

MISSISSIPPI'S GAME CHANGER:



THE ECONOMIC IMPACTS OF UNIVERSAL
SCHOOL CHOICE
IN MISSISSIPPI

JANUARY 2018

WILL FLANDERS
AND
COREY A. DEANGELIS

**MISSISSIPPI STATE UNIVERSITY INSTITUTE
FOR MARKET STUDIES WORKING PAPER**



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Flanders, Will and Corey A. DeAngelis. 2018. “Mississippi’s Game Changer: The Economic Impacts of Universal School Choice in Mississippi.” Institute for Market Studies Working Paper, Institute for Market Studies at Mississippi State University, Mississippi State, MS.

Abstract

Mississippi has a unique opportunity to improve its future economic condition through implementing a fully universal Education Savings Account (ESA) program. We forecast the economic impacts of such a program accrued through decreased criminal activity, increased high school graduation rates, and increased lifetime earnings. Our models assuming a higher rate of program participation find:

- Mississippi would pass West Virginia in 14 years on per capita personal income, and the advantage would grow to around \$2,300 per person by the year 2036.
- Mississippi’s streets would have 9,990 fewer felons and 13,824 fewer misdemeanants by 2036, leading to a reduction of over \$384 million in costs to society.
- Mississippi would have 7,798 more graduates by 2036, leading to social benefits in excess of \$1.6 billion.

Our models assuming moderate rates of program growth find:

- Mississippi would pass West Virginia in less than two decades on per capita personal income and the advantage would grow to around \$700 per person by the year 2036.
- Mississippi would have 6,191 fewer felons and 8,566 fewer misdemeanants by 2036, leading to a reduction of over \$238 million in costs to society.
- Mississippi would have 5,338 more graduates by 2036, leading to social benefits in excess of \$1 billion.

JEL Codes: I26, I28

Keywords: School Choice, Education Savings Account, Economic Analysis

Author Affiliation and Contact Information

Will Flanders, Ph.D.
Corresponding Author
Research Director, Wisconsin Institute for Law & Liberty
flanders@will-law.org

Corey A. DeAngelis
Policy Analyst, Cato Institute
Distinguished Doctoral Fellow, University of Arkansas
CDeAngelis@cato.org

Author Acknowledgements

The content of the report is solely the responsibility of the authors and does not represent the views of the Cato Institute, the University of Arkansas, or Mississippi State University.

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Mississippi's Game Changer:

The Economic Impacts of Universal School Choice in Mississippi

Will Flanders and Corey A. DeAngelis

Introduction

Mississippi is known for many things including the birthplaces of Elvis Presley and William Faulkner, and the location of the first human lung transplant.¹ However, the Magnolia State is also unfortunately known for having the lowest per capita personal income levels in the United States. In 2016, the average per capita income level for the country as a whole was about \$49,600, whereas Mississippi was around \$35,900. Per capita income levels are a close proxy for overall standard of living, and, unfortunately, Mississippi is 28 percent below the national average on this important measure.²

In order for Mississippi to get out of last place, the state would need to surpass the personal income of West Virginia, which had a per capita income level of around \$37,400 in 2016. The state would need to gain approximately \$4.3 billion in personal income to achieve this goal.³ Mississippi would need to implement some type of policy that would boost individual productivity at a rate faster than the economic growth experienced in West Virginia.

A high-quality education system may be the clearest path towards achieving such a goal. Of course, this does not mean the same thing as holding children and adults in traditional public schools for longer periods of time. In fact, maximizing time spent in school might have a negative effect on economic growth since individuals would delay entrance into

¹ <http://mentalfloss.com/article/59174/15-things-you-might-not-know-about-mississippi>

² <http://www.investopedia.com/terms/s/standard-of-living.asp>

³ http://www.outoflastplace.com/pdf/per_capita_income_ms.pdf

the workforce. Education Savings Accounts (ESAs) represent an intriguing new approach to education that personalizes education for parents and families. ESAs allow parents to customize their children's education to serve their unique needs by selecting educational options from multiple education providers simultaneously. This paper examines the role that a rigorous ESA program could play in helping Mississippi get out of last place with regard to personal income and the positive benefits such a system could have on graduation rates and incidence of criminal behavior.

Educational Options for Increasing Income

There are a number of ideas within education policy that might be considered to increase personal income. Among them are universal pre-Kindergarten (pre-K), merit pay for teachers, and higher per student spending. This section discusses the viability of each of these options.

Increased Per Student Spending

Perhaps the most common refrain when confronted with persistent academic underperformance is the call to increase spending. While there has been some evidence in recent years that increased spending can make a difference (Jackson, Johnson and Persico, 2015; Lafortune, Rothstein, & Schanzenbach, 2016), the preponderance of the evidence still suggests that it is how the money is spent rather than how much, that is the chief driver of performance.

Among the big leaps that the studies finding benefits to increased spending make is that court-ordered⁴ spending increases are exogenous (randomly occurring). Obviously, court-

⁴ LaFortune and coauthors report court ordered spending changes related to adequacy concerns in 24 states from 1990 to 2011.



ordered spending reforms are not random events, so using them to predict educational expenditures still results in biased estimates.⁵ Fully testing any potential benefits of higher spending requires an experimental situation—in which some districts are provided higher amounts of spending at random, and others are not. This is a situation that rarely occurs in the ‘real world.’

Perhaps more concerning is that event studies such as these capture an entire package of educational reforms during a particular period. For some reason, authors of these types of studies have chosen to point to spending as the cause of the altered outcomes. However, other reforms such as testing accountability, pay-for-performance, and educational choice happened during the study timeframes.

Stanford professor Eric Hanushek is one of the nation’s preeminent experts on school funding and the economics of education. In 1997, he conducted one of the most extensive analyses of the relationship between spending, teacher salary and performance. Analyzing around 400 studies that have examined the relationship between spending and student test scores, he concludes that there is “not a strong or consistent relationship between student performance and school resources” (Hanushek, 1997). Hanushek is not convinced by the recent evidence to the contrary, arguing that this research does not align with the facts ‘on the ground.’ Since 1970, per student spending has increased by more than 150 percent, but tremendous gaps in test scores and attainment remain along income and racial lines.⁶

A more recent example of the failure of increased spending to improve educational performance are the School Improvement Grants (SIG) that were given to schools during the Obama administration. Beginning in 2010, the Department of Education paid out more than

⁵ DeAngelis, C. 2017. Education Dollars Should Matter-but Do They? Cato Blog. <https://www.cato.org/blog/education-dollars-should-matter>

⁶ Hanushek, E. “Does Money Matter After All?” <http://hanushek.stanford.edu/opinions/does-money-matter-after-all>



\$7 billion to poor-performing schools that agreed to enact reforms from a menu of choices. While some of the reforms were ambitious—such as closure or reopening as a charter school, the most commonly chosen reforms were far more nebulous—involving additional training for staff and better application of data. The final Department of Education study of the effects of these grants was released in 2017 (Dragoset et. al. 2017). The researchers found no differences in math or reading test scores, high school graduation, or college enrollment despite the \$7 billion investment. This has been called the “greatest failure in the history of the US Department of Education” by Andy Smarick of the American Enterprise Institute.⁷

One need not look beyond the borders of Mississippi for evidence that higher spending does not always result in improved educational outcomes. From 1992 to 2014, Mississippi increased its per student spending by a staggering 54 percent after adjusting for inflation (Scafidi 2017), yet the state continues to languish near the bottom in academic achievement. Other areas in the United States like the District of Columbia spend more than \$19,000 per student, yet still achieve poor academic outcomes (US Census Bureau 2016).

Pre-K

Creating a universal program for students younger than Kindergarten age has been an increasingly common idea among policymakers. The most comprehensive evaluation of pre-K was conducted by researchers commissioned by the Administration for Children and Families, a division of the Department of Health and Human Services (Puma et al., 2012).

In this study, researchers followed nearly 5,000 children randomly assigned to Head Start (or not) for a number of years. They found some short-term gains. Students in the program had higher language skills, motor skills and vocabulary than their control-group peers after one year. However, by the end of third grade, these differences had evaporated.

⁷ <https://www.aei.org/publication/greatest-failure-in-history-us-department-of-education/>



Indeed, in the area of grade promotion, students that had been in Head Start fared worse than their non-Head Start peers by the third year. This is consistent with other research on pre-K, which has found that the cognitive benefits fade even as quickly as first grade in some instances (Magnuson, Ruhm and Waldfogel, 2007).

DeAngelis, Holmes-Erickson, and Ritter (2017) conducted a systematic review and meta-analysis of the evidence on scaled-up pre-K programs in the United States. Examining the most methodologically rigorous studies, they found positive effects on test scores by the end of kindergarten. However, the only experimental evaluation that exists on the subject found that the positive effects on student achievement turned negative just a year later - by the end of first grade (Lipsey et al., 2013).

Merit Pay for Teachers

Merit pay is a market-based reform that rewards teachers for their abilities to hit certain benchmarks, often based on test scores. In theory, this approach could improve student achievement since teachers would have a financial incentive to do so.

Of course, an increased focus on standardized tests results in important opportunity costs, such as less time spent on addressing the whole person and encouraging learning for its own sake. The promise of a bonus linked to test scores may incentivize using class time on test-taking methods and how to answer a narrow set of questions—often called “teaching to the test.” Ultimately, even if merit pay results in higher math and reading scores on state tests, ten empirical studies have found no link between standardized test scores and important, long-term outcomes such as high school graduation, criminal activity, and income.⁸

⁸ Greene, J., 2016. Evidence for the disconnect between changing test scores and changing later life outcomes. Education Next. <http://educationnext.org/evidence-for-the-disconnect-between-changing-test-scores-and-changing-later-life-outcomes/>



The evidence from these studies thus far is mixed, with some finding that merit pay can improve performance (Balch & Springer, 2015) and some that it does not (Fryer, 2013; Springer et al., 2012). A meta-analysis of the twelve experimental and quasi-experimental studies on the subject finds that, overall, merit pay programs do not have an effect on math or reading test scores (Ritter, Trivitt, Foreman, & DeAngelis, 2016). It is worth noting that these studies only look at merit pay as it relates to benchmarking teacher pay to test scores.

Private School Choice: A Path Forward?

Currently, there is a near-perfect monopoly on publicly raised educational funds held by traditional public schools. If a given school is failing to provide a high-quality product at a low price, for whatever reason, an individual family cannot freely exit the public school and choose an institution that better matches their children's unique needs. Currently, in order to opt out of the residentially assigned public school, the family has to pay for the new private school through tuition and fees while continuing to pay for the public school through property taxes. Imagine if you left Wal-Mart to go to Costco, but still had to pay Wal-Mart after leaving, even though you did not use any of their products. Obviously, Wal-Mart would have little incentive to keep you as a loyal customer. Opening the educational market by dispersing power from the traditional public school system to individual parents would provide competitive pressures to provide the highest quality educational product (since parents value quality) at the lowest cost (since people prefer lower prices to higher ones).

There are currently 63 private school choice programs in over half of the United States and the nation's capitol. These come in the form of vouchers, tax-credit scholarships, tax-credit deductions, and Education Savings Accounts (ESAs).⁹ All of these

⁹"*School Choice in America*" EdChoice. <https://www.edchoice.org/school-choice/school-choice-in-america/#>

programs allow for individuals to opt out of their traditional public school and take a portion of their tax dollars to the private institution of their choice.

ESAs have a clear advantage over school vouchers because they allow for price differentiation, specialization, and the incentive to economize. While vouchers may only be used for private tuition, ESA's allow parents to customize their children's educational setting to serve their unique needs. This aspect allows for price differentiation among schools and services and incentivizes efficiency because parents may choose to spend their funds on a variety of services (i.e. tutoring, therapies, online classes, curriculum, private tuition, etc.) and potentially rollover any unused funds to the next year.

Arizona was the first state to create an ESA program. The program began with a specific focus on special needs students. More than 3,500 students participated during the 2016-17 school year. The program will expand to include almost all students in the state for the 2017 school year.¹⁰ Another important ESA program is the Gardiner Scholarship in Florida. This program is focused on students with special needs. Since its inception in 2012, the program has grown into the largest ESA in the country with more than 7,000 participating students. Tennessee, Mississippi, and North Carolina also have special needs focused ESA programs (EdChoice, 2017).

School choice programs around the nation have produced a number of important benefits over the years. Participation in school choice programs has been found to increase test scores (Shakeel, Anderson and Wolf, 2016), increase graduation rates (Cowen et al., 2013; Wolf et al., 2013) and reduce occurrences of crime (DeAngelis and Wolf, 2016a). But, for better or worse, debates on the merits of school choice programs often come down to dollars and cents.

¹⁰ The expansion could be temporarily put on hold due to opposition from Save Our Schools Arizona, which has collected signatures to require a public referendum on the expansion. Currently, the state is in the process of validating these signatures.



Policymakers and legislators are naturally concerned about the fiscal impact of school choice on their community. Yet oftentimes, the debates focus on the immediate financial impact without consideration of the long term financial benefits of choice that accrue through the pathways mentioned in the preceding paragraph. This paper undertakes an examination of the potential long term economic benefits of the implementation of an Education Savings Account (ESA) system in Mississippi by bringing to bare the existing evidence on the benefits of school choice voucher programs. In particular, we focus on the impacts that a near-universal ESA in Mississippi could have on the entire state through a reduction in criminal activity, an increase in high school graduation rates, and an increase in per capita income.

Previous Studies

Criminal Activity

Only three experimental or quasi-experimental studies exist linking school choice programs to reduced criminal activity in the United States.¹¹ Two public school choice studies use charter admissions lotteries in order to replicate an experiment. Since it is merely random chance that determines whether a given student receives the school choice treatment, we are able to conclude that winning the lottery to go to a charter school actually causes the reduction in criminal activity.

David Deming (2011) found that a high-risk group of male students getting the chance to attend a charter school in Mecklenburg County, North Carolina through winning the admissions lottery were about half as likely to commit felonies as adults. Further, he found that charter school lottery winners reduced the average societal costs associated with criminal

¹¹ DeAngelis, Corey. 2017. "More School Choice, Less Crime?" Cato Institute blog. <https://www.cato.org/blog/self-interested-schooling-choices-improve-social-order>

activity by \$7,843, or 63 percent, and reduced expected criminal sentences by 31 months, or 64 percent.

Dobbie and Fryer (2015) similarly found that males getting the chance to go to a charter school in the Harlem Children's Zone through random lottery experienced a 4.4-percentage point, or 100 percent, reduction in the likelihood of incarceration. In addition, female lottery winners were 59 percent less likely than the control group of students to report ever having a teen pregnancy.

The only private school choice study examining the impacts on criminal activity also finds large social benefits. DeAngelis and Wolf (2016a) used a sophisticated matching procedure that is known to replicate (Bifulco, 2012) experimental results when an experimental setting is not available. They found that children that who persisted for at least four years in the Milwaukee Parental Choice Program (MPCP) and completed 12th grade had a 3.44-percentage point lower likelihood of committing a felony and a 4.76-percentage point lower likelihood of committing a misdemeanor. We use these estimates in our forecast for Mississippi and weight them by the difference in felony incidence across the two locations.

According to The Sentencing Project's 2012 report "State-Level Estimates of Felon Disenfranchisement in the United States, 2010," 8.27 percent¹² of voters were disenfranchised due to felony convictions. Since the incidence rate of felonies in the original Milwaukee student sample was 4.09 percent, we estimate that the crime reducing effects of a universal ESA program in Mississippi would be 6.96-percentage points ($8.27 / 4.09 * 3.44$) for felonies and 9.62-percentage points ($8.27 / 4.09 * 4.76$) for misdemeanors.

¹² <http://felonvoting.procon.org/view.resource.php?resourceID=000287>

Graduation Rates

There has been a significant amount of research dedicated to graduation rates it relates to participation in voucher programs. One of the most comprehensive studies to date was conducted on the Opportunity Scholarship Program (OSP) in Washington, D.C. (Wolf et al., 2013). Taking advantage of a lottery system that randomized whether students would be offered the voucher, researchers at the U.S. Department of Education found that the OSP raised the likelihood that the student would graduate high school by about 21-percentage points.

In Milwaukee, as part of the School Choice Demonstration Project, Cowen et al. (2013) utilized sophisticated matching methods similar to those used by DeAngelis and Wolf (2016a) to create a cohort of students in Milwaukee public schools that were similar across a number of dimensions including demographics, neighborhood, and prior educational achievement to students in the MPCP. These authors estimated that participation in the voucher program increased graduation by approximately 4 percent. Other research on Milwaukee by Warren (2011) found that graduation rates in the MPCP are as much as 12 percent higher than the public-school system. We rely on the more conservative findings of Cowen et al. (2013) in our subsequent analyses, meaning the economic benefits in the paper associated with graduation could potentially be much larger.

Economic Benefits of School Choice Forecasts

Though the potential economic benefits of school choice have not been extensively studied, there are a couple examples where researchers have used existing school choice data to forecast economic benefits.

Flanders and DeAngelis (2016) estimate that between 2016 and 2035, students who use a voucher in the Milwaukee Parental Choice Program (MPCP) will generate additional

economic benefits of \$473 million associated with higher graduation rates, and \$26 million associated with fewer felonies and misdemeanors, relative to their traditional public-school peers. DeAngelis and Wolf (2016b) estimate that by enacting a universally available ESA program, Texas would reduce societal costs by \$194 million between 2017 and 2035 through crime reduction.¹³ None of the previous studies have looked at the specific impact of a universal private school choice program on per capita personal income. The current study is the first that we know of to do so.

Methods

Graduation Impact

Studies of the economic benefits of high school graduation are particularly prolific. Henry Levin (2009) estimated the economic benefits of graduation in a number of categories, including the difference in tax revenue generated, public health expenditures, and welfare savings. Levin estimated tax revenue generated through analysis of income data on the Current Population Survey. These data are run through the TAXSIM program, which estimates the taxable income of an individual. The resulting tax levies are averaged across individuals with differing levels of educational attainment, including those who graduate high school. To estimate healthcare cost savings, Levin utilizes data from the 2006 Medical Expenditure Survey from the U.S. Department of Health. This survey included questions on enrollment in Medicare and Medicaid coverage, which Levin broke down by educational attainment through logistic regression.

To estimate the saving associated with lower utilization of welfare programs, Levin borrows from the research of Waldfogel, Garfinkel and Kelly (2007) who estimate the effect of

¹³<https://www.texaspolicy.com/library/doclib/2016-11-PP26-Approve-ESA-CEdF-DeAngelisWolf.pdf>

educational attainment on receipt of TANF, food stamps, and housing vouchers. The estimates of Waldfogel and colleagues are combined with data on the average monthly amount of each welfare benefit. When these components are aggregated, Levin estimates the savings at \$209,100 over the lifetime of the hypothetical graduate. Because there is likely to be a correlation between high school graduation and criminal behavior, we do not include the portion of Levin's estimates that are the results of reduced criminality. Consequently, we use an estimate of \$182,500 for the benefit of graduation.

Crime Reduction Impact

This paper builds upon existing work by DeAngelis and Wolf (2016a) that estimated the effect of the MPCP on the extent to which students were involved in criminal activity. DeAngelis and Wolf utilized a sophisticated matching method to create a comparable sample of students in the MPCP and Milwaukee's public schools. They matched students that lived in the same neighborhood at baseline, which allowed their study to better account for unobservable characteristics (such as motivation level) that are also involved in the selection of residence. Other factors used in the baseline match included grade, race, gender, English-language learner status, and math and reading test scores.

Selection bias is a legitimate concern raised by critics of school choice studies because participants can choose to use a program due to unobservable factors (such as parental involvement) that could also be related to the outcome of interest. However, the baseline matching method used by DeAngelis and Wolf (2016a) is the best approximation of a randomized experiment when such an experiment is unrealistic to conduct such as the situation in Milwaukee where students were not randomly assigned to school choice via a lottery (Bifulco, 2012).

For the societal cost of crime, we rely on the recent estimates produced by McCollister, French, and Fang (2010) for felonies and Aos et al. (2001) for misdemeanors. McCollister French, and Fang (2010) collected data from a wide variety of sources to estimate the societal cost of crime. To estimate the cost of crime prevention and the cost of crime prosecution, the authors gathered data from the 2005 “Justice Expenditure and Employment” report by the Bureau of Justice Statistics. To estimate the mortality cost of crime victimization, data were gathered from the CPS on lifetime earnings and employment. To estimate the cost of other crimes, the work of Cohen (1988) that provides estimates of jury compensation for various crimes was updated to 2010 levels. The cost to an individual from conviction for criminal behavior was conservatively estimated using data on the federal minimum wage times the total number of productivity hours lost for each crime committed. They combine these data to arrive at the average cost to society of a number of categories of crime. Misdemeanor arrests are significantly less costly to society. When compared to felonies, they generally carry neither the lengthy prison sentences, social stigma, or effect on lifetime earnings. Consequently, Aos et al.’s estimates of the cost for a misdemeanor only include the estimated cost of police work and court administration.

We found the specific crimes committed by former students in the Milwaukee dataset and matched them with the costs of crimes observed in the source data sets. These costs are then averaged across crime types to arrive at the average cost of each. Rape and murder are excluded from these averages because their costs are tremendously high and could distort the findings. Because of this, our estimates could be considered conservative. The societal cost of a misdemeanor is estimated at \$1,839 and the average cost of a felony at \$35,950, in 2017 dollars.



Data

We use personal income and population data from the U.S. Department of Commerce Bureau of Economic Analysis.¹⁴ We also use data¹⁵ from the Digest of Education Statistics for total 2017 student enrollment in Mississippi and assume a steady one percent annual growth rate for our forecast. Our base model assumes that 5 percent of eligible public school students will participate in the first year and 10 percent will participate in the second year. We assume a conservative one percent annual growth rate in participation for each school year after the second. This participation growth rate mirrors that of similar programs in the past, as noted by DeAngelis & Wolf (2016b). Specifically, this trend in student participation was observed in the D.C. OSP (Wolf et al., 2008) and the MPCP (Wolf, 2012). Because initial participation rates vary extensively between programs, we also examine a faster growth model, which we refer to as the “robust” model. Our more robust model assumes a doubling of the participation rate in the initial years of the program--10 percent in year one, 20 percent in year two, and then a steady growth rate of 1 percent in subsequent years.

Calculations

Crime Reduction and Graduation Increase

DeAngelis and Wolf (2016a) found that MPCP attendance reduced conviction for misdemeanors by 4.76-percentage points, and reduced conviction for felonies by 3.44-percentage points. We combine these estimates with Levin (2009) study on the economic benefit of graduation.

¹⁴ <https://www.bea.gov/itable/>

¹⁵ https://nces.ed.gov/programs/digest/d15/tables/dt15_203.20.asp?current=yes

For the calculation of our analysis of the economic benefits of graduation, we similarly combine existing research on the impact of MPCP on graduation rates with research on the economic benefits of graduating high school. Cowen and co-authors (2013) estimate the positive effect of attending an MPCP school on graduation as approximately 4%.

In each case, let R equal the percentage change in the outcome of interest (crime or graduation) for period i , N equal the total number of students that received at least a four-year dose and exited the program by the same period, and C be a constant equal the societal cost of the crime or dropout in 2017 dollars. The estimate for the economic benefit of the program is:

$$\text{EconomicBenefit}_i = N_i * C * R_i$$

The estimated economic benefit can be interpreted as the net change in economic benefit by students attending choice institutions rather than traditional public schools. We produce three estimates in our analyses: the economic benefit of misdemeanor reductions, felony reductions, and graduation increases.

We assume that all of the participating students will persist in the Mississippi program, and that students are evenly distributed from kindergarten through 12th grade. Additionally, since DeAngelis and Wolf searched criminal records when the students were at least 22 years old, we assume that no benefits will accrue until the students reach that age. Since these current students will not reach the age 22 for four more years, our first estimate is for the year 2021. The following estimates assume that enrollment will continue to expand at a similar rate as previous years. The graduation data of Cowen et al. (2013) do not require these assumptions, leading to a larger pool of potential impact in that part of the study.

Since graduating from high school may affect the likelihood of going to prison (Anderson 2014), aggregating the economic benefits from both analyses could inflate our



findings. Consequently, we consider the economic benefits of graduation and avoiding criminality separately in the results section.

Personal Income

We apply previous research by Stanford economist Eric Hanushek connecting standardized test scores to lifetime earnings. Hanushek (2011) found that a one standard deviation increase in standardized test scores is associated with a 13 percent increase in lifetime earnings. We combine the Hanushek estimate with the experimental meta-analysis by Shakeel, Anderson, and Wolf (2016) finding that the scientific evidence overall shows that private school choice programs improve student reading achievement by 27 percent of a standard deviation. Since 70 percent of learning is retained from one year to the next over the 13 years of K-12 schooling, we can forecast the impact of a universal ESA program on lifetime earnings by the following equations:

$$\text{Avg Lifetime Earnings} * [1 + (0.27 \text{ SD}) * (0.13/\text{SD}) * (0.70)]^{13} = \text{ESA Lifetime Earnings} \quad (1)$$

$$\text{ESA Lifetime Earnings} - \text{Avg Lifetime Earnings} = \text{ESA Gain in Lifetime Earnings} \quad (2)$$

In calculating the net present value of lifetime earnings, we 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 Mississippi in 2016 from the U.S. Department of Labor Bureau of Labor Statistics,¹⁶ the net present value of the average lifetime earnings in Mississippi is \$953,029. Since Mississippi does not have a near-universal private school choice program today, this is the best approximation of the net present value of lifetime earnings that results from 13 years of education received from the traditional public-school system in the state. This methodology is consistent with the previous literature¹⁷ by Wolf et al. (2014).

¹⁶ https://www.bls.gov/oes/current/oes_ms.htm

¹⁷ <http://www.uaedreform.org/downloads/2014/07/the-productivity-of-public-charter-schools.pdf>



Plugging this information into equation one yields an expected net present value of lifetime earnings for ESA students to be \$1,306,614:

$$\$953,029 * [1 + (0.27 \text{ SD}) * (0.13/\text{SD}) * (0.70)]^{13} = \mathbf{\$1,306,614} \quad (1)$$

Plugging this into equation two gives us a gain in lifetime earnings of \$353,585 per child participating in an ESA program in Mississippi:

$$\$1,306,614 - \$953,029 = \mathbf{\$353,585} \quad (2)$$

Assuming that this gain in lifetime earnings is evenly distributed across students' 46 years of employment, we estimate that the ESA produces social benefits of around \$7,687 per year (\$353,585 / 46) per participating student.

We make 2017 the baseline year of our forecast and assume that personal income would have risen by one percent in both Mississippi and West Virginia each subsequent year absent the ESA program. In addition, we add the personal income absent the program to the extra yearly benefits of a near-universal ESA program in Mississippi and divide by forecasted population for each year.¹⁸ As a result we are able to forecast per capita personal income by year from 2017 to 2036 in both states. Note that because this model is prospective and assumes that both states experience some level of income and population growth in subsequent years, Mississippi requires more than the \$4.3 billion in income growth that represents the current gap in order to surpass West Virginia.

A final note before proceeding to the results: our results only take into account the impact on those students who are actually participating in the ESA program, assuming no impacts on those students who remain in traditional public schools. A significant amount of research has found that the competition that school choice engenders fosters improvement among public schools as well (Egalite, 2016; Greene & Marsh, 2009). This means that our

¹⁸ We assume a steady one percent increase in population for each forecasted year.



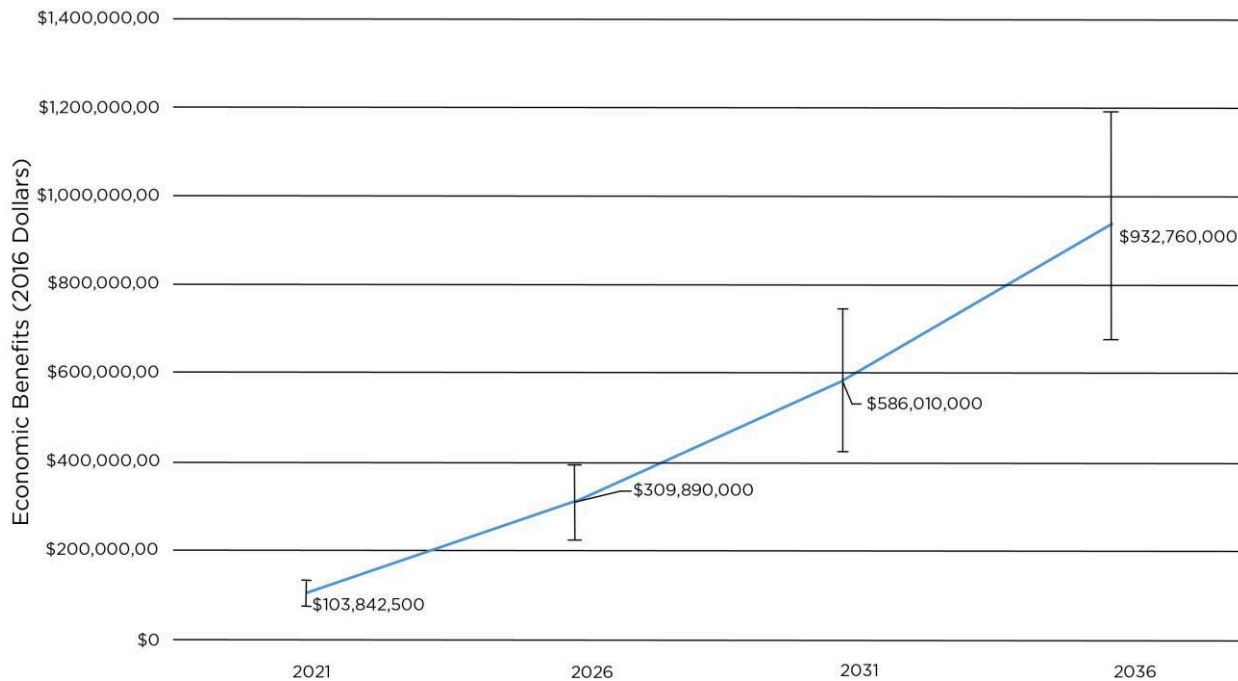
results could potentially be on the conservative side regarding the overall economic impact, and the time it would take for Mississippi to make meaningful improvements in personal income.

Results: Economic Benefits of Graduation

Based on the estimates of Cowen et al. (2013) combined with the economic benefits of graduation from Levin (2009), and data on the demographics of Mississippi, we now estimate the projected economic benefits of an ESA program in the state. Table 1 below shows both the conservative and robust estimates for the economic impact of an ESA. Under the conservative model, the implementation of an ESA is projected to lead to an increase of 5,111 high school graduates over the course the next 20 years. This translates into an economic benefit of approximately \$932 million over this period. Figure 1 below visually depicts the economic benefits of higher graduation over time. The black bars represent the confidence intervals on the estimated economic impacts.

Table 1. The Economic Impact of a Universal ESA in Mississippi (Graduation)

Conservative Estimates			
	2017-2021	2017-2026	2017-2036
Total Completed	14,237	42,460	127,785
Change in Number of Graduates	569	1,698	5,111
Economic Benefits (Millions of \$)	139.43	309.89	932.76
Robust Estimates			
	2017-2021	2017-2026	2017-2036
Total Completed	27,350	74,385	197,618
Change in Number of Graduates	1,092	2,975	7,905
Economic Benefits (Millions of \$)	199.29	542.93	1,442.89

Figure 1. The Economic Impact of a Universal ESA in Mississippi (Graduation)***Results: Economic Benefits of Crime Reduction***

First, we look at the reduction in social costs in terms of misdemeanors projected to result from the implementation of an ESA. Misdemeanors tend to have a far lower cost of society than felonies, thus the benefits accruing from their reduction are smaller (though still substantial). Over the twenty-year study period, a benefit exceeding \$25 million is projected from reduction in misdemeanors.

Table 3 below shows that Mississippi would experience around 6,191 less felons by 2036, resulting in over \$222 million in social benefits. With more robust program participation, Mississippi could have 9,990 less felons by 2036 and accrue over \$359 million in benefits to society. Over the next twenty years, robust program participation would lead to around \$385 million in economic benefits resulting from few felons and misdemeanants on the streets of The Magnolia State.

Table 2. The Economic Impact of a Universal ESA (Misdemeanor Reduction)

Conservative Estimates			
	2017-2021	2017-2026	2017-2036
Total Completed	14,237	42,460	127,785
Change in Number of Misdemeanors	180	1,840	8,566
Economic Benefits (Millions of \$)	0.331	3.384	15.753
Robust Estimates			
	2017-2021	2017-2026	2017-2036
Total Completed	27,350	74,385	197,618
Change in Number of Misdemeanors	360	3,464	13,824
Economic Benefits (Millions of \$)	0.662	6.370	25.421

Figure 2. The Economic Impact of a Universal ESA (Misdemeanor Reduction)

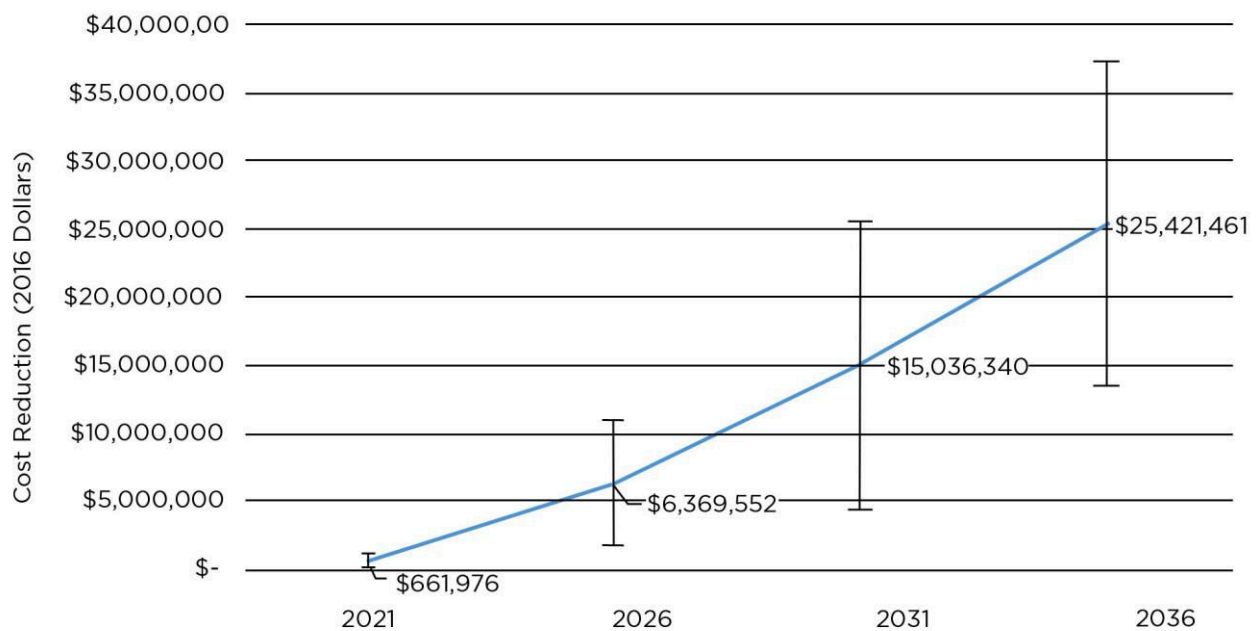
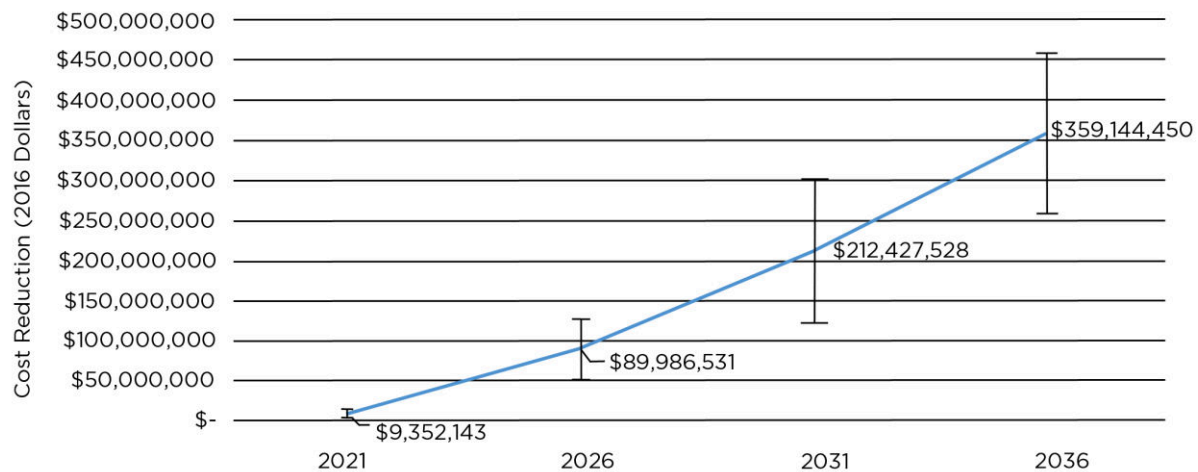


Table 3. The Economic Impact of a Universal ESA (Felony Reduction)

Conservative Estimates			
	2017-2021	2017-2026	2017-2036
Total Completed	14,237	42,460	127,785
Change in Number of Felonies	130	1,330	6,191
Economic Benefits (Millions of \$)	4.676	47.808	222.552
Robust Estimates			
	2017-2021	2017-2026	2017-2036
Total Completed	27,350	74,385	197,618
Change in Number of Felonies	260	2,503	9,990
Economic Benefits (Millions of \$)	9.352	89.987	359.144

Figure 3: Reduction in Felony Social Costs Over Time Through ESA Participation

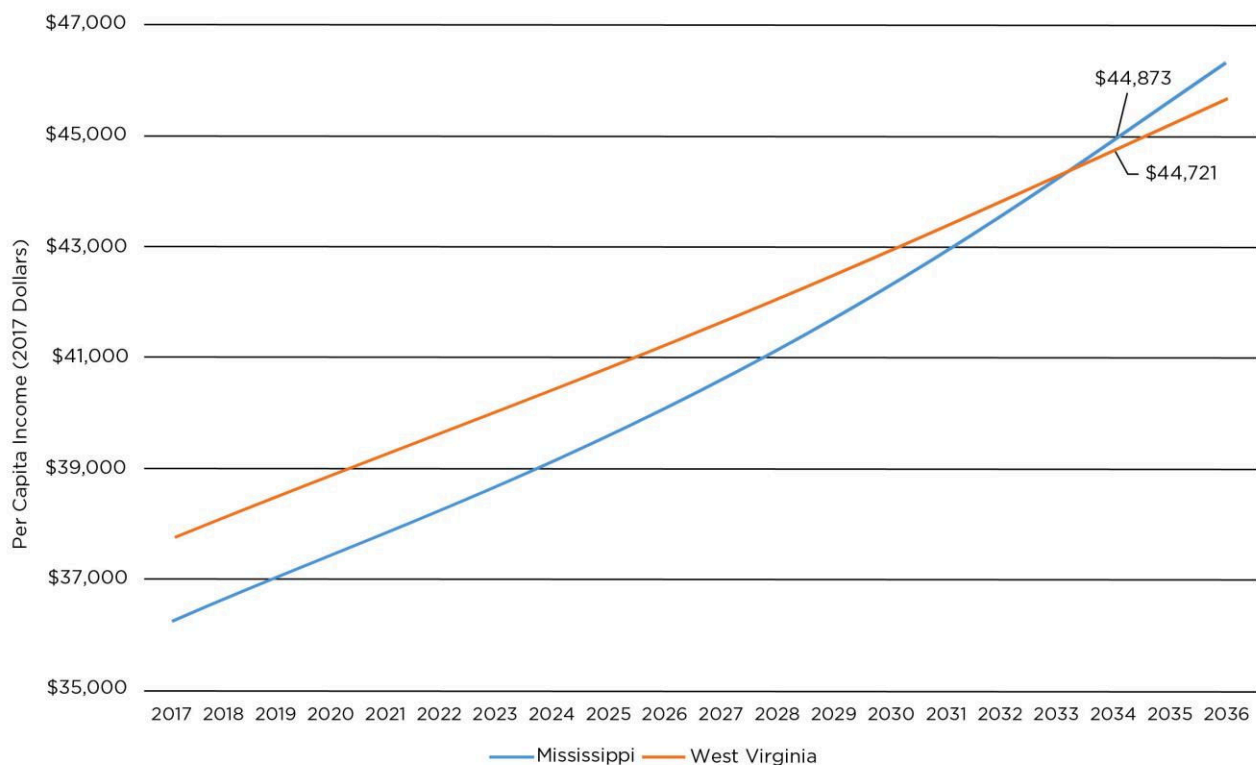


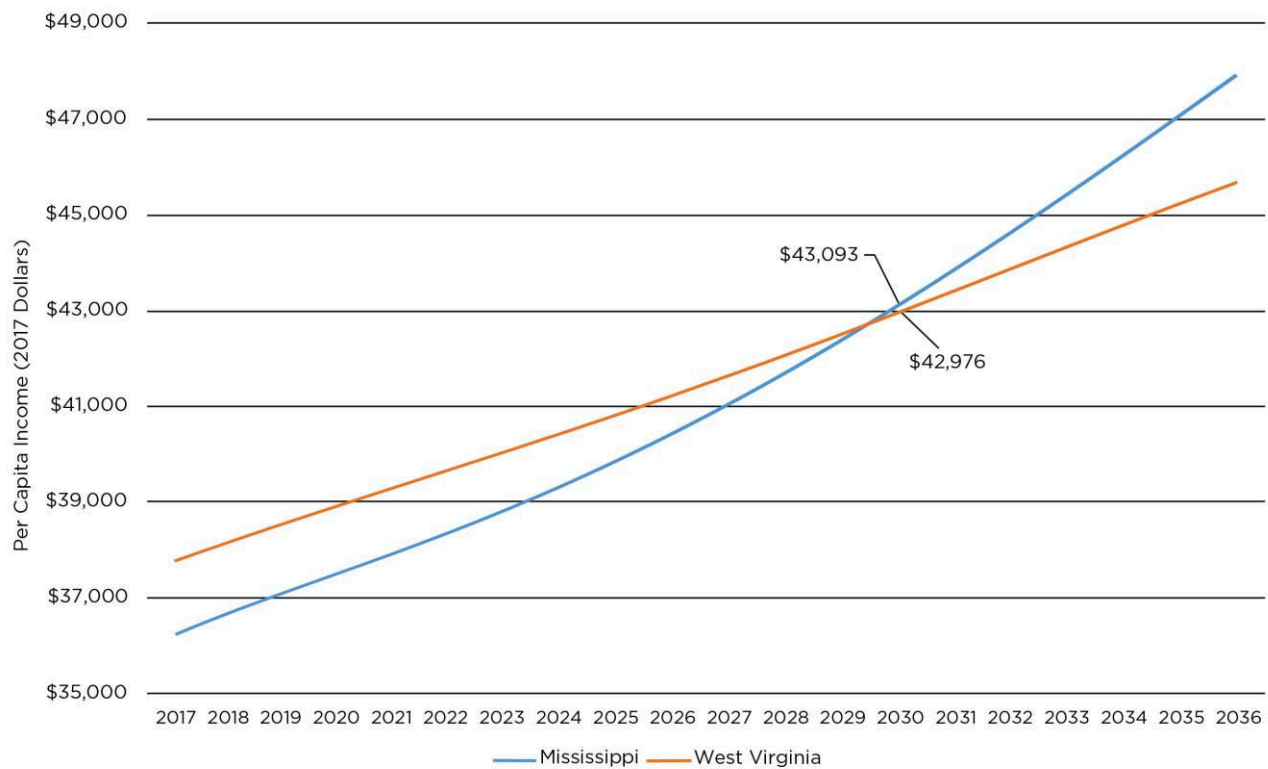


Results: Personal Income

Based on the assumptions outlined above, figure 4 below represents the projected impact of an ESA program on personal income over time. Currently, there is a substantial gap in the average personal income of Mississippians and West Virginians of about \$1,500 per person. Figure 4 uses our more conservative estimates of ESA participation. In this figure, the personal income of Mississippians would be expected to surpass those of West Virginians by 2034, with a Mississippi advantage growing to around \$700 per person by 2036. Figure 5 contains the estimates related to personal income based on our more robust projections. Under these assumptions, Mississippi's personal income would be forecasted to surpass West Virginia's in 2030, with a Mississippi advantage growing to around \$2,300 per person by 2036.

Figure 4. Per Capita Income by Year (Regular Participation)



**Figure 5. Per Capita Income by Year (Double Participation in First Two Years)**

Conclusion and Policy Implications

This paper shows that Mississippi could realize substantial economic benefits from the creation of an expansive ESA program. Over the next twenty years, this program would be expected to lead to a significant enough change in per capita income for Mississippi to get out of last place when compared to other states. As highlighted in this report, there are few other policies that could lead to as dramatic a change in personal income as the implementation of a broad-based ESA. For policymakers, this report suggests that the implementation of an ESA is not only a smart choice when one considers the tangible academic benefits that accrue to choice participants, but also from the perspective of improving Mississippi's economic standing.



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