An Updated Economic & Fiscal Assessment of Education Reform in Maryland

PREPARED BY SAGE POLICY GROUP, INC.
ON BEHALF OF STRONG SCHOOLS MARYLAND
April 2022

A Sage Analysis

EXECUTIVE SUMMARY

In 2019, Sage Policy Group, Inc. (Sage), a Baltimore-based economic consultancy, analyzed the economic and fiscal implications of implementing recommendations promulgated by the Maryland Commission on Innovation & Excellence in Education, otherwise known as the Kirwan Commission. While advancing its recommendations, the Commission estimated the impacts on educational outcomes, including in the form of higher graduation rates and greater propensities to earn undergraduate and graduate/professional degrees. The 2019 Sage report translated prospective gains in educational outcomes into forward-looking gains in statewide economic vibrancy and tax receipts.

Strong Schools Maryland commissioned the original report as well as this 2022 update. Much occurred during the two years following our 2019 report. First, Maryland's General Assembly passed several bills that begin to implement and fund Kirwan Commission recommendations. That legislation modified both the funding schedule and implementation timeline. Blueprint for Maryland's Future – Implementation (HB 1300) establishes in law Commission recommendations and supplies funding. HB 1300 took effect February 12, 2021, with mandated funding beginning in fiscal year 2022.

Second, a global pandemic altered the economy's trajectory. Many older workers responded to early crisis stages by retiring sooner than anticipated, leaving in their wake significant human capital shortfalls. That in turn drove up wage levels, which has created a higher floor for future compensation.

Like investments generally, costs of implementing education reform are front-loaded while benefits occur later. On behalf of this update, Sage also adjusted its 2019 findings for inflation to render them more easily comparable to the updated analysis. Altered implementation and economic parameters have meaningfully shifted several of the Sage study team's key analytical findings from 2019. In particular:

- By altering the pace of implementation, Maryland's General Assembly has lightened the fiscal burden on state and local governments. The 2019 report concluded that the maximum cumulative net cost would occur in FY2032 at $27.2 billion (total fiscal costs – total fiscal benefit). The update indicates that the maximum cumulative net cost will occur in FY2031 at $10.7 billion. In other words, implementing Kirwan Commission recommendations has become far less burdensome than originally estimated in 2019.
- The 2019 analysis determined that FY2033 would be the first year that fiscal benefits would exceed fiscal costs. The update concludes that the switch from negative fiscal impact to positive impact will occur one year earlier in FY2032.
- The 2019 analysis determined that the fiscal breakeven point (the point at which cumulative benefits exceed cumulative implementation costs) would occur in FY2041 when expected inflation is included in computations. The update finds that the fiscal breakeven point will occur in FY2038. From that point forward, Maryland's economy will experience massive net fiscal benefits as better educated workers continue to move up the economic ladder, increasing their income and other tax payments in the process as years go by. Exhibit ES-1 summarizes.

Exhibit ES-1: Comparison of Annual and Cumulative Net Cost Estimates: 2019 and 2021 (Millions of Current Dollars)

	2019 estimates		2021 estimates	
Year	Annual net cost	Cumulative net cost	Annual net cost	Cumulative net cost
FY 2020	$480	$480	$0	$0
FY 2021	$1,540	$2,020	$411	$411
FY 2022	$2,705	$4,726	$822	$1,233
FY 2023	$3,061	$7,787	$1,110	$2,343
FY 2024	$3,120	$10,906	$1,266	$3,609
FY 2025	$3,080	$13,986	$1,241	$4,850
FY 2026	$2,823	$16,809	$1,409	$6,259
FY 2027	$2,535	$19,344	$1,211	$7,470
FY 2028	$2,271	$21,615	$1,014	$8,484
FY 2029	$2,005	$23,620	$899	$9,384
FY 2030	$1,794	$25,413	$871	$10,255
FY 2031	$1,207	$26,620	$468	$10,723
FY 2032	$586	$27,206	($57)	$10,665
FY 2033	($70)	$27,136	($358)	$10,307
FY 2034	($762)	$26,374	($985)	$9,321
FY 2035	($1,814)	$24,560	($1,764)	$7,557
FY 2036	($2,924)	$21,636	($2,940)	$4,618
FY 2037	($4,093)	$17,543	($4,179)	$439
FY 2038	($5,324)	$12,219	($5,484)	($5,045)
FY 2039	($5,520)	$6,699	($6,860)	($11,905)
FY 2040	($5,723)	$976	($7,094)	($18,999)
FY 2041	($5,932)	($4,956)	($7,336)	($26,334)
FY 2042	($6,148)	($11,104)	($7,585)	($33,919)
FY 2043	($6,371)	($17,475)	($7,841)	($41,760)
FY 2044	($6,601)	($24,076)	($8,106)	($49,867)
FY 2045	($6,838)	($30,914)	($8,379)	($58,246)
FY 2046	($7,083)	($37,997)	($8,661)	($66,907)
FY 2047	($7,336)	($45,333)	($8,951)	($75,858)
FY 2048	($7,597)	($52,930)	($9,251)	($85,109)
FY 2049	($7,866)	($60,796)	($9,559)	($94,668)
FY 2050	($8,144)	($68,940)	($9,878)	($104,546)

Sources: Department of Legislative Services, Sage

IN SUMMATION

Several milestones are significant in the assessment. Full implementation is achieved in FY2031, and costs thereafter rise at the presumed rate of inflation. Full benefits of education reform in Maryland are not realized until FY2039. Annual costs exceed annual benefits until FY2032, when annual benefits exceed annual costs by $57 million. By FY2038, total positive fiscal impacts outweigh total negative ones. At this point, education reform emerges as a fiscal winner. Every year thereafter the cumulative net benefit of implementing Commission recommendations expands. By FY2050, cumulative fiscal benefits exceed cumulative costs by more than $104 billion and then keep rising into the distant future.

Table of Contents

List of Exhibits

Introduction

In 2019, Sage Policy Group (Sage) issued a report assessing the economic and fiscal implications of recommendations promulgated by the Maryland Commission on Innovation & Excellence in Education. The Commission, named after its chairman William E. Kirwan, who served as Chancellor of the University System of Maryland from 2002-2015, conducted a comprehensive analysis of preK-12 public education in Maryland and put forth extensive recommendations to improve Maryland's public schools. In making its recommendations, the Kirwan Commission also estimated the costs of implementing those recommendations and the timeline required to attain full implementation.

Strong Schools Maryland, which commissioned Sage's 2019 report, has commissioned this update of earlier findings. During the intervening two years, the Maryland legislature has passed several bills that support and fund the implementation of the Kirwan Commission recommendations. That legislation modified both the funding schedule and implementation timeline.

The other major event has been COVID-19, which has altered the trajectory of wage increases, shifted the industrial composition of Maryland's economy, and impacted labor force participation. This update alters economic and fiscal model parameters as appropriate to generate fresh estimates of Maryland's likely rate of economic return on stepped-up investments in public education.

BUILDING ON AN ANALYTICAL FRAMEWORK

Sage's 2019 report focused on translating projected educational outcomes prospectively flowing from implementation of the Commission's recommendations into economic and fiscal consequences. These economic and fiscal consequences could then be compared to the outcomes currently being generated by Maryland's public school system to generate economic and fiscal rates of return.

The 2019 report took as given projected improvements in educational outcomes described by the Commission. A major Kirwan Commission objective was to improve college and career readiness of Maryland high school graduates. These improvements would generate higher educational attainment for Maryland students, largely defined by the educational degrees and vocational certifications that students earn. Exhibit 1 compares the status quo against Commission expectations regarding educational attainment if Kirwan Commission recommendations are implemented with fidelity.

Prospective impacts of Commission recommendations include: 1) reducing by half the percentage of students who fail to graduate from high school; and 2) doubling the percentage of students who go on to achieve either a bachelor's degree or a graduate or professional degree. Another expected outcome of implementation of Commission recommendations is that 45 percent of future cohorts of public school students will enter apprenticeships or earn other industry certified credentials. That is,

almost half of future public school students will be better prepared for careers that are often alternatives to careers that require four-year college degrees or more. This preparation may include traditional apprenticeships, the acquisition of certificates verifying specific vocational qualifications, or other vocational credentials that prepare students for careers. Those earning these vocational certifications or credentials may stop their education at a high school diploma or may go on to college, earning an associate's or other degree in the process.

Exhibit 1: Comparison of Estimated Outcomes for Current Maryland Public School Students and Outcomes Resulting from Implementation of Commission Recommendations

Educational Attainment	Less Than a High School Diploma	High School Diploma or Equivalent	Some College or Associate Degree	Bachelor's Degree	Graduate or Professional Degree	Total
Status quo for students entering high school in 2010						
Share	13.0%	22.0%	39.9%	15.8%	9.3%	100.0%
Potential impacts of Commission recommendations on future cohorts						
Share	6.5%	11.0%	32.3%	31.6%	18.6%	100.0%

Sources: Kirwan Commission, Sage

Over the last five years, Maryland high school graduation rates have been consistent at roughly 87 percent of all students in a given cohort. Although data for the 2021 high school graduation rate are not available, the graduation rate for 2020 was 86.8 percent. While this is the lowest rate in the period from 2016 to 2020, it is less than a percentage point below the highest rate in that period, which was 87.7 percent in 2017. Similarly, dropout rates have consistently been approximately 8 percent. The dropout rate in 2020 was 8.3 percent, just below the 8.4 percent rate in 2018 and 2019, and barely higher than the rates in 2016 (8.0 percent) and 2017 (8.2 percent).[1] Despite disruptions and the move to online learning during much of the pandemic, these parameters have remained reasonably constant to date. Even if graduation and dropout rates worsened in 2021, that may prove a short-term pandemic consequence. Because the Blueprint will take many years to be fully implemented and more years will be required to realize the full impact of the many elements of the transformation of public education in Maryland, the impacts of the pandemic are viewed as aberrational for purposes of long-run estimation, though the study team recognizes that there has been a nontrivial level of lost learning during the public health crisis.

Improved educational attainment has many impacts on individuals. From an economic and fiscal perspective, a major consequence is the higher earning power associated with higher levels of educational attainment. Higher earnings translate into greater tax revenues, which benefit state and local governments. Among the impacted public revenue sources are income taxes, retail sales taxes, and property taxes.

1 Trend data on Maryland public school outcomes is available from the Maryland Department of Education's "Report Card." Cited data covered the period from 2016 through 2020. See "Cohort Graduation Rate Trend Data (2016 - 2020)" https://reportcard.msde.maryland.gov/Graphs/#/Graduation/GradRate/1/6/3/1/99/XXXX and "Dropout Rate Trend Data (2016 - 2020)" https://reportcard.msde.maryland.gov/Graphs/#/Graduation/DropOut/1/6/3/1/99/XXXX

Another consequence of greater educational attainment is the reduced need for many public services. Higher earnings reduce or eliminate the need for assistance such as food stamps, Medicaid, subsidized housing, energy assistance, and other forms of financial assistance.

By improving the educational attainment of Maryland public school students, Commission recommendations are predicted to significantly reduce costs associated with public assistance in its various forms. That represents pure fiscal upside.

A significant aspect of Commission recommendations is greater support for early childhood education, particularly, full-time prekindergarten for three-year-olds and four-year-olds. One consequence of this aspect of the Blueprint is that caretakers of these children may be able to enter or reenter the labor force while their children are in prekindergarten. The 2019 Sage analysis included enhanced economic activity associated with these caretakers being able to participate in the workforce. For the most part, these are mothers who are able to work because their children are enrolled in prekindergarten.

A similar emphasis of Commission recommendations is early intervention to address deficiencies in student performance. An area of particular interest and importance is students learning to read, a critical skill that affects virtually all other learning. Under Commission recommendations, students falling behind in reading are supplied extra attention. A remarkable example of the value of this kind of early intervention was noted in the Sage 2019 report. The Commission's research found that a majority of special education students do not have chronic conditions such as autism or intellectual disabilities that prevent them from being successful in school. Instead, for many children the failure to learn to read at an early age ultimately results in otherwise unwarranted referrals to special education. Early interventions that overcome reading and other problems can substantially reduce the population of special education students.[2] This also results in substantial savings since more students are enrolled in mainstream classes.

Another example of the benefits of early intervention is the experience of preschool and prekindergarten programs. Research regarding some of these programs has followed students for decades and determined that compared to children who did not attend preschool, students in high quality preschool programs were more likely to graduate from high school and earn college degrees. In addition to success in school, these students earned more as adults, paid more in taxes, were less involved with the criminal justice system, and produced fewer teen pregnancies.[3]

[2] The research on special education and the potential to intervene successfully to reduce the need for special education programs is discussed in a book by a Commission member. Hettleman, Kalman, "Mislabeled as Disabled," Radius Book Group, 2019.
[3] A discussion of this research can be found on pages 38 and 39 of the 2019 Sage report.

Legislation Implementing the Blueprint for Maryland's Future

Maryland's General Assembly enacted two major pieces of legislation to support Kirwan implementation. Blueprint for Maryland's Future – Implementation (HB 1300) establishes in law Commission recommendations and supplies funding. HB 1300 took effect July 1, 2020, with mandated funding beginning in fiscal year 2022.

The second bill, HB 1372, made some revisions to implementation timing as stipulated in HB 1300. These revisions were largely a result of the COVID-19 pandemic and generally extended the timeframe for certain provisions of the Blueprint for Maryland's Future by one year.

Fiscal notes prepared by the Department of Legislative Services for each bill supply extensive information regarding each bill's provisions and on state and local funding of public education overall as well as the added costs of implementing the Blueprint.[4] The Department of Legislative Services also reviewed the 2021 Maryland legislative session, which provided additional information regarding State support for K-12 public education.[5]

The fiscal notes and review of the 2021 Maryland legislative session provide an updated set of estimated costs for implementing the Blueprint. Exhibit 2 summarizes these estimated costs. As indicated, implementation begins with limited funding in FY2021 and FY2022. That early-stage funding primarily supports prekindergarten and early childhood programs as well as other Blueprint efforts. Annual funding increases are significant until full implementation of the Blueprint is achieved in FY2031, after which funding increases are generally scheduled to moderate. State aid distinguishes between basic funding for most Commission recommendations and what are referred to as other categorical costs. The latter include Judy Centers, school-based Health Centers, Infants and Toddlers, and the NBC (National Board Certification) support program.

[4] Department of Legislative Services, "Fiscal and Policy Note, HB 1300" https://mgaleg.maryland.gov/mgawebsite/Legislation/Details/HB1300?ys=2020RS and "Fiscal and Policy Note, HB 1372" https://mgaleg.maryland.gov/mgawebsite/Legislation/Details/HB1372?ys=2021RS

[5] Department of Legislative Services," The 90 Day Report - A Review of the 2021 Legislative Session," April 16, 2021, http://dls.maryland.gov/pubs/prod/RecurRpt/2021rs-90-Day-Report.pdf

Exhibit 2: State and Local Costs of Implementing the Blueprint (Millions of Current Dollars)

Year	Additional State Aid		Additional Local Aid	Total
	Foundation and Other	Other Categorical		
FY 2021	$411.2	-	-	$411.2
FY 2022	$838.4	-	-	$838.4
FY 2023	$1,034.0	$103.0	$117.9	$1,254.9
FY 2024	$1,277.0	$127.0	$143.5	$1,547.5
FY 2025	$1,394.0	$151.0	$120.3	$1,665.3
FY 2026	$1,678.0	$179.0	$140.9	$1,997.9
FY 2027	$1,963.0	$181.0	$126.3	$2,270.3
FY 2028	$2,259.0	$182.0	$127.6	$2,568.6
FY 2029	$2,548.0	$184.0	$244.9	$2,976.9
FY 2030	$2,930.0	$185.0	$383.6	$3,498.6
FY 2031	$3,067.0	$185.0	$419.0	$3,671.0
FY 2032	$3,211.0	$186.0	$493.0	$3,890.0
FY 2033	$3,527.0	$185.0	$660.0	$4,372.0
FY 2034	$3,680.0	$186.0	$702.6	$4,568.6

Source: Department of Legislative Services

In addition to legislation that supports Blueprint implementation, other recent legislation has increased tax revenues in Maryland. HB 732 imposes State sales and use taxes on certain types of digital advertising and also increases taxes on cigarettes, electronic smoking devices, and other tobacco products. Tobacco taxes were expected to increase State revenues by $100 million in FY2021. Net revenues would decrease in part because of expenditures on tobacco cessation programs starting in FY2022. By FY2025, net revenues are estimated at $72 million per annum. Digital advertising tax revenues, estimated at $250 million during the first full year of its imposition, are distributed to the Blueprint for Maryland's Future Fund.[6] HB 932 imposes Maryland's sales and use tax on a variety of digital products and codes. These products are defined as ones obtained electronically by the purchaser or delivered by means other than tangible storage media. They encompass such things as streaming pre-recorded or live musical performances, ring tones, e-books, and newspapers and periodicals transferred electronically. These taxes are expected to generate $83 million in FY2021, increasing to more than $118 million by FY2025. Tax revenues generated by HB 932 are also distributed to the Blueprint for Maryland's Future Fund to support implementation of Commission recommendations.[7]

Given the substantial expense of implementing the Blueprint, questions regarding the stability and viability of state funding are relevant. One source of funding, digital advertising taxes enacted by HB 732, may be subject to litigation as pointed out in the fiscal note for this legislation. If successful, such

[6] Department of Legislative Services, "Fiscal and Policy Note, HB 732: Tobacco Tax, Sales and Use Tax, and Digital Advertising Gross Revenues Tax" https://mgaleg.maryland.gov/mgawebsite/Legislation/Details/HB0732?ys=2020RS

[7] Department of Legislative Services, "Fiscal and Policy Note, HB 932: 21st-Century Economy Fairness Act" https://mgaleg.maryland.gov/mgawebsite/Legislation/Details/HB0932?ys=2020RS

litigation might eliminate as much as $250 million in funding for Blueprint implementation. The implications of this loss of funding are examined in a sensitivity analysis presented in the Appendix to this report.

Recent budget experience in Maryland, however, suggests that funding for the Blueprint is assured in the immediate future, and likely in the long run. During the fiscal year ending June 2021, Maryland state government registered a $2.5 billion budget surplus. This was more than four times larger than the budget surplus from the previous year, which was $585 million.[8] A recent report indicates that Maryland's current state government budget surplus is $4.6 billion. Moreover, budget surpluses of $1.9 billion per year are expected for the next five years.[9]

To meet obligations of funding the Blueprint in FY2023, Baltimore City and three counties (Caroline, Prince George's, and Talbot) will need to increase education appropriations by at least 5 percent above the pre-Blueprint levels. In FY2028, the same jurisdictions and Cecil and Kent counties will need to increase education appropriations by at least 5 percent over pre-Blueprint levels. By FY2034, when full implementation is achieved, these same six jurisdictions plus Garrett, Montgomery, and Wicomico counties will need to increase local appropriations by at least 5% over pre-Blueprint levels. Although these counties and Baltimore City will face non-trivial increases in education funding, for many of these counties expected revenue growth from local income and property taxes is expected to outpace increases in Blueprint funding. The expectation is that local revenues statewide will grow at an annual rate of 3.9 percent compared to an annual rate of 2.9 percent to fund the additional costs of implementing the Blueprint. In five jurisdictions, local revenue growth is expected to be lower than the growth in spending for the Blueprint. These jurisdictions include Baltimore City (-1.6 percent), Caroline County (-0.5 percent), Garrett County (-0.4 percent), Kent County (-1.1 percent), and Talbot County (-1.6 percent). State funding formulas may help by accommodating differences in local wealth across jurisdictions.[10]

Another source of viability for funding the Blueprint is federal funds. The American Rescue Plan has allocated $1.95 billion of support to Maryland and local school systems to support elementary and secondary education.[11] The Build Back Better legislation (stalled as of this writing) includes billions of dollars to support preschools for three-year-olds and four-year-olds.[12] Such funds would clearly

[8] Wood, Pamela, "Maryland government ends budget year with $2.5B surplus," Baltimore Sun, September 29, 2021 https://www.baltimoresun.com/politics/bs-md-pol-state-budget-surplus-20210929-fwycby7l3bgxlhygi5ibbersxe-story.html

[9] Boaz, David, 'Maryland Legislature Prepares to Divide Up a Budget Surplus," January 12, 2022 https://www.cato.org/blog/maryland-legislature-prepares-divide-budget-surplus

[10] Department of Legislative Services, "Local Fiscal Impacts of Implementing the Blueprint for Maryland's Future"

[11] "Maryland State Department of Education's Plan for ARP Funds to Support K-12 Schools and Students Approved" https://news.maryland.gov/msde/maryland-state-department-of-educations-plan-for-arp-funds-to-support-k-12-schools-and-students-approved/

[12] Guarino, Amanda, "Child Care and Pre-K in the Build Back Better Act: A Look at the Legislative Text." December 14, 2021 https://www.ffyf.org/child-care-and-pre-k-in-the-build-back-better-act-a-look-at-the-legislative-text/

align with the goals of the Blueprint should the legislation or these provisions of the legislation become law.

A significant factor in determining levels of state funding for K-12 public schools is foundation formula grants to Maryland's counties and Baltimore City. HB 1300 alters the formula for these grants. One component is the number of students enrolled in schools. The altered formula calls for this to be the greater of either: 1) the prior year full-time equivalent enrollment; or 2) the three-year moving average of full-time equivalent enrollment. Another formula component is the per-pupil foundation amount, which is increased by HB 1300. The bill specifies increases from FY2022 to FY2033; thereafter the per-pupil foundation amount is increased by inflation. The per-pupil foundation amount includes costs associated with Blueprint implementation, including additional support for existing teachers, career counseling, behavioral health, instructional opportunities so that students will be college and career ready, and materials for teachers. Per-pupil foundation amounts also incorporate provisions for special education, compensatory education and students learning English.[13]

[13] Op. cit., Department of Legislative Services, "Fiscal and Policy Note, HB 1300"

Changes in Earnings

During the two years since the original Sage report, wages and salaries have increased significantly in the context of diminished labor force participation and elevated numbers of available, unfilled jobs. The Federal Reserve Bank of Richmond publishes median earnings by education level in Maryland. To calculate lifetime earnings tied to educational attainment, these median earnings are adjusted to average earnings. Exhibit 3 summarizes these average earnings estimates for 2017 and 2019.[14] To estimate the corresponding value of earnings in 2021, 2019 estimates were adjusted by the Employment Cost Index published by the Bureau of Labor Statistics. That index supplies a quarterly estimate of the 12-month percentage change in total compensation for all civilian workers.[15] Average earnings increased 5.7 percent from 2019 to 2021.

Earnings estimates in Exhibit 3 are also adjusted to reflect a core concept of Commission recommendations. In preparing students for career readiness, the recommendations support pathways that lead to the acquisition of vocational certifications or other vocational credentials either within high school or in programs that follow on after high school graduation. These certifications and credentials will enhance the vocational skills of students and thereby support higher earnings. The analysis estimates that full implementation of Commission recommendations will lead to an average 6 percent increase in the earnings of students whose final level of educational attainment is either: 1) a high school diploma or 2) some college or an associate degree. Earnings estimates in Exhibit 3 reflect these enhancements of earnings for students who earn vocational certifications or other vocational credentials along with their high school diplomas or while attending college and possibly earning an associate degree.

Exhibit 3: Earnings by Educational Attainment Under Kirwan Recommendations, Maryland, 2017-2021

Educational Attainment	Less Than a High School Diploma	High School Diploma or Equivalent	Some College or Associate Degree	Bachelor's Degree	Graduate or Professional Degree
2017	$25,809	$38,547	$44,592	$68,975	$103,535
2019	$29,724	$39,952	$45,999	$72,951	$111,867
2021	$31,432	$42,248	$48,643	$77,143	$118,295
Increase in value from 2017 to					
2019	15.2%	3.6%	3.2%	5.8%	8.0%
2021	21.8%	9.6%	9.1%	11.8%	14.3%

Sources: Federal Reserve Bank of Richmond, Bureau of Labor Statistics, Sage

[14] Federal Reserve Bank of Richmond, "Educational Attainment in Maryland, 2017" and "Educational Attainment in Maryland, 2019" https://www.richmondfed.org/

[15] Bureau of Labor Statistics, "Employment Cost Index: Total Compensation for All Civilian Workers in All Industries and Occupations" https://data.bls.gov/cgi-bin/surveymost

The impact of these estimated earnings is driven primarily by improved educational outcomes generated by Blueprint implementation as reflected in Exhibit 1. The effects of improved educational outcomes and attendant increases in earnings for Marylanders who acquire vocational certificates or other vocational credentials are presented in Exhibit 4. Annual earnings for current cohorts of public school students are compared to earnings reflecting estimated Blueprint impacts. The number of students at each educational level before and after Blueprint impacts are achieved shows that the anticipated increases in student educational attainment are substantial.

This increased educational attainment results in a sharp increase in the potential earnings of each cohort. The listed maximum potential annual income is calculated by assuming that each member of the cohort will earn the average income for the level of educational attainment achieved. The maximum potential total annual income per cohort increases 27 percent when Blueprint impacts are fully realized, from $3.75 billion/year to $4.75 billion/year. This maximum potential annual income would almost certainly never be realized because some members of the cohort would be unemployed regardless of their educational attainment and not all members of the cohort would be participating in the labor force. These factors are also influenced by educational attainment, however, with more educated people more likely to be workforce participants and less likely to be unemployed. When considerations of unemployment and labor force absence are applied to the maximum potential annual income for the cohort, income at each level of educational attainment is reduced. The adjusted total annual income of current Maryland public school cohorts is $3.01 billion. Once the impacts of the Blueprint are fully realized, this adjusted annual income of the cohort increases 32 percent to $3.98 billion.

The largest gains in income are realized by those members of the cohort who go on to earn four-year college degrees or advanced degrees. Because the Blueprint is estimated to double the number of members of the cohort who go on to achieve these levels of educational attainment and the average annual income for these levels of educational attainment are substantially higher, those with bachelors or advanced degrees, who account for almost 47 percent of the adjusted total annual income of the status quo, are collectively expected to earn approximately 70 percent of the adjusted total annual income of the cohort when Blueprint implementation impacts are fully realized.

Exhibit 4: Estimated Income Gains Resulting from the Blueprint

Educational Attainment	Less Than a High School Diploma	High School Diploma or Equivalent	Some College or Associate Degree	Bachelor's Degree	Graduate or Professional Degree	Total
Estimated annual earnings by education attainment: status quo versus impacts of Blueprint						
Status quo	$31,432	$39,857	$45,934	$77,143	$118,295	N.A.
Blueprint impacts	$31,432	$42,248	$48,643	$77,143	$118,295	N.A.
Educational outcomes: status quo versus impacts of Blueprint						
Status quo share	13.0%	22.0%	39.9%	15.8%	9.3%	100.0%
Status quo cohort population	8,970	15,180	27,531	10,902	6,417	69,000
Blueprint share	6.5%	11.0%	32.3%	31.6%	18.6%	100.0%
Blueprint cohort population	4,485	7,590	22,287	21,804	12,834	69,000
Maximum potential total annual income per cohort (millions)						
Status quo	$281.9	$605.0	$1,264.6	$841.0	$759.1	$3,751.7
Share of total	7.5%	16.1%	33.7%	22.4%	20.2%	100.0%
Blueprint	$141.0	$320.7	$1,084.1	$1,682.0	$1,518.2	$4,746.0
Share of total	3.0%	6.8%	22.8%	35.4%	32.0%	100.0%
Unemployment and labor force participation rates by education level						
Unemployment rate	7.0%	4.6%	4.2%	2.3%	2.3%	N.A.
Labor force participation rate	64.6%	75.5%	82.5%	89.7%	89.7%	N.A.
Adjusted total annual income per cohort (millions)						
Status quo	$169.4	$435.8	$999.5	$737.0	$665.3	$3,007.0
Share of total	5.6%	14.5%	33.2%	24.5%	22.1%	100.0%
Blueprint	$84.7	$231.0	$856.8	$1,474.1	$1,330.5	$3,977.1
Share of total	2.1%	5.8%	21.5%	37.1%	33.5%	100.0%

Sources: Federal Reserve Bank of Richmond, Bureau of Labor Statistics, Kirwan Commission, Sage

Implementation of Commission recommendations will also increase earnings among mothers and other caretakers who are able to work because their children will be able to attend prekindergarten. Exhibit 5 updates estimates of earnings of these individuals and tax collections associated with these stepped-up earnings. The estimated number of employed caretakers is based on the number of children enrolled in prekindergarten and the likelihood that caretakers will return to the workforce and secure employment. The method to estimate augmented employment among caretakers and their earnings is the same as the one embodied in Sage's 2019 report. Earnings were adjusted to 2021 dollars using the Average Wage Index published by the Social Security Administration.[16] Exhibit 5 supplies relevant statistical detail.

[16] Social Security Administration, "National Average Wages Index" https://www.ssa.gov/oact/cola/AWI.html

Exhibit 5: Earnings of and Taxes Paid by Caretakers of Prekindergarten Students, 2022-2031
(Millions of 2021 Dollars)

Program Year	Employed Mothers	Total Earnings	State Tax	Local Tax	Total State & Local Tax
FY 2022	2,308	$91.9	$6.3	$5.3	$11.5
FY 2023	3,160	$129.0	$8.8	$7.4	$16.2
FY 2024	4,008	$168.0	$11.5	$9.6	$21.1
FY 2025	4,796	$206.8	$14.1	$11.8	$25.9
FY 2026	7,263	$321.8	$21.9	$18.4	$40.4
FY 2027	7,930	$361.0	$24.6	$20.7	$45.3
FY 2028	8,498	$397.7	$27.1	$22.8	$49.9
FY 2029	9,160	$440.6	$30.0	$25.2	$55.3
FY 2030	9,737	$481.4	$32.8	$27.6	$60.4
FY 2031	10,170	$516.7	$35.2	$29.6	$64.8

Sources: Kirwan Commission, Bureau of Labor Statistics, Comptroller of Maryland, Social Security Administration, Sage
Note: State and local tax figures may not add due to rounding

Updating Blueprint Costs & Benefits

To estimate the net impacts of Commission recommendations, Sage conducted an analysis of the lifetime earnings, tax payments, and costs of public assistance for a cohort of Maryland public school students. Each cohort is assumed to be 69,000 students who, for example, enter high school and are expected to graduate within four years. Enhanced educational attainment translates into higher lifetime earnings, which in turn translates into higher levels of State and local government taxes paid as well as diminished demand for public assistance and incarceration services.

The starting point for understanding the net benefits of the Commission's recommendations is assessing the economic and fiscal impacts of the status quo. Exhibit 6 summarizes the educational outcomes of each current cohort of Maryland students who have not benefitted from implementation of Commission recommendations. For each level of educational attainment, the number of students in that group is listed along with their estimated lifetime earnings, tax payments, and costs for various types of public assistance and services.

Exhibit 6: Under the Status Quo - Lifetime Economic and Fiscal Impacts and Social Costs of Current Student Outcomes (Millions of 2021 Dollars)

Educational Attainment	Less Than a High School Diploma	High School Diploma or Equivalent	Some College or Associate Degree	Bachelor's Degree	Graduate or Professional Degree	Total
No. of students by outcome (Share)	8,970 (13.0%)	15,180 (22.0%)	27,531 (39.9%)	10,902 (15.8%)	6,417 (9.3%)	69,000 (100.0%)
Lifetime earnings	$6,890	$17,505	$39,097	$28,024	$24,147	$115,664
Lifetime federal income tax	($805)	($910)	($775)	$755	$1,341	($395)
Lifetime Maryland state and local tax	$461	$1,393	$3,355	$2,869	$2,677	$10,755
Medicaid, lifetime benefit	$344	$595	$834	$113	$41	$1,926
Food stamps (SNAP), lifetime benefit	$72	$111	$147	$17	$6	$353
Public Assistance (incl. TANF), lifetime benefit	$43	$72	$95	$20	$0	$229
Housing and energy assistance, lifetime benefit	$48	$34	$83	$7	$3	$175
Incarceration costs and crime burdens	$275	$11	$0	$0	$0	$286
Maryland taxes less assistance	($320)	$570	$2,196	$2,712	$2,627	$7,785

Source: Sage

A measure of particular interest is the comparison of the total value of Maryland state and local taxes paid and the cost of public assistance and services related to each level of educational attainment. As indicated in Exhibit 6, those who do not earn a high school diploma pay less in state and local taxes than the value of public assistance and services they use over their lifetimes on average. As educational attainment increases, this relationship reverses. For the entire cohort, state and local taxes paid in a lifetime exceed the costs of public assistance and services by $7.8 billion.

The outcomes under the status quo can be compared to the estimates of outcomes for Maryland public school students once Commission recommendations are fully implemented and all the benefits of these changes are realized. Exhibit 7 summarizes the lifetime earnings and associated taxes and the demands for public assistance and services for future cohorts of Maryland public school students with implementation. Because fewer students fail to finish high school or stop their education at a high school diploma and more students attend college and earn postsecondary degrees, earnings and associated tax payments are substantially higher than under the status quo while demand for public assistance is diminished. Total lifetime value of Maryland state and local taxes paid by this future cohort of students exceeds the value of public assistance and services by $12.9 billion.

Exhibit 7: With Commission Recommendations Implemented - Updated New Steady-State in Maryland and Associated Estimates of Economic and Fiscal Impacts for Future Cohorts of Entering High School Students (Millions of 2021 Dollars)

Educational Attainment	Less Than a High School Diploma	High School Diploma or Equivalent	Some College or Associate Degree	Bachelor's Degree	Graduate or Professional Degree	Total
No. of students by outcome (Share)	4,485 (6.5%)	7,590 (11.0%)	22,287 (32.3%)	21,804 (31.6%)	12,834 (18.6%)	69,000 (100.0%)
Lifetime earnings with social gain	$3,445	$9,278	$33,517	$56,049	$48,294	$150,582
Lifetime federal income tax	($403)	($357)	($288)	$1,510	$2,682	$3,144
Lifetime Maryland state & local tax	$231	$763	$2,953	$5,738	$5,354	$15,038
Medicaid, average lifetime benefit	$172	$297	$675	$225	$83	$1,452
Food stamps (SNAP), lifetime benefit	$36	$55	$119	$35	$11	$257
Public assistance (incl. TANF), lifetime benefit	$21	$36	$77	$39	$0	$173
Housing & energy assistance, lifetime benefit	$24	$17	$67	$14	$6	$128
Incarceration costs & crime burdens	$138	$5	$0	$0	$0	$143
Maryland taxes less assistance	**($160)**	**$352**	**$2,014**	**$5,424**	**$5,254**	**$12,884**

Source: Sage

Differences in economic and fiscal impacts between the status quo and the performance of future cohorts fully benefiting from the Blueprint for Maryland's Future form the basis for assessing the long-term benefits of implementing these changes. The increase in earnings that has occurred since Sage's 2019 report has significantly impacted these computed differences. Exhibit 8 compares the economic and fiscal impacts of Commission recommendations estimated in the 2019 Sage report with the same impacts estimated in this update. The net benefit, defined as the difference between total state and local taxes paid and the cost of public assistance and services, has significantly increased in the updated analysis to more than $5 billion per cohort of students. This reflects computed gross benefits. We now turn to an assessment of implementation costs.

Exhibit 8: Updating the Benefit Per Cohort of Implementing the Blueprint (Millions of 2021 Dollars)

	2019 Sage Analysis		Updated Sage Analysis	
	Status Quo	Post-Kirwan	Status Quo	Post-Kirwan
Lifetime earnings with social gain	$103,181	$134,065	$115,664	$150,582
Lifetime Maryland state and local tax	$8,921	$12,540	$10,755	$15,038
Cost of public assistance	$3,213	$2,328	$2,970	$2,154
Maryland taxes less assistance	$5,708	$10,212	$7,785	$12,884
Net benefit	$4,504		$5,099	

Source: Sage

This assessment considers the impact of recommendations over the course of decades, which is precisely what it must do given the length of time to full implementation as well as the length of time between prekindergarten and entry into the workforce.

As detailed in Sage's 2019 report, full implementation of recommendations will require roughly a decade. Because measured impacts encompass the enhanced earnings of high school graduates who go on to earn bachelor's degrees and advanced and professional degrees, the full economic and fiscal

impacts of improved educational outcomes are not realized until years after full implementation is achieved. Another example of the long-term effects of Kirwan implementation is the increased achievement of children who attend prekindergarten. Studies have shown that these children go on to greater educational attainment and fewer social problems (e.g., teenage pregnancy, involvement with the criminal justice system) than children who do not have this opportunity.

This updated assessment presumes that implementation began in earnest in FY2021, or a year later than presumed in the 2019 assessment. Assumptions and estimates regarding phasing of implementation and attendant phasing of impacts used in the 2019 analysis are also utilized here. This analysis further presumes that benefits are enhanced by multiplier effects as higher incomes produce benefits for area businesses in the form of augmented sales. This also implicates a broader supply chain as consumers expand their demands for goods and services due to enhanced employment and earnings.

An important distinction between the original analysis and this update is that the update is presented in current dollars while we presented the original analysis in constant 2020 dollars. Because costs of implementation as assessed by the Department of Legislative Services were prepared in current dollars that incorporate the effects of inflation over time, this analysis deploys estimates of benefits that incorporate the long-term effects of inflation as well. Annual inflation adjustments for costs are 1.9 percent based on the average annual rate of inflation in the gross domestic product from 2000-2020 as measured by the Bureau of Economic Analysis.[17,18] Because estimated increases in state and local expenditures for implementation reflected in Exhibit 2 provide cost data only through FY2034, the inflation adjustment is applied to subsequent years embodied by this analysis. The annual inflation adjustment for earnings of 2.8 percent is based on the Average Wage Indexing Series from 2000-2020.[19,20] This adjustment is applied to earnings and their fiscal benefits after FY2021.

That the adjustment factor for wages is higher than the adjustment factor for general inflation applied to the costs of Blueprint implementation means that benefits will grow at a faster rate than costs. This is not to be viewed as an anomaly, but part of a long-lived trend with respect to wage and cost of living growth. The 20-year period chosen to generate key parameters in this analysis reflects an intentional decision to heavily weight recent trends in wages and inflation. A longer-term look at these factors confirms that wages grow faster than cost of living across the overall population. Using the same sources for wage increases and the general rate of inflation, but extending the period of inquiry to 1951-2020 reveals that wages increased at an average annual rate of 4.43 percent while the annual

[17] Bureau of Economic Analysis, *National Income and Product Accounts (NIPA)*. Table 1.1.9. Implicit Price Deflators for Gross Domestic Product.
[18] We are aware that inflation is presently elevated, but that is not expected to last indefinitely.
[19] Social Security Administration, "Average Wage Indexing Series" https://www.ssa.gov/oact/cola/awiseries.html.
[20] Wages have also been rising rapidly of late, but like inflation, unusually rapid wage growth is not anticipated to last indefinitely.

rate of inflation was 3.08 percent. Thus, whether the period of interest is the last 20 years or the last 70, the average annual increase in wages is almost 50 percent higher than the annual rate of inflation.[21]

Exhibit 9 summarizes costs and benefits of implementation from FY2021 through FY2051, a 30-year period that reflects the time period used in the 2019 analysis. As indicated, costs of implementation commence in FY2021 while the onset of benefits is delayed at least one year. The net annual cost is the difference between costs and benefits in any year. Cumulative net costs are the sum of all previous net annual costs.

Exhibit 9: Estimated Costs and Fiscal Benefits of Implementing Commission Recommendations (Millions of Current Dollars)

Year	Costs	Pre-K Workforce Fiscal Benefits	Better School Outcome Fiscal Benefits	Annual Net Cost	Cumulative Net Cost
FY 2021	$411	$0	$0	$411	$411
FY 2022	$838	$16	$0	$822	$1,233
FY 2023	$1,255	$23	$122	$1,110	$2,343
FY 2024	$1,548	$30	$252	$1,266	$3,609
FY 2025	$1,665	$37	$388	$1,241	$4,850
FY 2026	$1,998	$57	$532	$1,409	$6,259
FY 2027	$2,270	$64	$995	$1,211	$7,470
FY 2028	$2,569	$70	$1,484	$1,014	$8,484
FY 2029	$2,977	$78	$1,999	$899	$9,384
FY 2030	$3,499	$85	$2,542	$871	$10,255
FY 2031	$3,671	$90	$3,114	$468	$10,723
FY 2032	$3,890	$91	$3,856	($57)	$10,665
FY 2033	$4,372	$93	$4,637	($358)	$10,307
FY 2034	$4,569	$95	$5,459	($985)	$9,321
FY 2035	$4,655	$97	$6,323	($1,764)	$7,557
FY 2036	$4,744	$99	$7,584	($2,940)	$4,618
FY 2037	$4,834	$101	$8,911	($4,179)	$439
FY 2038	$4,925	$103	$10,306	($5,484)	($5,045)
FY 2039	$5,019	$108	$11,771	($6,860)	($11,905)
FY 2040	$5,114	$110	$12,098	($7,094)	($18,999)
FY 2041	$5,211	$112	$12,435	($7,336)	($26,334)
FY 2042	$5,310	$115	$12,780	($7,585)	($33,919)
FY 2043	$5,411	$117	$13,135	($7,841)	($41,760)
FY 2044	$5,514	$120	$13,500	($8,106)	($49,867)
FY 2045	$5,618	$123	$13,875	($8,379)	($58,246)
FY 2046	$5,725	$125	$14,261	($8,661)	($66,907)
FY 2047	$5,834	$128	$14,657	($8,951)	($75,858)
FY 2048	$5,944	$131	$15,064	($9,251)	($85,109)
FY 2049	$6,057	$134	$15,483	($9,559)	($94,668)
FY 2050	$6,172	$137	$15,913	($9,878)	($104,546)
FY 2051	$6,289	$140	$16,355	($10,206)	($114,751)

Sources: Department of Legislative Services, Sage

[21] Op. cit., Bureau of Economic Analysis, *National Income and Product Accounts (NIPA)*. Table 1.1.9. Implicit Price Deflators for Gross Domestic Product and Social Security Administration, "Average Wage Indexing Series"

Several milestones are significant in the assessment. Full implementation is achieved in FY2031. Implementation costs thereafter rise at the presumed rate of inflation. Full benefits of the Blueprint are not realized until FY2039. Annual costs exceed annual benefits until FY2032, when annual benefits exceed annual costs by $57 million. By FY2038, cumulative positive fiscal impacts outweigh negative ones. During that year, the cumulative fiscal benefits exceed cumulative net costs by $5 billion. Every year thereafter the cumulative net benefit of implementing Commission recommendations expands. By FY2051, cumulative net benefits exceed cumulative net costs by more than $114 billion. Among other things, this means that even if Commission expectations regarding the rate of improvement in educational outcomes are meaningfully overstated, implementation of the Blueprint could still stand as a major fiscal winner for Maryland. In fact, our estimates suggest that the impacts will be both positive and utterly transformational.

Conclusion

When Sage conducted an economic and fiscal assessment regarding the implications of implementing Kirwan Commission recommendations in 2019, we determined that total costs of implementation would exceed total benefits until the year FY2041. In legislating around these recommendations, Maryland's General Assembly has since stretched the period of full implementation. Furthermore, during the two years that ensued after our initial 2019 report, the labor market changed, with wages rising unusually quickly as the pandemic reshaped the labor market. Altered parameters have pushed the fiscal breakeven point for educational reform in Maryland forward. This update concludes that the fiscal breakeven point will now be reached by FY2038, several years earlier than determined by our initial assessment.[22]

[22] This analysis is based on new legislation in place before the current (2022) legislative session. Implementation of the final legislation may not conform with the schedule embodied in the current legislation and assumed by the analysis. Even if implementation is delayed, the main findings of the analysis are highly unlikely to change. Full implementation of the Blueprint will take about a decade and the full effect of the Blueprint will take many more years to be realized. Projected greater earnings will generate increases in state and local tax revenue that will more than pay for the added costs of implementing the Blueprint and creating world-class preK-12 education in Maryland.

Appendices

COMPARING THE RESULTS OF THE CURRENT ANALYSIS TO THE 2019 ANALYSIS

The analysis of costs and benefits in the 2019 Sage report used constant 2020 dollars, while the updated analysis in this report uses nominal or current dollars. The following tables adjust 2019 analysis findings to nominal dollars using annual inflation factors cited in the body of the report (1.9 percent for implementation costs and 2.8 percent for earnings). This adjustment allows for direct comparisons of costs and benefits in the two analyses.

Exhibit A-1 juxtaposes implementation costs in the two analyses. As indicated, cost estimates in the current analysis are consistently less than those in the 2019 analysis, gradually growing as a share of the 2019 estimates until FY2034 when they reach and thereafter continue to be 90 percent of earlier cost estimates. The fact that the implementation of the Commission's recommendations is expected to start a year later in the current analysis provides much of the explanation of the initial low values in comparing costs. The General Assembly also stretched the timeline of implementation such that costs grow more slowly than the trajectory presumed in our initial analysis.

Exhibit A-1: Comparison of Cost Estimates: 2019 and 2021 (Millions of Current Dollars)

Year	Cost Estimates		2021 Estimates as Share Of 2019 Estimates
	2019	2021	
FY 2020	$480	$0	0%
FY 2021	$1,556	$411	26%
FY 2022	$2,839	$838	30%
FY 2023	$3,319	$1,255	38%
FY 2024	$3,508	$1,548	44%
FY 2025	$3,620	$1,665	46%
FY 2026	$3,791	$1,998	53%
FY 2027	$3,953	$2,270	57%
FY 2028	$4,164	$2,569	62%
FY 2029	$4,398	$2,977	68%
FY 2030	$4,712	$3,499	74%
FY 2031	$4,802	$3,671	76%
FY 2032	$4,893	$3,890	80%
FY 2033	$4,986	$4,372	88%
FY 2034	$5,080	$4,569	90%
FY 2035	$5,177	$4,655	90%
FY 2036	$5,275	$4,744	90%
FY 2037	$5,375	$4,834	90%
FY 2038	$5,477	$4,925	90%
FY 2039	$5,581	$5,019	90%
FY 2040	$5,687	$5,114	90%
FY 2041	$5,795	$5,211	90%
FY 2042	$5,905	$5,310	90%
FY 2043	$6,017	$5,411	90%
FY 2044	$6,131	$5,514	90%
FY 2045	$6,248	$5,618	90%
FY 2046	$6,366	$5,725	90%
FY 2047	$6,487	$5,834	90%
FY 2048	$6,610	$5,944	90%
FY 2049	$6,736	$6,057	90%
FY 2050	$6,864	$6,172	90%

Sources: Department of Legislative Services, Sage

Exhibit A-2 compares economic and fiscal benefits generated by the two analyses. As was true with costs, the magnitude of estimates in the current analysis is initially less than estimates in the 2019 analysis. This year-to-year comparison of benefits is also affected by the one-year delay in the presumed commencement of implementation. By FY2039, however, benefits computed in the update exceed prior analysis estimates and thereafter remain consistently at 107 percent of 2019 estimates.

Exhibit A-2: Comparison of Benefits Estimates: 2019 and 2021 (Millions of Current Dollars)

Year	2019 Fiscal Benefits Estimates			2021 Fiscal Benefit Estimates			2021 Benefits as Share Of 2019 Benefits
	Pre-K workforce	Improved School Outcomes	2019 Total Benefit	Pre-K workforce	Improved School Outcomes	2021 Total Benefit	
FY 2020	$0	$0	$0	$0	$0	$0	N.A.
FY 2021	$16	$0	$16	$0	$0	$0	0%
FY 2022	$23	$111	$134	$16	$0	$16	12%
FY 2023	$30	$229	$258	$23	$122	$145	56%
FY 2024	$37	$352	$389	$30	$252	$281	72%
FY 2025	$57	$483	$540	$37	$388	$425	79%
FY 2026	$64	$904	$968	$57	$532	$589	61%
FY 2027	$70	$1,348	$1,418	$64	$995	$1,059	75%
FY 2028	$78	$1,815	$1,893	$70	$1,484	$1,555	82%
FY 2029	$85	$2,308	$2,393	$78	$1,999	$2,077	87%
FY 2030	$91	$2,827	$2,918	$85	$2,542	$2,627	90%
FY 2031	$94	$3,501	$3,595	$90	$3,114	$3,203	89%
FY 2032	$97	$4,210	$4,307	$91	$3,856	$3,947	92%
FY 2033	$99	$4,956	$5,056	$93	$4,637	$4,730	94%
FY 2034	$102	$5,740	$5,843	$95	$5,459	$5,554	95%
FY 2035	$105	$6,886	$6,991	$97	$6,323	$6,420	92%
FY 2036	$108	$8,091	$8,199	$99	$7,584	$7,683	94%
FY 2037	$111	$9,357	$9,468	$101	$8,911	$9,012	95%
FY 2038	$114	$10,688	$10,801	$103	$10,306	$10,409	96%
FY 2039	$117	$10,984	$11,102	$108	$11,771	$11,879	107%
FY 2040	$120	$11,290	$11,410	$110	$12,098	$12,208	107%
FY 2041	$124	$11,603	$11,727	$112	$12,435	$12,547	107%
FY 2042	$127	$11,926	$12,053	$115	$12,780	$12,895	107%
FY 2043	$131	$12,257	$12,388	$117	$13,135	$13,252	107%
FY 2044	$134	$12,598	$12,732	$120	$13,500	$13,620	107%
FY 2045	$138	$12,948	$13,086	$123	$13,875	$13,998	107%
FY 2046	$142	$13,308	$13,449	$125	$14,261	$14,386	107%
FY 2047	$146	$13,677	$13,823	$128	$14,657	$14,785	107%
FY 2048	$150	$14,057	$14,207	$131	$15,064	$15,195	107%
FY 2049	$154	$14,448	$14,602	$134	$15,483	$15,617	107%
FY 2050	$158	$14,849	$15,008	$137	$15,913	$16,050	107%

Sources: Department of Legislative Services, Sage

Exhibit A-3 compares annual net cost (benefit – costs) and cumulative net costs estimated in the two analyses. Benefits begin to exceed costs sooner under the update than under the original analysis. The updated analysis finds that implementation of the Blueprint becomes an annual net fiscal positive for Maryland by FY2032. The previous study found that the turn did not occur until FY2033. In terms of cumulative impact, the updated analysis indicates that the Blueprint emerges as a net fiscal winner by FY2038. Under the original analysis, implementation failed to become a cumulative net positive until FY2041 when inflation is considered, and not until FY2045 when the analysis is conducted in constant 2020 dollars.

Exhibit A-3: Comparison of Annual and Cumulative Net Cost Estimates: 2019 and 2021 (Millions of Current Dollars)

Year	2019 Estimates		2021 Estimates	
	Annual Net Cost	Cumulative Net Cost	Annual Net Cost	Cumulative Net Cost
FY 2020	$480	$480	$0	$0
FY 2021	$1,540	$2,020	$411	$411
FY 2022	$2,705	$4,726	$822	$1,233
FY 2023	$3,061	$7,787	$1,110	$2,343
FY 2024	$3,120	$10,906	$1,266	$3,609
FY 2025	$3,080	$13,986	$1,241	$4,850
FY 2026	$2,823	$16,809	$1,409	$6,259
FY 2027	$2,535	$19,344	$1,211	$7,470
FY 2028	$2,271	$21,615	$1,014	$8,484
FY 2029	$2,005	$23,620	$899	$9,384
FY 2030	$1,794	$25,413	$871	$10,255
FY 2031	$1,207	$26,620	$468	$10,723
FY 2032	$586	$27,206	($57)	$10,665
FY 2033	($70)	$27,136	($358)	$10,307
FY 2034	($762)	$26,374	($985)	$9,321
FY 2035	($1,814)	$24,560	($1,764)	$7,557
FY 2036	($2,924)	$21,636	($2,940)	$4,618
FY 2037	($4,093)	$17,543	($4,179)	$439
FY 2038	($5,324)	$12,219	($5,484)	($5,045)
FY 2039	($5,520)	$6,699	($6,860)	($11,905)
FY 2040	($5,723)	$976	($7,094)	($18,999)
FY 2041	($5,932)	($4,956)	($7,336)	($26,334)
FY 2042	($6,148)	($11,104)	($7,585)	($33,919)
FY 2043	($6,371)	($17,475)	($7,841)	($41,760)
FY 2044	($6,601)	($24,076)	($8,106)	($49,867)
FY 2045	($6,838)	($30,914)	($8,379)	($58,246)
FY 2046	($7,083)	($37,997)	($8,661)	($66,907)
FY 2047	($7,336)	($45,333)	($8,951)	($75,858)
FY 2048	($7,597)	($52,930)	($9,251)	($85,109)
FY 2049	($7,866)	($60,796)	($9,559)	($94,668)
FY 2050	($8,144)	($68,940)	($9,878)	($104,546)

Sources: Department of Legislative Services, Sage

SENSITIVITY ANALYSIS OF THE COSTS AND BENEFITS OF THE BLUEPRINT

As noted above, some Blueprint funding may be at risk because of litigation. Specifically, revenues generated by digital advertising taxes may face legal challenges that could limit or eliminate this source of funding. As the fiscal note for HB 732 notes, this revenue could generate as much as $250 million during the first full year that the tax is in place. If these revenues were available in FY2023, it would constitute almost 20 percent of total funding projected for that year ($250 million out of a total of $1.255 billion). Projected total funding for the Blueprint increases substantially over the next 11 years until full implementation is achieved in FY 2034. Assuming that digital advertising tax revenue increases at the general rate of inflation over that same period, the share of total funding supported by these tax revenues steadily decreases to 6.7 percent. After FY2034, this analysis assumes that costs rise at the general rate of inflation, or an estimated 1.9 percent per year. Thus, over the long run, eliminating digital advertising tax revenue as a funding source might reduce total funding of the Blueprint by 7-8 percent. Such a reduction in funding would likely be associated with lower expenditures, which in turn would diminish Blueprint impacts and benefits.

The exact impact of reducing funding for implementing the Blueprint is uncertain. To estimate the effects of reduced funding, this analysis assumes that reduced funding would diminish levels of educational attainment of future public school cohorts. Ultimately, this would also reduce the fiscal benefits that each cohort of students would generate. Specifically, this analysis estimates that the benefit per cohort achieved by future cohorts is reduced by 20 percent based on the relationship between costs and benefits generated by the model. Thus, instead of a benefit per cohort of $5.099 million as presented in Exhibit 8, this sensitivity analysis computes that the benefit per cohort would be in the range $4.079 million.

Using these estimates of reduced funding based on the elimination of the digital advertising tax revenues and the reduced benefit per cohort, the costs and benefits of implementing the Blueprint can be analyzed. Exhibit A-4 summarizes results of this analysis. Reduced funding is assumed to begin in FY2023 when $250 million is eliminated from current funding projected by the Department of Legislative Services. This loss of tax revenue is presumed to grow at the rate of inflation.

Exhibit A-4 supplies a year-by-year assessment of annual costs and benefits as well as the annual net cost and the cumulative net cost of implementation with reduced funding. By FY2034, annual net benefit shifts from negative to positive. That fiscal year, the net annual benefit is estimated at $201 million. By FY2039, Maryland's educational reform has more than paid for itself. At that point, cumulative benefits increase each year and exceed $76 billion by FY2051.

Exhibit A-4: Sensitivity Analysis of Estimated Net Costs and Fiscal Benefits of Implementing the Commission Recommendations Assuming Reduced Funding (Millions of Current Dollars)

Year	Costs	Prekindergarten Workforce Fiscal Benefits	Better School Outcome Fiscal Benefits	Annual Net Cost	Cumulative Net Cost
FY 2021	$411	$0	$0	$411	$411
FY 2022	$838	$16	$0	$822	$1,233
FY 2023	$1,005	$23	$98	$884	$2,117
FY 2024	$1,293	$30	$201	$1,062	$3,179
FY 2025	$1,406	$37	$310	$1,059	$4,238
FY 2026	$1,733	$57	$425	$1,251	$5,489
FY 2027	$2,001	$64	$796	$1,141	$6,629
FY 2028	$2,294	$70	$1,187	$1,036	$7,665
FY 2029	$2,697	$78	$1,600	$1,019	$8,685
FY 2030	$3,213	$85	$2,034	$1,094	$9,779
FY 2031	$3,380	$90	$2,491	$800	$10,579
FY 2032	$3,594	$91	$3,085	$417	$10,996
FY 2033	$4,070	$93	$3,710	$267	$11,263
FY 2034	$4,261	$95	$4,367	($201)	$11,062
FY 2035	$4,342	$97	$5,058	($814)	$10,248
FY 2036	$4,424	$99	$6,068	($1,743)	$8,506
FY 2037	$4,508	$101	$7,129	($2,722)	$5,784
FY 2038	$4,594	$103	$8,245	($3,755)	$2,029
FY 2039	$4,681	$108	$9,418	($4,844)	($2,815)
FY 2040	$4,770	$110	$9,680	($5,019)	($7,835)
FY 2041	$4,861	$112	$9,948	($5,200)	($13,035)
FY 2042	$4,953	$115	$10,225	($5,387)	($18,422)
FY 2043	$5,047	$117	$10,509	($5,579)	($24,001)
FY 2044	$5,143	$120	$10,801	($5,778)	($29,779)
FY 2045	$5,240	$123	$11,101	($5,983)	($35,763)
FY 2046	$5,340	$125	$11,410	($6,195)	($41,958)
FY 2047	$5,441	$128	$11,727	($6,413)	($48,371)
FY 2048	$5,544	$131	$12,052	($6,639)	($55,010)
FY 2049	$5,650	$134	$12,387	($6,871)	($61,881)
FY 2050	$5,757	$137	$12,731	($7,111)	($68,993)
FY 2051	$5,866	$140	$13,085	($7,359)	($76,352)

Sources: Department of Legislative Services, Sage

Exhibit A-5 compares three analyses of the costs and benefits of implementing the Blueprint: 1) the 2019 Sage analysis; 2) the updated 2022 analysis assuming full funding of implementation; and 3) the 2022 analysis assuming reduced funding for implementation. The 2019 analysis estimated that payback would occur in FY2041. This update estimates that Maryland will fully recover its investments by FY2038. Under the presumption of diminished funding, payback is pushed back to FY2039.

While details of each scenario differ, they each indicate that once the Blueprint is fully implemented and enough time is allowed to pass, efforts to develop a world-class public school system in Maryland generate benefits that more than offset considerable expenditures. Under each scenario, it requires

more than a decade from the beginning of implementation to achieve net annual benefits (i.e., negative net annual costs). Once these net annual benefits are achieved, it requires 5-8 more years for cumulative net benefits to emerge. Once the cumulative breakeven point is realized, cumulative benefits expand rapidly.

Exhibit A-5: Comparison of Annual and Cumulative Net Cost Estimates: 2019 analysis, 2022 analysis with full funding, and 2021 with reduced funding (Millions of Current Dollars)

Year	2019 Estimates		2021 Estimates Full Funding		2021 Estimates Reduced Funding	
	Annual Net Cost	Cumulative Net Cost	Annual Net Cost	Cumulative Net Cost	Annual Net Cost	Cumulative Net Cost
FY 2020	$480	$480	$0	$0	$0	$0
FY 2021	$1,540	$2,020	$411	$411	$411	$411
FY 2022	$2,705	$4,726	$822	$1,233	$822	$1,233
FY 2023	$3,061	$7,787	$1,110	$2,343	$884	$2,117
FY 2024	$3,120	$10,906	$1,266	$3,609	$1,062	$3,179
FY 2025	$3,080	$13,986	$1,241	$4,850	$1,059	$4,238
FY 2026	$2,823	$16,809	$1,409	$6,259	$1,251	$5,489
FY 2027	$2,535	$19,344	$1,211	$7,470	$1,141	$6,629
FY 2028	$2,271	$21,615	$1,014	$8,484	$1,036	$7,665
FY 2029	$2,005	$23,620	$899	$9,384	$1,019	$8,685
FY 2030	$1,794	$25,413	$871	$10,255	$1,094	$9,779
FY 2031	$1,207	$26,620	$468	$10,723	$800	$10,579
FY 2032	$586	$27,206	($57)	$10,665	$417	$10,996
FY 2033	($70)	$27,136	($358)	$10,307	$267	$11,263
FY 2034	($762)	$26,374	($985)	$9,321	($201)	$11,062
FY 2035	($1,814)	$24,560	($1,764)	$7,557	($814)	$10,248
FY 2036	($2,924)	$21,636	($2,940)	$4,618	($1,743)	$8,506
FY 2037	($4,093)	$17,543	($4,179)	$439	($2,722)	$5,784
FY 2038	($5,324)	$12,219	($5,484)	($5,045)	($3,755)	$2,029
FY 2039	($5,520)	$6,699	($6,860)	($11,905)	($4,844)	($2,815)
FY 2040	($5,723)	$976	($7,094)	($18,999)	($5,019)	($7,835)
FY 2041	($5,932)	($4,956)	($7,336)	($26,334)	($5,200)	($13,035)
FY 2042	($6,148)	($11,104)	($7,585)	($33,919)	($5,387)	($18,422)
FY 2043	($6,371)	($17,475)	($7,841)	($41,760)	($5,579)	($24,001)
FY 2044	($6,601)	($24,076)	($8,106)	($49,867)	($5,778)	($29,779)
FY 2045	($6,838)	($30,914)	($8,379)	($58,246)	($5,983)	($35,763)
FY 2046	($7,083)	($37,997)	($8,661)	($66,907)	($6,195)	($41,958)
FY 2047	($7,336)	($45,333)	($8,951)	($75,858)	($6,413)	($48,371)
FY 2048	($7,597)	($52,930)	($9,251)	($85,109)	($6,639)	($55,010)
FY 2049	($7,866)	($60,796)	($9,559)	($94,668)	($6,871)	($61,881)
FY 2050	($8,144)	($68,940)	($9,878)	($104,546)	($7,111)	($68,993)

Sources: Department of Legislative Services, Sage

About Sage Policy Group

Sage Policy Group is an economic and policy consulting firm headquartered in Baltimore, MD. Dr. Anirban Basu, Sage's chairman and CEO, founded the firm in 2004. More than a dozen years later, Sage has managed to create a client base that encompasses more than forty states and seven countries and includes Fortune 500 companies, NFL teams, aquariums and zoos, state and local governments, real estate developers, insurance companies and hospitals, trade organizations, law firms, and others.

The company is especially well known for its analytical capabilities in economic impact estimation, construction, healthcare, energy, real estate, manufacturing, thoroughbred horse racing, lotteries, agriculture, tourism, entrepreneurship, government contracting, secondary and post-secondary education, school enrollment forecasting, litigation support, economic development, economic forecasting, fiscal impact analyses, legislative analyses, industry outlooks, and the economics of retirement. The firm is also known for its superior communications and messaging skills.

Dr. Basu is one of the nation's most recognizable economists, in part because of his consulting work on behalf of clients including state and local governments, prominent developers, bankers, brokerage houses, elected officials, energy suppliers, and law firms, among others. He serves as the chief economist to Associated Builders and Contractors and as the chief economic adviser to the Construction Financial Management Association. He chaired the Maryland Economic Development Commission from 2014-2021 and remains Chair of the Baltimore County Economic Advisory Committee.

Dr. Basu's lectures in economics are delivered to audiences across the U.S. and abroad. In recent years, he has focused upon health economics, the economics of education, and economic development. He has lectured at Johns Hopkins University in micro-, macro-, urban, and international economics, and most recently, global strategy.