

Universal School Vouchers, Private Competition, and Public School Performance

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Introduction

In the age of school accountability, parents and communities want the best out of their schools. Parents who view public schools as failing to adequately prepare their children have increasingly turned to alternatives, making school choice the defining issue of modern education policy. Recent polls demonstrate that 55% of Americans are dissatisfied with the quality of K-12 education in the United States (Brenan, 2024). States have scrambled to construct school choice regimes to satisfy growing demand. In recent years, over twenty states have passed expanded school choice programs that fund private schools with public funds (Cowen & Nowak, 2024). This trend promises to continue. The 2024 general election saw school choice ballot measures in three states: Colorado, Kentucky, and Nebraska (Lieberman, 2024a). Each of these ballot measures failed, some by significant margins. The Colorado ballot measure, Amendment 80, sought to enshrine the right to school choice in the state constitution, but failed with 50.7% of voters rejecting it (Breunlin, 2024). In Kentucky, Amendment 2 sought to allow the legislature to provide public funds to private schools, but 64.8% voted against the measure (Garcia, 2024). This rejection included a majority of voters in every county voting against the measure. In Nebraska, a referendum to repeal a new state law authorizing \$10 million in state funds to K-12 private school scholarships passed with 57% of votes (Jimenez, 2024). In each of these ballot measures, voters conveyed disapproval with sending public money to private schools and a preference for continued investment in public education. While these ballot measures failed, the movement for private school choice continues. Following these failed races, Texas Governor Greg Abbott has promised to pursue universal school choice, with similar calls in Tennessee and at the national level following Donald Trump's election (Jimenez, 2024; Lieberman, 2024b).

In modern education debates, “support for private school choice is often based on ... dissatisfaction with current conditions and a blanket attack on the public schools as the source of the nation’s problems” (Weil, 2002, p. 45). Advocates have called for school choice on a variety of fronts, including inadequate support systems in public schools (Kumar, 2024), the potential fiscal benefits of choice programs (Lueken & Conway, 2024), higher teacher satisfaction in private schools (Fennell, 2024), greater availability of gifted programs (Aldis, 2024), parents’ rights to control how their children are educated (Fletcher, 2024), and improved student achievement in private schools (Burke, 2022). Detractors have argued that school voucher programs hurt achievement for voucher users (Dynarski & Nichols, 2017), take away funding from students in already struggling public schools (Greene, 2023), provide less support for students with disabilities (Goodwin, 2023), have roots in racism and discrimination (Menas, 2020), and represent a larger attack on public education (Bryant, 2024). It is difficult to impartially evaluate these claims. However, as data from school choice programs across the United States becomes available researchers have continued to analyze important questions about school vouchers and their impacts.

The school choice environment in the United States is complicated and encompasses charter schools and private schools, with different mechanisms for utilizing public funds for private education, including school vouchers, tax credits, and education savings accounts. Policy analysis requires careful distinction between these mechanisms. Charter schools, which are not the focus of the current analysis, are publicly funded, tuition-free schools that operate with a degree of independence from local school districts (B. Miller, n.d.). This is distinct from private schools which do not receive public funding (other than through voucher programs), charge tuition, and are often religious. When private schools do receive public funding through school

voucher programs, there are three primary funding mechanisms: tax-credit scholarships, private school vouchers, and education savings accounts. Tax-credit scholarships give tax credits to businesses and individuals that provide scholarships to students who attend private schools, school vouchers allow parents to have administrators direct funds that would have been used by their public school to private schools for tuition, and education savings accounts create accounts for families to use for education-related expenses such as private school tuition or tutoring services (Ordway, 2024).

The present analysis examines Arizona's summer 2022 expansion of their Empowerment Scholarship Account (ESA) program. ESAs are a form of education savings account and are the latest development in three decades of school voucher initiatives in Arizona. The earliest school voucher programs in Arizona began in 1993 with privately funded scholarships, followed by tax credit scholarships in 1997. Legal and legislative struggles would prevent the further development of school voucher policy in Arizona until 2011, when the state pioneered its Empowerment Scholarship Account. These accounts provided funds directly to parents and were targeted at students with high levels of need. In 2022, this program was expanded to include universal eligibility, removing the prior qualification requirements. Now, any student in the state can take advantage of an ESA, regardless of status. The modern-day ESA allows parents to use 90% of the state aid that the state would have spent to educate them at a public charter school for private education expenses. Nearly 75,000 students in Arizona use an ESA with the total cost of the program reaching \$738 million. Analyzing the impact of this program is critical given the process of policy diffusion that has led to similar policies in other states. Understanding how Arizona's ESA expansion impacted students and communities can help inform future school choice policy across the country.

While there is existing research on other school voucher programs, the empirical research has shown mixed results. One of the earliest voucher programs in Milwaukee was a small program that delivered promising results for students who used the program and students in public schools. However, evidence from a Florida program discredits the idea that increased private school competition may improve public school achievement. Additionally, evidence from Washington, D.C., Louisiana, Indiana, and Ohio suggest vouchers had negative to non-existent effects on student achievement at best. The literature shows mixed results in part due to the unique circumstances and design of the programs. This paper seeks to contribute to the literature by analyzing the impact of the Arizona ESA expansion on public school performance and discussing the ethical implications of the program. It will provide both a normative and empirical lens that has yet to be contributed to the literature due to the novelty of Arizona's ESA expansion. This paper argues that Arizona public schools that faced private school competition had no difference in the percentage of students passing state exams following the ESA expansion when compared to those that did not face private competition. It further argues that universal school voucher programs, including the Empowerment Scholarship Account expansion, are unethical because they disregard the role of public education in democracy building.

The upcoming sections are organized as follows. The second section will overview a brief history of school voucher development in the United States and in Arizona to establish the necessary context for the following empirical and ethical analysis. The third section will review the relevant literature on school voucher programs, including the underlying economic theory and quasi-experimental research. The fourth section contains the empirical analysis in the paper, including a description of the data, method, and results. Finally, the fifth section will provide an ethical analysis of the Arizona ESA program and the broader school voucher movement.

History of School Vouchers

School Vouchers in the United States

The history of private school choice in the United States is rich and complicated. Unlike other policy areas where the federal government plays a substantial role, states have historically determined education policy. With their delegation as the “last remaining bastion of traditional American federalism,” states are tasked with self-guidance in education policy and innovation, while the federal government offers limited assistance (Davies, 2007). Since each state acts as a laboratory of democracy, the education policy landscape is constantly changing. This section overviews significant historical developments in school voucher policy in the United States to establish the necessary context for understanding the development of school voucher policy in Arizona. The history of school vouchers includes roots in *de facto* segregation, numerous foundational Supreme Court decisions, and modern policy innovations that set the stage for Arizona’s Empowerment Scholarship Accounts.

It would be misguided to ignore segregation’s role in school voucher development. Milton Friedman’s original argument for school vouchers shortly followed the Supreme Court decisions in *Brown v. Board of Education*, 1954 and *Brown II*, 1955 and soon communities in Little Rock, Arkansas and Prince Edward County, Virginia began using school vouchers as a mechanism to avoid desegregation (Weil, 2002). Prince Edward County closed public schools while allocating public funds to white students attending all-white private schools. Vouchers allowed communities to sidestep desegregation orders and maintain *de facto* segregation. The role of voucher policy in segregation illustrates the importance of conducting ethical evaluations of modern school voucher policy. If modern voucher policies exacerbate pre-existing inequalities or enable discrimination, they must be reformed or abandoned to promote equity.

While the early history of school vouchers offers an important lesson in ethical evaluation, the Supreme Court is the legal entity tasked with evaluating the legal ethics and constitutionality of school voucher policies. A handful of landmark Supreme Court cases have defined the changing boundaries of school voucher programs. One of the earliest, *Everson v. Board of Education*, was a 1947 challenge of a New Jersey policy that reimbursed parents for transportation expenses to schools. The Court determined this statute did not violate the Establishment Clause of the First Amendment because it used taxpayer funds for a public purpose, not in direct support of religion (Weil, 2002). The Court's decision also set the precedent to evaluate school voucher policies based on child-benefit theory. Child-benefit theory argues the use of public funds for private school expenses is constitutional so long as the child directly benefits, not the institution (Davies, 2007). Years later, the Supreme Court would consider the constitutionality of direct appropriations to private schools for tuition expenses. In *Swart v. South Burlington Town School District*, 1961, the Court ruled the expenditure of public funds for private religious education was unconstitutional citing the Establishment Clause (Weil, 2002). While these two cases defined the early school voucher policy landscape, perhaps the most influential Supreme Court decision regarding school vouchers came in *Lemon v. Kurtzman*, 1971. This case examined public funding given to religious private schools, and the Court developed the three-prong Lemon test, stating "(1) The legislation must have a secular purpose; (2) the primary effect of the legislation must not advance or inhibit religion; and (3) the legislation must not foster excessive government involvement with religion" (Weil, 2002, p. 32). This three-prong test clearly defined the limits of government participation in religious matters such as private schooling. The Establishment Clause remains a guiding constitutional principle for modern school voucher policy, and cases have built on the Lemon test. *Zelman v. Simmons-*

Harris clarified the meaning of “a secular purpose” by finding a Cleveland private school voucher program “was one of true private choice, with no evidence that the State deliberately skewed incentives towards religious schools” (*Zelman v. Simmons-Harris*, 2002). *Zelman* enabled modern school voucher policy by ensuring that, so long as parents make decisions between private secular and religious schools and not the state, a school voucher policy does not violate the Establishment Clause even if most voucher users attend private religious schools. While the Court does not explicitly provide an ethical evaluation of school voucher programs, these cases serve as useful bases for understanding the boundaries of school voucher policy.

Before the Court enabled modern school vouchers, states commonly used tax credits to incentivize organizations to give private school tuition grants to students. One of the first such programs started in Minnesota in 1955, where the state allowed parents to claim a tax deduction for educational expenses, public or private (Manzi & Larson, 1999). Tax credit programs for families and organizations existed on smaller scales than modern school vouchers and relied on individuals and private organizations to directly fund education. Modern school vouchers allow the direct use of public funds for private education. The first comprehensive modern school voucher program began in 1991 in Milwaukee, Wisconsin and is still in place today (Weil, 2002). The program was a small program with strict participation limits. Enrollment was originally capped at 1% of the enrollment in Milwaukee Public Schools, restricted to families below 175% of the poverty level, and only available to students who previously attended public schools or had not previously attended school (Ford, 2015). Though the Milwaukee program was isolated to a single school district, voucher policies soon spread to other states. The first statewide school voucher policy was Florida’s A+ Plan for Education implemented in 1999, which targeted voucher support to students in failing schools (Weil, 2002). Similar targeted

voucher programs have existed in many states, typically intended to support students who are low-income, attend at-risk schools, or are from historically disadvantaged backgrounds. By assisting students with the most need, targeted vouchers sought the greatest possible return on public investments. The most recent shift in policy has been toward universal rather than targeted vouchers. There are now twelve states with universal school voucher programs, while twenty-eight states and the District of Columbia have some form of school voucher program (Stanford et al., 2024). Though the exact specifications of the policies vary, the core idea is the use of public money to fund private education, whether through tuition at a private school or individual education expenses (Stanford et al., 2024).

School Vouchers in Arizona

Arizona's school voucher history is situated within the broader history of vouchers in the United States. In 1993, Arizona School Choice Trust, Inc. began privately funding scholarships for students to attend private schools (Center for Education Reform, 1993). This privately funded program was the first tangible initiative in Arizona to increase privatization of K-12 education. Four years later, Arizona enacted legislation that provided tax credits to individuals supporting School Tuition Organizations (STOs), nonprofits that gave students in need private school scholarships, indirectly using public funds for private education for the first time in the state (EdChoice, 2023). In 2006, Arizona attempted the first direct private school vouchers, targeted at students with disabilities and students in foster care. The Arizona Court of Appeals declared this policy unconstitutional because it directly funded private religious schools (Arizona Center for Economic Progress, 2023). Further legal challenges were brought to the courts regarding the STO tax-credit policy. In 2009, the Ninth Circuit ruled the STO program lacked "religious neutrality" and that, despite the element of individual choice in selecting a religious or secular private

school, the practice “carries with it the imprimatur of government endorsement” (*Winn v. Arizona Christian School Tuition Organization*, 2009). This decision would be reversed by the Supreme Court which found the plaintiff lacked standing (*Arizona Christian School Tuition Organization v. Winn*, 2011). In making this determination, the court avoided addressing the merits of the challenge to the religious neutrality of the legislation. Without commenting on the Ninth Circuit’s religious neutrality argument, the Court chose to allow previous decisions to set the precedent and continued to allow public funds to go to religious private schools.

Shortly after the decisions, Arizona pioneered the Empowerment Scholarship Account (ESA) program. This program originally allowed families to use private school vouchers, so long as they met certain eligibility requirements, such as students with disabilities (Griffith & Burns, 2024). This targeted policy intended to empower parents to assess their children’s needs, whether public schools were meeting those needs, and use public funding that would have gone to their public school to privately educate them if appropriate. In 2017, Arizona attempted to expand the program to universal eligibility, but a 2018 ballot measure repealed the bill (Arizona Center for Economic Progress, 2023). Similar attempts to expand the voucher program in 2020 and 2021 both failed to pass in the state legislature (Arizona Center for Economic Progress, 2023). However, during the summer of 2022, the state passed new legislation expanding ESA eligibility to every student in the state, regardless of whether they previously attended public school, private school, or were homeschooled (Griffith & Burns, 2024). The key difference between this successful policy and previous failed expansions was the included eligibility for all students, not just those who previously attended public schools, and the expansion of potential uses for ESA funds (Arizona Center for Economic Progress, 2023).

As of December 2024, ESAs allow parents to use 90% of the state aid that a public charter school would have received to educate the student to instead fund private education expenses, leaving the remaining 10% in the state's general fund (Arizona Department of Education, 2023b). Since state aid varies depending on student need, the scholarships allocated range from \$4,626 to \$44,666, with an average scholarship of \$9,818 and a median scholarship of \$7,409 (Arizona Department of Education, 2024b). Funds can be used for approved educational expenses defined by the state, including private school tuition, tutoring services, and technology (Arizona Department of Education, 2023b). Universal ESAs make \$4.4 billion of the \$4.9 billion in state education funding available to students and families, or thirty-seven percent of total school revenues in the state (United States Census Bureau, 2024). Not every family chooses to use an ESA. Prior to the expansion, 12,127 students used Arizona's voucher program (Arizona Department of Education, 2022a). This sum represented 15.9% of the 76,390 private school students and 1% of the total 1,201,215 students enrolled in Arizona K-12 schools during 2021-2022 (National Center for Education Statistics, 2023b; Arizona Department of Education, 2023a). Following the expansion, the number of students using ESAs jumped to 30,471 students, with 16,969 of those students (55.7%) utilizing the program under the universal eligibility category (Arizona Department of Education, 2022b). According to the most recent state reports, 74,578 students utilize the voucher program, with 56,196 (74.5%) participating under universal eligibility (Arizona Department of Education, 2024b). In other words, nearly three-quarters of ESA users were not eligible pre-expansion. Additionally, only approximately 6.2% of students educated in Arizona public and private schools use the ESA program. The total cost of the program as of the third quarter of 2024 was just over \$738 million (Arizona Department of Education, 2024b).

Literature Review

Before exploring the impacts of Arizona's Empowerment Scholarship Account expansion on public school students, this section will review the economic theory that seeks to justify school voucher policies while also reviewing the empirical research on previous programs. The economic theory lays the groundwork for establishing school voucher policy by arguing that such policy can bring alignment between education preferences and consumption, public school improvement through competitive pressures from private schools, and encouraging private school innovation to improve educational outcomes across the board. The empirical literature takes advantage of previous programs in Milwaukee, Florida, Washington D.C., Ohio, Louisiana, and Indiana to estimate the benefits of school voucher programs, specifically as they relate to the academic outcomes of school voucher users and the achievement of public schools who face competitive pressure from private schools. Both the economic theory and empirical literature will establish the expectations tested by the modeling later in the paper.

Economic Theory

Much of the school voucher literature relates to the economic theory used to justify such programs. School vouchers did not gain popularity until the 1950's when Nobel economist Milton Friedman first argued for them by applying free market logic to schools. He believed that, while education is a public good that provides positive externalities to the polity as far as it promotes citizenship and leadership, the government should only fund schools and maintain minimum standards, not oversee schooling. Instead, private firms should carry out schooling with public funds. He wrote that "[g]overnments could require a minimum level of schooling financed by giving parents vouchers redeemable for a specified maximum sum per child per year if spent on 'approved' educational services" (Friedman, 1962, p. 89). Friedman's argument was

one of the first to popularize the idea of a school voucher, and economic justifications for school vouchers continue to appeal to many. These justifications include the alignment of private preferences with the level of public goods, potential for competitive pressure to improve public schools, and the ability for private providers to tailor their product to students' specific needs.

In the United States everyone is guaranteed some level of public schooling, which can be viewed as the minimum level of education consumption. Taxes used to fund public education are collected regardless of whether a family chooses to utilize it, and therefore public education can be viewed as free. However, some families will have preferences to consume more education than is publicly available. Without school vouchers families can optimize their consumption through two primary mechanisms. Either they can move to a location where the level of public education matches their preferences, a process called Tiebout sorting, or they can forgo public education and pay for private education (Lovenheim & Turner, 2018). Both options are costly. Tiebout sorting is expensive both in terms moving costs but also in terms of the disruptions to students' education (Hanushek et al., 2004). However, if families choose not to relocate, they can instead pay large premiums for marginal gains in consumption. For example, consider a family whose seeks to consume \$10,000 a year per student in education but lives in a district that spends \$7,500 per student. This family is faced with under consuming or investing substantially more. If they choose to forgo the public education they have already paid \$7,500 in taxes for they must pay an additional \$10,000 to cover private school tuition that matches their preferences. In this scenario, the family spends \$10,000 to increase educational consumption \$2,500. Though this hypothetical is not a perfect representation of the choices families face, it captures the options available to families concerned with school safety or teacher quality, which they are unable to change without moving schools. Without vouchers, it is costly to optimize consumption.

School vouchers attempt to resolve inconsistencies in education preferences by altering both demand and supply. When the government provides a voucher option restricted to educational expenses, families face two options. They can choose to remain in public schools and leave funding with the public school, or they can choose to enroll a child in a private school using that funding to subsidize costs. Theoretically, this should be beneficial to every family. Families content with public education are unaffected.¹ Families with a higher level of optimal education consumption can more effectively increase consumption using a voucher. For example, with a voucher the family considered above would only pay an additional \$2,500 to align their education consumption with their preferences. This saves them \$7,500, the amount of the voucher. Notably, for families that chose to send their children to private schools in a pre-voucher policy environment, the school voucher is equivalent to a cash transfer (Lovenheim & Turner, 2018). These families use the voucher to cover a portion of their education consumption and redirect the replaced funds elsewhere. Vouchers are a theoretically more effective approach for all because they do not rely on costly Tiebout sorting, family investment, or time-intensive coordinated democratic action (Friedman, 1962).

School vouchers also impact the supply of education by reducing barriers to entry. Typically, potential education firms are limited by the number of students and other barriers.² These include regulations, lack of government funding for private schools, and economies of scale (Lovenheim & Turner, 2018). Regulations on the type and number of private schools that can exist in each area prevent free market competition. Furthermore, unlike public schools that receive funding from government sources regardless of their profitability, private schools must

¹ No family should optimally want to consume *less* education if education is a good with positive utility.

² From 2017-18 to 2022-23, the number of students in Arizona public schools grew only 1.6% (Arizona Department of Education, 2023a). This growth is not substantial enough to support large scale entry.

maintain profitability. Public schools are maintained with public funds and do not need to profit maximize. Finally, economies of scale mean it can be cheaper on a per-student basis for a school or district to educate 2,000 students than 200 students. There are many fixed costs schools must pay for regardless of the number of students in a school, such as facilities and administrators. Per-student fixed costs decline as the number of students grow, something large public schools can take advantage of. Each of these factors prevents free entry into the education market. Increasing funds available to private firms through vouchers can help potential education providers overcome these barriers to entry and increase the number of providers in a market.

By inducing entry into the education market through vouchers, governments can increase competition and potentially improve student outcomes and provide upward pressure on teacher salaries (Friedman, 1962). Private competition may improve student outcomes as schools compete to attract students. These effects can spill over to public schools who also hope to retain their enrollment-based funding (Lovenheim & Turner, 2018). However, there are limitations to the benefits of increased competition in the education market. The economic theory assumes parents have high-quality information about schools, but information is imperfect. Though parents meaningfully evaluate school options, “parental choices are ensnared and limited by the parents' own limited experiences, level of learning, ignorance, biases, and mythology on which they depend to make educational choices for their children and is, thus, in most cases, highly suspect” (Alexander, 2012, p. 171). Additionally, because peer effects impact student outcomes, there is a risk that the most academically capable students will leave public schools and lower the quality of other students' education (Lovenheim & Turner, 2018). Due to theoretical limitations, empirical literature hopes to clarify expectations by examining voucher programs.

Empirical Literature

Though the first universal school voucher program in the United States was not implemented until 2022, there were many smaller programs that can inform expectations about universal expansions. While there have been both publicly and privately funded voucher programs, this examination of the empirical literature only considers academic analysis of publicly funded school voucher programs and excludes analysis of tax credit programs. Publicly funded direct allocation programs should share the most similarities with Arizona's universal program and future universal expansions. This section focuses on the empirical research regarding the performance of students who use vouchers and the performance of public schools facing increased private competition. Studies in these areas are common because the outcomes associated with vouchers are uncertain. Students may benefit from private school choice because they can attend private schools that match their specific needs, or they may be worse off because private schools that opt in to voucher programs may be lower performing schools that would otherwise risk closure (Erickson et al., 2019). Furthermore, students who remain in public schools may perform better because of private school competition, or they may suffer due to peer effects. If higher achieving students leave public schools, the quality of peers and the related effects on remaining students' education may decline in a process called cream skimming. The research on voucher programs hopes to add clarity but fails to resolve uncertainty. The programs that are most well-studied include the Milwaukee Parental Choice Program, Florida's A+ Plan for Education, and the Washington D.C. Opportunity Scholarship Program, though this section considers studies from other programs as well. This section overviews the empirical findings relating to these programs and the implications for universal voucher expansions.³

³ Authors used different standards for statistical significance. In this section, statistical significance is determined at a 95% confidence level.

The Milwaukee Parental Choice Program (MPCP) was first implemented in the 1990-91 school year (Hoxby, 2002). It was initially an extremely narrow program, with eligibility limited to families below 175 percent of the federal poverty level, secular private schools, and less than one percent of total enrollment in Milwaukee Public Schools (MPS). In 1994, the limit on total student participation was raised to 1.5 percent but was still minimal (Rouse, 1998). The extent of the program grew significantly following a 1996 legislative change and 1998 Wisconsin Supreme Court decision that allowed religious private schools to participate in the program, and the program grew to as many as 28,917 students in the 2018-2019 school year (Chingos et al., 2019). Due to the limited nature of the program, officials used enrollment lotteries to determine who received vouchers. This program provided a unique opportunity for researchers because of its constant evolution and lottery mechanism. The evolution of the program allows researchers to compare different program scales, while the lottery mechanism allows researchers to compare voucher users to unsuccessful applicants who should have similar unobservable characteristics. Researchers have used these strategies to determine that the MPCP had positive overall effects on voucher users and public school students. MPCP voucher users had gains of 0.08-0.13 standard deviations in math per year in the program and a six percentage point increase in likelihood of enrolling in a four-year college or university (Chingos et al., 2019; Greene et al., 1999; Rouse, 1998). The program also led to improved exam performance in public schools in reading and language arts, science, math, and social studies (Chakrabarti, 2008; Greene & Marsh, 2009; Hoxby, 2002). The MPCP demonstrates the potential for school vouchers to benefit all students. However, findings from the MPCP have limited generalizability, especially to universal voucher programs. The MPCP was targeted at low-income students, did not originally allow religious schools to participate, and happened within a single school district. It

was also extremely limited in size when compared to modern universal voucher programs. While the findings for this program can provide some insight to researchers and policymakers, the studies examining the program evaluated data that was nearly two decades old or older, had a unique policy environment, and were targeted at students who had the greatest room to improve.

The Florida A+ Plan for Education was an accountability program that assigned grades to public schools based on state test performance in fourth, eighth, and tenth grades. Students in public schools that received two “F” grades within a four-year period were offered vouchers to private schools (Greene, 2001). These vouchers were called Opportunity Scholarships and served students who ostensibly had the most to gain from changing schools (Figlio & Rouse, 2006). In 2006 the Florida Supreme Court determined these vouchers were unconstitutional (Bowen & Trivitt, 2014). The threshold for multiple “F” grades before students were offered vouchers allows researchers to examine the impact of potential private school competition, and the 2006 ruling allows a comparison of the differential effects of the A+ Plan for Education with and without the voucher component. While some early studies found the voucher threat led to public school test score improvements (Greene, 2001), authors revisiting this analysis connected improvements to other accountability mechanisms in the policy, not the voucher threat (Bowen & Trivitt, 2014; Camilli & Bulkley, 2001; Figlio and Rouse, 2006). While the Florida A+ Plan for Education had a short-lived voucher component, researchers were able to exploit its design and development to analyze the impact of voucher threats on public schools in the state. The evidence overwhelmingly suggests public schools facing greater threats from school voucher programs did not have greater improvements than similar schools without a voucher threat. Though this program is not directly comparable to universal programs it suggests policymakers should not anticipate major changes in public school quality due to a voucher threat.

In 2004, Congress created the District of Columbia Opportunity Scholarship Program (OSP), the first federally funded voucher program. In 2011, they reauthorized the OSP and required an independent evaluation of the program. OSP eligibility conditions required students to be residents of Washington, D.C. with household incomes below 185% of the federal poverty line and held participating private schools to adhere to evaluation and transparency requirements. The OSP presents a unique opportunity for researchers to evaluate the impact of voucher programs because it required students to be tested when applying and each spring for three years, allowing researchers to measure growth and compare voucher users to non-recipients through randomization lotteries used to award scholarships (Webber et al., 2019). The results from the first two years of evaluation were decidedly negative. Elementary students fared particularly poorly, with reading scores 6.7 percentile points lower in reading and math scores 13.9 percentile points lower, though all grades saw negative impacts (Dynarski et al., 2018). However, an analysis after the third year of the program showed no statistically significant differences between voucher students and other students (Webber et al., 2019). Additional research showed voucher students graduated at a rate twenty-one percentage points higher but did not have higher test scores (Wolf et al., 2013).⁴ Despite higher graduation rates, there were no significant effects on college enrollment (Chingos & Kisida, 2022). Though it is unclear if students were positively impacted overall by voucher use, other research shows no effects of private competition on public schools, likely due to the choice rich environment that predated vouchers (Greene & Winters, 2007). While the research does not support any strong conclusions, it warrants discussion. This program is distinct from Arizona because it is the result of federal funding, it had an income cap on participation, and it exists within a single city rather than a larger state.

⁴ Wolf et al. (2013) relies on survey data, which may bias estimates upward.

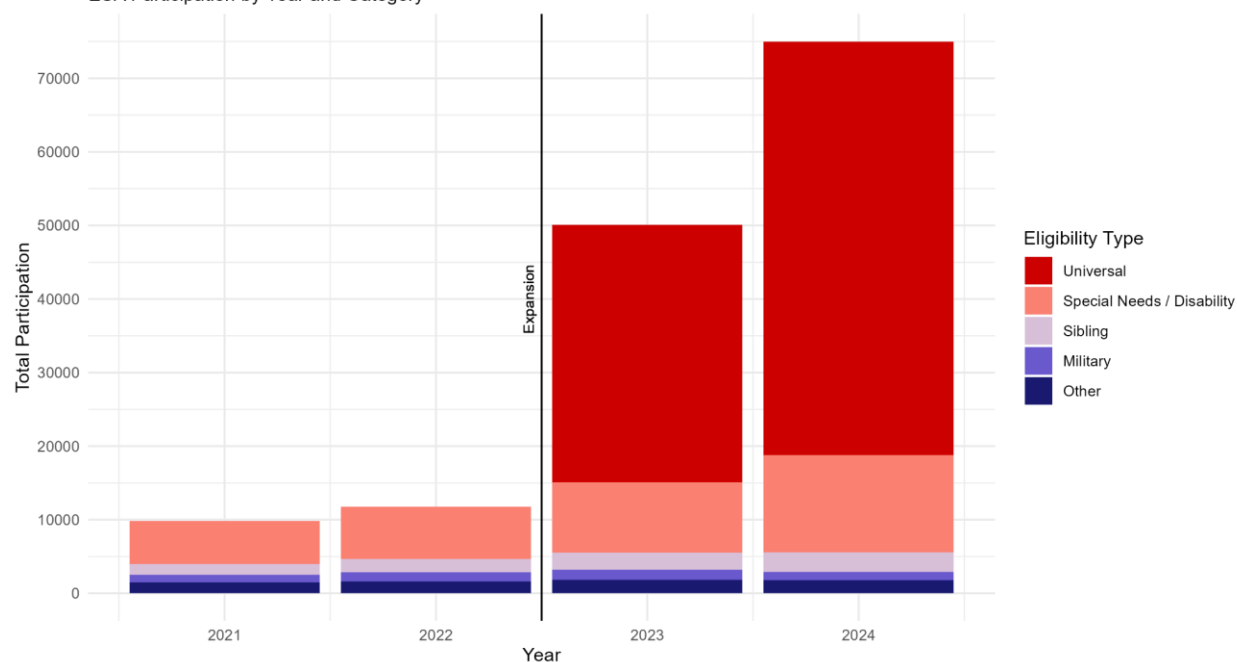
There have been other small voucher programs in Louisiana, Indiana, and Ohio. Each of these programs was targeted at low-income students or students in poorly performing public schools, and researchers evaluated the effectiveness of these programs at improving results for voucher users and public school students. The results of these programs on student performance were primarily negative for students who utilized the voucher programs, though private school competition in Ohio may have improved test scores for some public school students. The Louisiana Scholarship Program targeted low-income students in New Orleans attending low-performing public schools (Erickson, Mills, & Wolf, 2019). This program had no impact on college enrollment and persistent, large, negative impacts on math and science performance for voucher users (Erickson, Mills, & Wolf, 2019; Mills & Wolf, 2019). Achievement declines increased the likelihood of failing tests in these subjects by 24-50 percent and declines in math alone were equivalent to a loss of \$17,000 in present discounted value per student based on future outcomes (Abdulkadiroglu et al., 2018). The results of this program were decidedly negative for participants, potentially due to low-quality private schools taking advantage of vouchers to stay solvent. Another program, the Indiana Choice Scholarship Program had a voucher program targeted at low- and middle-income families. Students scored below their peers in math, an effect that grew with additional time in the program (Waddington & Berends, 2018). The program had no impact on public schools through private competition (Egalite & Catt, 2020). Finally, the 2005 Ohio Educational Choice Scholarship Program led to moderate proficiency gains for elementary reading scores but did not show gains in other grade levels or subjects (Carr, 2011). These smaller programs cast doubt on the hypotheses that voucher programs will positively impact users and public school students.

The empirical literature evaluating previous voucher programs can help form expectations about future voucher programs. The Milwaukee Parental Choice Program had promising early results for voucher users in math scores and college enrollment, while also contributing to increased scores in public schools facing private competition in multiple subjects. However, this was a smaller, early program in the history of voucher programs. Evidence from Florida points to the importance of other accountability mechanisms for improving public school performance, rather than the threat of school voucher competition. Evidence from the Washington D.C. program showed concerning declines in student performance across most measures for the first two years, though it is unclear whether these effects were persistent. Both Louisiana and Indiana add to the concerns with voucher programs, as students who used the voucher program had noticeably lower test scores than students who did not. Finally, evidence from Ohio suggests there may be some marginal benefits in some grades or subjects, but did not find these positive effects across the board. This evidence suggests that policymakers should not rely on school vouchers to directly improve the performance of low-income students in poorly performing schools, or to indirectly improve the performance of public school students through increased competitive pressures. The evidence for vouchers on these fronts is largely negative. Considering these negative impacts is important, especially because they discredit claims about achievement gains. Without achievement gains, ethical considerations become significantly more relevant for policy analysis. If a voucher program cannot be accurately predicted to have positive or negative impacts on users or public school students, the school choice debate becomes a question of ethical values. Further discussion of these important ethical considerations will follow the data analysis below.

Data Analysis

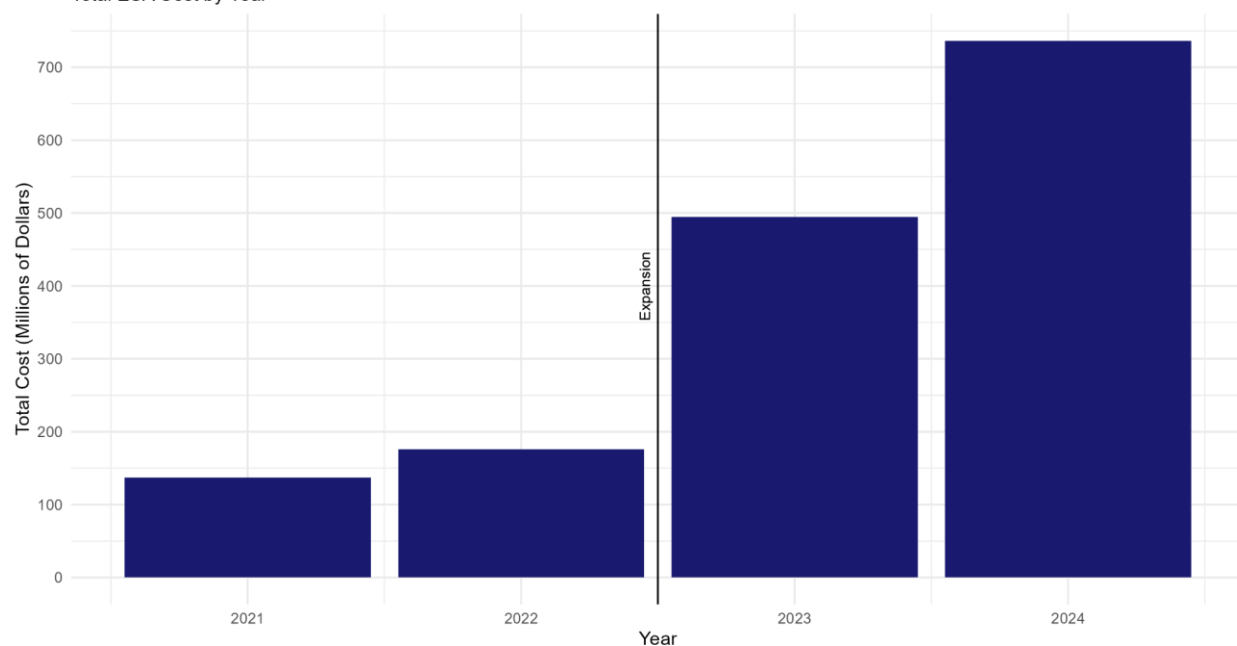
This paper conducts an empirical analysis of the effect of private school competition on public school performance. Arizona's ESA expansion in summer 2022 was an exogenous shock to competition induced by the legislature. This shock enables analysis to isolate the effect of the expansion from other effects. Additionally, Arizona serves as a useful case study for voucher policy for a few reasons. First, the ESA expansion was the first universal school voucher program in the United States. This is significant because states model policies off one another in a process of policy diffusion. This is especially true for school voucher policies, with the American Legislative Exchange Council (ALEC) working to replicate existing policies (Cowen, 2024). Therefore, future programs will mirror Arizona's expansion. Second, Arizona is like other states in that they had a non-universal voucher program pre-expansion. Twenty-eight states, Washington D.C. and Puerto Rico have existing private school choice programs and moves to universal programs in these states would be expansions akin to Arizona's (Stanford et al., 2024). Third, Arizona has a rich school choice environment with many private and charter school options available. As a result, the results from this program will be more likely to represent expected results in other states than previous studies focused on non-choice-rich environments. However, this approach has limitations with external validity due to Arizona's unique demographic and policy environment. Regardless, research can help to guide future policy, and this paper will be among the first to analyze the ESA expansion. Before continuing to the model, Figures 1 and 2 provide context for the growth of the ESA program. They show the significant rise in number of students participating in the program and the program costs post-expansion. Both increased dramatically following the expansion due to an increase in the number of universal participants, which is the exogenous shock that is the subject of the analysis.

Figure 1
ESA Participation by Year and Category



Source: Arizona Department of Education Quarterly ESA Reports

Figure 2
Total ESA Cost by Year



Source: Arizona Department of Education Quarterly ESA Reports
2021 and 2022 reports included bins, not exact amounts. Values are estimated as bin midpoints

Data

This paper uses test score data from the Arizona Department of Education to evaluate school performance. The dataset includes passing rates for each school on Arizona's Academic Standards Assessment (AASA), the statewide English Language Arts and Math achievement test for students in grades three through eight. Additionally, the dataset includes passing rates and proficiency levels for each school on the English Language Arts and Math portions of the ACT for students in grade eleven, with passage rates and proficiency levels determined by state determined cutoff scores. Unlike some states, students in Arizona are required to take the ACT, making this a useful source for comparison across schools. Data on the AASA and ACT are available for each Spring from 2021 until 2024. These scores are reported alongside school name, district, status as a charter or alternative school, and a unique school identifying code. While this data is not student level and cannot be used to draw conclusions about how specific students or groups of students perform before and after the ESA expansion, the school level data provides some insight into how public schools respond to private competition. This analysis considers only reported passing rates for all full academic year (FAY) students.

Table 1 describes the characteristics of observations in the sample. There are 1,338 unique elementary schools, 1,281 unique middle schools, and 419 unique high schools. For each statistic in Table 1, there are more observations than there are unique schools because each school reports the percent of students passing tests for multiple grades (grades 3-5, 6-8, or 11), multiple years (2021-2024), and in two subjects (ELA and Math). The average elementary observation reported scores for 507 students, with 553 and 995 students on average for middle and high schools, respectively. For elementary schools, a quarter of observations came from charter schools, with just under a third of high school observations coming from charter schools.

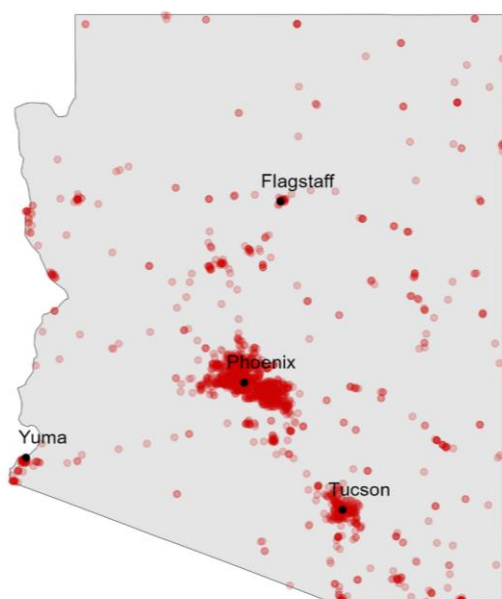
Table 1: School Characteristics by Type, All Observations

Statistic	N	Mean	St. Dev.	Min	Max
Elementary (Grades 3-5)	1,338				
Charter	29,383	0.248	0.432	0	1
Students	29,310	507.356	381.364	11	7,664
Asian	8,268	0.067	0.101	0.006	0.816
American Indian/Alaskan Native	7,177	0.143	0.258	0.005	1.000
Black/African American	17,554	0.082	0.062	0.011	0.572
Hispanic/Latino	28,008	0.490	0.252	0.013	1.000
White	26,129	0.386	0.239	0.013	1.000
Multiple Races	18,464	0.059	0.024	0.011	0.211
English Learner	21,419	0.142	0.128	0.006	1.000
Disability	27,628	0.144	0.061	0.010	0.833
Low Income	24,159	0.502	0.272	0.011	1.000
Competitor within Two Miles	29,383	0.525	0.499	0	1
Competitor within Five Miles	29,383	0.791	0.407	0	1
Middle (Grades 6-8)	1,281				
Charter	22,118	0.298	0.457	0	1
Students	22,023	553.373	473.261	12	7,664
Asian	6,716	0.067	0.109	0.006	0.816
American Indian/Alaskan Native	5,502	0.136	0.255	0.004	1.000
Black/African American	13,486	0.082	0.061	0.008	0.572
Hispanic/Latino	20,934	0.490	0.252	0.013	1.000
White	19,584	0.390	0.241	0.013	1.000
Multiple Races	13,386	0.055	0.023	0.011	0.211
English Learner	14,994	0.132	0.116	0.004	1.000
Disability	20,283	0.137	0.058	0.010	0.833
Low Income	17,917	0.509	0.273	0.011	1.000
Competitor within Two Miles	22,118	0.491	0.500	0	1
Competitor within Five Miles	22,118	0.757	0.429	0	1
High (Grade 11)	419				
Charter	2,361	0.326	0.469	0	1
Students	2,320	994.553	959.326	11	7,147
Asian	1,012	0.070	0.121	0.005	0.816
American Indian/Alaskan Native	884	0.164	0.300	0.004	1.000
Black/African American	1,372	0.072	0.059	0.007	0.572
Hispanic/Latino	2,144	0.443	0.241	0.013	1.000
White	2,064	0.415	0.224	0.009	1.000
Multiple Races	1,410	0.048	0.022	0.005	0.135
English Learner	1,320	0.081	0.081	0.004	0.576
Disability	2,002	0.119	0.065	0.010	0.950
Low Income	1,762	0.453	0.266	0.027	1.000
Competitor within Two Miles	2,361	0.363	0.481	0	1
Competitor within Five Miles	2,361	0.656	0.475	0	1

- (1) For Elementary, Middle, and High, N is the number of unique schools reporting scores in those designations
(2) Observation counts are higher for categories than the number of schools because schools report statistics for multiple grades (up to 3), years (up to 4), and subjects (up to 2)
(3) Demographic means are biased upwards. The state reports 0 as NA which are excluded from calculations

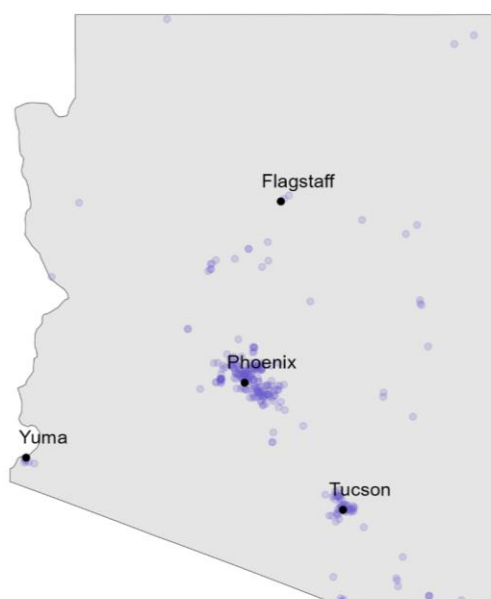
The primary predictor of interest for school performance is the presence of private school competition. If schools with private school competition perform differently than schools without private competition after Arizona's ESA expansion, the difference can be attributed to the expansion and suggests policymakers can improve student outcomes with universal programs. In this analysis, a public school is said to face private school competition if it has a private school that teaches the same grade of students within two miles. To construct the competition measure, data from the National Center for Education Statistics (NCES) Private School Universe Survey (PSS) and Education Demographic and Geographic Estimates (EDGE) was used. PSS data includes private school locations for 2021-2022, the year before the expansion of Arizona's ESA program, as well as enrollment counts for each grade level (National Center for Education Statistics, 2022a, 2022b). EDGE data includes locations of public schools, which were matched with test observations. The locations of private schools and public schools in Arizona are shown below in Figures 3 and 4.

Figure 3
Arizona Public Schools



Source: Arizona Department of Education

Figure 4
Arizona Private Schools



Source: National Center for Education Statistics

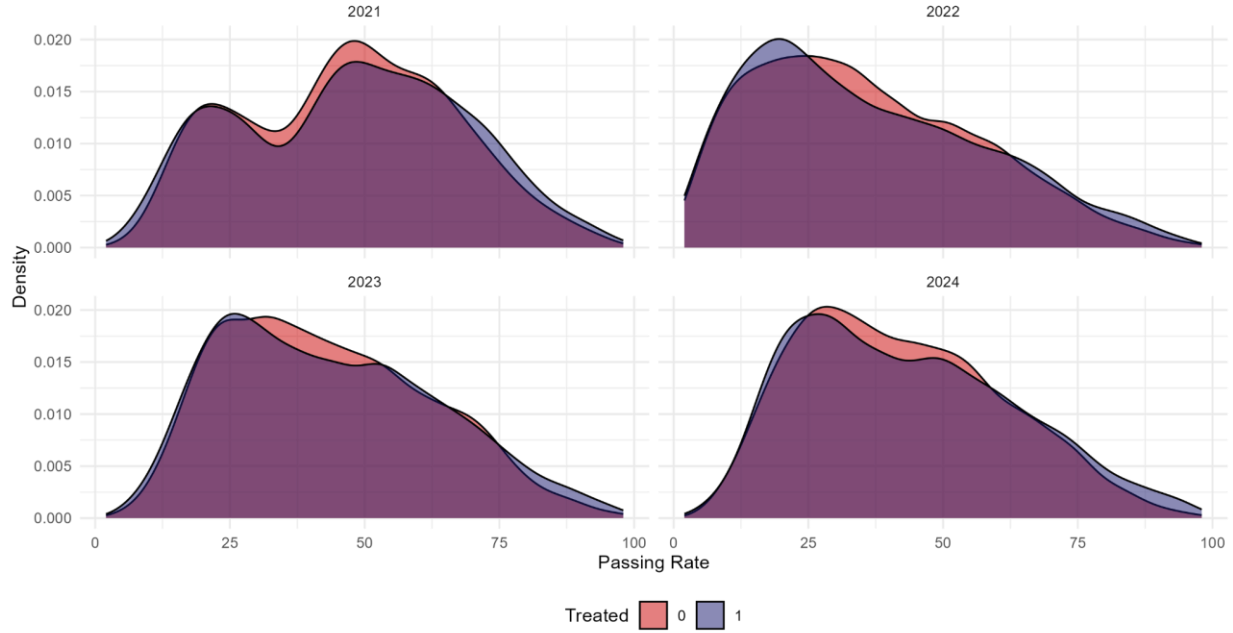
Figures 3 and 4 demonstrate the distribution of schools throughout Arizona. Notably, private schools are concentrated in urban environments compared to public schools which are spread across the state. Some schools will have private competitors while others will not. Table 1 above showed that 52.5% of elementary school observations, 49.1% of middle school observations, and 36.3% of high school observations had a private school competitor within two miles. This two-mile cutoff proves useful because it separates schools into roughly equal control and treatment groups. Table 2 compares control observations to treatment. Differences between the two groups in every observable category are statistically significant due to the large number of observations in each group. The difference-in-difference model specification should alleviate concerns with differences between the control and treatment group by accounting for differences in treatment and control group characteristics both before and after the policy change.

Table 2: Summary Statistics for Control vs Treatment, All Observations

Variable	Treatment	Control	Difference	p-value
Charter	0.326	0.217	0.109***	$< 2.2e^{-16}$
Students	579.91	514.04	65.87***	$< 2.2e^{-16}$
Asian	0.073	0.057	0.016***	$< 2.2e^{-16}$
American Indian/Alaskan Native	0.057	0.229	-0.173***	$< 2.2e^{-16}$
Black/African American	0.086	0.075	0.010***	$< 2.2e^{-16}$
Hispanic/Latino	0.509	0.464	0.045***	$< 2.2e^{-16}$
White	0.347	0.433	-0.086***	$< 2.2e^{-16}$
Multiple Races	0.059	0.055	0.004***	$< 2.2e^{-16}$
English Learner	0.148	0.121	0.027***	$< 2.2e^{-16}$
Disability	0.138	0.142	-0.003***	$< 4.1e^{-10}$
Low Income	0.522	0.483	0.040***	$< 2.2e^{-16}$

The key measure of analysis in this paper is the percentage of students passing state exams. Figure 5 shows the distribution of ELA and Math passage rates for each year by treatment status. The treatment group tends to have a larger proportion of extreme passage rates. Though there are differences between the distribution of passage rates the treatment compared to the control, these differences are apparent both before and after the ESA expansion. As such, it is necessary to estimate the changes in the differences between groups over time.

Figure 5
Density of Passing Rates by Year and Treatment Status



Source: Arizona Department of Education

Methodology

This paper estimates differences in the percent of public school students who pass state exams in schools that faced increased private school competition as the result of the summer 2022 ESA expansion compared to schools that did not face increased competition. The motivating idea is that the ESA expansion was an exogenous shock to the degree of competition faced by public schools in 2022, creating a natural experiment. The shock is the result of lowered barriers for students to attend private schools through vouchers for private education expenses, which should only increase competition for public schools with a private school competitor within a reasonable distance. To determine the impact of this policy, this paper estimates a difference-in-differences model to analyze potential variations by comparing schools impacted by treatment to those that are not both before and after the policy. The standard difference-in-differences specification is as follows (Wang et al., 2024):

$$Y_{g,t} = k + \alpha TREAT_g + \beta POST_t + \delta(TREAT_g \cdot POST_t) + \epsilon_{g,t}$$

In the standard specification, $Y_{g,t}$ is regressed on $TREAT_g$ the indicator for treatment or control group, $POST_t$ an indicator describing whether an observation is after the policy implementation, the interaction term $TREAT_g \cdot POST_t$, a constant k , and the error term $\epsilon_{g,t}$ (Wang et al., 2024). The coefficient of interest describing the difference-in-differences is δ .

This design is appropriate for two reasons. First, there are some observations that are never-treated, and a common event date for all, pointing to the need for a difference-in-differences analysis (D. L. Miller, 2023). The never-treated observations are test passing rates for public schools that do not have a private competitor within two miles. The common event date is the legislative expansion of the ESA program in summer of 2022, which took effect for every school simultaneously. Second, due to the quasi-experimental nature of this analysis which considers the natural experiment of policy enactment in a diverse competition environment, a difference-in-differences model is appropriate to determine the average treatment effect (Fougère & Jacquemet, 2023). Finally, this model is similar to the empirical specification used by Figlio and Rouse (2006) to analyze Florida's Opportunity Scholarship Program:

$$T_{ist} - T_{ist-1} = \alpha + YEAR_t \lambda + \beta(F_{is} \times POST_t) + \delta(GRADE)_{ist} + \phi_s + \mu_s t + \epsilon_{ist}$$

This methodology allowed Figlio and Rouse (2006) to determine the effect of the Florida voucher program on individual student performance in treated versus untreated schools. Though this paper considers school-level performance measures, it requires similar analysis. Since the difference-in-differences model aligns with the theoretical underpinnings of the research question and previous quasi-experimental literature in the field it is the appropriate approach.

This analysis considers the traditional difference-in-differences model and variations to determine if there is a causal relationship between private school competition and public school performance and to test the robustness of those results. Recall that a treated observation is the

passage rate on a given exam for a public school that has a private school competitor within two miles. The simple specification of the model is:

$$Y_{it} = \beta_0 + \beta_1 T_i + \beta_2 P_t + \beta_3 (P_t \cdot T_i) + \epsilon_{it}$$

where Y_{it} is the passage rate of school i at time t , β_0 is an intercept that is the average score for an untreated observation pre-expansion, β_1 is the average difference in passage rate between groups in both time periods, T_i is a treatment indicator, β_2 is the average change in passage rate for all observations post-expansion, P_t indicates an observation occurred post-expansion, β_3 is the difference-in-differences estimator describing the average differential change in passage rate post-expansion of the treatment group compared to the control, and ϵ_{it} is the error term. The results of this model are shown in the first column of Table 3 and discussed below.

Many regression analyses control for potential covariates to improve estimates. However, due to the nature of difference-in-differences estimates care must be taken when including covariates. Unlike other regression models, the difference-in-differences design does not directly compare the treatment and control groups. Instead, it compares how these groups change over time relative to each other. This design alone should control for compositional differences between the treatment and control groups. Including covariates measured post-event is not recommended because changes in covariates could be the result of the treatment (Huntington-Klein, 2023). An implication of this is that demographic controls should be avoided because changes in demographics could be explained by a movement of certain demographics of students from public schools to private schools post-expansion. As such, the models estimated with additional controls only use controls for district and for the test type, both of which are time invariant. The results for these models are reported in the second and third column of Table 2 and discussed below.

Finally, to test the robustness of the findings from the previously described models, this paper estimates a donut difference-in-differences design. This design follows the donut regression discontinuity design which is intended to alleviate the effects of heaping-induced bias in causal estimates (Barreca et al., 2011). Since a public school with a private competitor 1.9 miles away and one with 2.1 should not be substantially different but the model considers them to be treated versus untreated, this robustness check hopes to verify that results from previous models are not the result of heaping or setting an arbitrary cutoff for treatment versus control. The treatment group is defined as observations with a private competitor within two miles, and the control group is defined as those with no competitor within five miles. Each model with varying controls estimated above is estimated a second time with the donut specification as a robustness check. Results are presented in Table 4 and discussed in the following section.

Results

Table 3 reports the results from primary difference-in-difference models, with the first column reporting coefficients from the model without controls, the second with a control for school district, and the third with a control for district and test. Column 1 reports results for the regression with treatment status, a pre/post policy indicator, and an interaction term. The Treatment coefficient shows that treated schools had passing rates 0.497 percentage points higher on average than control schools. The Post coefficient shows that the average improvement in passage rates post-expansion was 3.974 percentage points, regardless of treatment status. The coefficient of interest on the interaction terms shows that there was a small but not statistically significant additional increase of 0.261 percentage points in passage rates for treated schools compared to the control observations. This model provides little explanatory power, with only one percent of the variation in passing rates attributable to factors in the model. The second

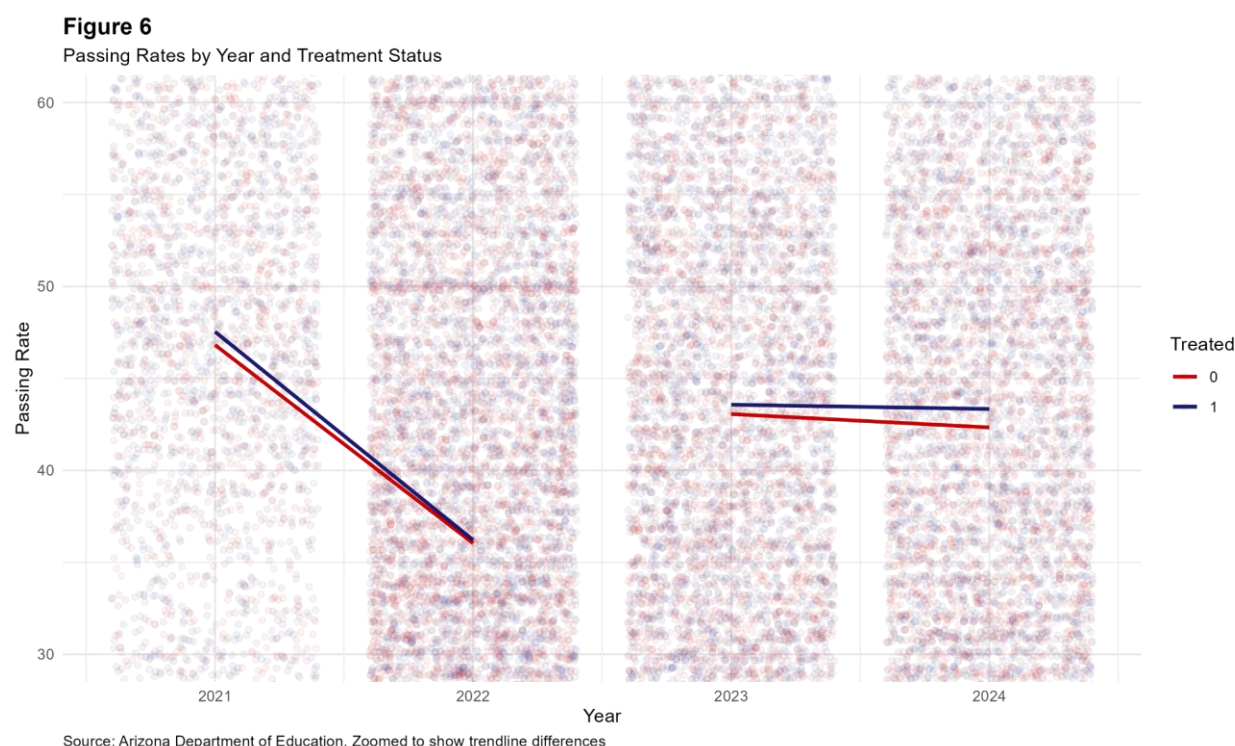
column displays results for the model that builds on the first by including a control factor for district. This model changes the sign of the Treatment coefficient (-3.021) and size of the Post (2.716) coefficient, making them both statistically significant, and increases the difference-in-difference estimate to 0.360 percentage points, though it is still statistically insignificant. However, this model explains 50.3% of the variation in passage rates for schools. The third column reports results for the model with controls for district and test. This model changes treatment and post coefficients, which are both still statistically significant at -3.187 and 2.317, and increases the interaction coefficient to 0.407 though it remains insignificant. The additional control raises the explanator power of the model to 54.3%. Importantly, none of the models suggest a statistically significant impact of increase private school competition on the performance of public schools, positive or negative. Effect size estimates are small and standard errors are large, so no conclusions can be derived from the model results.

Table 3: Primary Model Results

	No Controls	District	District, Test
Treatment	0.497 (0.309)	-3.021*** (0.279)	-3.187*** (0.268)
Post	3.974*** (0.314)	2.716*** (0.232)	2.317*** (0.223)
Treatment*Post	0.261 (0.437)	0.360 (0.320)	0.407 (0.307)
Observations	35,491	35,491	35,491
R ²	0.010	0.503	0.543
Adjusted R ²	0.010	0.495	0.536
Residual Std. Error	20.548	14.670	14.067
df	(35487)	(34980)	(34967)
F Statistic	121.490***	69.315***	79.401***
df	(3; 35487)	(510; 34980)	(523; 34967)

*p<0.1; **p<0.05; ***p<0.01

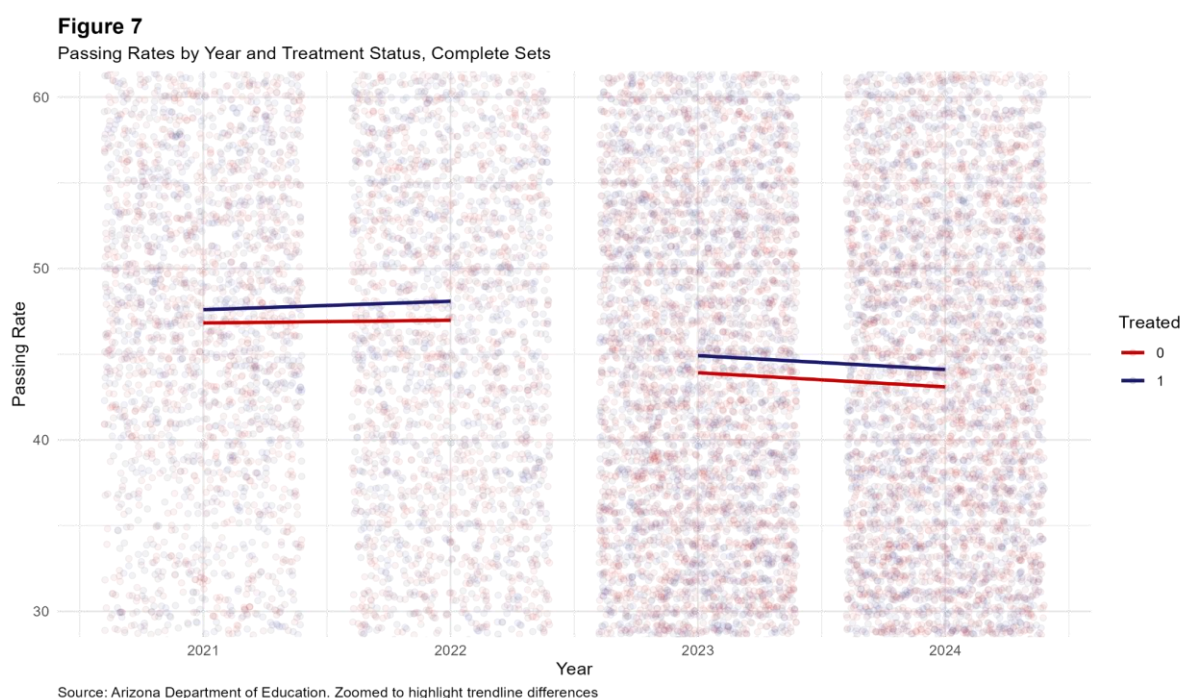
Verification of the model results requires a test of the parallel trends assumption. This assumption requires that the treatment and control groups exhibit similar trends before treatment. If this assumption is violated, post-treatment differences may be due to pre-treatment trends rather than the treatment itself. Figure 6 visualizes the pre-treatment and post-treatment trends.⁵ The pre-trend is approximately parallel, though there is some indication that the negative slope of the treatment group is steeper than the negative slope of the control group and there may be convergence in trends. Additionally, there are significantly more observations for 2022 than any other year, especially compared to 2021, the first year after COVID.



To provide an additional test of the parallel trends assumption, Figure 7 repeats the above process but only includes complete pairs. Complete pairs are pre-treatment observations where a school reported the percent of students passing a certain exam in both 2021 and 2022, and post-

⁵ Figure 6 is zoomed to highlight the trendline differences between the treatment and control groups. Appendix B shows the non-zoomed version.

treatment observations where a school reported the percent of students passing a certain exam in both 2023 and 2024. Figure 7 clearly indicates parallel trends for the treatment and control groups.⁶ Additionally, it suggests the schools that reported scores in 2021 were higher performance schools than those that did not. For robustness, a third parallel trends visualization was created with only observations for school and tests present across all four years. This visualization is in Appendix D and confirms the parallel trends assumption.



To verify the results from the primary models, each of the three regression models in Table 3 was repeated to only include observations of school and test combinations with four years of results. Table 4 reports these estimates. The original findings regarding the coefficient of interest on the interaction term are confirmed. There is not a statistically significant difference between the percent of students that pass exams in schools facing private school competition compared to those that do not face private school competition.

⁶ Figure 7 is zoomed to highlight the trendline differences between the treatment and control groups. Appendix C shows the non-zoomed version.

Table 4: Full Observations Model Results

	(1)	(2)	(3)
Treatment	1.388*** (0.436)	-2.613*** (0.380)	-2.731*** (0.362)
Post	0.359 (0.448)	0.420 (0.332)	0.420 (0.316)
Treatment*Post	0.110 (0.617)	0.048 (0.456)	0.048 (0.435)
Observations	16,192	16,192	16,192
R ²	0.001	0.465	0.515
Adjusted R ²	0.001	0.456	0.506
Residual Std. Error	19.586	14.458	13.773
df	(16188)	(15917)	(15906)
F Statistic	7.921***	50.484***	59.220***
df	(3; 16188)	(274; 15917)	(285; 15906)

*p<0.1; **p<0.05; ***p<0.01

The final robustness check considered in this analysis is the donut specification. This attempts to verify that the regression results represent actual trends rather than being the product of heaping-induced bias. To conduct this analysis, the treatment group is set to include all observations with a private school competitor within two miles, while the control group includes all observations without any private school competitors within five miles. Notably, this excludes all observations with no private school competitors within two miles but at least one private school competitor within five miles. The results of this method are reported in Table 5, with the first three columns corresponding to the primary model (Table 3) and the second three columns corresponding to the full observations model (Table 4). This additional robustness check supports the original findings from each of the previous models. There is no reason to suggest the presence of private school competition improved public school performance after the expansion of the ESA program, and this finding is not attributable to heaping-induced bias.

Table 5: Donut Specification

	<i>All Observations</i>			<i>Full Observations</i>		
	No Controls	District	District, Test	No Controls	District	District, Test
Treatment	4.528*** (0.403)	−0.810 (0.573)	−1.357** (0.552)	5.333*** (0.639)	0.507 (0.801)	0.187 (0.767)
Post	5.063*** (0.502)	3.389*** (0.389)	2.843*** (0.374)	0.825 (0.799)	0.843 (0.598)	0.843 (0.571)
Treatment*Post	−0.828 (0.586)	−0.275 (0.448)	−0.071 (0.430)	−0.356 (0.904)	−0.378 (0.677)	−0.378 (0.646)
Observations	25,011	25,011	25,011	10,976	10,976	10,976
R ²	0.020	0.500	0.539	0.012	0.464	0.512
Adjusted R ²	0.020	0.491	0.531	0.012	0.453	0.501
Residual Std. Error	20.452	14.738	14.155	19.625	14.600	13.943
df	(25007)	(24564)	(24551)	(10972)	(10748)	(10737)
F Statistic	172.881***	55.134***	62.611***	44.095***	41.027***	47.311***
df	(3; 25007)	(446; 24564)	(459; 24551)	(3; 10972)	(227; 10748)	(238; 10737)

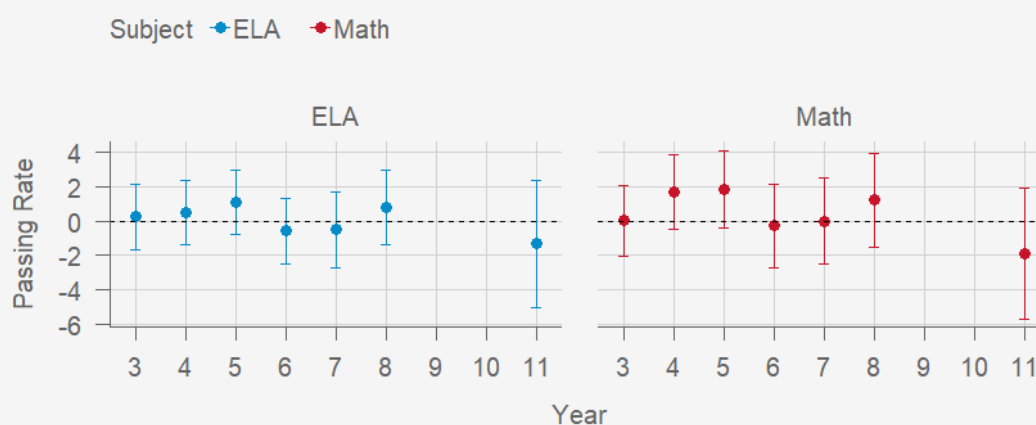
*p<0.1; **p<0.05; ***p<0.01

The result from the above analysis fails to find support for the argument that additional competitive pressures from private schools after the expansion of Arizona's ESA program meaningfully affected the performance of public schools. There are a few potential interpretations. This could be interpreted as a lack of statistically significant negative effects which would provide evidence against the idea that cream skimming can harm public school students by diminishing the quality of their peers. Alternatively, this finding could be interpreted as evidence against the claim that moving students out of struggling public schools will require those schools to improve to retain students. It could be that a combination of both effects occurs, but their magnitude and direction are such that the combined effects are null. Regardless of the interpretation of these results, the primary implication for education policy is that policymakers should not make universal school voucher policy based on the potential impacts it might have on public school students who choose not to participate in the voucher program. Instead, policymakers should consider the potential harms or benefits to students utilizing the program, budget implications, and ethical concerns regarding program motivation and design.

While the above approach considers each grade level and subject equally, such an approach can be improved by looking at the effect of the ESA expansions on individual grades in particular subjects. Figure 8 demonstrates the individual grade- and subject-level estimates of the difference-in-difference specification, with dots at the regression estimates and error bars depicting a 95% confidence level. For both ELA and Math in each grade level the coefficient estimates are small while the standard errors are large. The error bars overlap with 0 considerably, demonstrating a lack of statistical significance of the estimates at a 95% confidence level. Notably, estimates are not uniformly in the negative or positive direction. This gives an additional layer of evidence, beyond a lack of statistical significance, that the effect of the ESA expansion was neither negative nor positive. Considered alongside the full difference-in-differences specification, this additional evidence supports the argument that student performance as measured by the percentage of students passing state exams was not meaningfully different after the ESA expansion.

Figure 8

Passing Rates by Year and Treatment Status, Complete Four Years



Source: Arizona Department of Education.

The above findings have a handful of limitations. The primary limitation is that because the data is reported at a school level for each test, this analysis cannot speak to any impacts of private school competition on specific students. Data availability also limits the results due to the short time periods available for analysis. Prior to 2021, data availability is cut off by the COVID pandemic and changes in the state test, creating a gap for data in 2020 and issues with comparing pre-2020 passing rates to post-2020 passing rates. COVID also brings concerns with potential long-term harms to student achievement that could underlie the trends this paper seeks to analyze. Additional concerns are introduced by state reporting requirements, which mask results for observations with fewer than ten students to protect their privacy. This necessarily means that the average observation in the sample is larger than the average observation would be in a fully representative sample. Due to difference in the size of schools included in estimates compared to those excluded, the results may be more relevant for mid-sized to large schools in Arizona, while having limited implications for smaller schools. Other limitations relate to the unique demographic and policy environments in Arizona, which are not necessarily generalizable to other contexts. Caution should be taken when attempting to generalize these results outside of the specific contexts in which they were derived. With these limitations in mind, the results of this paper contribute to a large body of literature that has shown mixed results for small school voucher programs across the United States. Currently, it is the only empirical analysis of a universal voucher program in the United States, and its findings are limited to the lack of an effect of private school competition on public school performance as measured by the percentage of students passing English Language Arts and Math state exams after the expansion of Arizona's Empowerment Scholarship Account program.

Future analysis could improve on these findings in several ways. First, using student level data may provide more accurate estimates of treatment effects by illuminating how individual students are affected by the policy implementation. Such analysis could benefit the literature by describing the effects on students who use vouchers after universal expansions, as well as by providing smaller units of analysis for the effect on public school students. Second, the above analysis only examines the effect of private competition on passage rates on state exams. However, the state also publishes four proficiency levels for each exam. These proficiency levels are a more specific representation of how students fare on aggregate in each school and are especially important if teachers and administrators are expected to target additional academic resources at students just below passing thresholds. If this were the case, it would result in a lower proportion of students in the second proficiency level and a greater percentage in the third proficiency level. Future analyses could take advantage of these proficiency levels to examine how the distribution of student performance is impacted by universal voucher expansions. This paper does not conduct such an analysis. Third, this paper does not consider the effect of competition on specific demographic groups. If certain demographic groups were more likely to be targeted by private school programs or universal voucher expansions, it is plausible that these groups would see improvements that other demographic groups would not have due to targeting by teachers and administrators. Such patterns could be obscured by examining high level aggregate data on the percentage of students passing state exams. Finally, additional research should be conducted on other universal voucher expansions across the United States. Currently, data on these programs and their results are extremely limited due to their novelty. However, as data becomes available, it will be critical for researchers to verify the findings described above by conducting similar analyses on other programs.

Discussion

Given the available evidence, it is unclear whether school voucher policies positively or negatively affect users. Previous studies focused on targeted programs with substantially fewer participants and demonstrated mixed results. The preliminary analysis in this paper adds to the existing literature by showing that private competition did not create measurable improvements in public school performance following the implementation of a universal voucher program. This can be interpreted in a positive manner by arguing it disproves potential harms to public schools, or in a negative manner by arguing it disproves competitive benefits as a justification for widespread voucher programs. Regardless, with a large degree of uncertainty on the effectiveness of voucher programs on improving student outcomes, ethical considerations must be the center of the education policy discussion while additional research is conducted. This section explores the ethical dimensions of universal school choice. Using David Labaree's purposes of education as a framework, this section argues that the government has a unique obligation to prioritize the public purposes of education over the private purposes. Additionally, it argues that while the universal school choice movement over-emphasizes the private purposes of education, their concerns are rooted in valid desires for student success. Finally, this section proposes a potential path forward given the competing claims of the private and public purposes of education to salvage the positive potential of school choice mechanisms.

Purposes of Education

To understand competing claims on either side of the universal school choice movement, it is useful to establish a framework for analyzing the purposes of education. Establishing such a framework is not just useful for analyzing competing claims but also for understanding the underlying motivations behind different arguments. As David Labaree explains,

[T]he central problems with American education are not pedagogical or organizational or social or cultural in nature but are fundamentally political ... the problem is not that we do not know how to make schools better but that we are fighting among ourselves about what goals schools should pursue (1997, p. 40).

Therefore, without understanding the different perspectives on what goals schools should pursue normative assessments are impossible. Labaree describes three unique and often competing purposes of education: democratic equality, social efficiency, and social mobility (Labaree, 1997). Democratic equality defines schools as spaces to prepare students to play constructive roles in democratic society. This purpose requires schools to train students as future citizens and to minimize social and economic inequality. If inequalities are too large, democratic society may fracture. Social efficiency envisions schools as tools for economic well-being. Schools, therefore, are investments to improve productivity of future workers to ensure the long-term economic stability of the polity. Social mobility, the final purpose, commodifies education as a way for students to acquire competitive advantage relative to other students as they struggle for various social and economic opportunities. Though these three purposes often conflict, each is a meaningful goal for the government to pursue. Labaree further argues the primary political difference between the goals is positional, where the democratic equality goal comes from the perspective of a citizen, social efficiency from the taxpayer and the employer, and social mobility from the educational consumer (1997).

This understanding of the potential purposes of education raises important questions even without considering specific policies. Each goal has distinctions and parallels with other goals. Democratic equality and social efficiency both center education as a tool for the public good. Students who are well educated are better able to support democratic institutions while

simultaneously contributing meaningfully to the economy, both of which benefit the public good by stabilizing the polity. Simultaneously, social efficiency and social mobility both advance private goods, with the former advancing the needs of the market and the latter the consumption needs of the individual (Labaree, 1997). The potential conflicts between different goals are apparent. If an individual seeks to distinguish themselves from other individuals in the market, this has the potential to exacerbate social and economic inequalities, striking at the heart of democratic equality. Alternatively, the pursuit of egalitarian goals both undermines individual desires to differentiate themselves but can also conflict with social efficiency. Truly equal outcomes conflict with the stratification required to place students into useful economic roles needed to sustain the economy. Similarly, the need for stratification is jeopardized by the pursuit of differentiating credentials on the individual level. A race to the top caused by individuals seeking to advance their interests necessarily conflicts with placing students within the existing economic structures. Disentangling these purposes and motivations in the context of universal school vouchers will help to define the appropriate framework for such programs.

Conflict Between Universal Vouchers and Public Purposes of Education

Due to the conflicting purposes of education, much of the universal school choice movement and debate about privatization of education can be understood as valuing different approaches to the purposes of education. Support for universal school vouchers typically arises from a greater weight on schools as tools for social mobility. This support can analogously be understood as most universal school voucher supporters evaluating education from a consumerist position, rather than the perspective of a citizen or an employer. Using Labaree's framework, support for universal school vouchers can be understood as the result of hyper focusing on social

mobility, and that refocusing the debate from the perspective of the citizen and the employer to focus on public goods shows universal vouchers are unethical.

Universal school voucher supporters defend such policies through the lens of educational consumers and focus on the private returns to education rather than public ones. Arguments of this nature focus on the ability to improve outcomes, personalize education, and protect parents' rights. Education consumers envision school choice programs as life-changing tools:

[They] can transform your child's learning experience. It can lead to a more personalized education, one that aligns with their strengths, interests, and aspirations. Whether your child thrives in smaller class sizes, needs a curriculum tailored to their learning pace, or benefits from a more hands-on, project-based approach, there's likely a school out there that fits their needs better than the default option. (Kumar, 2024)

Therefore, because the educational consumer seeks the best personal outcomes from education, they strongly support universal school vouchers. In their mind, school vouchers can help their children be more academically successful, allow them to have a specialized education, and enable parents to be more invested in their children's education. These supporters use consumerist language to defend their position, saying parents who use school choice mechanisms are "investing in [their] child's future" with larger expected long-run returns. Parents behaving as education consumers who want the best for their children is admirable. However, this approach comes at the cost of the public purposes of education, social efficiency, and democratic equality. Some advocates go as far as to explicitly name social mobility as education's "fundamental purpose," casting the others aside (Fletcher, 2024). This narrow view of education ignores the potential for schools to train employees and citizens, critical outcomes for education systems.

While parents can reasonably approach education as consumers, governments should balance the perspective of consumers, employers, and citizens to consider each of the purposes of education. Even Milton Friedman, a free market advocate and early supporter of school voucher programs recognized that the need for government support of education arose from the public goods produced from education (1962). The universal school voucher movement undermines the government's goal to advance public purposes of education both in democracy building and employee development. The movement's "radical decentralization ... greatly affect[s] the democracy-building mission of the public schools" especially because it may "expose students to less social and cultural diversity" (Grier & Sheasley, 2022). While not all universal school choice supporters desire homogenous learning environments, many supporting organizations have defended homogeneity. For example, Moms for America argues that classrooms that teach about inequity, emphasize social and emotional learning, and educate students about diversity of gender and sexual orientation are "pushing ideological curricula" detrimental to student success and "represents a grave threat" to children (Fletcher, 2024). Teaching about diverse cultures and views is key to democracy preservation and community building. While it would be unethical to prohibit parents from seeking private education, public funds should not be utilized in pursuit of goals antithetical to democratic equality. Families wishing to send their children to ideologically homogenous schools should do so only using private funds and scholarships, without government endorsement. Beyond undermining the government's interest in democracy preservation, universal school vouchers also undermine the social efficiency goals of public education. If universal school vouchers are the primary path toward improved educational outcomes, these improved outcomes will only be seen by the portion of families who have the necessary resources to utilize them. With school choice

mechanisms, families with more time to gather information and compare options will have better access to top schools, and these families are often wealthier. Additionally, private schools have a history of pushing out low-achieving students and students with special needs, due to the need to maintain high test averages to attract students (Waddington et al., 2023). These factors make private schools an untenable option for educating every student and increase social and economic stratification that is antithetical to democratic equality. A comprehensive way to improve outcomes for every student is to invest more into public education, which serves all students, rather than create a universal school voucher program accessible only to some. The only way a universal school voucher program would be defensible from the social efficiency perspective would be if increased competition improved outcomes across the board, but the available research does not support this claim. As such, only a well-funded public school system can improve outcomes for every student, improving the quality of the average employee, and fulfilling the social efficiency purpose of public education. Since governments should design policy while considering each of the three purposes of education, it is essential they prioritize other policy solutions, not universal school vouchers.

A Path Forward

Despite tensions between fulfilling each of the purposes of education and the consumerist approach of the school voucher movement, school voucher policy is salvageable. School voucher policy, when existing within a larger portfolio of school choice mechanisms like charter schools and a well-funded public school system, has a place in education. However, effective school voucher policy would require specific, intentional design that is unlikely given the current trajectory. While previous education policy movements have focused on improving measurable student achievement, the voucher movement has pushed forward despite negative results due to

political motivations. Historically, political motivations took the form of using school voucher programs “as a way around the *Brown* decision but also as an attempt to stop the progress of integration efforts completely and establish ‘white flight academies’” (Weil, 2002, p. 49). In the modern school voucher movement, this politicization takes a similar form, where movement leaders like former Secretary of Education Betsey DeVos and organizations like Moms for Liberty capitalizing on culture war issues to push their agenda. In this context, “school vouchers ... must then be considered exactly alongside book bans, salvos on the issues of race and diversity, gender identity, and sexuality” as examples advocates cite to defend their push to redirect students and funding from public schools to private ones (Cowen, 2024, p. 123). By using school vouchers as a mechanism to create schools without these subjects, movement leaders obscure the true desires of most school voucher supporters:

Very little of the public support for private school vouchers is due to a strong philosophy or ideology regarding government-neoliberal or otherwise; nor is it a result of hidden business interests or even a certain religious orientation. Private school vouchers enjoy a great deal of support among parents because they offer a promise, if not the reality, that their children might escape what they believe are failing public schools ... Many parents think that vouchers would finally free their children to go to the best schools, which until now have been reserved for the more affluent (Weil, 2002, p. 69).

Disregarding legitimate interests of parents to pursue the best education for their children would be a denial of the social mobility purpose of education and therefore be equally problematic as a sole focus on social mobility. Unfortunately, despite these legitimate interests, the leaders of the school voucher movement push the movement on political grounds, rather than educational ones, and make it unlikely that effective, apolitical school voucher policy will be implemented.

Though the current movement advocates for vouchers without specific concern for improving education, carefully designed school voucher programs can help improve educational outcomes. Failed programs in Louisiana, Washington, D.C., Indiana, and Ohio teach that school voucher programs are unlikely to improve outcomes for students unless they are small, targeted programs with oversight and regulation. However, the current policy momentum is moving the opposite direction toward universal programs. As this continues, results will continue to be negative. A return to targeted programs for special needs students who struggle to find support in the public school system would allow them to fulfill their specific needs. Having alternative options can benefit low-income students and students in failing public schools and secure social mobility. However, if school vouchers are to be successful, it will require a re-evaluation of educational priorities and a faithful attempt to fulfill vouchers' educational – not political – potential. Free choice in education should be encouraged, but school voucher programs should target students with the most need, while imposing strict participation limits to ensure the policy is not a blank check to wealthy families whose children already have access private schools. Oversight on participating private schools should be included to incentivize high quality education and prevent discrimination. Most importantly, school voucher programs should not replace meaningful investments in the quality of public school options. Public schools, not private schools, serve all children, without regard to socioeconomic status or religious orientation, and are therefore key to ensuring that all students can succeed. School voucher programs have immense potential to help students, especially when legislation includes government oversight, standardized testing requirements, and public reporting standards (Cowen, 2024). Only careful policy design can protect state budgets, student success, and democracy.

Conclusion

As the school voucher movement has grown in recent years, it is important to address the empirical and ethical issues that can arise from increased school privatization. While support for school voucher programs has been largely political throughout history, there are supporters with apolitical motivations. Most advocates want what is best for their children and to offer a lifeline to students in struggling schools. The existing literature shows that for some carefully designed, limited school voucher programs both voucher users and public school students benefit. However, the recent universal school voucher expansions across the United States do not resemble previous successful programs. Rather, they are politically motivated subsidies for families whose children already attended private schools instead of a mechanism to improve education opportunities for children in need. This paper adds to the empirical literature by analyzing the impact of Arizona's universal Empowerment Scholarship Account program and demonstrating that the program left public schools unaffected by private school competition. Additional work needs to be done to analyze how students who take advantage of the program fare in private schools, though data on student outcomes is not readily publicly available. This paper also provides an ethical analysis of school voucher programs broadly motivated by the available evidence on previous programs and the emerging evidence on universal programs. Though school vouchers can be useful tools to improve education outcomes for students, they will only do so if they are carefully designed. Such a design would include careful limits on participation to ensure only students who previously lacked access to private school alternatives are included, as well as oversight mechanisms to ensure private schools are equitable and meet minimum curriculum standards. Anything less would continue the voucher movement's path of politics, not progress.

References

- Abdulkadiroğlu, A., Pathak, P. A., & Walters, C. R. (2018). Free to Choose: Can School Choice Reduce Student Achievement? *American Economic Journal: Applied Economics*, 10(1), 175–206. <https://doi.org/10.1257/app.20160634>
- Aldis, A. (2024, July 11). *Gifted education important to parents in latest monthly poll*. EdChoice. <https://www.edchoice.org/engage/gifted-education-important-to-parents-in-latest-monthly-poll/>
- Alexander, K. (2012). Asymmetric Information, Parental Choice, Vouchers, Charter Schools and Stiglitz. *Journal of Education Finance*, 38(2), 170–176.
<http://www.jstor.org/stable/23353972>
- Arizona Center for Economic Progress. (2023). *Arizona School Vouchers, Explained*.
<https://azeconcenter.org/arizona-school-vouchers-explained/>
- Arizona Department of Education. (2022a). *Empowerment Scholarship Account (ESA): Quarterly Report to the Arizona State Board of Education Fiscal Year 2022 Quarter 4*.
<https://www.azed.gov/sites/default/files/2022/09/FY2022%20Q4%20ESA%20Report.pdf>
- Arizona Department of Education. (2022b). *Empowerment Scholarship Account (ESA): Quarterly Report to the Arizona State Board of Education Fiscal Year 2023 Quarter 1*.
<https://www.azed.gov/sites/default/files/2022/11/FY2023%20Q1%20SBE%20Report.pdf>
- Arizona Department of Education. (2023a). *AZ School Report Cards: 2021-2022 School Year*.
<https://azreportcards.azed.gov/state-reports>
- Arizona Department of Education. (2023b). *Parent Handbook: Empowerment Scholarship Account Program School Year 2023-2024*.

<https://www.azed.gov/sites/default/files/2023/05/ESA-2023-24-Parent-Handbook-FINAL-PROOF.pdf>

Arizona Department of Education, (2024a). *Accountability and Research Data* [Data sets].

<https://www.azed.gov/accountability-research/data/>

Arizona Department of Education. (2024b). *Arizona Empowerment Scholarship Account (ESA) Program: Fiscal Year 2024 Quarter 3 Report*.

https://www.azed.gov/sites/default/files/2024/08/Q3%20FY2024%20ESA%20Report_SBE.pdf

Arizona Department of Education. (2024c). *Fiscal Year 2023 October 1 Enrollment* [Data set].

<https://www.azed.gov/accountability-research/data>

Arizona Christian School Tuition Organization v. Winn, 563 U.S. 125 (2011).

Barreca, A., Lindo, J., & Waddell, G. (2011). Heaping-Induced Bias in Regression-Discontinuity Designs. *National Bureau of Economic Research*. <https://doi.org/10.3386/w17408>

Bowen, D. H., & Trivitt, J. R. (2014). Stigma without Sanctions: The (Lack of) Impact of Private School Vouchers on Student Achievement. *Education Policy Analysis Archives*, 22, 87. <https://doi.org/10.14507/epaa.v22n87.2014>

Brenan, M. (2024, August 28). *Americans' view of K-12 education improves from 2023 low*.

Gallup. <https://news.gallup.com/poll/649385/americans-view-education-improves-2023-low.aspx>

Breunlin, E. (2024, November 7). *Amendment 80 fails: Right to school choice won't be added to Colorado's Constitution*. The Colorado Sun.

<https://coloradosun.com/2024/11/07/amendment-80-results-colorado/>

- Bryant, J. (2024, February 26). *The right's long game to end public education*. The Progressive Magazine. <https://progressive.org/public-schools-advocate/the-right%E2%80%99s-long-game-to-end-public-education/>
- Burke, L. (2022, August 18). *The data prove education choice is a winner for students and taxpayers*. The Heritage Foundation.
<https://www.heritage.org/education/commentary/the-data-prove-education-choice-winner-students-and-taxpayers>
- Camilli, G., & Bulkley, K. (2001). Critique of "An Evaluation of the Florida A-Plus Accountability Program". *Education Policy Analysis Archives*, 9, 7.
<https://doi.org/10.14507/epaa.v9n7.2001>
- Carr, M. (2011). The Impact of Ohio's EdChoice on Traditional Public School Performance. *Cato Journal*, 31(2), 257-284.
https://ciaotest.cc.columbia.edu/journals/cato/v31i2/f_0022698_18682.pdf
- Center for Education Reform. (1993). *School Choice in the United States: State by State Analysis, 1993*. <https://edreform.com/wp-content/uploads/2013/03/School-Choice-State-by-State-1993.pdf>
- Chakrabarti, R. (2008). Can increasing private school participation and monetary loss in a voucher program affect public school performance? Evidence from Milwaukee. *Journal of Public Economics*, 92(5–6), 1371–1393. <https://doi.org/10.1016/j.jpubeco.2007.06.009>
- Chingos, M. M., & Kisida, B. (2022). School Vouchers and College Enrollment: Experimental Evidence from Washington, DC. *Educational Evaluation and Policy Analysis*, 45(3), 422–436. <https://doi.org/10.3102/01623737221131549>

- Chingos, M. M., Kuehn, D., Monarrez, T., Wolf, P. J., Witte, J. F., & Kisida, B. (2019). *The Effects of Means-Tested Private School Choice Programs on College Enrollment and Graduation*. Center on Education Data and Policy.
https://www.urban.org/sites/default/files/publication/100665/the_effects_of_means-tested_private_school_choice_programs_on_college_enrollment_and_graduation_2.pdf
- Cowen, J. (2024). *The Privateers: How Billionaires Created a Culture War and Sold School Vouchers*. Harvard Education Press.
- Cowen, J. & Nowak, R. D. (2024). *How can states make school voucher systems more accountable, accessible, and transparent?* Boulder, CO: National Education Policy Center. Retrieved 23 October 2024 from <http://nepc.colorado.edu/publication/voucher-accountability>
- Davies, G. (2007). *See Government Grow: Education Politics from Johnson to Reagan*. University Press of Kansas.
- Dynarski, M., & Nichols, A. (2017, July 13). *More findings about school vouchers and test scores, and they are still negative*. Brookings. <https://www.brookings.edu/articles/more-findings-about-school-vouchers-and-test-scores-and-they-are-still-negative/>
- Dynarski, M., Rui, N., Webber, A., and Gutmann, B. (2018). *Evaluation of the DC Opportunity Scholarship Program: Impacts Two Years After Students Applied* (NCEE 2018-4010). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education.
- EdChoice. (2023). *Original Individual Income Tax Credit Scholarship Program*.
<https://www.edchoice.org/school-choice/programs/arizona-original-individual-income-tax-credit-scholarship-program/>

- Egalite, A. J., & Catt, A. D. (2020). *Competitive Effects of the Indiana Choice Scholarship Program on Traditional Public School Achievement and Graduation Rates* (2020-3). EdChoice. <https://files.eric.ed.gov/fulltext/ED609380.pdf>
- Erickson, H.H., Mills, J., & Wolf, P.J. (2019). The Effects of the Louisiana Scholarship Program on Student Achievement and College Entrance. *Education Reform Faculty and Graduate Students Publication*. Retrieved from <https://scholarworks.uark.edu/edrepub/79>
- Fennell, C. (2024, June 1). *New survey finds private and charter school teachers most likely to recommend profession*. EdChoice. <https://www.edchoice.org/media/new-survey-finds-private-and-charter-school-teachers-most-likely-to-recommend-profession/>
- Figlio, D. N., & Rouse, C. E. (2006). Do accountability and voucher threats improve low-performing schools? *Journal of Public Economics*, 90(1–2), 239–255.
<https://doi.org/10.1016/j.jpubeco.2005.08.005>
- Fletcher, K. (2024, April 2). *School choice is key to ensuring parents' rights*. Newsweek.
<https://www.newsweek.com/school-choice-key-ensuring-parents-rights-opinion-1884991>
- Ford, M. (2015). Nailing Shut the Policy Window: The Policy Evolution of America's First Urban School Voucher Program. *Journal of Public and Nonprofit Affairs*, 1(2), 87–99.
<https://doi.org/10.20899/jpna.1.2.87-99>
- Fougère, D. & Jacquemet, N. (2023). Difference-in-differences Method. In A. Revillard (Ed.), *Policy Evaluation: Methods and Approaches*. Quebec City: Éditions science et bien commun.
<https://scienceetbiencommun.pressbooks.pub/pubpolevaluation/chapter/difference-in-differences-method/>
- Friedman, M. (1962). *Capitalism and Freedom*. The University of Chicago Press.

- Garcia, J. (2024, November 6). *Every Kentucky County voted against Amendment 2*. WHAS 11. <https://www.whas11.com/article/news/education/amendment-2-kentucky-results-county-by-county-school-choice-measure/417-0ca52a5a-88de-4b3d-865a-b39f76a9ac4a>
- Goodwin, J. (2023, February 7). *Voucher schemes are failing students with disabilities*. The Progressive Magazine. <https://progressive.org/public-schools-advocate/vouchers-failing-students-with-disabilities-goodwin-7223/>
- Greene, J. P. (2001). *An Evaluation of the Florida A-Plus Accountability and School Choice Program*. Center for Civic Innovation. https://media4.manhattan-institute.org/pdf/cr_aplus.pdf
- Greene, J. P. (2023, April 3). *The empty and expensive promise of school voucher programs*. The Progressive Magazine. <https://progressive.org/public-schools-advocate/empty-expensive-school-vouchers-greene-030423/>
- Greene, J. P., & Marsh, R. H. (2009). *The Effect of Milwaukee's Parental Choice Program on Student Achievement in Milwaukee Public Schools*. School Choice Demonstration Project. <https://files.eric.ed.gov/fulltext/ED530091.pdf>
- Greene, J. P., Peterson, P. E., & Du, J. (1999). Effectiveness of School Choice: The Milwaukee Experiment. *Education and Urban Society*, 31(2), 190-213. <https://doi.org/10.1177/0013124599031002005>
- Greene, J. P., & Winters, M. (2007). An Evaluation of the Effect of DC's Voucher Program on Public School Achievement and Racial Integration After One Year. *Journal of Catholic Education*, 11(1). <https://doi.org/10.15365/joce.1101072013>
- Grier, P., & Sheasley, C. (2022, August 18). *Public education, democracy, and the Future of America*. The Christian Science Monitor.

<https://www.csmonitor.com/USA/Education/2022/0608/Public-education-democracy-and-the-future-of-America>

Griffith, M. & Burns, D. (2024). *Understanding the Cost of Universal School Vouchers: An Analysis of Arizona's Empowerment Scholarship Account Program*. Learning Policy Institute.

https://learningpolicyinstitute.org/media/4193/download?inline&file=Universal_School_Vouchers_REPORT.pdf

Hanushek, E. A., Kain, J. F., & Rivkin, S. G. (2004). Disruption versus Tiebout improvement: the costs and benefits of switching schools. *Journal of Public Economics*, 88(9–10), 1721–1746. [https://doi.org/10.1016/s0047-2727\(03\)00063-x](https://doi.org/10.1016/s0047-2727(03)00063-x)

Hlavac, Marek (2022). *stargazer: Well-Formatted Regression and Summary Statistics Tables. R package version 5.2.3*. <https://CRAN.R-project.org/package=stargazer>

Hoxby, C. (2002). *School Choice and School Productivity (or Could School Choice be a Tide that Lifts All Boats?)*. National Bureau of Economic Research. <https://doi.org/10.3386/w8873>

Huntington-Klein, N. (2023, April 20). Controls in Difference-in-Differences Don't Just Work: Covariation, Violation, Frustration. *Substack*. <https://nickchk.substack.com/p/controls-in-difference-in-differences#footnote-3-116117427>

Jimenez, K. (2024, November 7). *Voters rejected multiple school choice measures in 2024 election*. USA Today. <https://www.usatoday.com/story/news/education/2024/11/06/school-choice-failed-2024-election/76091645007/>

Kumar, A. (2024, September 6). *Are our children truly supported?* EdChoice.

<https://www.edchoice.org/engage/are-our-children-truly-supported/>

Labaree, D. F. (1997). Public Goods, Private Goods: The American Struggle over Educational Goals. *American Educational Research Journal*, 34(1), 39.

<https://doi.org/10.2307/1163342>

Lieberman, M. (2024a, September 19). *Private school choice in the 2024 election, explained.*

Education Week. <https://www.edweek.org/policy-politics/private-school-choice-in-the-2024-election-explained/2024/09>

Lieberman, M. (2024b, November 7). *Voters rejected private school choice. A Trump*

administration may push it anyway. Education Week. <https://www.edweek.org/policy-politics/voters-rejected-private-school-choice-a-trump-administration-may-push-it-anyway/2024/11>

Lovenheim, M., & Turner, S. (2018). *Economics of Education*. Worth Publishers.

Lueken, M., & Conway, C. (2024, October 15). *New research: The fiscal effects of school*

choice: The costs and savings of Private School Choice Programs in America through FY 2022. EdChoice. <https://www.edchoice.org/engage/the-fiscal-effects-of-school-choice/>

Manzi, N., & Larson, L. (1999). *Income Tax Deductions and Credits for Public and Nonpublic*

Education in Minnesota. Minnesota House of Representatives Research Department. <https://www.house.mn.gov/hrd/pubs/edcred.pdf>

Menas, A. (2020, September 28). *School vouchers – an enduring racist practice.* National

Education Association. <https://www.nea.org/advocating-for-change/new-from-nea/school-vouchers-enduring-racist-practice>

- Miller, B. (n.d.). *Understanding charter schools vs. public schools*. Education Degree.
<https://www.usnews.com/education/k12/articles/understanding-charter-schools-vs-public-schools>
- Miller, D. L. (2023). An Introductory Guide to Event Study Models. *Journal of Economic Perspectives*, 37(2), 203–230. <https://doi.org/10.1257/jep.37.2.203>
- Mills, J., & Wolf, P. (2019). The Effects of the Louisiana Scholarship Program on Student Achievement after Four Years. *SSRN Electronic Journal*.
<https://doi.org/10.2139/ssrn.3376230>
- National Center for Education Statistics. (2022a). *Arizona Private Schools* [Data set].
https://nces.ed.gov/surveys/pss/privateschoolsearch/school_list.asp?Search=1&SchoolName=&SchoolID=&Address=&City=&State=04&Zip=&Miles=&County=&PhoneAreaCode=&Phone=&Religion=&Association=&SchoolType=&Coed=&NumOfStudents=&NumOfStudentsRange=more&IncGrade=-1&LoGrade=-1&HiGrade=-1
- National Center for Education Statistics. (2022b). *Private School Universe Survey (PSS) 2021-22* [Data set]. <https://nces.ed.gov/surveys/pss/pssdata.asp>
- National Center for Education Statistics. (2023a). *Education Demographic and Geographic Estimate Public School Locations* [Data set]. <https://data-nces.opendata.arcgis.com/datasets/nces::public-school-locations-current-1/about>
- National Center for Education Statistics. (2023b). *Private elementary and secondary schools, enrollment, teachers, and high school graduates, by state: Selected years, 2009 through 2021* [Data set]. https://nces.ed.gov/programs/digest/d23/tables/dt23_205.80.asp
- National Center for Education Statistics. (2024). *CCD public school data* [Data set].
https://nces.ed.gov/ccd/schoolsearch/school_list.asp?Search=1&InstName=&SchoolID=

&Address=&City=&State=04&Zip=&Miles=&County=&PhoneAreaCode=&Phone=&DistrictName=&DistrictID=&SchoolType=1&SchoolType=2&SchoolType=3&SchoolType=4&SpecificSchlTypes=all&IncGrade=-1&LoGrade=-1&HiGrade=-1

Ordway, D. M. (2024, January 31). *Private School Vouchers: Research to help you assess school choice programs*. The Journalist's Resource.

<https://journalistsresource.org/education/private-school-vouchers-school-choice-research-2/>

Pebesma, E. (2018). Simple Features for R: Standardized Support for Spatial Vector Data. *The R Journal* 10 (1), 439-446, <https://doi.org/10.32614/RJ-2018-009>

Rouse, C. E. (1998). Private School Vouchers and Student Achievement: An Evaluation of the Milwaukee Parental Choice Program. *The Quarterly Journal of Economics*, 113(2), 553-602. <http://www.jstor.org/stable/2586913>

Stanford, L., Lieberman, M. & Ifatusin, V. A. (2024, September 25). *Which States Have Private School Choice?* EducationWeek. <https://www.edweek.org/policy-politics/which-states-have-private-school-choice/2024/01>

United States Census Bureau. (2024). *Summary Tables: Public Elementary-Secondary Education Finances: Fiscal Year 2022* [Data set].

<https://www.census.gov/data/tables/2022/econ/school-finances/secondary-education-finance.html>

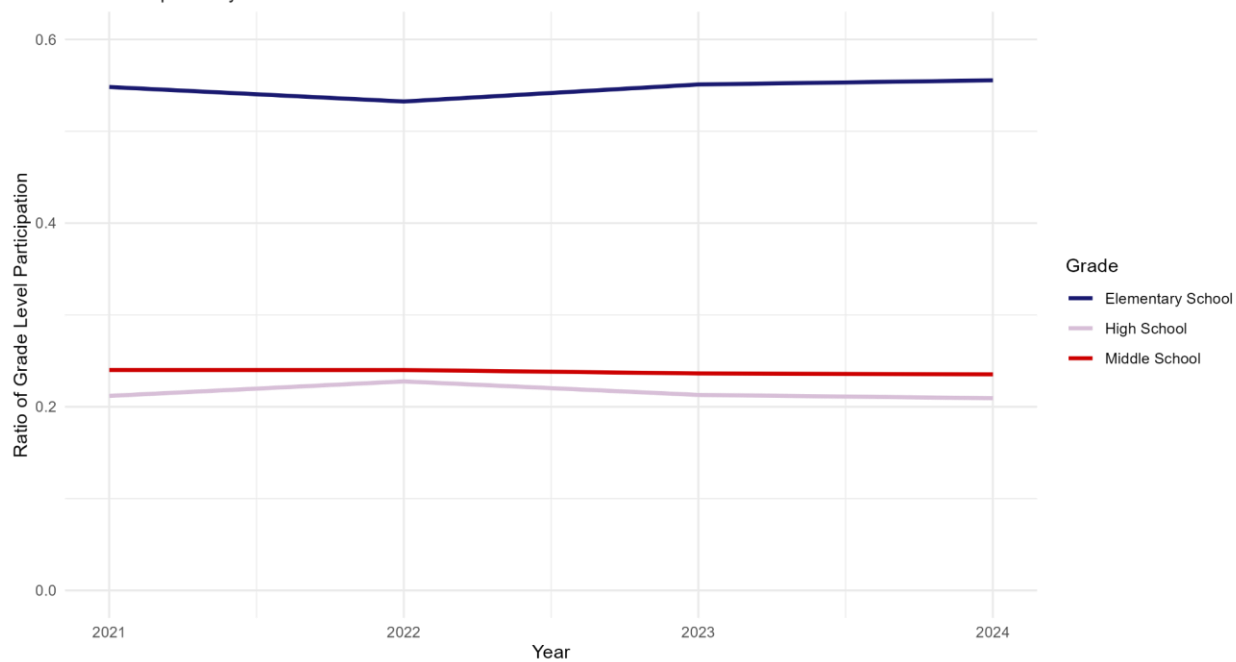
Waddington, R. J., & Berends, M. (2018). Impact of the Indiana Choice Scholarship Program: Achievement Effects for Students in Upper Elementary and Middle School. *Journal of Policy Analysis and Management*, 37(4), 783–808. Portico. <https://doi.org/10.1002/pam.22086>

- Waddington, R. J., Zimmer, R., & Berends, M. (2023). Cream Skimming and Pushout of Students Participating in a Statewide Private School Voucher Program. *Educational Evaluation and Policy Analysis*. <https://doi.org/10.3102/01623737231183397>
- Wang, G., Hamad, R., & White, J. S. (2024). Advances in Difference-in-differences Methods for Policy Evaluation Research. *Epidemiology*, 35(5), 628–637.
<https://doi.org/10.1097/ede.0000000000001755>
- Webber, A., Rui, N., Garrison-Mogren, R., Olsen, R. B., and Gutmann, B (2019). *Evaluation of the DC Opportunity Scholarship Program: Impacts Three Years After Students Applied (NCEE 2019-4006)*. Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education.
- Weil, D. (2002). *School Vouchers and Privatization*. ABC-CLIO.
- Winn v. Arizona Christian School Tuition Organization*, 562 F.3d 1002 (9th Cir. 2009).
- Wickham, H., Averick, M., Bryan, J., Chang, W., McGowan, L. D., François, R., Grolemond, G., Hayes, A., Henry, L., Hester, J., Kuhn, M., Pedersen, T. L., Miller, E., Bache, S. M., Müller, K., Ooms, J., Robinson, D., Seidel, D. P., Spinu, V., Takahashi, K., Vaughan, D., Wilke, C., Woo, K., & Yutani, H. (2019). “Welcome to the tidyverse.” *Journal of Open Source Software*, 4(43), 1686. doi:10.21105/joss.01686
- Wickham, H., & Bryan, J. (2023). *readxl: Read Excel Files*. R package version 1.4.3, <https://CRAN.R-project.org/package=readxl>.
- Wolf, P. J., Kisida, B., Gutmann, B., Puma, M., Eissa, N., & Rizzo, L. (2013). School Vouchers and Student Outcomes: Experimental Evidence from Washington, DC. *Journal of Policy Analysis and Management*, 32(2), 246–270. <http://www.jstor.org/stable/42001528>
- Zelman v. Simmons-Harris*, 536 U.S. 639 (2002).

Appendices

Appendix A

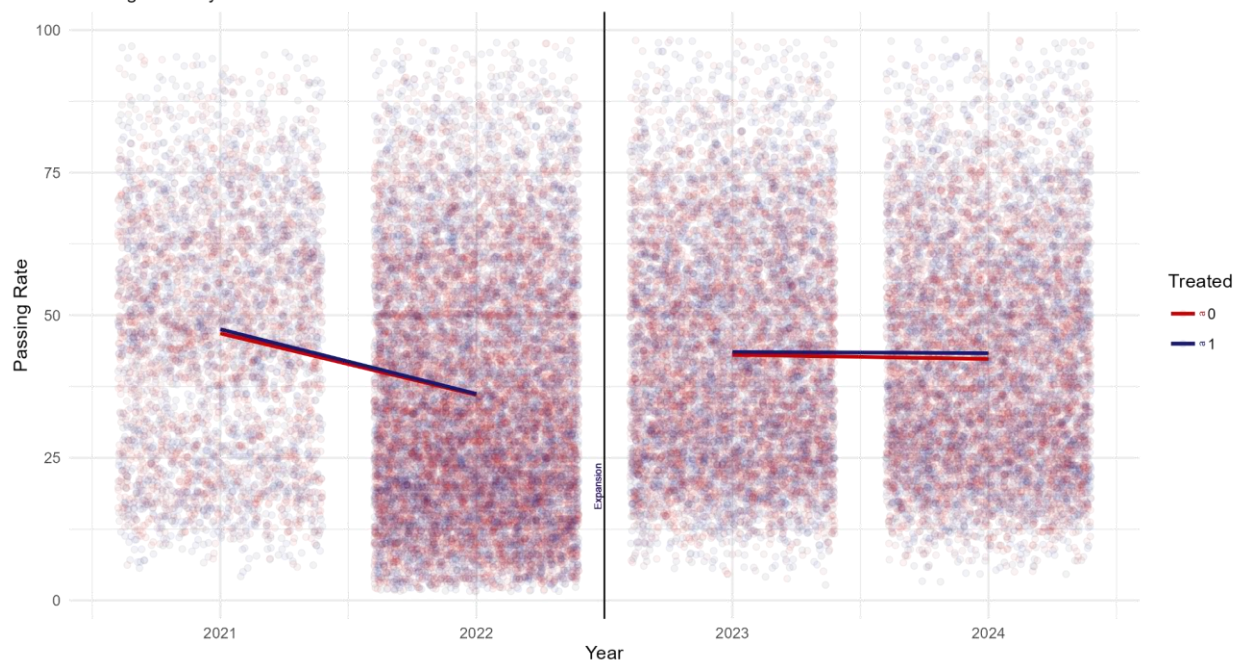
ESA Participation by Grade Level



Source: Arizona Department of Education Quarterly ESA Reports

Appendix B

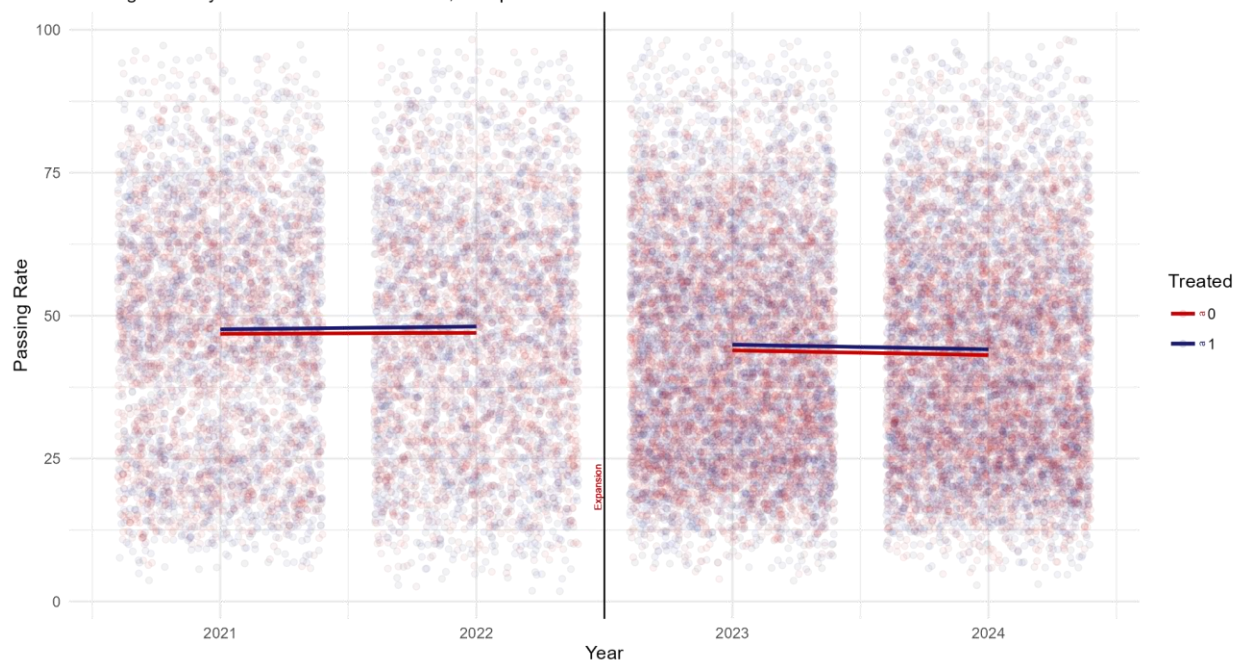
Passing Rates by Year and Treatment Status



Source: Arizona Department of Education

Appendix C

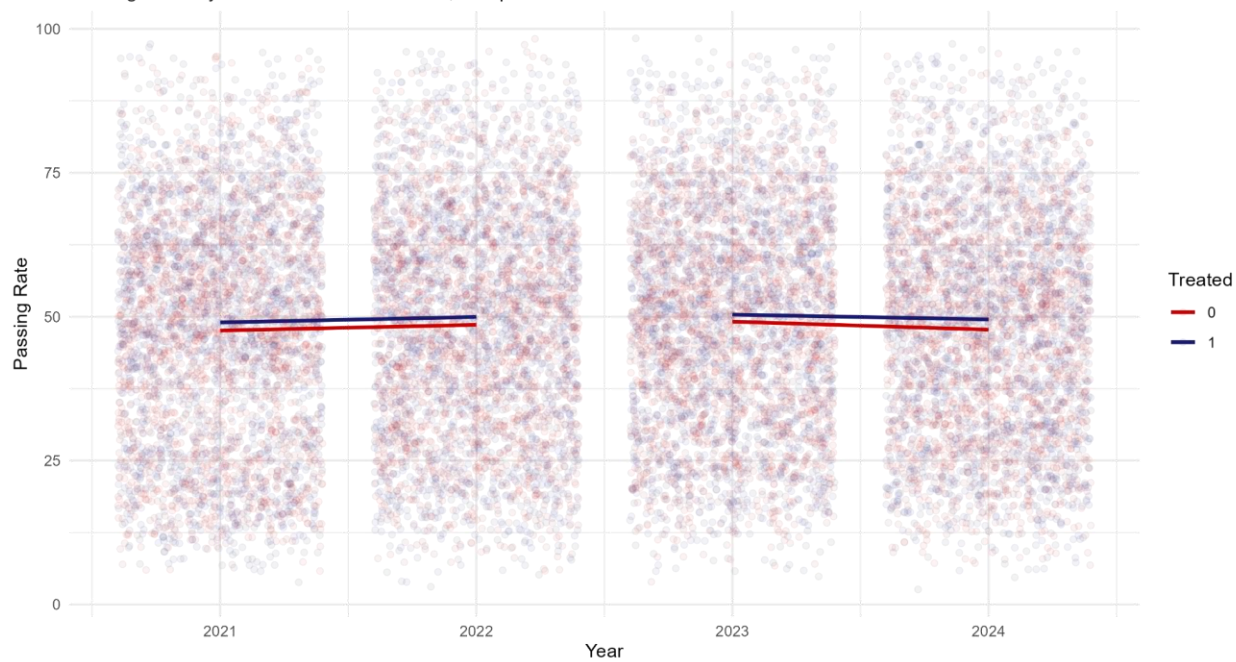
Passing Rates by Year and Treatment Status, Complete Sets



Source: Arizona Department of Education. Zoomed to highlight trendline differences

Appendix D

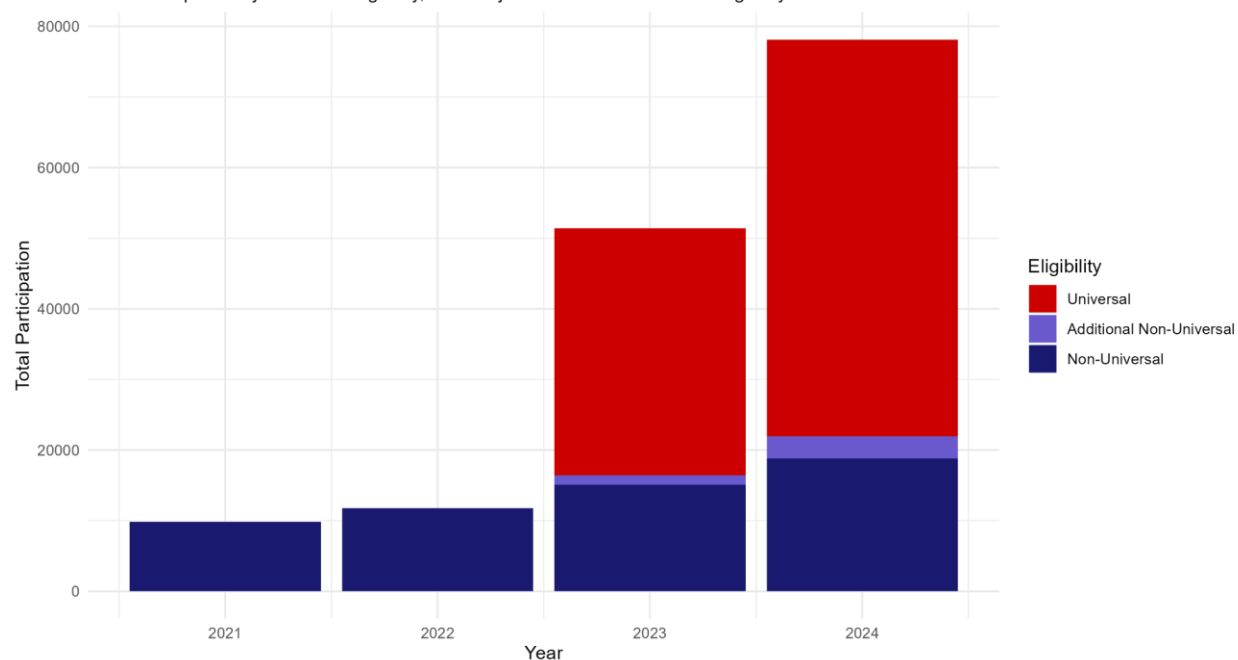
Passing Rates by Year and Treatment Status, Complete Four Years



Source: Arizona Department of Education.

Appendix E

ESA Participation by Year and Eligibility, with Projection for Non-Universal Eligibility

**Appendix F**

Total ESA Cost by Year

