

ECONOMIC IMPACTS *of* SCHOOL CHOICE IN KENTUCKY



Understanding the Impact of Charter Schools on Louisville



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Forty-five states and the District of Columbia have enacted laws allowing for the existence of public charter schools. Although Kentucky enacted a charter school law in 2017, the state does not have any public charter schools because a funding mechanism currently does not exist. How would access to public charter schools in Kentucky affect students and their communities?

This report summarizes the state of the scientific evidence on public charter schools. The preponderance of the rigorous evidence suggests that access to public charter schools generally benefits students by increasing academic achievement and educational attainment. A smaller body of literature tends to suggest that access to public charter schools could benefit society by improving civic outcomes and safety while reducing crime and taxpayer costs. Applying cautious estimates from the evidence on each outcome to the population of students currently enrolled in district-run public schools in Louisville, Kentucky, this report finds that access to public charter schools could provide the following citywide economic benefits:

- **\$138 million in economic benefits from higher lifetime earnings associated with increases in academic achievement.**
- **\$54 million from additional high school graduates.**
- **\$6 million from reductions in the social costs associated with crimes.**
- **\$13 million each year from reductions in public education spending.**

These potential economic benefits should not be combined and should be assessed separately since they overlap. For example, higher academic achievement increases the likelihood of high school graduation, and receiving a high school diploma reduces the likelihood of incarceration.

Keywords: charter schools; school choice; economics of education

JEL Codes: I28; I20



Introduction

Understanding the Impact of Charter Schools on Louisville

According to the U.S. Department of Education, charter schools are independently run public schools of choice.¹ In general, and in Kentucky, public charter schools must accept all students who apply and must use random lottery admissions when they are oversubscribed. Public charter schools “cannot discriminate in their admissions policies” and “they are required to comply with special education laws.” Furthermore, public charter schools “are not allowed to admit students based on performance or test scores.” Between 1991 and 2019, 45 states and the District of Columbia enacted laws allowing for the existence of public charter schools.² The most recent estimates suggest that nearly 3.2 million students are enrolled in over 7,000 public charter schools in the United States (David & Hesla, 2018). According to the most recent federal data, about 6 percent of the U.S. student population is enrolled in a public charter school.³

In theory, public charter schools could lead to improvements in students’ outcomes through competitive pressures, improved matches between educators and students, and increased regulatory freedom. Some economists would argue that residential assignment and funding through property taxes allows district-run schools to exercise considerable monopoly power (Friedman, 1955; Hoxby, 2007). Access to public charter schools could reduce monopoly power in the education system, and improve outcomes, by providing families with educational alternatives to their residentially assigned public schools (Chubb & Moe, 1988; Friedman, 1997).



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Access to public charter schools could also lead to improved outcomes for students through specialization, by allowing for better matches between educators and students (DeAngelis & Holmes Erickson, 2018). Finally, access to public charter schools could improve student outcomes if charter school leaders use the additional autonomy effectively (e.g. Hanushek, Link, & Woessmann, 2013; Ouchi, 2006; Woessmann et al., 2009).

Although Kentucky enacted a public charter school law in 2017, the state does not have any public charter schools because a funding mechanism currently does not exist. Kentucky's public charter school law states that public charter schools must participate in all state accountability programs, meet or exceed state graduation requirements and compulsory attendance laws, and hire teachers certified by the state. This report summarizes the scientific evidence on public charter schools and private school choice programs in the U.S. This review finds that the preponderance of the rigorous evidence suggests that public and private school choice generally improves academic achievement, educational attainment, civic outcomes, and safety, and decreases crime, teen pregnancies, and taxpayer costs.



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The evidence base suggests that allowing for access to public charter schools might produce similar benefits in Kentucky. Applying cautious estimates from the evidence on each outcome to the population of students currently enrolled in district-run public schools in Louisville, Kentucky, this report finds that access to public charter schools could provide the following citywide economic benefits:

- **An additional \$138 million in economic benefits from higher lifetime earnings associated with increases in academic achievement.**
- **An additional \$54 million from additional high school graduates.**
- **An additional \$6 million from reductions in the social costs associated with crimes.**
- **An additional \$13 million each year from reductions in public education spending.**

These potential economic benefits should not be combined and should be assessed separately since they overlap. For example, higher academic achievement increases the likelihood of high school graduation, and receiving a high school diploma reduces the likelihood of incarceration. It is also possible that Kentucky's public charter school results would differ based on context, geographic location, time, and implementation. As such, readers should exercise considerable caution when assessing forecasts of economic impacts because they are based on evaluations from other states.

Academic Achievement

The latest and most comprehensive review of the rigorous evidence on the topic suggests that access to public charter schools in the U.S. leads to modest improvements in students' academic achievements. Betts and Tang (2019) perform a systematic review and meta-analysis of 38 rigorous studies and find that public charter schools increase math achievement by 3.3 percent of a standard deviation and increase reading achievement by 2 percent of a standard deviation. According to Stanford University's Center for Research on Education Outcomes (2015), these positive effects translate to about 24 additional days of learning in math and about 14 additional days of learning in reading. Specifically, Betts and Tang (2019) find that public charter schools produce "higher achievement gains in math relative to traditional public schools in elementary and middle but not high schools. For reading achievement charter schools on average are producing higher gains in middle schools but not in elementary or high schools."

Betts and Tang (2019) found nine random assignment studies linking public charter schools to student academic achievement. These random assignment evaluations tend to suggest public charter schools improve students' test scores (Abdulkadiroğlu et al., 2011; Angrist et al., 2012; Angrist et al., 2016; Dobbie & Fryer, 2011; Gleason et al., 2010; Hoxby, Murarka, & Kang, 2009; Hoxby & Rockoff, 2004; McClure et al., 2005; Tuttle et al., 2013). For example, Tuttle et al. (2013) found that winning a lottery to attend a KIPP charter school increased math achievement by 36 percent of a standard deviation and reading achievement by 15 percent of a standard deviation after two years of attendance; however, the reading effects were not statistically significant.

Academic Achievement

Two other recent random assignment studies, not included in the Betts and Tang (2019) review, also found that winning a lottery to attend a public charter school increased students' test scores in Massachusetts (Cohodes, Setren, & Walters, 2019) and Michigan (Dynarski et al., 2018). Zimmer et al. (2019) also recently summarized the random assignment evaluations and similarly concluded that "lottery-based analyses have generally shown strong positive effects on student achievement of charter school admission and enrollment."

According to Betts and Tang (2014), the random assignment evaluations tend to find significantly larger positive effects of public charter schools on math test scores than studies using less rigorous statistical techniques. The overall modest positive effects of public charter schools on math test scores, reported by Betts and Tang (2019), are generally consistent over time. Three of the researchers' previous iterations of their 2019 meta-analysis of the rigorous evidence have each found modest positive effects on students' math achievement overall (Betts & Tang, 2011; 2014; 2018). Similarly, the majority of the 16 random assignment studies linking private school choice programs in the U.S. to student achievement find positive effects in math or reading overall or for student subgroups (DeAngelis & Wolf, 2019c; EdChoice, 2019; Egalite & Wolf, 2016; Wolf & Egalite, 2019).

In order to link the potential achievement effects of public charter schools in Louisville, Kentucky to changes in lifetime earnings, I combine this literature with findings from Stanford University economist Eric Hanushek (2011).

Academic Achievement

Hanushek (2011) observed that a one standard deviation increase in student achievement is associated with a 13 percent increase in lifetime earnings. Following the methodology from previous evaluations (e.g. DeAngelis, 2018; DeAngelis et al., 2019; DeAngelis & DeGrow, 2018; DeAngelis & Flanders, 2018; Wolf et al., 2014), because 70 percent of learning is retained from one year to the next, it is possible to forecast the potential effects of public charter schools in Louisville on lifetime earnings. Using the more cautious estimate of public charter schools' effects on student achievement reported by Betts and Tang (2019) (a 2 percent of a standard deviation positive effect on reading scores), the following two equations can be used to forecast the possible effects of public charter schools on lifetime earnings in Louisville, Kentucky:

- (1) $\text{Avg Lifetime Earnings} * [1 + (0.02) * (0.13/\text{SD}) * (0.70)]^{13} = \textbf{Expected Lifetime Earnings}$
- (2) $\text{Expected Lifetime Earnings} - \text{Avg Lifetime Earnings} = \textbf{Gain in Lifetime Earnings}$

To calculate the net present value of lifetime earnings, I assume that each student will work for 46 years, or from the age of 25 to the age of 70. Using a discount rate of 3 percent, and the average wage in Kentucky in 2018 (\$43,210) from the U.S. Department of Labor Bureau of Labor Statistics, the net present value of the average lifetime earnings in Kentucky is \$1,075,206. Because Kentucky does not have any public charter schools today, this number is the best approximation available for the expected lifetime earnings of individuals educated in district-run public schools in the state. Plugging this information into equation (1) produces an expected lifetime earnings of \$1,100,925 for students attending public charter schools for their entire K-12 education.

Academic Achievement

Plugging this information into equation (2) produces an expected gain in lifetime earnings of \$25,719 for each child attending public charter schools in the state.

$$(1) \$1,075,206 * [1 + (0.02) * (0.13/SD) * (0.70)]^{13} = \mathbf{\$1,100,925}$$

$$(2) \$1,100,925 - \$1,075,206 = \mathbf{\$25,719}$$

According to the Kentucky Department of Education, 89,437 students⁸ were enrolled in district-run public schools in Louisville in the 2016-17 school year. If the enrollment of students in public charter schools in Louisville mirrored the 6 percent⁹ participation rate found nationwide, then about 5,366 students would attend public charter schools in Louisville when given the opportunity.¹⁰ Multiplying 5,366 students by the expected lifetime earnings gain of \$25,719 per student results in an expected economic benefit of an additional \$138 million in lifetime earnings citywide. Using the less cautious result from Betts and Tang (2019) – a 3.3 percent of a standard deviation increase in academic achievement – provides an estimated economic benefit of around \$229 million in increased lifetime earnings citywide.

Notably, the estimates of economic benefits reported in this section should be assessed with caution because effects on standardized test scores may not be strong proxies for effects on lifetime earnings. Although studies such as Hanushek (2011) and Chetty, Friedman, Rockoff (2014) suggest that higher standardized test scores tend to be associated with higher earnings, two recent reviews of the school choice literature suggest that schools' effects on standardized test scores often do not successfully predict their effects on long-term outcomes (DeAngelis, 2019d; Wolf, Hitt, & McShane, 2018).

Educational Attainment

The evidence linking both public and private school choice to educational attainment – defined as high school graduation, college enrollment, and college completion – tends to lean more positive than the evidence linking school choice to standardized test scores. Foreman (2017) reviewed the literature on this topic and found six rigorous evaluations linking access to public charter schools to educational attainment (Angrist et al., 2016; Davis & Heller, 2019; Dobbie & Fryer, 2015; Dobbie & Fryer, 2016; Furgeson et al., 2012; Sass et al., 2016). All six of the evaluations found statistically significant positive effects of public charter schools on at least one educational attainment outcome. None of the six studies found that public charter schooling reduced educational attainment. Three of the six evaluations used random assignment methodology, and all three of these studies found statistically significant positive effects of attending public charter schools on educational attainment (Angrist et al., 2016; Davis & Heller, 2019; Dobbie & Fryer, 2015). For example, Davis and Heller (2019) found that winning a random lottery to attend a public charter school in Chicago increased the likelihood of attending college by 10 percentage points.

Betts and Tang (2014) also reviewed the literature linking access to public charter schools to outcomes such as educational attainment and similarly concluded that “overall the studies appear to find positive effects of charter schools on non-achievement outcomes.” To my knowledge, only three other rigorous studies on this subject have been published since the Betts and Tang (2014) and Foreman (2017) reviews.

Educational Attainment

Two of these studies found significant positive effects on college enrollment (Coen, Nichols-Barrer, & Gleason, 2019; Gwynne & Moore, 2017) and one study found no effects overall (Place & Gleason, 2019). For example, Coen, Nichols-Barrer, and Gleason (2019) found that winning the lottery to attend a KIPP charter school increased students' enrollment in four-year colleges by 6.9 percentage points.

The evidence linking private school choice programs to educational attainment also leans positive. Foreman (2017) reviewed this evidence and found that all five studies on the subject indicated statistically significant positive effects of private school choice programs on at least one educational attainment outcome overall or for student subgroups. Most recently, DeAngelis and Wolf (2019c) reviewed this literature and found eight rigorous evaluations on the subject. Six of the eight evaluations found statistically significant positive effects of private school choice programs on at least one measure of educational attainment overall or for student subgroups (Cheng, Chingos, & Peterson, 2019; Chingos, Monarrez, & Kuehn, 2019; Chingos & Peterson, 2015; Cowen et al., 2013; Wolf et al., 2013; Wolf, Witte, & Kisida, 2019). The two remaining evaluations did not find any statistically significant effects of school choice on educational attainment overall (Chingos, 2018; Holmes Erickson, Mills, & Wolf, 2019).

It is possible to forecast expected economic benefits associated with access to public charter schools in Louisville by linking these estimates to information about the economic value of additional high school graduates. Levin (2009) estimated the present value of economic benefits associated with an additional high school graduate was \$209,100.

Educational Attainment

Levin's (2009) estimates of these economic benefits were derived from expected increases in tax revenues and decreases in social costs associated with crime, healthcare, and welfare. According to the U.S. Department of Labor Bureau of Labor Statistics, Levin's (2009) estimate for the economic value of an additional high school graduate is equal to about \$254,700 in 2019 dollars after adjusting for inflation. The findings from Cowen et al. (2013) provide a cautious estimate that access to school choice might increase high school graduation rates by at least four percentage points in Louisville. According to the Kentucky Department of Education, 89,437 students were enrolled in traditional public schools in Louisville in the 2016-17 school year.¹¹

If the enrollment of students in public charter schools in Louisville mirrored the 6 percent participation rate found nationwide, then about 5,366 students would attend public charter schools in Louisville when given the opportunity.¹² The estimates from Levin (2009) and Cowen et al. (2013) can be combined with the number of students expected to enroll in public charter schools in Louisville to forecast economic benefits, as shown in equations three and four:

5,366 students * 0.04 = **215** additional graduates

(3) 215 additional graduates * \$254,700 = **\$54.76 million** in economic

(4) benefits

As shown in equation three, a four-percentage point increase in high school graduation rates would be expected to produce 215 additional high school graduates. Equation four demonstrates that a 215-student increase in high school graduates would be expected to translate to \$54.76 million in economic benefits over their lifetimes.

Educational Attainment

A model using a less cautious estimate of a seven-percentage point increase in high school graduation, from Sass et al. (2016), suggests that the economic benefits associated with access to public charter schools in Louisville would be at least \$95.67 million ($5,366 * 0.07 * \$254,700$).

Crime Reduction

School choice could theoretically reduce criminal activity through competitive pressures to improve civic education, improvements in discipline policies, and by relocating students to schools with cultures and peer groups that discourage risky behaviors (DeAngelis & Wolf, 2019a). Six rigorous studies have linked school choice to reductions in criminal activity. Each of the six studies finds statistically significant positive effects on crime reduction overall or for student subgroups (DeAngelis & Wolf, 2019a; DeAngelis & Wolf, 2019b; Deming, 2011; Dills & Hernández-Julián, 2011; Dobbie & Fryer, 2015; McEachin et al., 2019). None of the six evaluations finds evidence to suggest that school choice increases criminal activity. Two of the studies use random assignment methodology, and both find that winning a school choice lottery has large negative effects on incarceration rates for male students (Deming, 2011; Dobbie & Fryer, 2015). For example, Dobbie and Fryer (2015) find that winning a lottery to attend a public charter school in New York City reduced incarceration for male students by 4.4 percentage points. DeAngelis and Wolf (2019a) similarly found that students who used the Milwaukee Parental Choice Program for at least four years were 3 to 4 percentage points less likely to be found guilty of a felony.

Based on the average social costs of crimes estimated by McCollister, French, and Fang (2010) and the average social cost of a felony estimated by Flanders and DeAngelis (2018), it is possible to forecast the economic impact of access to public charter schools in Louisville. Flanders and DeAngelis (2018) estimated the cost of a felony to be \$35,950 in 2017 dollars, or about \$37,800 in 2019 dollars.

Crime Reduction

Using the more cautious estimate of a three-percentage point reduction in felonies found by DeAngelis and Wolf (2019a), and the expected number of students enrolled in public charter schools in Louisville (5,366), equations 5 and 6 can be used to forecast economic benefits:

(5) $5,366 \text{ students} * -0.03 = \mathbf{161}$ fewer felons

(6) $161 \text{ fewer felons} * \$37,800 = \mathbf{\$6.09 \text{ million}}$ in economic benefits

If the crime-reducing benefits are similar in Louisville, access to public charter schools could reduce crime by 161 felons for the population of students currently enrolled in district-run schools in Louisville. This reduction in felons would be expected to produce about \$6.09 million in economic benefits associated with reductions in the social costs associated with crimes. This estimate is cautious since it assumes that each felon would have committed only one crime.

Social Benefits

Other reviews of the evidence suggest that access to school choice leads to other social benefits such as improvements in civic outcomes and safety, and reductions in teen pregnancies. Because these types of economic benefits cannot be reliably monetized, this section will simply review the literature for these outcomes.

Three reviews of the evidence link school choice to civic outcomes such as tolerance of others, political participation, volunteerism, and charitable activity. Wolf (2007) reviewed 59 findings from 21 empirical studies linking public and private school choice to civic outcomes in the United States. Wolf (2007) found that 95 percent of the results (56 of 59 estimates) found that school choice either improved civic outcomes (33 results) or had no statistically significant effects (23 results). Only 3 of the 59 results (about 5 percent) indicated that access to school choice harmed civic outcomes. More recently, I summarized the most rigorous evidence on the subject and found 11 studies linking private school choice programs to civic outcomes in the United States (DeAngelis, 2017). I found that the majority of the studies indicated statistically significant positive effects of private school choice on civic outcomes and none of the 11 studies indicated statistically significant negative effects. Most recently, DeAngelis and Wolf (2019c) reviewed this literature and found 12 studies similarly suggesting that private school choice generally had positive effects, or no effects, on civic outcomes.

As summarized by DeAngelis and Wolf (2019c), the three random assignment evaluations on the topic found that winning a lottery to use a private school choice program increased student safety as reported by parents or students (Howell & Peterson, 2006; Webber et al., 2019; Wolf et al., 2010). For example, the most recent federal evaluation of the D.C. Opportunity Scholarship Program found that winning a voucher lottery to attend a private school increased the likelihood that students reported being in a “very safe” school by 34 percent (Webber et al., 2019). Three other rigorous analyses found that public charter schools and private schools generally outperformed district-run public schools on reports of school climate and safety in Detroit, Michigan (Hamlin, 2017), Indiana (DeAngelis & Lueken, 2019), and across the United States (Shakeel & DeAngelis, 2018).

The generally positive results for student safety coincide with evidence suggesting that families highly value safety when choosing schools for their children (Bedrick & Burke, 2018; Holmes Erickson, 2017; Kelly & Scafidi, 2013). Similarly, the rigorous evaluations on the subject tend to suggest that parents with children in public charter and private schools are generally more satisfied with their children’s schools than parents with children in district-run public schools (e.g. Barrows et al., 2017; DeAngelis, 2019c; EdChoice, 2019; Gleason et al., 2010; Oberfield, 2019; Rhinesmith, 2017; Tuttle et al., 2013).

Only four studies have examined the intersection between school choice and teen pregnancies. All four of the studies have found evidence to suggest that access to public or private school choice reduces teen pregnancies or paternity disputes (Beuermann & Jackson, 2019; Bettinger et al., 2019; DeAngelis & Wolf, 2019b; Dobbie & Fryer, 2015).

Social Benefits

For example, Dobbie and Fryer (2015) found that winning a lottery to attend a public charter school in New York City reduced reports of teen pregnancies by 59 percent. Similarly, although the study is not U.S.-based, Bettinger et al. (2019) found that winning a lottery to exercise private school choice in Colombia reduced the likelihood of having a child as a teenager by 18 percent.

Fiscal Effects on Taxpayers and School Districts

Each of the previously described benefits tends to come at lower costs to taxpayers because public charter schools generally receive less per pupil funding than district-run public schools (e.g. DeAngelis et al., 2019; Wolf et al., 2014). At least eight studies examine funding inequities between public charter schools and district-run public schools in the U.S. Each of these eight evaluations finds that public charter schools receive substantially fewer resources than district-run public schools (Batdorff et al., 2005; Batdorff et al., 2010; Batdorff et al., 2014; DeAngelis & DeGrow, 2018; DeAngelis et al., 2018; DeAngelis, 2019a; DeAngelis, 2019b; Wolf et al., 2017). The funding gaps favoring district-run public schools are mostly explained by public charter schools receiving little to no local education dollars (e.g. DeAngelis et al., 2018; Wolf et al., 2017).

For example, Batdorff et al. (2014) found that public charter schools received about 28 percent less funding per pupil than district-run public schools across 30 states and the District of Columbia. DeAngelis et al. (2018) similarly found that public charter schools received about 27 percent less funding per pupil than district-run public schools across 14 cities in the U.S. Most recently, DeAngelis (2019b) found that public charter schools in Texas received about 15 percent less in per pupil funding than district-run public schools after controlling for differences in student and school characteristics. Evaluations of private school choice programs also tend to suggest that taxpayers benefit financially since private school scholarships tend to be funded at lower amounts than per pupil spending in nearby district-run public schools (e.g. EdChoice, 2019; Lueken, 2018a; Lueken, 2018b; Spalding, 2014; Trivitt & DeAngelis, 2016).

Fiscal Effects on Taxpayers and School Districts

According to the most recent data available from the Kentucky Department of Education, district-run public schools in Jefferson County spent \$17,243 per pupil in the 2017-18 school year.¹³ If public charter schools in Louisville were to be funded 15 percent less per pupil than district-run public schools, as estimated in Texas (DeAngelis, 2019b), that would mean Louisville's public charter school students would receive about \$14,657 per year (\$17,243 times 85 percent), assuming similar student populations. Applying the previous estimate of around 5,366 public charter school students in Louisville to the 15 percent cost-savings per pupil (\$2,586), Louisville would save around \$13.87 million (5,366 students times \$2,586) in education spending each year. This estimated cost-savings would be higher (lower) if public charter schools received less (more) than 85 percent of the per pupil funding amount in district-run public schools.

It is true that district-run public schools lose some funding when students switch to public or private schools of choice. However, when a student leaves a particular school district, the fiscal impact on that district is the same regardless of the reason for the switch. Put differently, the fiscal impact on the public school district is identical whether the student leaves to a public charter school, uses a voucher to attend a private school, pays for a private school out of pocket, receives education at home, or moves to a residence assigned to a public school in another district because education funding is based on student enrollment counts. However, public school districts actually financially benefit when they lose students to public charter schools because less than 100 percent of student funding is driven by changes in student enrollment (Roza & Edmonds, 2014).

For example, Georgetown University's Edunomics Lab finds that about 68 percent of state and local education funding is disbursed on the basis of students in Texas. ¹⁴As reported by the Edunomics Lab at Georgetown University, the state with the highest proportion of student-centered funding is New Jersey (85 percent). In other words, district-run public schools in most states mathematically must end up with more dollars on a per pupil basis when they lose students to public charter schools. Furthermore, a limited body of research shows that district-run public schools generally financially benefit even after excluding fixed costs from the calculations (e.g. DeAngelis & Trivitt, 2016; Scafidi, 2012; Trivitt & DeAngelis, 2017).

Discussion

This report summarizes the scientific evidence on public charter schools and private school choice programs in the U.S. This review finds that the preponderance of the evidence suggests that school choice generally improves academic achievement, educational attainment, civic outcomes, and safety, and decreases crime, teen pregnancies, and taxpayer costs. These findings suggest that access to public charter schools could provide substantial economic benefits to Louisville, Kentucky by increasing academic achievement and educational attainment and decreasing crime and taxpayer costs.

Although the existing evidence tends to suggest that public charter schools improve students' outcomes overall, researchers have noted that their effects differ by location and context (e.g. Betts & Tang, 2011; Betts & Tang, 2014; Betts & Tang, 2019). In other words, while the overall effects of public charter schools tend to be positive, on average, it is likely that individual realized effects could be positive or negative and would differ in magnitude in Louisville, Kentucky. Because public charter schools have not been empirically tested in Kentucky, readers should exercise considerable caution regarding these forecasted economic benefits, which rely on estimates from other states. The success of public charter schools in Kentucky would depend on various factors such as the quality of district-run schools in the area, the quality of new public charter schools, geography, and implementation fidelity. If a funding mechanism allows for the existence of public charter schools in Kentucky, future research on those schools would be especially welcome.

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