NEPC Review: Unleashing Educational Opportunity: The Untapped Potential of Expanded Tax Credit Scholarships (Commonwealth Foundation, August 2020)

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October 2020

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Suggested Citation: Baker, B.D. (2020). *NEPC Review: "Unleashing Educational Opportunity: The Untapped Potential of Expanded Tax Credit Scholarships."* Boulder, CO: National Education Policy Center. Retrieved [date] from http://nepc.colorado.edu/thinktank/tax-credits

Funding: This review was made possible in part by funding from the Great Lakes Center for Educational Research and Practice.

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Executive Summary

The primary goal of the report *Unleashing Educational Opportunity: The untapped potential of tax credit scholarships in Pennsylvania,* is to argue that expanding vouchers or tuition tax credits for private schooling can lead to large economic gains for the state. Such gains would result from two purported benefits: increased lifetime earnings for those attending private schools on vouchers, and reduced social costs associated with crime. These assertions are based on the claim that a vast body of rigorous research shows higher academic achievement among voucher recipients and shows that these voucher recipients are more likely to attend and graduate college and less likely to commit felonies.

To support the report's thesis, one would need sufficient evidence that expanding vouchers for private schooling in Pennsylvania or similar contexts would likely lead to the projected outcomes. Instead, the report ignores recent negative studies of statewide private school choice programs, and it misapplies findings from literature on crime reduction.

Moreover, the core claim that vouchers improve reading achievement is based on findings from some charter school studies, not studies of children attending private school on taxpayer-subsidized vouchers. Given the negative effects on student achievement found in recent studies of voucher programs, this data selection choice makes the estimates particularly suspect. The report also applies facile assumptions to suggest additional cost savings achieved by setting public expenditure levels for vouchers that are lower than average district per-pupil spending levels. For all these reasons, the report is of no practical use to policymakers and others.

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I. Introduction

The primary objective of the report *Unleashing Educational Opportunity: The untapped potential of tax credit scholarships in Pennsylvania*[1] is to argue that expanding vouchers or tuition tax credits for private schooling leads to better outcomes for students and society as a whole due to increased test scores, high school graduation rates and college attendance, as well as reduced crime. The report asserts that over time, these individual and societal benefits can lead to large economic gains, specifically for the Commonwealth of Pennsylvania.

II. Findings and Conclusions of the Report

The report's major conclusions, reiterated in the cover letter by the research director of the Commonwealth Foundation, executive summary, and again in the body of the report, are the projected economic benefits derived from the individual and social benefits of expanded private school choice programs. At the high end, the report estimates that a ten percent annual increase in scholarship funding could lead to $6 billion in economic benefits from higher lifetime earnings associated with increases in academic achievement, $2.1 billion from additional high school graduates, and $228 million from reductions in the social costs associated with crimes.[2] Readers who access only the cover letter summary by Marc LeBond of the Commonwealth Foundation or the executive summary will miss the caveats, embedded on page 9 in the body of the report, which warn readers to be cautious about such predictions.[3]

III. The Report's Rationale for its Findings and Conclusions

The report's relatively straightforward rationale is that taxpayer-subsidized private school choice programs lead to:

- increased achievement levels as measured by test scores;
- increased high school graduation rates, college attendance and completion; and
- reduced crime

for students exposed to private schooling through the program.

The assumption is that expanding taxpayer subsidies for private school choice programs and thereby increasing the number of students attending private schools leads to linear increases in each of the aforementioned benefits. Moreover, the report assumes that each of these significant benefits of expanded private school choice programs leads to compounded long-term economic benefits by increasing individual earnings and reducing societal costs.

It is certainly reasonable to assume that improving student achievement, high school graduation, and college persistence and completion, along with reducing crime, could have short- and long-term benefits for individuals and society. The analysis, however, fails to apply the most relevant and rigorous available literature to make a compelling case that expansion of tuition tax credits in a context like Pennsylvania would lead to the specified outcomes and projected economic benefits.

IV. The Report's Use of Research Literature

The purpose of the compiled research literature is to provide an empirical basis for estimating the economic benefits of expanded taxpayer-subsidized private school choice, through the mechanisms of improved achievement and attainment as well as reduced crime. The intent is specifically to inform expansion of such a program, statewide in the Commonwealth of Pennsylvania. As such, the literature review should focus on the most recent and most rigorous studies of the most analogous programs and policy contexts.

Student Achievement

Regarding studies validating that private school choice programs positively affect student achievement, the report summarizes:

> The majority of the 16 random assignment studies linking private school choice programs in the U.S. to student achievement find positive effects in math or reading overall or for subgroups of students (DeAngelis & Wolf, 2019c; EdChoice, 2020; Egalite & Wolf, 2016; Wolf & Egalite, 2019).[4]

By contrast, education writer Matt Barnum, in a summary article on studies of private school vouchers, concluded: "Recent studies suggest that vouchers reduce scores on state tests, especially in math."[5] Why the difference? Among other things, the report omits a number of particularly relevant recent studies. It does not include recent studies of statewide voucher programs in Indiana[6] and Ohio,[7] which would be more relevant to the Pennsylvania policy context than studies in Washington, DC or Milwaukee, or even statewide in Louisiana.[8]

These studies are especially important to the present case and context, and are well known in policy discourse on school vouchers. But the report is careful in its phrasing of the summary above to note that it is referring to "random assignment" studies – the likely basis for excluding the Indiana and Ohio studies. Still, it would be more appropriate to at least acknowledge the existence of these negative results. Although a previous NEPC Review addresses pros and cons of using "random assignment" as a screen for whether a study is valid or policy relevant,[9] it would have been appropriate to at least acknowledge the existence of these negative results.

Other researchers paint a far grimmer picture of the results of recent voucher studies. Joe Waddington noted, "While the early research was somewhat mixed . . . it is striking how consistent these recent results are . . . We've started to see persistent negative effects of receiving a voucher on student math achievement."[10] And in 2017, summarizing recent studies in District of Columbia, Louisiana, Indiana and Ohio, Dynarski and Nichols summarized, "on average, students that use vouchers to attend private schools do less well on tests than similar students that do not attend private schools. [11]

To summarize, when it comes to research literature pertaining to achievement effects, the Commonwealth Foundation's report:

a. ignores relevant studies that show strong negative effects,

b. ignores math outcomes outright, which are also associated with economic benefits,[12] and

c. chooses ultimately to substitute a finding of reading achievement gains from a review of charter school research[13] in place of private school effects in the context of a voucher program.

Even if student outcomes are unchanged on reading in taxpayer-subsidized private schools, but largely negative on mathematics, the long run economic impact, when run through the report's equations would be negative, and of greater magnitude than the positive estimates provided.

Attainment

The report's summary of literature on the relationship between private school attendance and high school graduation, college enrollment, persistence and completion is somewhat more consistent with the conclusions of others. The report concludes: "Educational attainment includes high school graduation, college enrollment, college persistence, and college

completion. The evidence linking private school choice programs to these educational attainment outcomes leans positive."[14]

Whereas the same review cited above, by *Chalkbeat* reporter Matt Barnum, concludes: "Studies show that vouchers have a neutral or positive impact on student outcomes later in life, like attending college or graduating high school."[15]

A significant shortcoming of this literature, for purposes of the policy report, is that most of these findings do not come from studies of statewide voucher systems, and instead come from studies of voucher programs in cities like New York,[16] Washington, D.C.[17] and Milwaukee,[18] where voucher recipients in significant numbers attended urban Catholic schools which were then compared against outcomes of students in urban district schools. The causal mechanism is not the mere presence of private school choice, but the nature and quality of choices available and of the comparison group.[19] One statewide study of students on tuition tax credit scholarships in Florida found positive effects on both college enrollment and degree completion.[20]

Nonetheless, based on existing literature, the report's case that expanding private school vouchers may boost graduation and college attendance is likely the strongest of the three cases.

Crime and Safety

When it comes to linking school choice with reduced crime and improved public safety, the report concludes:

> Six rigorous studies link access to school choice to crime outcomes. Each of the six studies finds statistically significant positive effects on crime reduction overall or for subgroups of students (DeAngelis & Wolf, 2019a; DeAngelis & Wolf, 2019b; Deming, 2011; Dills & Hernández-Julián, 2011; Dobbie & Fryer, 2015; McEachin et al., 2019).[21]

Technically, studies that "link access to school choice to crime outcomes" is an accurate portrayal of the six studies cited. Only the studies conducted by the report's author himself, however, address crime in relation to private school choice in the context of a public subsidy program (Milwaukee).

In contrast, the study by Dobbie and Fryer examines the effects of attending Harlem Children's Zone Promise Academy,[22] a single charter school which includes a wide array of costly[23] wraparound and family and community service supports. Private school choices available to students in Pennsylvania's tuition tax credit program are unlikely to be similar. The study by Dills and Hernandez-Julian is a study linking the density of public school district options within metropolitan areas (as theoretical choices), and metropolitan area aggregate crime rates.[24] The study by Deming compares the impact of attending a first-choice middle or high school on outcomes of children participating in public school choice lotteries in the Charlotte-Mecklenburg school district (CMS).[25] And the study by McEachin and colleagues

is a study of students who switch to a charter school in ninth grade from the traditional public district school sector.[26]

Again, only the study conducted by the report's author, and only in the context of the Milwaukee school voucher program, serves to validate and support the report's estimates of the economic benefits of crime reduction "caused" by taxpayer-subsidized private school choice.

Fiscal Effects

The report includes a discussion of the potential tax expenditure savings by expanding the tuition tax credit program, explaining:

> It is true that the private school choice programs in Pennsylvania reduce total taxpayer revenues because of the tax credit funding mechanism. However, the programs could save taxpayer money by reducing spending in public schools for each student switching from the public sector to the private sector. Taxpayer savings could occur whenever a student uses the school choice programs to switch out of public schools because the average scholarship amount is much lower than the average amount spent in public schools in the state. In fact, the most recent data reported by EdChoice show that the average scholarship amount was $2,490 for the Opportunity Schoslarship Tax Credit Program, which was only about 16 percent of the average public school spending amount per student.[27]

The report's explanation follows similar logic to other cited sources including Lueken and Scafidi.[28] But, this framework ignores the fact that by providing a partial tuition voucher wherein either parents or schools must absorb the additional costs may have other economic consequences.

- First, low voucher funding levels – which in this framework lead to greater savings – may lead to larger shares of children attending especially low-quality (low-cost) private schools and even lead to expansion of lower quality providers (relative to higher quality ones).
- Second, alternatively, if average to higher quality providers opt to participate in the program, they may find these under-subsidized vouchers destabilize their finances, spreading their resources more thinly and reducing quality.
- Third, to the extent that parents are forced to incur additional costs, whether by subsidizing tuition itself or incurring additional transportation, food and activities expenses, parents then have less disposable income to contribute to the state's economy (to spend, for example, on taxable goods and services.)[29]

It is thus an oversimplification to assume that 100% of the difference between voucher levels offered and public district expenditures are "savings."

V. Review of the Report's Methods

The centerpiece of the report is the estimates of long-run economic benefits. For this analysis, the report includes three separate equations pertaining to the outcomes of interest. The economic benefits of achievement gains were estimated to be the largest by far.[30]

The margin of difference in lifetime earnings is driven by 2% reading achievement gain specified in the equation, resulting in a cumulative 2.39% lifetime earnings increase for each individual ($29,778/$1,244,910). The report notes that this .02, or 2% of a standard deviation gain is conservative, and drawn from Betts and Tang (2019).[31] But the Betts and Tang .02 value is drawn from meta-analysis of charter school effects, *not private schools,* in a taxpayer-subsidized program.[32] Again, the report carefully phrases the choice of the .02 measure as being based on the effects of "school choice" and not specifically private school enrollment under a school choice model. But that does not make the chosen estimate relevant or appropriate.

If we substitute -.15 for the negative effects on math achievement (assuming it equally important to reading for long-term wages) from the Indiana voucher study,[33] we find that lifetime wages of the individual are reduced by over 16% (to about $1,041,218 from the baseline of $1,244,910).

Crime Assumptions

Based on its own estimates of crime reduction related to participation in the Milwaukee voucher program, the current report uses a 3% reduction in crime among participants to determine long-run economic benefits. The report explains:

> If the crime-reducing benefits are similar in Pennsylvania, private school choice could reduce crime by 1,564 felons for the population of students currently enrolled in choice programs in the state. This reduction in felons would be expected to produce about $59.12 million in economic benefits by reducing the social costs associated with crimes. This estimate is cautious since it assumes that each felon would have committed only one crime.[34]

On the one hand, the economic savings from this analysis are much smaller than for the achievement analysis. If those achievement gains actually turned out to be losses, those losses would wipe out these gains (along with attainment gains estimated) many times over. But the likelihood that findings from a single urban context (Milwaukee) are transferable to the statewide policy context of Pennsylvania remains slim, and highly speculative.

VI. Review of the Validity of the Findings and Conclusions

To summarize, two major issues in particular undermine the report's validity for informing Pennsylvania state policies pertaining to expansion of that state's tuition tax credit program:

First, the review of studies of the presumed net positive effects of expanded taxpayer-subsidized private school enrollments on achievement, attainment, and crime reduction is skewed, excluding especially relevant negative effects, and of questionable relevance for estimating effects in the present policy context. The largest economic benefit is derived from a multiplier drawn from charter school research (on reading effects only) and ignores a much larger negative possible effect from more similar statewide voucher programs (in math specifically).

The report's findings regarding the potential economic benefits of attainment may be most valid, but the transferability of the most relevant studies remains questionable. The same is true of the crime reduction analysis, which is based on even more limited evidence, and strangely couched in a body of unrelated evidence.

Second, even if we accept the report's estimates of economic gains as accurate (which they are not), the presentation of these benefits goes to great lengths to make mountains of molehills.[35] For those readers who do get beyond the first two summaries of economic benefits, which do not put those benefits into context, the report does eventually explain:

> Assuming a $100 million increase in scholarship funding for the 2020-21 school year, I find the 102,085 students who would be using the program would be expected to accrue an additional $3 billion in lifetime earnings (Table 1). That economic benefit is equal to about 0.4 percent of Pennsylvania's current gross domestic product of $817.2 billion. Assuming a 10 percent increase in the scholarship funding amount each year, additional lifetime earnings would be around $6 billion for students utilizing the program in the 2029-30 school year.[36]

That is, the cumulative lifetime (46 year) benefits for the just over 200,000 children accessing private schools through the expanded tax credit in 2029-30 would be $6 billion, which amounts to roughly .74% of Pennsylvania's 2019 GDP (of $813,513,600,000).[37]

VII. Usefulness of the Report for Guidance of Policy and Practice

Because the largest positive economic impact estimate from the report is based on a false premise, misrepresentation (excluding relevant studies showing large negative effects) and misapplication of research findings (substituting charter school estimates), the study is of little value for informing policies pertaining to Pennsylvania's tuition tax credit program. One simply cannot extrapolate the economic benefits of a tuition tax credit program to expand private school enrollment in Pennsylvania based on estimated reading achievement gains derived from charter schools across the country (though limited to specific major operators and disproportionately in specific cities and states). This is especially true when the preponderance of recent evidence on students attending private schools through vouchers and tax credits points to worse, rather than better, outcomes -- particularly in mathematics. As such, applying the report's own methods, it is more likely that Pennsylvania would suffer significant economic losses, not gains, by expanding the tax credit scholarship program.

Notes and References

1 DeAngelis, C. (2020, August 13). *Unleashing educational opportunity: The untapped potential of expanded tax credit scholarships in Pennsylvania*. Harrisburg, PA and Los Angeles, CA: Commonwealth Foundation and Reason Foundation. Retrieved October 6, 2020, from https://www.commonwealthfoundation.org/docLib/20200813_UnleashingEducationalOpportunityDeAngelis08_13_2020reduced.pdf

2 DeAngelis, C. (2020, August 13). *Unleashing educational opportunity: The Untapped potential of expanded tax credit scholarships in Pennsylvania* (p. 8). Harrisburg, PA and Los Angeles, CA: Commonwealth Foundation and Reason Foundation. Retrieved October 6, 2020, from https://www.commonwealthfoundation.org/docLib/20200813_UnleashingEducationalOpportunityDeAngelis08_13_2020reduced.pdf

3 The report notes:

> These potential economic benefits should not be combined and should be assessed separately because of overlap. For example, higher academic achievement increases the likelihood of high school graduation, and receiving a high school diploma reduces the likelihood of incarceration. It is also possible that Pennsylvania's private school choice results will differ based on context, geographic location, time, and implementation. As such, readers should exercise considerable caution when assessing these types of forecasts of economic impacts because they are based on evaluations from other locations. (p. 9)

DeAngelis, C. (2020, August 13). *Unleashing educational opportunity: The untapped potential of expanded tax credit scholarships in Pennsylvania* (p. 9). Harrisburg, PA and Los Angeles, CA: Commonwealth Foundation and Reason Foundation. Retrieved October 6, 2020, from https://www.commonwealthfoundation.org/docLib/20200813_UnleashingEducationalOpportunityDeAngelis08_13_2020reduced.pdf

4 DeAngelis, C. (2020, August 13). *Unleashing educational opportunity: The untapped potential of expanded tax credit scholarships in Pennsylvania* (p. 9). Harrisburg, PA and Los Angeles, CA: Commonwealth Foundation and Reason Foundation. Retrieved October 6, 2020, from https://www.commonwealthfoundation.org/docLib/20200813_UnleashingEducationalOpportunityDeAngelis08_13_2020reduced.pdf

5 Barnum, M. (2020). Do school vouchers work? As the debate heats up, here's what research really says. *Chalkbeat*. Retrieved October 2, 2020, from https://www.chalkbeat.org/2017/7/12/21108235/do-school-vouchers-work-as-the-debate-heats-up-here-s-what-research-really-says

6 Waddington and Berends found that in Indiana:

> Overall, voucher students experienced an average achievement loss of 0.15 SDs in mathematics during their first year of attending a private school compared with matched students who remained in a public school. This loss persisted regardless of the length of time spent in a private school. In English/Language Arts, we did not observe statistically meaningful effects. (p. 783)

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.

7 Figlio and Karbownik found in Ohio:

> The students who use vouchers to attend private schools have fared worse academically compared to their closely matched peers attending public schools. The study finds negative effects that are greater in math than in English language arts. Such impacts also appear to persist over time, suggesting that the results are not driven simply by the setbacks that typically accompany any change of school. (p. 2)

Figlio, D., & Karbownik, K. (2016). *Evaluation of Ohio's EdChoice Scholarship Program: Selection, competition, and performance effects* (p. 2). Washington, DC: Thomas B. Fordham Institute. Retrieved

October 6, 2020, from https://edex.s3-us-west-2.amazonaws.com/publication/pdfs/FORDHAM%20Ed%20Choice%20Evaluation%20Report_online%20edition.pdf

8 This is because different states and contexts have vastly different distributions of private school types (and qualities). For more on the geographic distribution of private schools by types and resources, see:

Baker, B. (2009). *Private schooling in the U.S.: Expenditures, supply, and policy implications*. Boulder and Tempe: Education and the Public Interest Center & Education Policy Research Unit. Retrieved October 4, 2020, from https://nepc.colorado.edu/publication/private-schooling-US

9 Baker, B.D. (2020). *NEPC review: "Comparing ed reforms: Assessing the experimental research on nine K-12 education reforms."* Boulder, CO: National Education Policy Center. Retrieved October 4, 2020, from https://nepc.colorado.edu/thinktank/charter-research

10 Joe Waddington, University of Kentucky, quoted in Barnum, M. (2020) Do school vouchers work? As the debate heats up, here's what research really says. *Chalkbeat*. Retrieved October 4, 2020, from https://www.chalkbeat.org/2017/7/12/21108235/do-school-vouchers-work-as-the-debate-heats-up-here-s-what-research-really-says

11 Dynarski, M., & Nichols, A. (2017, July 13). More findings about school vouchers and test scores, and they are still negative (p. 1). *Evidence Speaks Reports, 2*(18). Brookings Institute. Retrieved October 6, 2020, from https://www.brookings.edu/wp-content/uploads/2017/07/ccf_20170713_mdynarski_evidence_speaks1.pdf

12 Dougherty, C. (2003). Numeracy, literacy and earnings: Evidence from the National Longitudinal Survey of Youth. *Economics of Education Review*, *22*(5), 511-521.

13 Betts, J.R., & Tang, Y.E. (2019). The effect of charter schools on student achievement. In Mark Berends, R. Joseph Waddington, & John Schoenig (Eds.), *School choice at the crossroads: Research perspectives* (pp. 67-89). Routledge.

14 DeAngelis, C. (2020, August 13). *Unleashing educational opportunity: The untapped potential of expanded tax credit scholarships in Pennsylvania* (p. 13). Harrisburg, PA and Los Angeles, CA: Commonwealth Foundation and Reason Foundation. Retrieved October 6, 2020, from https://www.commonwealthfoundation.org/docLib/20200813_UnleashingEducationalOpportunityDeAngelis08_13_2020reduced.pdf

15 Barnum, M. (2020). Do school vouchers work? As the debate heats up, here's what research really says. *Chalkbeat*. Retrieved October 2, 2020, from https://www.chalkbeat.org/2017/7/12/21108235/do-school-vouchers-work-as-the-debate-heats-up-here-s-what-research-really-says

16 NYC study found gains for black and Hispanic students in college enrollment. See:

Chingos, M.M., & Peterson, P.E. (2015). Experimentally estimated impacts of school vouchers on college enrollment and degree attainment. *Journal of Public Economics*, *122*, 1-12.

17 DC study found increased graduation but no difference in college attendance. See:

Chingos, M.M. (2018). The effect of the DC school voucher program on college enrollment. Washington DC: Urban Institute. Retrieved September 25, 2019, from https://www.urban.org/research/publication/effect-dc-school-voucher-program-college-enrollment

Wolf, P., Gutmann, B., Puma, M., Kisida, B., Rizzo, L., Eissa, N., ... & Silverberg, M. (2010). *Evaluation of the DC Opportunity Scholarship Program*. Washington, DC: US Department of Education, Institute of Education Sciences.

18 Milwaukee studies show increased college attendance but no difference in completion. See:

Cowen, J.M., Fleming, D.J., Witte, J.F., Wolf, P.J., & Kisida, B. (2013). School vouchers and student attainment: Evidence from a state-mandated study of Milwaukee's parental choice program. *Policy Studies*

Journal, *41*(1), 147-168.

Wolf, P.J., Witte, J.F., & Kisida, B. (2018). *Do voucher students attain higher levels of education? Extended evidence from the Milwaukee Parental Choice Program*. Washington, DC: Urban Institute.

19 The relevance of both the treatment and counterfactual are important. For example, one is more likely to find positive treatment effects where the counterfactual is less effective. Studies comparing effectiveness (relative to local counterfactuals) of charter schools show that "urban" charter schools reveal positive effects in many cases where suburban ones do not. Whether this is a result of better charter schools in urban than rural contexts, or worse comparison schools, or unobserved differences in patterns of student sorting is an open question. Regardless, if the author wishes to advocate the benefits of expanding a statewide program, that case would be stronger if the cited findings of positive effects also addressed suburban and rural settings.

For a discussion of the New York City study, see:

Baker, B.D. (2012) Helicopters can improve minority college attendance and other misguided policy implications: Comments on the Brookings Voucher Study [blog post]. *School Finance 101*. Retrieved October 6, 2020, from https://schoolfinance101.wordpress.com/2012/08/24/helicopters-can-improve-minority-college-attendance-other-misguided-policy-implications-comments-on-the-brookings-voucher-study/

Dynarski, S. (2015). Urban charter schools often succeed. Suburban ones often don't. *New York Times*, *20*.

20 Chingos, M.M., & Kuehn, D. (2017, September 27). *The effects of statewide private school choice on college enrollment and graduation: Evidence from the Florida Tax Credit Scholarship Program*. Washington DC: Urban Institute. Retrieved October 6, 2020, from https://www.urban.org/research/publication/effects-statewide-private-school-choice-college-enrollment-and-graduation

Chingos, M.M., Manarrez, T., & Kuehn, D. (2019). *The effects of the Florida tax credit scholarship program on college enrollment and graduation: An update*. Washington DC: Urban Institute. Retrieved October 14, 2020, from https://www.urban.org/research/publication/effects-florida-tax-credit-scholarship-program-college-enrollment-and-graduation

21 DeAngelis, C. (2020, August 13). *Unleashing educational opportunity: The untapped potential of expanded tax credit scholarships in Pennsylvania* (p. 15). Harrisburg, PA and Los Angeles, CA: Commonwealth Foundation and Reason Foundation. Retrieved October 6, 2020, from https://www.commonwealthfoundation.org/docLib/20200813_UnleashingEducationalOpportunityDeAngelis08_13_2020reduced.pdf

22 Dobbie, W., & Fryer Jr, R.G. (2015). The medium-term impacts of high-achieving charter schools. *Journal of Political Economy*, *123*(5), 985-1037.

23 Baker, B.D. & Ferris, R. (2011). *Adding up the spending: Fiscal disparities and philanthropy among New York City charter schools*. Boulder, CO: National Education Policy Center. Retrieved October 14, 2020, from http://nepc.colorado.edu/publication/NYC-charter-disparities

24 Dills, A.K., & Hernández-Julián, R. (2011). More choice, less crime. *Education Finance and Policy*, *6*(2), 246-266. Retrieved October 14, 2020, from http://angeladills.com/choice_march1_2010.pdf

25 Deming, D.J. (2011). Better schools, less crime? *Quarterly Journal of Economics*, *126*(4), 2063-2115.

26 McEachin, A., Lauen, D.L., Fuller, S.C., & Perera, R.M. (2020). Social returns to private choice? Effects of charter schools on behavioral outcomes, arrests, and civic participation. *Economics of Education Review*, 76, 101983.

27 DeAngelis, C. (2020, August 13). *Unleashing educational opportunity: The* untapped potential of expanded tax credit scholarships i*n Pennsylvania* (p. 18). Harrisburg, PA and Los Angeles, CA: Commonwealth Foundation and Reason Foundation. Retrieved October 6, 2020, from https://www.commonwealthfoundation.org/docLib/20200813_UnleashingEducationalOpportunityDeAngelis08_13_2020reduced.pdf

28 In his analysis, Lueken notes ""The fiscal effect on the state is the difference between savings generated by students redirected from public schools and the amount of tax credits disbursed to taxpayers for donations to private school scholarship organizations."

Lueken, M.F. (2019). Projected Fiscal Impact of Pennsylvania Senate Bill No. 299. EdChoice Brief. Retrieved October 14, 2020, from https://files.eric.ed.gov/fulltext/ED600662.pdf

Scafidi, B. (2012). *The fiscal effects of school choice programs on public school districts*. National Research. Indianapolis, IN: Friedman Foundation for Educational Choice. Retrieved October 14, 2020, from http://www.edchoice.org/wp-content/uploads/2015/07/The-Fiscal-Effects-of-School-Choice-Programs.pdf

29 Having to spend more on food, for example, which is not taxable in Pennsylvania, would reduce family expenditures on taxable items. See:

Sales, Use and Hotel Occupancy Tax, Pennsylvania Dept of Revenue (n.d.). Retrieved October 14, 2020, from https://www.revenue.pa.gov/GeneralTaxInformation/Tax%20Types%20and%20Information/SUT/Pages/default.aspx

30 The report explains the calculation as follows:

Using the more cautious estimate of the effects of school choice on student achievement reported by Betts and Tang (2019) (a 2 percent of a standard deviation positive effect on reading scores), the following two equations can be used to forecast the possible effects of private school choice on lifetime earnings in Pennsylvania:

Avg Lifetime Earnings * [1 + (0.02) * (0.13/SD) * (0.70)] = Expected Lifetime Earnings (1)

Expected Lifetime Earnings – Avg Lifetime Earnings = Gain in Lifetime Earnings (2)

To calculate the net present value of lifetime earnings in 2020 dollars, I assume that each student will work for 46 years, or from the age of 25 to the age of 70. Using a discount rate of 3 percent, and the average wage in Pennsylvania in 2018 ($50,030) from the U.S. Department of Labor Bureau of Labor Statistics, the net present value of the average lifetime earnings in Pennsylvania is $1,244,910. This number is the best approximation available for the expected lifetime earnings of individuals educated in district-run public schools in the state since the majority of students attend public schools in Pennsylvania.

Plugging this information into equation (1) produces an expected lifetime earnings of

$1,274,688 for students attending private schools for their entire K-12 education. Plugging this information into equation (2) produces an expected gain in lifetime earnings of $29,778 for each child using a private school choice program in the state.

$1,244,910 * [1 + (0.02) * (0.13/SD) * (0.70)] = $1,274,688 (1)

$1,274,688 - $1,244,910 = $29,778 (2)

According to the Pennsylvania Department of Community and Economic Development, 52,144 scholarships were awarded to students in the 2017-18 school year. An additional $29,778 in lifetime earnings for each of the students using these scholarships would amount to an economic benefit of about $1.55 billion (52,144 x $29,778).

DeAngelis, C. (2020, August 13). *Unleashing educational opportunity: The untapped potential of expanded tax credit scholarships in Pennsylvania* (p. 10). Harrisburg, PA and Los Angeles, CA: Commonwealth Foundation and Reason Foundation. Retrieved October 6, 2020, from https://www.commonwealthfoundation.org/docLib/20200813_UnleashingEducationalOpportunityDeAngelis08_13_2020reduced.pdf

31 Betts, J.R., & Tang, Y.E. (2019). The effect of charter schools on student achievement. In M. Berends, R.J. Waddington, & J. Schoenig (Eds.), *School choice at the crossroads: Research perspectives* (pp. 67-89). Routledge.

32 Betts and Tang summarize, p. 1 of their chapter:

Meta-analytic methods are used to obtain overall estimates on the effect of charter schools on reading and math achievement. The authors find an overall effect size for elementary school reading and math of 0.02 and 0.05, respectively, and for middle school math of 0.055. Effects are not statistically meaningful for middle school reading and for high school math and reading. Studies that focus on urban areas tend to find larger effects than do studies that examine wider areas.

33 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.

34 DeAngelis, C. (2020, August 13). *Unleashing educational opportunity: The untapped potential of expanded tax credit scholarships in Pennsylvania* (p. 15). Harrisburg, PA and Los Angeles, CA: Commonwealth Foundation and Reason Foundation. Retrieved October 6, 2020, from https://www.commonwealthfoundation.org/docLib/20200813_UnleashingEducationalOpportunityDeAngelis08_13_2020reduced.pdf

35 Sadly, it is not uncommon for researchers to multiply small estimated gains across more and more people and more and more years until the number looks big enough to catch the attention of a lay audience. For example, Chetty, Friedman and Rockoff estimated that having a "good" teacher (high value-added, Top 5%) versus a "bad" one could lead to a lifetime cumulative economic benefit for a classroom full of children of $266,000. This extrapolation was based on an estimated 2.9% average wage differential at age 28, multiplied across the entire classroom of 28 students, and for their lifetime of earnings. Walked back, the actual wage differential at age 28 for an individual was about $250. See:

Baker. B.D. (2013, June 9). Revisiting the Chetty Rockoff Friedman Molehill [blog post]. *School Finance 101*. Retrieved October 5, 2020, from https://schoolfinance101.wordpress.com/2013/06/09/revisiting-the-chetty-rockoff-friedman-mole-hill/

36 DeAngelis, C. (2020, August 13). *Unleashing educational opportunity: The untapped potential of expanded tax credit scholarships in Pennsylvania* (p. 11). Harrisburg, PA and Los Angeles, CA: Commonwealth Foundation and Reason Foundation. Retrieved October 6, 2020, from https://www.commonwealthfoundation.org/docLib/20200813_UnleashingEducationalOpportunityDeAngelis08_13_2020reduced.pdf

37 Total personal income in Pennsylvania. *FRED Economic Data*. Retrieved October 6, 2020, from https://fred.stlouisfed.org/series/PAOTOT