

The Economic Value of Charles County Public Schools: Dollars & Cents and Beyond

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Executive Summary

Charles County Public Schools (CCPS) is the ninth largest public school system in Maryland with 36 schools and four educational centers serving more than 26,400 students. CCPS is a significant economic engine for the county and the state of Maryland with nearly 3,500 employees, making CCPS the largest employer in the county, and an operating budget for FY 2017 of \$344.2 million.

This study estimated the economic, employment, and where appropriate, fiscal impacts of CCPS. The study examined the value of the degrees awarded, the impact on local wealth, and the value of reduced future public costs.

The four major categories of economic value examined were:

Economic Value 1. Economic and Employment Benefits from CCPS Operations

Every \$1 in operational monies spent by CCPS and retained in the county results in total spending locally of \$1.81. Every CCPS job supports another .49 jobs in the local economy.

Every \$1 in capital spending that is retained in the county results in total spending locally of \$1.37. For every \$1 million in CCPS capital spending, 7.7 additional jobs are supported in the county.

Economic Value 2. Economic Value of Degrees Awarded

In recent years, CCPS has annually graduated students who will realize an additional lifetime earnings of approximately \$575.77 million (estimated total present value). The present value of the county income tax to be paid on these additional earnings is approximately \$11.29 million per graduating class.

Based on the improved college-readiness of CCPS seniors, approximately \$1.04 billion in additional lifetime earnings can be attributed to CCPS graduates that anticipate going on to successfully graduate college. The present value of the county income tax to be paid on these additional earnings is approximately \$20.35 million per graduating class.

Economic Value 3. Economic Development Impacts

The additional economic activity generated by CCPS graduates who work and spend in the county positively impacts property values and property tax revenues. Each graduating class is estimated to add nearly \$48.54 million in real property values and \$0.58 million in real property tax revenues.

Economic Value 4. Reduction in Public Costs

Over the past five years, each CCPS graduating class has been associated with approximately \$86.76 million in future public health care costs savings, \$56.98 million in future crime related costs savings, and \$6.43 million in future welfare costs savings.

Introduction

Located in Southern Maryland, Charles County Public Schools (CCPS) continues to be one of the fastest growing school systems in Maryland. CCPS has 36 schools and four educational centers serving more than 26,400 students in grades prekindergarten through 12 with an academically challenging education.

Many students, staff and schools have been honored with national and state awards, including: the National Distinguished Principal for Maryland, a national Green Ribbon School and a nationally recognized computer science curriculum.

CCPS contributes to the local economy as Charles County's largest employer with nearly 3,500 staff members. The school system's fiscal year 2017 operating budget is \$344.2 million.

Located south of Washington, D.C., Charles County is considered part of the Washington, D.C. metropolitan area. Charles County has a population of nearly 155,000. Elementary schools are composed of students from prekindergarten to grade five; middle schools have students from sixth to eighth grade; and high schools serve students in grades nine through twelve.

This study estimates the economic, employment¹, and where appropriate, fiscal impacts of CCPS. Furthermore, this study examines the value of the degrees awarded, the impact on local wealth, and the value of reduced future public costs. Each of these types of values generated by CCPS is explained in further detail below.

Value 1. Economic and Employment from CCPS Operations

These impacts include the direct, indirect, and induced impact of the dollars spent by CCPS including salaries of employees, supplies, and services provided by local vendors. The direct spending (the initial payments made by CCPS) that stays within the county will then create a "multiplier" or "trickle down" effect as money is respent in the local economy. This recirculation of money generates indirect and induced effects. The economic and employment impacts are estimated separately for CCPS' annual operating and capital budgets.

Value 2. Economic Value of Degrees Awarded

A higher level of educational attainment is associated with a higher economic value in the job market. Graduates of CCPS will have a higher lifetime earning potential than non-graduates. Furthermore, an improvement in the academic achievement of CCPS students increases the likelihood of successfully completing a college degree. Therefore, a portion of the increased lifetime earnings of those students from CCPS who go on to graduate from college can be attributed to the education provided by CCPS.

Value 3. Economic Development Impacts

CCPS impacts local wealth through enhancing the ability of the county to attract and/or retain families with skilled and/or professional workers who are net wealth creators. Some of these benefits include:

- Quality-of-life measures that encourage parents to use school quality as a residential location factor which adds a premium to the local property values;
- Quality-of-life issues that are based on a "Sense of Well Being" for parents who believe high quality public education is essential to the success of their child's transition from high school to higher education or the labor market;
- Property value enhancements attributable to the presence of good local public schools;
- Productivity enhancements in local businesses due to quality K-12 education;
- Business, economic, workforce, and community enhancements due to increases in the number of post-secondary institution graduates in a jurisdiction due to quality K-12 education.

Value 4. Reduction in Public Costs

Research has shown that high school graduation rates are negatively correlated with crime, public health care costs, and welfare expenditures. This means that as graduation rates go up, these public expenses go down. This study estimates the impact that CCPS graduates have on these public costs.

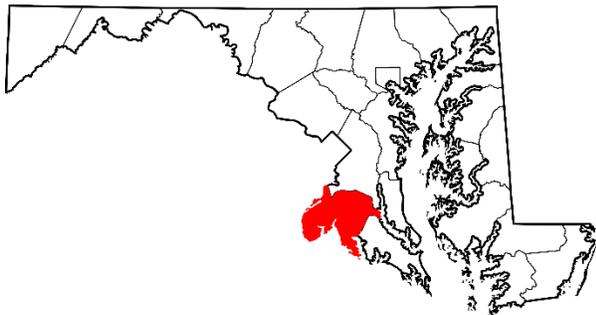
¹ Jobs as reported by IMPLAN include all full-time, part-time, and temporary positions supported in the local economy.

The primary economy of interest in this study is Charles County, hereafter referred to as the “the county.” Each type of impact will be addressed in a separate section of the report following an overview of the economic trends in Charles County.

Charles County Overview

Charles County is located south of Washington, D.C. and is considered part of the Washington, D.C., metropolitan area. The county is home to more than 156,000 residents². The gross regional product (the value of all final goods and services produced) in Charles County was approximately \$4.77 billion (2014)³. This accounts for approximately 1.93 percent of the GDP of the state⁴.

Figure 1. Map of Charles County in Maryland



The unemployment rate in the county has remained relatively steady, hovering around 7 percent between 2011 and 2014².

Table 1 shows the employment structure in Charles County and Maryland. As can be seen in the table, the employment patterns in the county follow very closely to those of the state. The only notable differences are the slightly heavier concentration of employment in the leisure and hospitality sector in the county, and the heavier concentrations in the education and health services sector and the local government sector in the state.

Industry	Percent of Total Employment	
	Charles County	Maryland
Federal Government	5.24%	5.56%
State Government	1.37%	3.81%
Local Government	16.16%	9.37%
Natural Resources and Mining	0.10%	0.25%
Construction	8.59%	5.95%
Manufacturing	1.54%	4.01%
Trade, Transportation, and Utilities	26.02%	17.68%
Information	0.71%	1.48%
Financial Activities	2.75%	5.36%
Professional and Business Services	7.41%	16.61%
Education and Health Services	12.55%	16.13%
Leisure and Hospitality	13.96%	10.31%
Other Services	3.60%	3.47%

Source: Maryland’s Quarterly Census of Employment and Wages (WCEW)- OWIP, DLLR

Table 2 compares key socioeconomic and demographic information between the county, the state, and the nation. Median income is quite a bit higher in Charles County as compared to the rest of the state, and is significantly higher than that of the nation. However, these figures are not adjusted for any cost-of-living differences. Charles County has a slightly smaller percentage of the population over the age of 65, indicating a slightly younger population overall. The county has a higher percentage of adults with a high school degree or higher but lags behind the state and the nation in the percentage of adults with a bachelor’s degree or higher.

In a similar vein, the presence of federal contractors and the Naval Support facility are key economic and employment engines with the key sources of their funding being in Washington, D.C., and in Virginia. These employers tend to have a very high appetite for well educated, trained, and trainable workforce. CCPS is uniquely positioned to provide a career ladder for students in the county through these key employers.

² U.S. Census Bureau

³ IMPLAN

⁴ U.S. Bureau of Economic Analysis

The challenge is in keeping the graduates in the county and in making sure those graduates who sought post-secondary education opportunities elsewhere return to the county. The more successful the county is in accomplishing these two things, the higher the return on the county's investment on public education will be.

Table 2. Socioeconomic and Demographic Comparisons, 2014 (unless otherwise noted)			
	Charles County	Maryland	U.S.
Population (2015)	156,118	6,006,401	321,418,820
Median Household Income	\$91,910	\$74,149	\$52,482
% of population aged 65 and over (2015)	11.5%	14.1%	14.9%
% persons aged 25 and over with a high school degree (or equivalent) and higher	91.7%	88.9%	86.4%
% of persons aged 25 and over with a bachelor's degree or higher	26.8%	37.3%	29.3%

Source: U.S. Census Bureau

IMPLAN

To estimate the economic impact of the public school systems, the IMPLAN software package (produced by the Minnesota IMPLAN Group, Inc) was utilized. The IMPLAN model includes all economic effects when calculating total output/employment (i.e. this includes "direct" plus "indirect" plus "induced" ripple-effect impacts). The IMPLAN model is based on Input-Output (IO) theory, for which Wassily Leontief was awarded the Nobel Prize in Economics in 1973. In IO models, the "jobs supported" estimates are the number of jobs that are needed to produce the current level of local output at the average productivity levels of workers in their respective industries. The IMPLAN model is based on actual Charles County data from 2014 inflated to 2016 figures. The principle advantage of the IO IMPLAN model is in its use of state and county-specific data. The

social accounting matrixes in IMPLAN provide the multipliers or estimates of additional effects of the indirect and induced economic and employment impacts.

Value 1. Economic and Employment Impacts from CCPS Operations

Economic and employment impacts are separated into three categories: direct, indirect and induced.

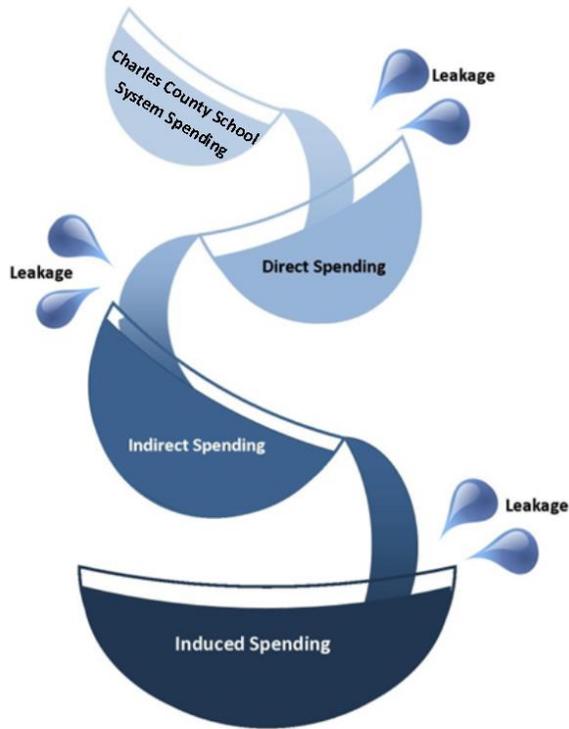
The *direct economic impact* includes the initial spending by CCPS to its employees, through salaries, or to businesses selling directly to the school system.

The *indirect economic impact* accounts for the additional spending and jobs supported in the local economy from the spending to local suppliers. These local suppliers pay salaries to their employees from the money received from contracts with CCPS. Additionally, they contract with other local firms for goods and services.

The *induced economic impact* accounts for the additional spending and jobs supported in the local economy from consumer retail spending associated with the direct and indirect effects. For example, employees of CCPS and those of the firms contracting with CCPS will spend a significant portion of their salaries in the local economy. This spending supports additional jobs at local firms.

At each level of impact, there is "leakage." Leakage accounts for the spending that goes to employees and vendors outside of the county. Once this money exits the county, it is not available for re-spending or recirculating within the county. The different levels of impacts and leakage are graphically represented in Figure 2 below.

Figure 2. Graphical Representation of CCPS Spending Impacts



Impact of the CCPS Operating Budget

Every \$1 in operational monies spent by CCPS and retained in the county results in total spending locally of \$1.81. Every CCPS job supports another .49 jobs in the local economy.

The operating budget of CCPS is substantial, with \$344.2 million budgeted for FY 17. The significance of this spending increases as the multiplier effect of the money being spent is taken into consideration. Many individuals and business receive funds from the school system and spend the money again in the local economy. Approximately 60 percent of the CCPS operating budget goes directly to employee salaries. Including benefits, total employee compensation makes up about 80 percent of the CCPS operating budget. The portion of spending that stays within the county is calculated in the model through use of the Social

Accounting Matrix, which estimates the percent of each expenditure category that stays within the defined geography.

Table 3 shows the estimated annual economic and employment impact of the CCPS operating budget for FY 17. After accounting for leakage, the direct spending of CCPS is estimated to be \$163.71 million. In other words, for every \$1 spent on operations by CCPS, nearly \$0.50 is retained in Charles County. This spending creates an indirect impact of \$58.22 million and an induced impact of \$73.98 million for a total economic impact of \$295.91 million. Every dollar that is spent by CCPS and retained in the county generates a total of \$1.81 in economic activity.

	Economic (\$ millions)	Employment⁵
Direct Effect	\$163.72	2,374
Indirect Effect	\$58.22	570
Induced Effect	\$73.98	594
Total Effect	\$295.91	3,538

The employment impacts in the local economy are also significant. In addition to the nearly 2,375 CCPS employees that live in the county, another 570 indirect jobs and 594 induced jobs are supported in the local economy through the operational spending of the CCPS. Every CCPS job supports an additional .49 job in the local economy.

While a significant portion of the impacts remain within the county, the county does experience significant leakage of economic activity to surrounding counties and states. Some of the impact that leaks out of Charles County will flow to surrounding counties in the state. This includes the spending of CCPS employees as well as spending that occurs to vendors outside of Charles County. Therefore, the impact to the state as a whole is larger than that of Charles County.

The impact of CCPS’ operational spending spreads throughout the local economy. Given the number of economic sectors that are significantly impacted by this spending only the top five sectors impacted in regards

⁵ The employment estimates are “jobs supported” estimates. The direct employment effect estimated by the IMPLAN model is greater than the actual number

of CCPS employees as it includes all full-time and part-time jobs needed to produce the estimated output.

to spending and the top five sectors impacted in regards to employment are provided here⁶. After private households, the top five sectors impacted, reported in order of spending impacts, are: owner-occupied dwellings, electric power transmission and distribution, electric power generation- fossil fuel, personal and household goods repair and maintenance, and real estate. Given that private households represent the sector that is most affected by CCPS operational spending, it makes sense that the other sectors most impacted are sectors that serve or supply private households. Reported in order of employment impacts, the top five sectors most affected are: independent artists, writers, and performers, landscape and horticultural services, personal and household goods repair and maintenance, limited-service restaurants, and full-service restaurants.

Impact of the CCPS Capital Budget

Every \$1 in capital spending that is retained in the county results in total spending locally of \$1.37. For every \$1 million in CCPS capital spending, 7.7 additional jobs are supported in the county.

CCPS also makes substantial capital expenditures that have impacts within the county and state. Capital expenditures include both those for updating and modernizing existing schools as well as the construction of new school buildings.

Capital expenditures are not consistent from year to year. Therefore, rather than examining the impact for one given year, the impact of the average capital expenditures is examined here for projects completed over the last ten years (FY 2007-2016).

CCPS spent an average of \$22.45 million for capital projects per year between FY 2007 and 2016. Only a very small portion of capital project spending (0.45%) leaks out of the county and is retained in the state. This indicates that nearly all of the capital spending by CCPS is spent and retained within the county and is available to be recirculated and respend in subsequent economic transactions.

Table 4 shows the total impact of the annual average capital spending of CCPS over the last ten years at the

county level is over \$30.79 million and 173 additional jobs supported. This means that for every \$1 million in CCPS capital spending, 7.7 additional jobs are supported in the local economy.

Table 4. Economic and Employment Impact of CCPS Average Annual Capital Spending (2007-2016)		
Impact	Charles County	
	Economic (\$ millions)	Employment
Direct Effect	\$22.45	111
Indirect Effect	\$4.80	34
Induced Effect	\$3.54	28
Total Effect	\$30.79	173

Table 5 shows the economic sectors, as reported by IMPLAN, that are impacted the most by CCPS' capital spending.

Table 5. Impact of CCPS Capital Spending (2007-2016) by Economic Sector-State Level		
Sector	Spending (\$ millions)	Employment
Construction of new educational and vocational structures	22.45	110.90
Wholesale trade	0.89	4.78
Owner-occupied dwellings	0.80	0.00
Architectural, engineering, and related services	0.52	3.35
Real estate	0.46	3.96
Ready-mix concrete manufacturing	0.44	1.26
Petroleum refineries	0.26	0.03
Electric power transmission and distribution	0.23	0.16
Retail - Clothing and clothing accessories stores	0.22	3.10
Truck transportation	0.22	1.39

In summary, this means that there is a 37 percent economic activity return on Charles County's public

⁶ The sectors most impacted by Charles County Public Schools operations in regards to economic versus employment impacts are not the same. This is due to

the fact that the spending within each of the sectors impacted follows a distinct pattern and, therefore, supporting a different number of jobs.

investments in the capital budget for the public schools. The key question is whether such expenditures improve the quality of education while introducing efficiencies to the school system's operations. The analysis presented in this report by the BEACON team shows this to be the case. Since such improvements in effectiveness and efficiency have high returns on investment, the payback period for such investments can be seen as being significantly shorter than the nominal 20-year horizon normally associated with such capital projects. While direct comparisons with private industry are difficult to make, the multiplier effect of an investment in public education tends to be higher than that of a private sector investment, precisely because the benefit accrues to the larger "public" rather than to the more focused "private" beneficiaries.

Value 2. Economic Value of Degrees Awarded

The goal of any educational system is to produce knowledgeable and skilled individuals. These individuals are then able to contribute more human capital, creating higher returns for them throughout their careers and higher returns for their communities as they are able to be more successful and work at higher skilled jobs which earn higher salaries. The availability of both a trained and trainable workforce in the community helps to attract and/or retain businesses that utilize this workforce.

The value of an education system cannot be fully understood without examining the impact of the "product" the system helps to create. The first aspect of this value that will be examined is the increased earning potential of students who graduate from CCPS. The second aspect of this value that will be examined is the further increased lifetime earning potential of CCPS graduates that go on to graduate college.

An analysis of the findings from this study shows that the total economic value of K-12 public education in Charles County is directly related to the number of students who are retained in the county upon graduation, including those students who return to the county after further (post-secondary) education or early career employment elsewhere. This direct relationship means that retention and return of former students is an important public policy issue as well as being an economic imperative.

Incremental Lifetime Earning of CCPS Graduates

In recent years, CCPS has annually graduated students who will realize an additional lifetime earnings of approximately \$575.77 million (average estimated total present value). The present value of the county income tax to be paid on these additional earnings is approximately \$11.29 million per graduating class.

Data shows that high school graduates are more likely to earn a higher income than non-graduates. It is noted that a CCPS education cannot be deemed as the sole reason for graduates' performance and successful graduation. Other factors may include parental or mentor guidance and tutoring, the inherent abilities of the individual students, the influence of other school systems or educational programs, etc.

The additional lifetime earning potential of CCPS graduates will be calculated as the incremental difference in lifetime earnings of graduates as compared to non-graduates over their expected work life. This estimate will be calculated for each of the last five graduating classes (2011 to 2015). A retirement age of 65 is assumed in this study and, therefore, a work life of 47 years is assumed (age 18 to 65). The U.S. Census indicates that non-graduates in Charles County earned approximately \$31,597 in 2014 while high school graduates earned approximately \$42,027 in 2014. The difference in salaries is about \$10,430, which is assumed to be maintained throughout the work lifespan. The present value of the additional annual earnings is calculated using a discount rate of 2.84 percent, the annual rate on a 30-year constant maturity Treasury Bond in 2015⁷. For a detailed explanation of how these estimates were calculated, refer to Appendix A. Table 6 shows the number of graduating seniors per year and the present value of the incremental lifetime earnings of the sum of graduates for each year.

Assuming that 70 percent of the additional future income is subject to local tax each year, the present value of the additional county income taxes over the work lifespan is estimated to be around \$11.29 million per graduating class.

The incremental lifetime earnings of CCPS graduates are significant. However, not all graduates are expected to

⁷ Federal Reserve System Historical Data on Selected Interest Rates, www.federalreserve.gov

remain within the county for their entire work life. Some will leave for college and not return; others will exit at other points in their lifetime. Some may stay within the state of Maryland even if they leave the county and others may leave the state entirely. On the other hand, graduates from elsewhere will migrate into the county and state from other school systems. Even if only a fraction of graduates stay within the county throughout their work life, the impact is still very significant.

Incremental Lifetime Earnings of CCPS Graduates that go on to Graduate from College

Based on the improved college readiness of CCPS seniors, approximately \$1.04 billion in additional lifetime earnings can be attributed annually to CCPS graduates that anticipate successfully completing college (average estimated present value). The present value of the county income tax to be paid on these additional earnings is approximately \$20.35 million per graduating class.

Following successful graduation from CCPS, many graduates go on to attend and graduate college. Students who obtain a college degree increase their lifetime earning potential even further above those who obtain a high school degree. The incremental annual earnings of those in Charles County who have an associate’s degree compared to those with a high school degree or equivalent was \$13,633⁸ in 2014. This difference in salaries is assumed to be maintained throughout the work lifespan. The incremental annual earnings of those in Charles County who have a bachelor’s degree compared to those with a high school degree or equivalent was \$33,947⁸ in 2014. This difference in salaries is assumed to be maintained throughout the work lifespan.

The additional lifetime earning potential of CCPS graduates who go on to graduate college will be calculated as the incremental difference in lifetime earnings of those with bachelor’s degrees compared to those with high school degrees over their expected work life. This estimate will be calculated using data for the last two graduating classes. Given the assumed retirement age of 65, a traditional college graduate will have a work life of 43 years (age 22 to 65). To determine

the portion of these students’ future lifetime earnings that can be attributed to CCPS, the annual incremental earnings will be multiplied by the difference in the percent of students meeting the college entry requirements and having declared their intention of attending college across the last two academic years. The present value of the additional annual earnings is again calculated using a discount rate of 2.84 percent. For a detailed explanation of how these estimates were calculated refer to Appendix B.

The present value of the additional lifetime earnings attributable to CCPS for the graduating class of 2015 is approximately \$1.06 billion (the annual average over the past five years is \$1.04 billion). Assuming, as before, that 70 percent of the additional future income is subject to local tax each year, the present value of the additional county income taxes over the work lifespan is estimated to be approximately \$20.70 million (the annual average over the past five years is \$20.35).

Table 6. Present Value of Additional Lifetime Earnings of CCPS Graduates as Compared to Non-Graduates

Year	Number of Graduates	Present Value of Additional Earnings (\$ million)
2015	2,175	\$584.58
2014	2,090	\$561.74
2013	2,115	\$568.46
2012	2,187	\$587.81
2011	2,144	\$576.25

Value 3. Economic Development Impacts

The meta-analysis presented in this report shows that quality of public education, measured on an educational attainment and outcome basis, is directly related to individual earnings. This, in turn, results in increased economic activity through the enhanced churning of those increased earnings in the locality. It can also be said that the distribution of skills in a jurisdiction is closely related to the distribution of income. The ripple effects do not end there. Quality public education drives other well-functioning economic institutions such as established property values, open labor and product markets, and participation in international markets.

⁸ United States Census Bureau, 2010-2014 American Community Survey 5-Year Estimates

Given the productivity-enhancing effects of education discussed in this report, it is possible to assert that quality education, and any improvement thereof, will add to the long-term economic growth of a jurisdiction. This growth manifests itself in the form of the attractiveness of the jurisdiction as a place to start or grow a business (business retention and relocation), and as a place where productive individuals and members of the Creative Class (and their families) would prefer living. This, in turn, increases the locality's ratio of net economic value (wealth) creators to net public service users.

Overall, public investments in infrastructure tend to have higher economic impacts in the aggregate than specific project investments. This is natural and to be expected. Infrastructure investments have much higher numbers of beneficiaries than specific project investments. In fact, infrastructure investments are prerequisites to project investments. Among public infrastructure investments, transportation investments (roads, bridges, ports, etc.) on the hard infrastructure side and investments in public education, on the soft infrastructure side, have the two largest numbers of beneficiaries and the two highest levels of economic impacts.

Real Property Values and Taxes

The additional economic activity generated by CCPS graduates who work and spend in the county positively impacts property values and property tax revenues. Each graduating class is estimated to add nearly \$48.54 million in real property values and \$0.58 million in real property tax revenues.

The higher lifetime earnings of high school graduates, and even higher lifetime earnings of those who go on to graduate college, also impact the local economy through higher spending. Additional spending within the local economy generates further economic activity. This higher economic activity impacts local property values through making the county more attractive as a place to live and a place to do business. The availability of a trained and trainable workforce creates added incentive for businesses as these individuals can serve

their workforce needs. To estimate the additional real property value, the method utilized by Walden (2011)⁹ was followed here. First the ratio of Charles County real property values (\$15.71 million¹⁰) to local income (\$7.23 million¹¹) for 2015 was calculated as 2.17. This indicates that each additional dollar of income translates into an additional \$2.17 in real property values. Thus, each graduating class is estimated to generate an increase in real property values of \$48.54 million¹². This assumes that the graduating class will remain living and working in the county. Although some students will leave and not return, others will migrate into the county. With the county's growth rate and its proximity to several major metropolitan areas, the county has traditionally benefitted from a net in-migration of residents¹³.

Given the Charles County real property tax rate, currently set at \$1.205 per \$100 in assessed value, the estimated impact on real property taxes from this increased value is approximately \$0.58 million.

Residential Property Value and Taxes

Research has indicated the positive impact that quality education has on property values. In terms of residential property, one of the major concerns in buying is location, including location within a high quality school district. The high demand for residential property within such districts increases the home prices within the community while the higher purchasing power of graduates helps to further increase prices. By continuing to prove itself as a high quality school system and increasing the test scores and grade point averages (GPAs) of its students, CCPS will help to increase the residential property values and residential property taxes within the county.

Value 4. Reduction in Public Costs

There is a large and growing body of research on the positive societal outcomes associated with educational attainment. Many of these societal impacts have associated cost savings which are important to consider when looking at educational investments. The specific societal outcomes and their associated public cost savings that will be examined in this report include: public health-care costs, crime costs, and welfare costs.

⁹ Walden, M. L. (2011). *The Economic Impact of the Virginia Beach City Public School System*.

¹⁰ Maryland State Department of Assessments and Taxation

¹¹ U.S Bureau of Economic Analysis

¹² See Appendix C for calculation details.

¹³ U.S. Census Bureau, American Community Survey

Health Care Costs

Over the past five years, each CCPS graduating class has been associated with approximately \$86.76 million in future public health care costs savings.

A study conducted by Cutler and Lleras-Muney (2006)¹⁴ has found that health status improves and mortality rates are lower for high school graduates as compared to non-graduates. These improvements are even greater for college graduates. As suggested by Levin, Belfield, Muennig, and Rouse (2007)¹⁵, those with higher educational attainment are less likely to use public programs. Furthermore, the higher quality jobs that graduates are more likely to have typically provide health insurance. Based on their extensive research into health outcomes, Medicaid and Medicare enrollment, graduation rates, and present value calculations of per capita health care costs across different levels of educational attainment, Levin et al. estimate the lifetime health benefits savings from graduation to equal approximately \$40,500 per student. Using this estimate, Table 7 provides the estimated public health care costs saved for each graduating class over their lifetime from 2011 to 2015.

Table 7. Present Value of Estimated Lifetime Savings in Public Health care Costs

Year	Number of Graduates	Present Value of Lifetime Public Health care Costs Savings for Graduating Class (\$ millions)
2015	2,175	\$88.09
2014	2,090	\$84.65
2013	2,115	\$85.66
2012	2,187	\$88.57
2011	2,144	\$86.83

Crime Costs

Over the past five years, each CCPS graduating class has been associated with \$56.98 million in savings in future crime related costs.

Research indicates that educational attainment is also related to a reduction in crime, both by juveniles and adults (Levin et al., 2007). Although it is unclear

whether this is due to behavioral or financial mechanisms, the end result is clear: a reduction in public costs to manage crime. Levin et al. outline four main public costs of crime: the criminal justice costs for policing and trials; incarceration costs (including parole and probation); state-funded victim costs (medical and from lost tax revenue); and expenditures of government crime prevention agencies. Based on the crime rates for different types of crime for high school dropouts of 20 years and older, the estimated cost per crime (based on type of crime), and the expected decrease in crime rates due to high school graduation, Levin et al. estimate the average lifetime savings due to reduced crime to be \$26,600 per graduate.

Table 8 shows the total expected lifetime savings in public cost savings due to reduced crime for the last five graduating classes. Each graduating class has saved the public an average of \$56.98 million in costs associated with crime over their lifetime.

Table 8. Present Value of Estimated Lifetime Savings in Public Crime Costs

Year	Number of Graduates	Present Value of Lifetime Public Crime Cost Savings of the Graduating Class (\$ millions)
2015	2,175	\$57.86
2014	2,090	\$55.59
2013	2,115	\$56.26
2012	2,187	\$58.17
2011	2,144	\$57.03

Welfare Costs

Over the past five years, each CCPS graduating class is associated with approximately \$6.43 million in savings in future welfare costs.

High school graduates are also less likely to require public assistance in the form of welfare (including Temporary Assistance for Needy Families or TANF, food stamps, and housing assistance). Levin et al. (2007) calculated the present value of the estimated lifetime welfare cost savings of high school graduates to be \$3,000 on average. Their analysis focuses on state-level benefits and excludes assistance from federal

¹⁴ Cutler, D, & Lleras-Muney, A. (2006). *Education and health: evaluating theories and evidence*. NBER Working Paper.

¹⁵ Levin, H., Belfield, C., Muennig, P., & Rouse, C. (2007). *The Costs and Benefits of an Excellent Education for All of America's Children*. Columbia University.

programs. Table 9 below shows the total estimated welfare cost savings over the lifetime of the last five graduating classes.

Table 9. Present Value of Estimated Lifetime Savings in Welfare Costs		
Year	Number of Graduates	Present Value of Lifetime Welfare Cost Savings of the Graduating Class (\$ millions)
2015	2,175	\$6.53
2014	2,090	\$6.27
2013	2,115	\$6.35
2012	2,187	\$6.56
2011	2,144	\$6.43

Summary and Conclusions

CCPS has a significant impact within both the county and the state. The economic and employment impact created by the operational and capital spending alone is substantial. Every \$1 in operational monies spent by CCPS and retained in the county results in total spending locally of \$1.81. Every CCPS job supports another .49 jobs in the local economy. CCPS is a major employer in the county with a majority of its employees residing within the county. By providing additional incentives for employees residing outside of the county to reside in Charles County, more of the impact from employee salaries and spending can be retained within the county.

In terms of capital expenditures, every \$1 in capital spending that retained in the county results in total spending locally of \$1.37. For every \$1 million in CCPS capital spending, 7.7 additional jobs are supported in the county.

Beyond the economic and employment impacts generated through CCPS operations, its graduates generate many additional positive societal and economic benefits in the local economy. The value of a more educated population and trainable workforce manifests itself in many ways. The three main categories examined in this study include: the increased lifetime earning of graduates, the economic development impacts, and the reduction in public costs.

Current data indicates that high school graduates earn a higher annual income than non-graduates; college graduates earn an even higher annual income. The lifetime value of the incremental earnings for high school graduates is approximately \$575.77 million. The

present value of the county income tax to be paid on these additional earnings is approximately \$11.29 million per graduating class. A significant portion of CCPS graduates intend to go on to college and meet the requirements to enter a four year in-state public school of higher education. If these students go on to successfully complete college, they will earn an estimated \$1.04 billion additional in income over their lifetime. The present value of the county income tax to be paid on these additional earnings is approximately \$20.35 million per graduating class.

A trained and trainable workforce positively impacts the economic development of a region in many ways including:

- Quality-of-life measures that push parents to use school quality as a residential location factor which adds a premium to the local property values;
- Quality-of-life issues that are based on a sense of well-being for parents who believe high quality public education is essential to the success of their child’s transition from high school to higher education or the labor market;
- Property value enhancements attributable to the presence of good local public schools;
- Productivity enhancements in local businesses due to quality K–12 education;
- Business, economic, workforce, and community enhancements due to increases in the number of post-secondary institution graduates in a jurisdiction due to quality K-12 education.

Of these benefits, the increased real property values and real property taxes are quantified in this study. The additional economic activity generated by CCPS graduates who work and spend in the county positively impacts property values and property tax revenues. Each graduating class is estimated to add nearly \$48.54 million in real property values and \$.58 million in real property tax revenues.

Lastly, a more educated population has been found to result in lower public costs including public health care, public crime costs, and welfare costs. For each graduating class, public cost savings are estimated as follows:

- \$86.76 million in future public health care cost savings
- \$56.98 million in future public crime cost savings
- \$6.43 million in future welfare cost savings

Although some commentators argue that public school systems are just another cost line item to the taxpayers, it would be more accurate to treat local expenditures in K-12 public education as an investment in the county's economic future well-being. In addition to the significant and widespread economic activity generated by the operations of CCPS, the benefits to the county are multiplied when the impact of the educated population produced by the school system are considered. The added benefits of higher educational outcomes in a jurisdiction are key economic predictors of the fiscal and economic health of that locality. Based on these findings, it is important to note that, such benefits are directly linked to the number of graduates choosing to stay in the county or to return to the county after either further education or work experiences. When Charles County's public school graduates leave the county and do not return, most of these benefits accrue to the jurisdictions where they choose to reside. Based on this simple fact, it is clear that there is a clear benefit associated with engaging in a concerted public-private effort to retain the graduates of the Charles County Public Schools in the County and encouraging those who had left to return.

Appendix A: Calculating the Additional Lifetime Earnings of Graduates of Charles County Public Schools Compared to Non-Graduates

The present value of the incremental lifetime earnings of graduates as compared to non-graduates were calculated as follows. First the incremental annual income was multiplied by the number of graduates in a given year.

Second, the present value of the total incremental income for the whole graduating class was calculated. The discount rate of 2.84 percent was utilized for each of the 47 years of the work life. The present value was calculated for each year's incremental income as

=total incremental income/(1.0284^Number of years in the future that the income payment occurs)

Lastly, the present values for each year were summed to obtain the present value of the entire stream of future cash flows. This is the value reported in Table 6.

Appendix B: Calculating the Impact of Improved High School Performance on the Lifetime Earnings of College Graduates

To calculate the impact of improved high school performance on the lifetime earnings of those graduates who go on to college the number of students meet the following criteria were identified for each jurisdiction:

- 1) Voluntarily declare their intentions to go on to a two-year institution of higher education at the time of their exit survey, and
- 2) Voluntarily declare their intentions to go on to a four-year institution of higher education at the time of their exit survey.

To determine the portion of the incremental lifetime earning of college graduates that can be attributable to Charles County Public Schools, the following formula was utilized:

$$PV((\%2YR \times \#HSG \times IEAD) + (\%4YR \times \#HSG \times IEBD))$$

%2YR= the percent of graduates intending to go to a two-year institution of higher education

%4YR= the percent of graduates intending to go to a two-year institution of higher education

#HSG= the number of high school graduates

IEAD= the incremental annual earnings those with an Associate's Degree compared to high school graduates

IEBD= the incremental annual earnings those with an Bachelor's Degree compared to high school graduates

PV= present value of the incremental future cash flows, calculated with a discount rate of 2.84 percent and a work life of 43 years (22 years old to 65 years old) beginning four years out from the year of high school graduation

Appendix C: Calculating the Impact of an Educated Population on Property Values and Property Taxes

To estimate the increase in the real property value attributable to the higher earning and spending of graduates, the number of graduating seniors was multiplied by the incremental annual earnings per student. This figure was then multiplied by the ratio of real property value to personal income in each jurisdiction.

of graduates X incremental annual earnings X real property to personal income ratio = additional real property value

The estimated real property value taxes were calculated by multiplying the property tax rate by the additional real property value.

additional real property value X real property tax rate = additional real property taxes

Appendix D:

"PRE--K-12 Education in the U.S. Economy"

Summary and Excerpts from

"K-12 Education in the U.S. Economy"

A Monograph by Thomas L. Hungerford and Robert W. Wassmer (2004)

This appendix summarizes/excerpts a 2004 monograph titled "K-12 Education in the U.S. Economy: Its Impact on Economic Development, Earnings, and Housing Values" by Thomas L. Hungerford and Robert W. Wassmer. The complete text of the monograph can be found at: <http://www.nea.org/assets/docs/HE/economy.pdf>

Parents worry over the quality of the schools their children attend because a good primary and secondary education is essential to the success of their child's

transition from high school to higher education or the labor market.

Homeowners, even if they do not have children in public schools, are anxious about the quality of local public schools because they know the direct positive effect it has on the resale value of their property.

Finally, business owners recognize that a quality K–12 education makes the workers they employ more productive.

When faced with budget deficits, lobbyists claiming to represent the state’s business and economic interests have argued that revenue enhancement to balance a government budget is a less-preferred option than cutting state expenditures, including support for primary and secondary education. They cite the possible detrimental effects a tax increase would have on the state’s economic development.

The argument, which is theoretically correct, is that higher taxes will discourage businesses and entrepreneurs from locating in the state and, consequently, reduce the amount of income and employment generated there.

Often left out of this lobbying cry is the fact that a reduction in the quality of K–12 public education will also induce a decline in a state’s long-term economic vitality.

The question, then, is whether the negative economic effects of raising taxes to support quality K–12 public education are greater or less than the alternative of cutting statewide public support for primary and secondary education.

This monograph offers evidence on the economic benefits of a quality K–12 public education.

Overall, the authors conclude that if faced with the choice of (1) increasing revenue statewide to continue supporting the provision of quality public K–12 education or (2) cutting support statewide to public K–12 education to forestall a tax increase, a state’s long-term economic interests are better served by increasing revenue.

In support of this conclusion, the authors examine the evidence on the large spillover benefits of a quality public education beyond the direct benefit to those who receive it, the direct data-based evidence of the influence that various taxes and fees and K–12

education expenditures have on economic development, and the empirical evidence on how a quality public education influences an individual’s lifetime earnings and the value of homes in the school district where it is provided.

The provision of a quality K–12 public education plays a crucial role in the individual and economy-wide acquisition of “human capital.” The economic payoff to individuals of increased schooling is higher earnings throughout their lifetime—a market-based individual benefit.

In addition, a considerable number of benefits from a quality K–12 public education (the spillover effects) extend beyond individuals. Respected economists noted for their efforts to put a monetary value on some of education’s spillover effects argue that the value of these spillovers for individuals and the economy is significant and that it may be as large as education’s market-based individual benefits.

Economic development, as used in this report, is any dollar-based increase in economic activity within a state. Such increased economic activity can occur through two channels:

First, a given economy (with a fixed number of workers, land, raw materials, machinery, and other physical inputs) is able to produce a greater dollar value of output because of the increased productivity of one or more of the existing inputs.

Second, an economy produces a greater dollar value of total output by adding more inputs to its production processes. Improving the quality of a state’s public K–12 education can result in greater economic development through both of these channels.

Improving public education costs money and often results in increasing taxes which depresses economic development.

The authors’ review of the research indicates that in most circumstances the negative influence of cutting K–12 public education expenditure by an amount that forestalls a statewide revenue increase of an equivalent amount exerts a greater negative influence on the state’s economic development than if the revenue increase were put in place to maintain educational expenditures.

The authors conclude that school resources can lead to improved student outcomes and higher-quality schools.

Additional funding for public primary and secondary schools, however, will not generate greater student achievement unless the funds are used wisely.

Furthermore, it must be recognized that other factors—such as student, parent, and neighborhood characteristics—also influence student outcomes and, hence, school quality.

Many of these factors are outside the control of teachers, school administrators and school boards.

The preponderance of statistical evidence shows a positive correlation between the quality of local public K–12 education and the value of homes in that neighborhood.

This finding is important because it demonstrates yet another way that the provision of a quality elementary, middle, or high school education yields a tangible economic impact that would be lost with a decline in the quality of this service.

The empirical findings in this literature reinforce the notion that spending per student is not how parents identify a quality public K–12 education. But the findings presented here do not dismiss the possibility that higher spending is necessary for the provision of quality education.

Most states have had to deal with projected budget deficits for a number of years now. Many states have wisely addressed this revenue shortfall by avoiding significant decreases in public K–12 education spending that could compromise educational quality. Even so, the authors believe that pressure to deal with projected budget deficits through decreases in state expenditures, which could include K–12 education, will continue.

Furthermore, the pressure to cut taxes in good times could cause state and local politicians to question the merits of increasing or even maintaining primary and secondary education spending at current levels. The authors provide evidence that suggests that reduced public spending on primary and secondary education could have an array of consequences in several economic areas. Here are some examples of the type and magnitude of the effects, as derived from the studies reviewed:

- Economic development decline caused by a decrease in in-migration of potential laborers (short run), loss of productivity of future laborers (long run), or both.

Cutting statewide public K–12 expenditure by \$1 per \$1,000 state’s personal income would (1) reduce the state’s personal income by about 0.3 percent in the short run and 3.2 percent in the long run; (2) reduce the state’s manufacturing investment in the long run by 0.9 percent and manufacturing employment by 0.4 percent. Cutting statewide public K–12 education per student by \$1 would reduce small business starts by 0.4 percent in the long run. Cutting statewide public K–12 expenditure by one percentage point of the state’s personal income would reduce the state’s employment by 0.7 percent in the short run and by 1.4 percent in the long run.

- Reduction in a state’s aggregate home values if a reduction in statewide public school spending yields a decline in standardized public school test scores, if in the long run people leave or do not enter the state because of test-score declines. A 10 percent reduction in various standardized test scores would yield between a 2 percent and a 10 percent reduction in aggregate home values in the long run.

- Reduction in a state’s aggregate personal income, if a reduction in statewide public school spending yields a decline in “quality” of public education produced and a long-run decrease in earning potential of the state’s residents. A 10 percent reduction in school expenditures could yield a 1 to 2 percent decrease in post-school annual earnings in the long run. A 10 percent increase in the student–teacher ratio would lead to a 1 to 2 percent decrease in high school graduation rates and to a decrease in standardized test scores.