notes: The sample consists of district-year observations from 1996-2015, and includes the largest 300 public school districts in enrollment as of 1996. Broad districts refer to those districts that ever hired a BSA-trained superintendent. Non-Broad districts refer to districts that never hired such a superintendent. The top panel uses district-year observations, while the bottom panel uses unique district-superintendent observations. There are 5,994 total observations in the top panel across the 300 largest districts, and 4,754 and 1,240 Broad and non-Broad observations, respectively. Observations for the top 300 largest districts for the bottom panel range from 1,277 to 1,434 observations. Note that the tenure variable is only computed for superintendents with completed tenures. *** p<0.01, ** p<0.05, * p<0.1

Table 6: Broad and Non-Broad Superintendent Attributes in Broad Districts

	All	Broad Superintendents	Non-Broad Superintendents	Difference
	(1)	(2)	(3)	(4)
Female	0.28	0.35	0.26	0.09
	(0.03)	(0.05)	(0.03)	(0.05)
White	0.55	0.41	0.58	-0.17***
	(0.04)	(0.06)	(0.04)	(0.06)
Black	0.32	0.41	0.30	0.12**
	(0.04)	(0.06)	(0.04)	(0.05)
Hispanic	0.12	0.13	0.11	0.02
	(0.02)	(0.04)	(0.02)	(0.04)
Tenure	4.14	3.53	4.28	-0.75***
	(0.17)	(0.25)	(0.19)	(0.28)

Notes: The sample consists of unique district-superintendent observations from 1996-2015. The sample only includes the 62 top-300 public school districts that ever hired a BSA-trained superintendent. There are 355 observations or unique district-spell combinations with non-missing gender data, 349 observations with non-missing race data, and 323 observations for tenure since this variable is only computed for superintendents with completed tenures. *** p<0.01, ** p<0.05, * p<0.1

Table 7: Estimated Effects of Broad Superintendents on Charter Schools and Enrollment

	Log(Charter enrollment)			Log(Total charters)		
	(1)	(2)	(3)	(4)	(5)	(6)
Broad hire	0.138		-0.022	0.095		0.002
	(0.100)		(0.092)	(0.071)		(0.066)
Year of Broad hire		-0.010			0.015	
		(0.092)			(0.060)	
1 year after Broad hire		0.034			0.043	
		(0.094)			(0.066)	
2 years after Broad hire		0.091			0.061	
		(0.102)			(0.075)	
3 years after Broad hire		0.161			0.076	
		(0.103)			(0.077)	
4 or more years after Broad hire		0.234*			0.158*	
		(0.132)			(0.094)	
Years since Broad hire			0.063**			0.037*
			(0.030)			(0.022)

Notes: The sample consists of district-year observations from 1998-2015. The panel begins in 1998 because this is the earliest year in which the Common Core of Data starts collecting data on charter schools. Note that there are a total of 5,394 observations covering the largest 300 public school districts by enrollment. Six observations are missing because the Memphis City School District and Shelby County School District merged and seceded during the final three years. Broad hire is an indicator variable that assumes a value of 1 for the year of Broad superintendent hire and all ensuing years. Years since Broad hire is 0 for the year of Broad hire and up to 4 for 4 or more years after the Broad hire. All models include district and year fixed effects. Standard errors are clustered at the district level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 8: Estimated Effects of Broad Superintendents on School Closures

	Log(No. closed)		
	(1)	(2)	(3)
Broad hire	-0.018		-0.012
	(0.026)		(0.043)
Year of Broad hire		-0.046	
		(0.055)	
1 year after Broad hire		-0.015	
		(0.062)	
2 years after Broad hire		0.052	
		(0.074)	
3 years after Broad hire		-0.014	
		(0.060)	
4 or more years after Broad hire		-0.031	
		(0.038)	
Years since Broad hire			-0.002
			(0.014)

Notes: The sample consists of district-year observations from 1998-2015. There are a total of 5,394 observations covering the largest 300 public school districts by enrollment. Six observations are missing due to Memphis City and Shelby County School Districts merging and seceding. Broad hire is an indicator variable that assumes a value of 1 for the year of Broad superintendent hire and all ensuing years. Years since Broad hire is 0 for the year of Broad hire and up to 4 for 4 or more years after the Broad hire. All models include district and year fixed effects. Standard errors are clustered at the district level. *** p<0.01, ** p<0.05, * p<0.1

Table 9: Estimated Effects of Broad Superintendents on Expenditure Outcomes

	Per pupil exp.: total current			Per pupil exp.: instruction		
	(1)	(2)	(3)	(4)	(5)	(6)
Broad hire	132.605		-167.278	21.648		68.766
	(267.550)		(285.263)	(94.052)		(118.729)
Year of Broad hire		63.255			183.069	
		(293.274)			(147.621)	
1 year after Broad hire		-137.953			-22.830	
		(270.055)			(103.649)	
2 years after Broad hire		-128.882			-56.040	
		(276.880)			(108.279)	
3 years after Broad hire		-12.016			-47.198	
		(264.693)			(94.214)	
4 or more years after Broad hire		412.147			25.676	
		(342.526)			(114.194)	
Years since Broad hire			122.270			-19.211
			(81.396)			(32.641)

	Per pupil exp.: support services			Per pupil exp.: capital outlays		
	(7)	(8)	(9)	(10)	(11)	(12)
Broad hire	82.009		9.615	-115.196		-369.769***
	(85.354)		(80.935)	(93.360)		(124.065)
Year of Broad hire		32.404			-262.414**	
		(69.294)			(113.156)	
1 year after Broad hire		23.579			-264.398**	
		(81.487)			(123.811)	
2 years after Broad hire		40.565			-294.243***	
		(96.421)			(109.857)	
3 years after Broad hire		111.551			-218.191*	
		(99.059)			(123.108)	
4 or more years after Broad hire		130.568			103.662	
		(110.954)			(129.901)	
Years since Broad hire			29.517			103.796**
			(25.567)			(40.283)

Notes: The sample consists of district-year observations from 1997-2014. We restrict to these years due to availability of F-33 data. There are a total of 5,395 observations covering the largest 300 public school districts by enrollment. Missing observations are due to Memphis City and Shelby County School Districts merging and seceding. Broad hire is an indicator variable that assumes a value of 1 for the year of Broad superintendent hire and all ensuing years. Years since Broad hire is 0 for the year of Broad hire and up to 4 for 4 or more years after the Broad hire. All models include district and year fixed effects. Standard errors are clustered at the district level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 10: Estimated Effects of Broad Superintendents on High School Completion Outcomes

	Ratio: Grade 12 to 8 enrollment			Ratio: Grade 12 to 10 enrollment		
	(1)	(2)	(3)	(4)	(5)	(6)
Broad hire	0.008		-0.000	-0.005		-0.010
	(0.016)		(0.015)	(0.013)		(0.012)
Year of Broad hire		0.003			-0.011	
		(0.014)			(0.012)	
1 year after Broad hire		0.003			-0.008	
		(0.015)			(0.012)	
2 years after Broad hire		0.004			-0.002	
		(0.016)			(0.013)	
3 years after Broad hire		0.002			-0.008	
		(0.017)			(0.014)	
4 or more years after Broad hire		0.014			-0.002	
		(0.021)			(0.018)	
Years since Broad hire			0.003			0.002
			(0.005)			(0.005)

Notes: The sample consists of district-year observations from 1996-2015. It covers the largest 300 public school districts by enrollment. There are 5,543 observations in the first three columns and 5,623 observations in the final three columns. We observe fewer than 6000 observations due to missing data from 23 districts for the grade 12 to 8 enrollment outcome and missing data from 19 districts for the grade 12 to 10 enrollment outcome. Broad hire is an indicator variable that assumes a value of 1 for the year of Broad superintendent hire and all ensuing years. Years since Broad hire is 0 for the year of Broad hire and up to 4 for 4 or more years after the Broad hire. All models include district and year fixed effects. Standard errors are clustered at the district level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

(a) Log(Charter enrollment)   (b) Log(Total charters)

Figure 1: Estimated Effects of Broad Superintendents on Charter Outcomes

Note: The figure shows coefficients corresponding to leading and lagged years relative to Broad superintendent hire. The reference category includes 6 or more years prior to the Broad hire as well as control districts that never hired a Broad superintendent. Results correspond to Table A5. The figures are computed using geographic local education agencies, such that enrollment counts take into consideration charter schools located within the same catchment area but are managed under a different LEA code in CCD data.

(a) Log(School closures)

Figure 2: Estimated Effects of Broad Superintendents on School Closures

Note: The figure shows coefficients corresponding to leading and lagged years relative to Broad superintendent hire. The reference category includes 6 or more years prior to the Broad hire as well as control districts that never hired a Broad superintendent. Results correspond to Table A6. Note that schools are defined as non-charter public schools.

(a) Per pupil expenditures

(b) Per pupil exp.: instruction

(c) Per pupil exp.: support services

(d) Per pupil exp.: capital outlays
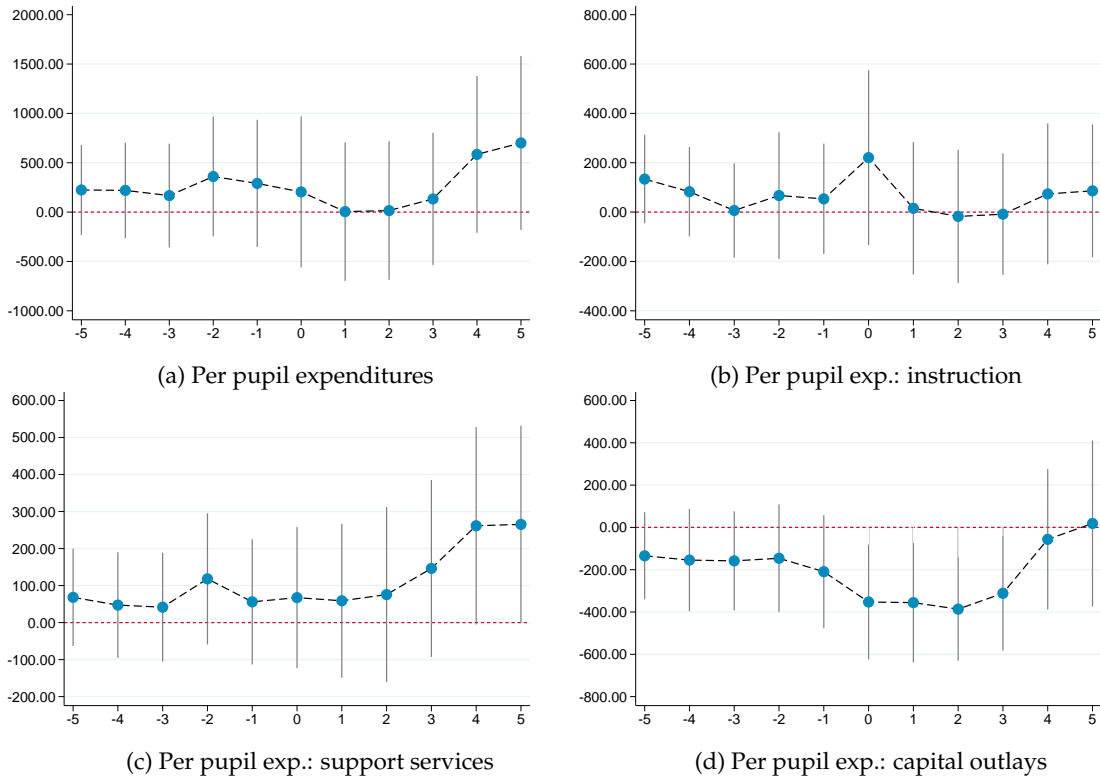
Figure 3: Estimated Effects of Broad Superintendents on Expenditure Outcomes

Note: The figure shows coefficients corresponding to leading and lagged years relative to Broad superintendent hire. The reference category includes 6 or more years prior to the Broad hire as well as control districts that never hired a Broad superintendent. Expenditure outcomes are expressed in 2015 constant dollars. Results correspond to Table A7.
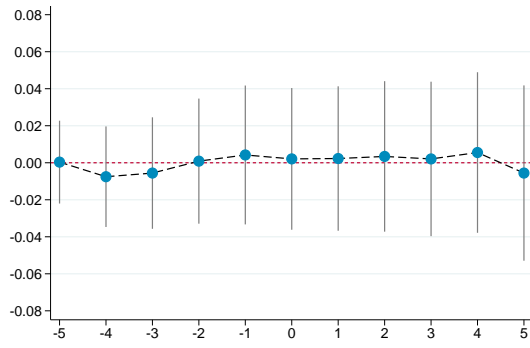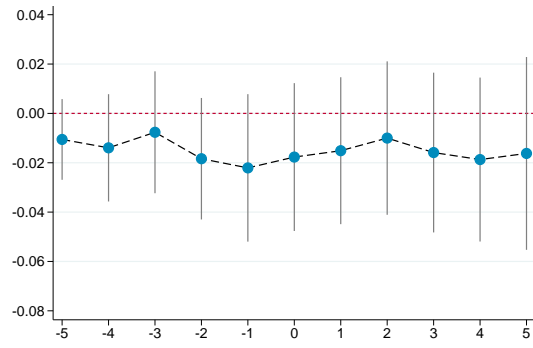
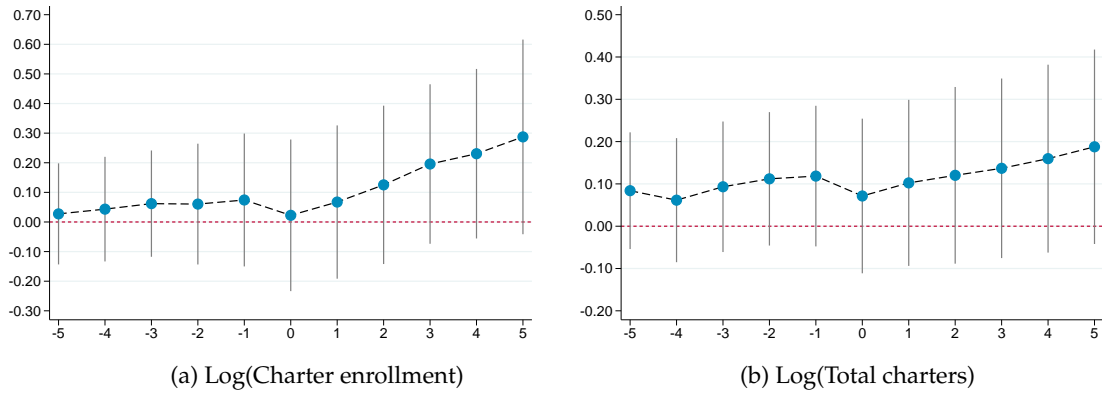(a) 12th to 8th grade enrollment   (b) 12th to 10th grade enrollment

Figure 4: Estimated Effects of Broad Superintendents on Completion Outcomes

Note: The figure shows coefficients corresponding to leading and lagged years relative to Broad superintendent hire. The reference category includes 6 or more years prior to the Broad hire as well as control districts that never hired a Broad superintendent. Results correspond to Table A8.
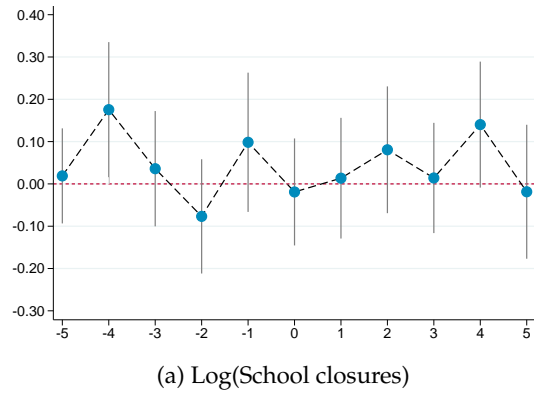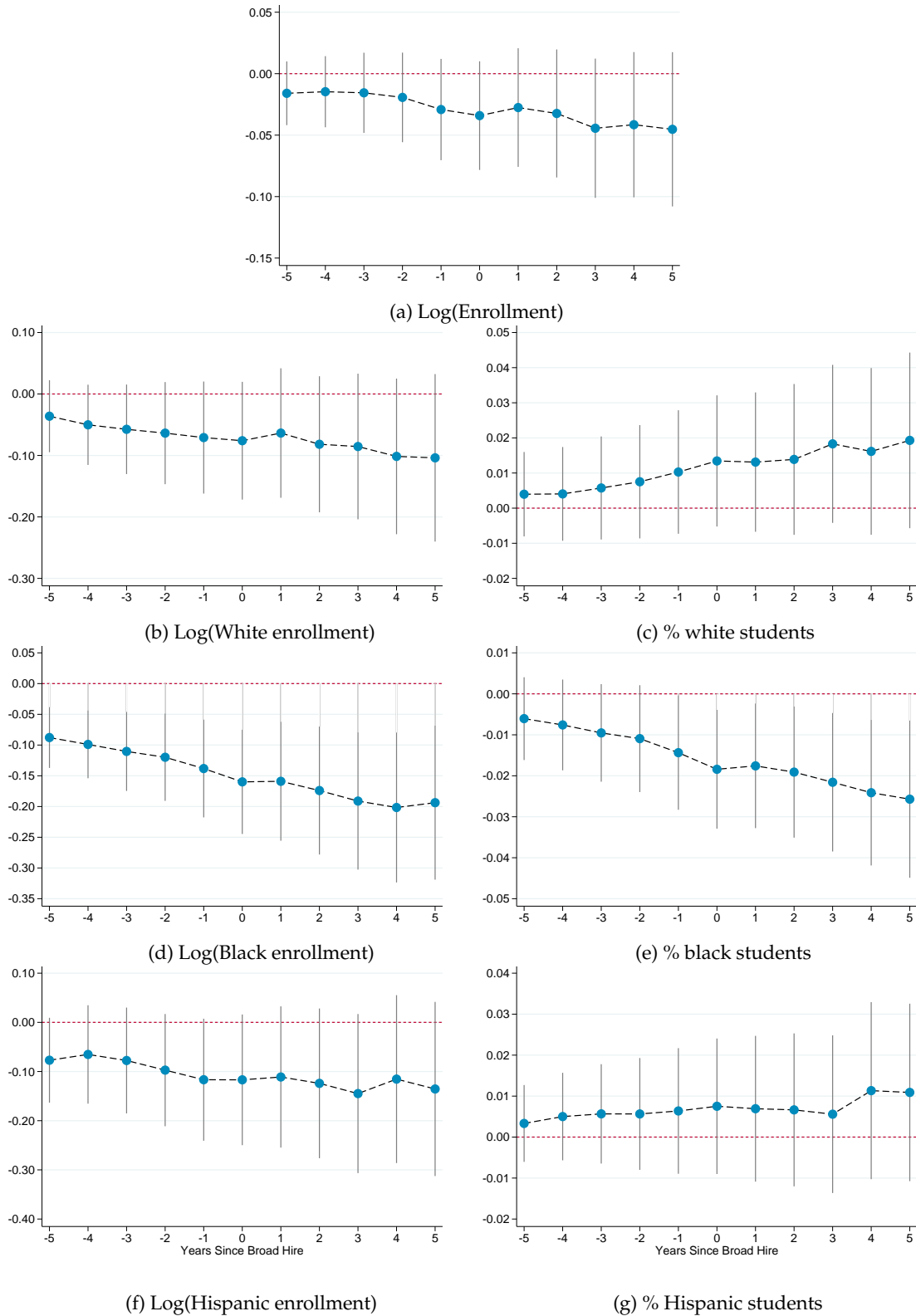
Figure 5: Estimated Effects of Broad Superintendents on Enrollment Outcomes

Note: The figure shows coefficients corresponding to leading and lagged years relative to Broad superintendent hire. The reference category includes 6 or more years prior to the Broad hire as well as control districts that never hired a Broad superintendent. Results correspond to Table A9.

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Table A1: Broad Leadership Program Cohorts

Year	Count
2002	23
2003	19
2004	22
2005	20
2006	18
2007	13
2008	12
2009	13
2010	14
2011	8
2012	-
2013	11
2014	10
2015	15
Total	198

Notes: The sample includes all individuals observed participating in the BSA from 2002-2015. There are a total of 198 participants whose information was included in press releases announcing each cohort and the Broad Center website.

Table A2: Largest Districts with Broad-Trained Superintendents

Name of education agency	Size rank	Enrollment
Albuquerque Public Schools	32	88119
Aurora Joint District No. 28 of	187	33831
Broward	5	258214
Boston	52	53358
Capistrano Unified	118	48692
Charleston 01	97	44109
Charlotte-Mecklenburg Schools	25	128789
Chino Valley Unified	184	31553
Christina School District	294	16428
Clayton County	105	50204
Clovis Unified	164	38002
Cobb County	30	102034
Compton Unified	185	32435
Dallas ISD	11	159445
Duval	17	126662
DeKalb County	26	98086
Durham Public Schools	183	31260
East Baton Rouge Parish	62	42307
Fort Bend ISD	82	67014
Fort Worth ISD	36	80336
Fairfield-Suisun Unified	289	23377
Fort Wayne Community Schools	155	31320
Fulton County	57	88299
Houston ISD	6	208919
Huntsville City	234	21530
Jersey City School District	182	25662
Kansas City	285	19830
Knox County	72	55535
Los Angeles Unified	2	660250
Minneapolis Public School District.	88	40511
Montgomery County	131	31985
Newark Public School District	107	32602
Oklahoma City	113	40727
Omaha Public Schools	92	51132
Oakland Unified	66	50308
Ontario-Montclair	241	22560
Palm Beach	13	189145
Paterson Public School District	248	24148
Philadelphia City SD	7	138219
Pittsburgh SD	120	32255
Pomona Unified	163	30521
Prince George's County Public Sc	18	131014
Providence	246	27580
Richmond City	207	23177
Rochester City School District	137	32711
Rockford SD 205	197	28893
San Antonio ISD	54	53069
SD U-46	147	40048
St. Louis City	104	38235
St. Paul Public School District	100	38096
Syracuse City School District	281	20259

Sacramento City Unified	73	47445
San Jose Unified	150	32976
Santa Ana Unified	70	57145
School District No. 1 in the cou	48	77267
Seattle Public Schools	81	45581
Springfield	247	25294
Tulsa	106	39224
Utica Community Schools	216	29621
Virginia Beach City Public Schools	37	75888
Washoe County School District	77	64744
Wake County Schools	31	146663

Notes: The list contains 62 districts from the largest 300 districts that ever hired a Broad-trained superintendent. District size rank is based on enrollment size in 1996. Enrollment is given for the initial year of Broad superintendent hire.

Table A3: Summary Statistics - Outcomes

	Mean (1)	Std. Dev. (2)
Charter enrollment	2756	7488
Total charters	7.48	17.14
No. of closed schools	1.22	4.11
Per pupil exp: current expenditures	12232	3739
Per pupil exp: current exp for instruction	6187	1785
Per pupil exp: current exp for support services	3596	1270
Per pupil exp: total exp for capital outlays	1318	1012
Ratio: Grade 12 to 8 enrollment	0.85	0.25
Ratio: Grade 12 to 10 enrollment	0.85	0.14
District enrollment	55053	78474
Enrollment: white	20044	18682
Enrollment: Black	14561	27083
Enrollment: Hispanic	16285	40883
Percent white	0.42	0.26
Percent Black	0.25	0.23
Percent Hispanic	0.26	0.25

Notes: The sample consists of district-year observations from 1998-2015. It covers the largest 300 public school districts by enrollment. Per pupil expenditures are expressed in 2015 dollars.

Table A4: Estimated Effects of Broad Superintendents on School Openings

	Log(No. open)		
	(1)	(2)	(3)
Broad hire	0.000		0.014
	(0.041)		(0.057)
Year of Broad hire		-0.032	
		(0.058)	
1 year after Broad hire		0.052	
		(0.071)	
2 years after Broad hire		0.050	
		(0.078)	
3 years after Broad hire		-0.025	
		(0.070)	
4 or more years after Broad hire		-0.012	
		(0.045)	
Years since Broad hire			-0.006
			(0.015)

Notes: The sample consists of district-year observations from 1998-2015. It covers the largest 300 public school districts by enrollment. There are a total of 5,394 observations. Six observations are missing due to Memphis City and Shelby County School Districts merging and seceding. Broad hire is an indicator variable that assumes a value of 1 for the year of Broad superintendent hire and all ensuing years. Years since Broad hire is 0 for the year of Broad hire and up to 4 for 4 or more years after the Broad hire. All models include district and year fixed effects. Standard errors are clustered at the district level. *** p<0.01, ** p<0.05, * p<0.1

Table A5: Estimated Effects of Broad Superintendents on Charter Schools and Enrollment

	Log(Charter enrollment) (1)	Log(No. of charters) (2)
Supt hire$_{t+5}$	0.027	0.084
	(0.087)	(0.070)
Supt hire$_{t+4}$	0.043	0.062
	(0.090)	(0.075)
Supt hire$_{t+3}$	0.062	0.093
	(0.092)	(0.079)
Supt hire$_{t+2}$	0.060	0.112
	(0.104)	(0.080)
Supt hire$_{t+1}$	0.074	0.118
	(0.114)	(0.085)
Supt hire$_{t=0}$	0.022	0.071
	(0.131)	(0.093)
Supt hire$_{t-1}$	0.067	0.102
	(0.132)	(0.100)
Supt hire$_{t-2}$	0.125	0.120
	(0.136)	(0.107)
Supt hire$_{t-3}$	0.196	0.137
	(0.137)	(0.108)
Supt hire$_{t-4}$	0.231	0.160
	(0.146)	(0.113)
Supt hire$_{t-5}$	0.287*	0.188
	(0.168)	(0.117)

Notes: The sample consists of district-year observations from 1998-2015. It covers the largest 300 public school districts by enrollment. Note that the panel begins in 1998 because this is the earliest year in which the Common Core of Data starts collecting data on charter schools. There are a total of 5,394 observations. Six observations are missing because the Memphis City School District and Shelby County School District merged and seceded during the final three years. The omitted category is Supt hire$_{t+6}$, or observations among Broad districts that are 6 or more years prior to the Broad hire as well as control districts that never hired a Broad superintendent. All models include district and year fixed effects. Standard errors are clustered at the district level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table A6: Estimated Effects of Broad Superintendents on School Closures

	Log(School closures)
	(1)
Supt hire$_{t+5}$	0.019
	(0.057)
Supt hire$_{t+4}$	0.176**
	(0.081)
Supt hire$_{t+3}$	0.036
	(0.070)
Supt hire$_{t+2}$	−0.077
	(0.069)
Supt hire$_{t+1}$	0.098
	(0.084)
Supt hire$_{t=0}$	−0.019
	(0.065)
Supt hire$_{t-1}$	0.014
	(0.073)
Supt hire$_{t-2}$	0.081
	(0.076)
Supt hire$_{t-3}$	0.014
	(0.066)
Supt hire$_{t-4}$	0.140*
	(0.076)
Supt hire$_{t-5}$	−0.019
	(0.081)

Notes: The sample consists of district-year observations from 1998-2015. It covers the largest 300 public school districts by enrollment. There are a total of 5,394 observations. Six observations are missing because Memphis City and Shelby County School Districts merged and seceded. The omitted category is Supt hire$_{t+6}$, or observations among Broad districts that are 6 or more years prior to the Broad hire as well as control districts that never hired a Broad superintendent. All models include district and year fixed effects. Standard errors are clustered at the district level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table A7: Estimated Effects of Broad Superintendents on Expenditure Outcomes

	Per pupil total exp. (1)	Per pupil exp.: instruction (2)	Per pupil exp.: support services (3)	Per pupil exp.: capital exp. (4)
Supt hire$_{t+5}$	224.737	133.780	68.113	−134.263
	(233.195)	(91.418)	(66.988)	(105.136)
Supt hire$_{t+4}$	219.880	82.759	47.254	−154.498
	(246.672)	(92.447)	(72.792)	(123.137)
Supt hire$_{t+3}$	167.325	6.537	41.623	−158.222
	(268.096)	(97.440)	(75.078)	(119.277)
Supt hire$_{t+2}$	360.389	67.160	118.090	−145.918
	(309.361)	(130.980)	(90.404)	(129.882)
Supt hire$_{t+1}$	290.651	53.558	56.109	−209.165
	(328.641)	(114.279)	(86.308)	(136.273)
Supt hire$_{t=0}$	204.657	220.770	67.440	−352.637**
	(390.131)	(180.623)	(97.303)	(138.457)
Supt hire$_{t-1}$	4.929	15.432	58.870	−355.583**
	(358.269)	(136.783)	(106.170)	(144.252)
Supt hire$_{t-2}$	15.462	−17.480	75.747	−386.266***
	(357.904)	(137.648)	(120.548)	(124.447)
Supt hire$_{t-3}$	133.631	−8.471	146.311	−311.409**
	(342.046)	(125.676)	(121.986)	(138.268)
Supt hire$_{t-4}$	584.884	73.701	261.610*	−56.319
	(405.355)	(145.660)	(136.023)	(169.454)
Supt hire$_{t-5}$	700.907	86.131	265.321*	18.654
	(449.470)	(137.253)	(136.009)	(200.187)

Notes: The sample consists of district-year observations from 1997-2014. It covers the largest 300 public school districts by enrollment. We restrict to these years due to availability of F-33 data. There are a total of 5,395 observations. Missing observations are due to Memphis City and Shelby County School Districts merging and seceding. The omitted category is Supt hire$_{t+6}$, or observations among Broad districts that are 6 or more years prior to the Broad hire as well as control districts that never hired a Broad superintendent. All models include district and year fixed effects. Standard errors are clustered at the district level. Expenditure outcomes are expressed in 2015 constant dollars. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table A8: Estimated Effects of Broad Superintendents on Completion Outcomes

	12th to 8th grade enrollment (1)	12th to 10th grade enrollment (2)
Supt hire$_{t+5}$	0.000	−0.011
	(0.011)	(0.008)
Supt hire$_{t+4}$	−0.008	−0.014
	(0.014)	(0.011)
Supt hire$_{t+3}$	−0.006	−0.008
	(0.015)	(0.013)
Supt hire$_{t+2}$	0.001	−0.018
	(0.017)	(0.013)
Supt hire$_{t+1}$	0.004	−0.022
	(0.019)	(0.015)
Supt hire$_{t=0}$	0.002	−0.018
	(0.020)	(0.015)
Supt hire$_{t-1}$	0.002	−0.015
	(0.020)	(0.015)
Supt hire$_{t-2}$	0.003	−0.010
	(0.021)	(0.016)
Supt hire$_{t-3}$	0.002	−0.016
	(0.021)	(0.017)
Supt hire$_{t-4}$	0.006	−0.019
	(0.022)	(0.017)
Supt hire$_{t-5}$	−0.006	−0.016
	(0.024)	(0.020)

Notes: The sample consists of district-year observations from 1996-2015. It covers the largest 300 public school districts by enrollment. There are 5,543 observations in the first column and 5,623 observations in the second column. We observe fewer than 6000 observations due to missing data from 23 districts for the grade 12 to 8 enrollment outcome and missing data from 19 districts for the grade 12 to 10 enrollment outcome. The omitted category is Supt hire$_{t+6}$, or observations among Broad districts that are 6 or more years prior to the Broad hire as well as control districts that never hired a Broad superintendent. All models include district and year fixed effects. Standard errors are clustered at the district level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table A9: Estimated Effects of Broad Superintendents on Enrollment Outcomes

	Log(enrollment) (1)	Log(enr): white (2)	% white (3)	Log(enr): Black (4)	% Black (5)	Log(enr): Hisp (6)	% Hisp (7)
Supt hire$_{t+5}$	−0.016	−0.036	0.004	−0.088***	−0.006	−0.077*	0.003
	(0.013)	(0.030)	(0.006)	(0.025)	(0.005)	(0.044)	(0.005)
Supt hire$_{t+4}$	−0.015	−0.050	0.004	−0.099***	−0.008	−0.065	0.005
	(0.015)	(0.033)	(0.007)	(0.028)	(0.006)	(0.051)	(0.005)
Supt hire$_{t+3}$	−0.016	−0.057	0.006	−0.110***	−0.010	−0.078	0.006
	(0.017)	(0.037)	(0.007)	(0.033)	(0.006)	(0.055)	(0.006)
Supt hire$_{t+2}$	−0.019	−0.064	0.008	−0.120***	−0.011	−0.097*	0.006
	(0.019)	(0.042)	(0.008)	(0.036)	(0.007)	(0.058)	(0.007)
Supt hire$_{t+1}$	−0.029	−0.071	0.010	−0.138***	−0.014**	−0.117*	0.006
	(0.021)	(0.047)	(0.009)	(0.041)	(0.007)	(0.063)	(0.008)
Supt hire$_{t=0}$	−0.034	−0.076	0.013	−0.160***	−0.018**	−0.117*	0.008
	(0.023)	(0.049)	(0.010)	(0.043)	(0.007)	(0.068)	(0.008)
Supt hire$_{t-1}$	−0.028	−0.064	0.013	−0.159***	−0.018**	−0.111	0.007
	(0.025)	(0.054)	(0.010)	(0.049)	(0.008)	(0.073)	(0.009)
Supt hire$_{t-2}$	−0.032	−0.082	0.014	−0.174***	−0.019**	−0.124	0.007
	(0.027)	(0.056)	(0.011)	(0.053)	(0.008)	(0.078)	(0.010)
Supt hire$_{t-3}$	−0.044	−0.085	0.018	−0.191***	−0.022**	−0.145*	0.006
	(0.029)	(0.060)	(0.011)	(0.057)	(0.009)	(0.083)	(0.010)
Supt hire$_{t-4}$	−0.042	−0.102	0.016	−0.202***	−0.024***	−0.115	0.011
	(0.030)	(0.065)	(0.012)	(0.062)	(0.009)	(0.087)	(0.011)
Supt hire$_{t-5}$	−0.045	−0.104	0.019	−0.194***	−0.026***	−0.135	0.011
	(0.032)	(0.070)	(0.013)	(0.064)	(0.010)	(0.090)	(0.011)

Notes: The sample consists of district-year observations from 1996-2015. It covers the largest 300 public school districts by enrollment. There are a total of 5,994 observations. Six observations are missing because the Memphis City School District and Shelby County School District merged and seceded during the final three years. The omitted category is Supt hire$_{t+6}$, or observations among Broad districts that are 6 or more years prior to the Broad hire as well as control districts that never hired a Broad superintendent. All models include district and year fixed effects. Standard errors are clustered at the district level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table A10: Estimated Effects of Broad Superintendents on Charter Outcomes - Inverse Hyperbolic Sine

	Charter enrollment			Total charters		
	(1)	(2)	(3)	(4)	(5)	(6)
Broad hire	0.138		-0.023	0.096		-0.004
	(0.100)		(0.092)	(0.075)		(0.071)
Year of Broad hire		-0.010			0.010	
		(0.092)			(0.064)	
1 year after Broad hire		0.033			0.041	
		(0.094)			(0.070)	
2 years after Broad hire		0.091			0.058	
		(0.103)			(0.079)	
3 years after Broad hire		0.161			0.075	
		(0.103)			(0.081)	
4 or more years after Broad hire		0.234*			0.163	
		(0.132)			(0.099)	
Years since Broad hire			0.063**			0.039*
			(0.030)			(0.023)

Notes: The sample of district-year observations spanning 1998-2015 includes the largest 300 public school districts in enrollment as of 1996. Note that the panel begins in 1998 because this is the earliest year in which the Common Core of Data starts collecting data on charter schools. There are a total of 5,394 observations. Six observations are missing because the Memphis City School District and Shelby County School District merged and seceded during the final three years. Broad hire is an indicator variable that assumes a value of 1 for the year of Broad superintendent hire and all ensuing years. Years since Broad hire is 0 for the year of Broad hire and up to 4 for 4 or more years after the Broad hire. All models include district and year fixed effects. Standard errors are clustered at the district level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table A11: Estimated Effects of Broad Superintendents on School Closures - Inverse Hyperbolic Sine

	No. closed		
	(1)	(2)	(3)
Broad hire	-0.019		-0.014
	(0.028)		(0.047)
Year of Broad hire		-0.049	
		(0.061)	
1 year after Broad hire		-0.016	
		(0.067)	
2 years after Broad hire		0.054	
		(0.080)	
3 years after Broad hire		-0.015	
		(0.065)	
4 or more years after Broad hire		-0.033	
		(0.041)	
Years since Broad hire			-0.002
			(0.015)

Notes: The sample of district-year observations spanning 1998-2015 includes the largest 300 public school districts in enrollment as of 1996. There are a total of 5,394 observations. Six observations are missing due to Memphis City and Shelby County School Districts merging and seceding. Broad hire is an indicator variable that assumes a value of 1 for the year of Broad superintendent hire and all ensuing years. Years since Broad hire is 0 for the year of Broad hire and up to 4 for 4 or more years after the Broad hire. All models include district and year fixed effects. Standard errors are clustered at the district level. *** p<0.01, ** p<0.05, * p<0.1

Table A12: Estimated Effects of Broad Superintendents on segregation (Theil Index)

	(1)	(2)	(3)
Broad hire	0.001		0.001
	(0.004)		(0.004)
Year of Broad hire		0.000	
		(0.003)	
1 year after Broad hire		0.002	
		(0.004)	
2 years after Broad hire		0.001	
		(0.004)	
3 years after Broad hire		0.000	
		(0.004)	
4 or more years after Broad hire		0.001	
		(0.005)	
Years since Broad hire			-0.000
			(0.001)

Notes: The sample of district-year observations spanning 1996-2015 includes the largest 300 public school districts in enrollment as of 1996. There are a total of 5,994 observations. Six observations are missing due to Memphis City and Shelby County School Districts merging and seceding. Broad hire is an indicator variable that assumes a value of 1 for the year of Broad superintendent hire and all ensuing years. Years since Broad hire is 0 for the year of Broad hire and up to 4 for 4 or more years after the Broad hire. All models include district and year fixed effects. Standard errors are clustered at the district level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$