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Elasticity Memo

## **School Choice and the Demand for Private Schooling**

### **Introduction**

The idea of “school choice” originated in 1955 when Dr. Milton Friedman proposed government could pay for a child’s education without providing the education itself (Edchoice.org). Those arguing for school choice today believe their local public schools are not the best form of education for their child(ren). Proponents of school choice believe “public education funds [should] follow students to the schools or services that best fit their needs—whether that’s public school, private school...or any other learning environment parents choose for their kids” (Edchoice.org). Currently, school choice operates in four economic realms: vouchers, tax-credit scholarships, individual tax credits/deduction and education savings accounts. For the purpose of this paper, we will limit the discussion to vouchers which remove the equivalent of a child’s K-12 educational funds for public school from the federal and state government and give that money to private schools to subsidize tuition.

### **Policy Background**

Due to the varying tax and policy implications of school choice, several legislative bills have been introduced to members of Congress of varying scope. One recent bill, introduced by Rep. Steve King (H.R. 610), intends to create a nationwide education voucher program. Under H.R. 610, the U.S. Department of Education would provide block grants to states who would then distribute funds to parents who wish to enroll their child in private school or home school (Congress.gov). In states and municipalities that currently have a school voucher program, the amount of money a family receives towards private school tuition is equivalent to that state’s

per-student cost of attending public school (Table 2). Since we do not know whether the block grants from H.R. 610 would be in addition to current funding levels or simply change current categorical grant money into block grants to allow for the creation of vouchers, for this paper we will assume no additional federal funding is provided for this program. To understand the implications of this policy and how it would change the layout of education in America, we must attempt to understand how many children would move from public to private school, how schools will respond in terms of price, the elasticity of the demand of private school as well the supply of schools.

### **Methodology and Calculations**

The below calculations attempt to understand how many students would move from public to private school with a subsidy program. With a decreased price in tuition for parents (and the assumption that private and public schools are substitutes), we make the assumption the demand for private school would increase. As a result, private schools, with a fairly inelastic supply, can raise tuition and make more revenue. Using previous literature on private school elasticity and publicly available data about school tuition and enrollment, I attempt to begin understanding the implications of a nationwide school choice program by estimating how many students would actually switch from public to private school.

1. Original Price ( $P_o$ ): The average private tuition of non-sectarian education across the states that currently have some type of school voucher program is **\$22,440** (National Center for Education Statistics). The numbers vary greatly by state, but we will use the average tuition of \$22,440 as calculated in Table 2.
2. New Price ( $P_N$ ): Since we do not know exactly how schools would respond to a voucher program, we will use price estimates from literature. According to a 2016 report from the

National Association of Independent Schools, average tuition increases **2.6 to 4.1%** each year. And, over the past 10 years, half of all private schools have increased tuition by **30%** (Daughtrey 2016). We also do not know if the introduction of subsidies would allow a larger percentage increase than 2.6 %to 4.1% in year-to-year increases.

Therefore, we will use both the low and high end year-to-year estimates as well as the ten-year estimate to provide a short term and longer term view of the change in quantity demanded.

3. Original Quantity: Currently, **1.4 million** students attend non-sectarian private schools across the United States (Table 2).
4. Elasticity of Supply: Daniel Hungerman and Kevin Rinz’s 2016 paper “Where does voucher funding go” concludes that the range of elasticity of supply for private school ranges from **.2 to 1.5**. The range in elasticities is partly due to the different predictions of school revenue after the subsidy as well as the percentage amount of the subsidies.
5. New Quantity: How many students would be enrolled in private school with the voucher? To calculate this we will use the elasticity of supply equation:

$$Es = \frac{\% \Delta Q}{\% \Delta P} \rightarrow Es = \frac{Q_n - Q_o}{\frac{Q_o}{P_n - P_o}} \rightarrow (E_s) (\% \Delta P) (Q_o) + (Q_o) = Q_n$$

## Results

	Low Elasticity Estimate (.2)	Mid Elasticity Estimate (.85)	High Elasticity Estimate (1.5)
Calculations for raising tuition 2.6% +\$583.44	$.2 = \frac{Q_n - 1,400,000}{\frac{1,400,000}{\$23,023.44 - 22,440}}$ $= \mathbf{1,407,280}$	$.85 = \frac{Q_n - 1,400,000}{\frac{1,400,000}{\$23,023.44 - 22,440}}$ $= \mathbf{1,430,940}$	$1.5 = \frac{Q_n - 1,400,000}{\frac{1,400,000}{\$23,023.44 - 22,440}}$ $= \mathbf{1,454,600}$
Calculations for raising tuition 4.1% +\$920.04	$.2 = \frac{Q_n - 1,400,000}{\frac{1,400,000}{\$23,360.04 - 22,440}}$ $= \mathbf{1,411,480}$	$.85 = \frac{Q_n - 1,400,000}{\frac{1,400,000}{\$23,360.04 - 22,440}}$ $= \mathbf{1,448,790}$	$1.5 = \frac{Q_n - 1,400,000}{\frac{1,400,000}{\$23,360.04 - 22,440}}$ $= \mathbf{1,486,100}$

Calculations for raising tuition 30% +\$6,732	$.2 = \frac{Q_n - 1,400,000}{\frac{1,400,000}{\$29,172 - 22,440 - 22,440}}$ $= \mathbf{1,484,000}$	$.85 = \frac{Q_n - 1,400,000}{\frac{1,400,000}{\$29,172 - 22,440 - 22,440}}$ $= \mathbf{1,757,000}$	$1.5 = \frac{Q_n - 1,400,000}{\frac{1,400,000}{\$29,172 - 22,440 - 22,440}}$ $= \mathbf{2,030,000}$
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Using a range of elasticity and tuition estimates, the table above shows the calculations using three different tuition increase estimates and three different elasticity estimates. Based on these nine different calculations, student enrollment would have a gain of somewhere between 7,280 to 630,000. At the most inelastic estimate (.2) enrollment would likely increase somewhere between 7,280 (%ΔQ: .0052) and 11,480 (%ΔQ: .06) in the short term and closer to 84,000 over a longer time period. The highest elasticity estimate (1.5) suggests an enrollment increase of 54,000 (%ΔQ: .039) to 86,100 (%ΔQ: .061) in the short term and 630,000 over a longer time period. Though the differences between the elasticity estimates are quite dynamic, it is unlikely that enough students would switch from public to private school to create enough of a change to warrant any fear that the landscape of public education would change drastically.

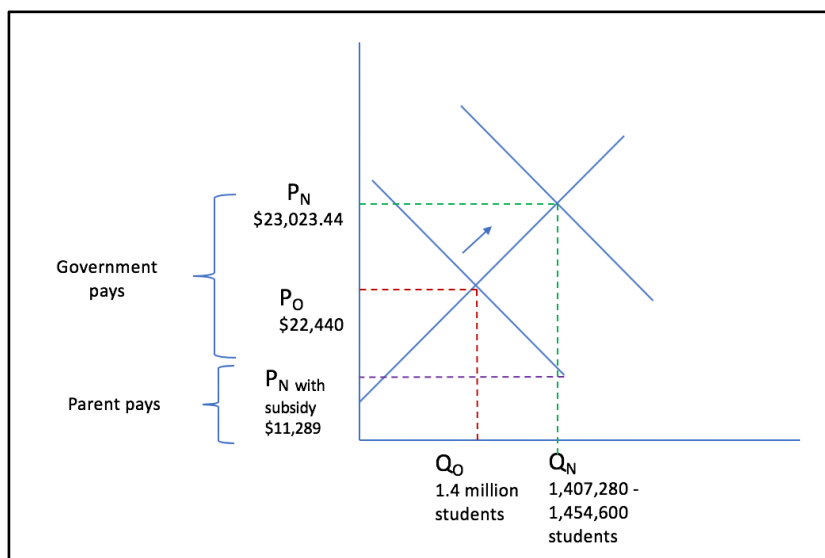
According to the National Center for Education Statistics, 56.6 million students are currently enrolled in elementary to secondary school across the country. Of those, approximately 5.9 million or 10% are in private school (including religious institutions). At our highest estimate, the population of students enrolled would increase to 6.53 million, just over 11% of the American school-age population. Across the United States, this 1% increase may not make a huge difference. However, it's more difficult to determine how these numbers would impact a smaller community. A combination of factors including elasticity, demographics, socioeconomics, subsidy amount and tuition prices could greatly change the numbers we found and actually create a sizeable impact.

## Conclusion

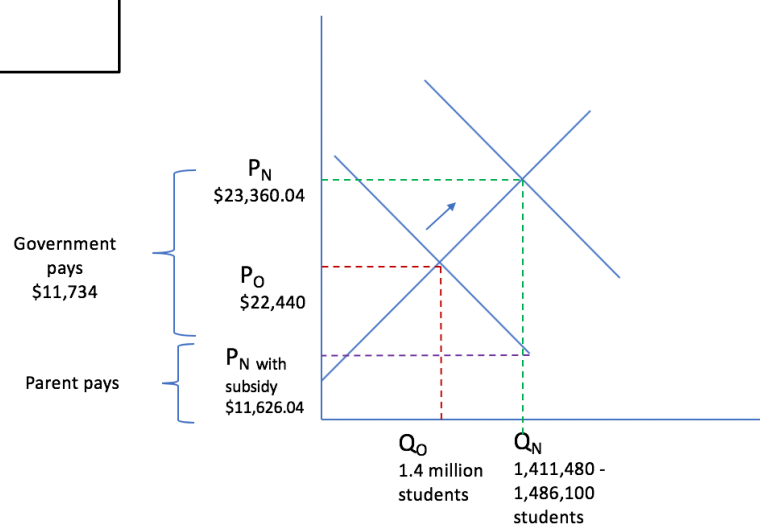
The majority of previous literature similarly suggests that “vouchers would have generally small impacts on the demand for and the supply of private alternatives to public school” (Buddin 1998). Instead, many researchers suggest that the majority of voucher users will be families with children already enrolled in private school. Parents instead are more “sensitive to family income, and tastes for education, but not to the cost of private schooling” (Buddin 1998). Other research suggests that public and private schools are weak substitutes and thus, “a voucher program that would make private schools more competitive will not cause a mass exodus from public schools” (Brasington 2016). Also, private school supply is limited (and thus inelastic) in the short run, so it’s possible that private schools would not even be able to meet the increased demand.

Hungerman suggests that even if enrollment numbers do not change dramatically, subsidies may change the actual demographic population of the private schools (2016). The implications of demographic changes in the long-run could greatly alter who attends private school, whether subsidies diminish opportunities for families who may not be able to pay the increased full-tuition prices and how public schools will be forced to react. The range of outcomes of Knight’s proposed H.R. 610 is unknown and hard to predict. However, based on the laws of supply and demand, it is safe to assume that private school enrollment will increase to some degree and raising tuition will increase revenue.

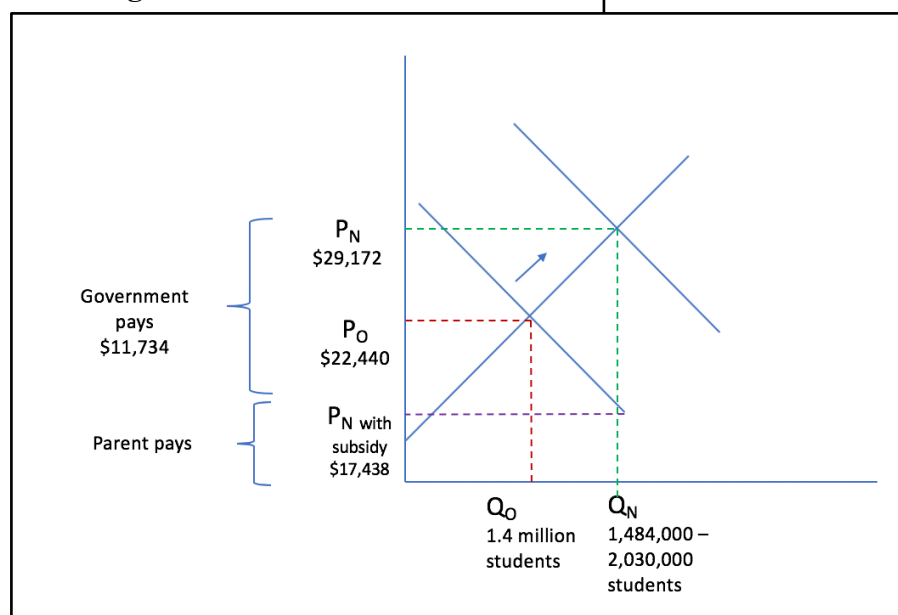
**Diagram 1: 2.6% Increase in Tuition.**



**Diagram 2: 4.1% Increase in Tuition**



**Diagram 3: 30% Increase in Tuition**



## Tables

**Table 1: Calculations**

Variable	Definition	Estimate
$E_s$	Elasticity of supply for private school (Hungerman)	.2 $\rightarrow$ 1.5
$Q_o$	Original # of students enrolled in private school (National Center for Education Statistics 2015)	5.8 million Total <b>1.4-non-religious</b> (total is 10% of total US school children)
$Q_N$	# of students enrolled in private school after school choice policy enacted	1,407,280 $\rightarrow$ 2,030,000
$P_o$	Full cost of tuition (nonsectarian schools)	\$22,440
$P_N$	New cost of tuition ( $P_o \times x\%$ )	2.6% = \$23,023.44 4.1% = \$23,360.04 30% = \$29,172
% $\Delta Q$	Enrollment change as a result of School Choice	.0052 $\rightarrow$ .45

Source: [https://nces.ed.gov/programs/coe/indicator\\_cgc.asp](https://nces.ed.gov/programs/coe/indicator_cgc.asp)

**Table 2: Which States have School Voucher Programs?**

\*Does not include states with programs only for students with IEPs and/or disabilities or tax subsidy programs. \*

State	\$ Provided per Student (from National Conference of State Legislatures and Edweek.org)	Average Private School Tuition Cost (from Privateschoolreview.com)
D.C. “Opportunity Scholarship Program”	Per pupil spending: \$19,159 Voucher: Federal statute establishes the value and allows it to adjust each year based on the Consumer Price Index. Students can receive more funds in grades 9-12.	\$24,017
Louisiana “Louisiana Scholarship Program”	Per pupil spending: \$12,153 Voucher: Students can receive up to 90 percent of the local and state per-pupil funding amount based on each student’s resident school district.	\$6,511
North Carolina	Per pupil spending: \$9,217	\$9,119

“Opportunity Scholarship Program”	Voucher: As of 2016, students can receive up to \$4,200 per year. Students with a household income between 100 percent and 133 percent of the FRPL guideline are only eligible for a voucher worth 90 percent of a private school’s tuition and fees, up to \$4,200	
Maryland “Broadening Options and Opportunities for Students Today (Boost) Program”	Per pupil spending: \$13,075 Participating students can receive a voucher up to the statewide average of the local per-pupil expenditure for the current school year.	\$12,678
Ohio “Cleveland Scholarship Program”	Per pupil spending: \$12,453 Voucher: The maximum dollar value is set in statute. Students with household incomes between 200% and 400% of the federal poverty guideline receive a smaller voucher.	\$6,429
Indiana “Choice Scholarship Program”	Per pupil spending: \$11,342 Voucher: 50-90% based in income	\$7,031
Vermont “Town Tuitioning Program”	Per pupil spending: \$20,795 Voucher: worth up to the average announced public school tuition or the private school’s tuition (whichever is less).	\$21,522
Maine “Town Tuitioning Program”	Per pupil spending: \$15,912 Voucher: can be worth up to 115% of the student’s current funding.	\$21,119
<b>National</b>	<b>\$11,734</b>	<b>\$22,440</b>

Sources: <https://www.edweek.org/ew/collections/quality-counts-2018-state-finance/map-per-pupil-spending-state-by-state.html>  
[https://nces.ed.gov/programs/coe/indicator\\_cmb.asp#f1](https://nces.ed.gov/programs/coe/indicator_cmb.asp#f1)

### Citations

- Bayer, Patrick. 2005. “Choice and Competition in Local Education Markets.” *Cambridge, Mass.: National Bureau of Economic Research*. <https://www.nber.org/papers/w11802>
- Brasington, David M. 2007. “Private Schools and the Willingness to Pay for Public Schooling.” *Education Finance and Policy* 2 (2): 152–174.  
<https://www.mitpressjournals.org/doi/10.1162/edfp.2007.2.2.152>
- Brasington, David. 2006. “School Choice and the Flight to Private Schools: To What Extent Are Public and Private Schools Substitutes?” *Louisiana State University Department of Economics Working Paper*. <https://ideas.repec.org/p/lsu/lsuwpp/2006-04.html>



- Buddin, Richard, Joseph Cordes, and Sheila Nataraj Kirby. 1998. "School Choice in California: Who Chooses Private Schools?" *Journal of Urban Economics* (44): 110-134.  
<https://www.sciencedirect.com/science/article/pii/S0094119097920635>
- Burgess, Simon, Ellen Greaves, and Deborah Wilson. 2014. "What Parents Want: School Preference and School Choice." *The Economic Journal* 125 (587): 1262-1289.  
<https://onlinelibrary.wiley.com/doi/full/10.1111/econj.12153>
- Cohen-Zada, Danny and Moshe Justman. 2002. "The Political Economy of School choice: Linking Theory and Evidence." *National Center for the Study of Privatization of Education Columbia University Teachers College. Department of Economics Ben Gurion University*.  
<https://ncspe.tc.columbia.edu/working-papers/OP57.pdf>
- Cunningham, Josh. 2018. "School Voucher Laws: State-by-State Comparison." *National Conference of State Legislators*. June 2017.  
<http://www.ncsl.org/research/education/interactive-guide-to-school-choice.aspx>
- Daughtrey, William, William Hester, and Kevin Weatherill. 2016. *Tuition Trends in Independent Schools*. Peabody College at Vanderbilt University and National Association of Independent Day Schools. August 2016.  
[https://www.nais.org/articles/documents/member/tuitiontrends\\_final.pdf](https://www.nais.org/articles/documents/member/tuitiontrends_final.pdf)
- Dynarski, Susan, Jonathan Gruber, and Danielle Li. 2009. Cheaper by the Dozen: Sibling Discounts at Catholic Schools to Estimate the Price Elasticity of Private School Attendance. *National Bureau of Economic Research. Working Paper 15461*.  
<https://www.nber.org/papers/w15461>
- Hungerman, Daniel, and Kevin Rinz. 2016. "Where does Voucher Funding Go? How Large Scale Subsidy Programs Affect Private-School Revenue, Enrollment, and Prices." *Journal of Public Economics* (136): 62-85. March 2016. [https://ac-els-cdn-com.proxygw.wrlc.org/S0047272716000426/1-s2.0-S0047272716000426-main.pdf?\\_tid=373cd3fe-825c-4015-b79c-07aaf5e17049&acdnat=1540858669\\_f3e5e8039b6a197c6d09c8fc258c4c9c](https://ac-els-cdn-com.proxygw.wrlc.org/S0047272716000426/1-s2.0-S0047272716000426-main.pdf?_tid=373cd3fe-825c-4015-b79c-07aaf5e17049&acdnat=1540858669_f3e5e8039b6a197c6d09c8fc258c4c9c)
- Spalding, Jeff. 2014. *The School Voucher audit: Do Publicly Funded Private School Choice Programs Save Money?* The Friedman Foundation for Education Choice. September 2014.  
<http://www.edchoice.org/wp-content/uploads/2015/07/The-School-Voucher-Audit-Do-Publicly-Funded-Private-School-Choice-Programs-Save-Money.pdf>