

**THE ECONOMIC IMPACT OF
WILLIAMSBURG-JAMES CITY COUNTY
PUBLIC SCHOOLS**



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EXECUTIVE SUMMARY

The Williamsburg-James City County Public Schools (WJCC) system has a significant economic impact on the local community. This report uses data from 2005 to 2013 to estimate the school division's impact on the Williamsburg-James City County area. All figures are in 2012 dollars.

There are four major impacts of the WJCC school division: the impact of the WJCC budget on regional spending, the impact of the academic performance of WJCC students on local property values and tax revenues, the impact on lifetime earnings of WJCC graduates compared to dropouts, and the impact of future reduction in public costs of WJCC graduates compared to dropouts.

While a significant amount of school division spending goes to neighboring areas, the spending that remains in the region has a significant effect. Almost 60% of school spending goes outside the region in the form of salaries of nonlocal employees, nonlocal purchases, employee benefits, and taxes. Of the 40% that remains in the region, an average \$1.00 of spending results in **\$1.63** of regional spending. Each million dollars in the operating and CIP budgets supports an average of **13.4** local jobs.

WJCC Public Schools impacts local property values in two important ways. One is through the additional spending of WJCC graduates compared to dropouts. The increased spending leads to economic activity in the community, resulting in higher property values. The additional spending of each WJCC graduating class adds **\$25.8 million** to local property values and provides **\$188,005** in property tax revenue.

The second impact on property values is the positive response of residential property values to improved academic performance of WJCC students. Academic performance measures include SOL passage rates, ACT scores, and SAT scores. The recent trends in these measures show that academic performance of WJCC students is improving and is consistently higher than the average performance of students in Virginia and the United States. WJCC's comparatively higher test scores result in local residential property values that are **\$28.6 million** higher per year than they would be without the improvement in academic performance. The corresponding gain in residential property tax revenues to Williamsburg-James City County is **\$208,978**.

The economic value of degrees earned from WJCC is measured as the expected increase in lifetime earnings of high school graduates compared to high school dropouts. On average, the return from earning a WJCC diploma (as opposed to dropping out of high school) range from about **\$176.7 million to \$496 million** per graduating class.

Research shows that increased education is associated with lower rates of criminal activity, healthier and longer lives, and reduced dependency on government social services. Thus, high school graduates reduce future public crime and public health costs. Each graduating class saves society an average of **\$41.5 million** in terms of reducing spending on crime, health care, and social services.

The economic impact of Williamsburg-James City County Public Schools is summarized as follows:

Short-term Impact Estimates:

- An average \$1.00 of the school division's Operating and Capital Improvement Projects (CIP) budgets *retained in the region* results in \$1.63 of regional spending.
- Each million dollars in the operating and CIP budgets supports around 13.4 local jobs.
- The additional spending of each WJCC graduating class adds \$25.8 million to local property values and provides \$188,005 in property tax revenue.
- The recent improvement in WJCC's academic performance results in local residential property values that are \$28.6 million more per year than levels without the improvement in academic performance. The corresponding gain in residential property tax revenues to Williamsburg-James City County is \$208,978.

Long-term Impact Estimates:

- On average, the returns from earning a WJCC high school diploma (as opposed to dropping out) range from about \$176.7 million to \$496 million per graduating class.
- Each graduating class saves society an average of \$41.5 million in terms of reducing spending on crime, health care, and social services.

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INTRODUCTION

The objective of this study is to provide school leaders with an overall analysis of the local economic impact of the Williamsburg-James City County School Division. The division serves the independent city of Williamsburg and James City County in Virginia. There are fifteen schools in the division, including three high schools, three middle schools, and nine elementary schools. As of the 2012-2013 school year, there were 10,800 students, 800 instructional staff, and over 600 support staff. In 2012, the on-time graduation rate was 88.7%. In terms of spending, James City County shoulders approximately 90% of the WJCC Public Schools Budget, while Williamsburg shoulders the remaining 10%. The County and City jointly approve the operational costs of the system each year, and the shares of spending depend on the number of each area's students enrolled in the system.

WJCC public schools have economic impacts on Williamsburg and James City County. Research shows that schools impact the local community in a variety of ways. This report evaluates two short-term impact categories that focus on annual effects: regional spending and local property values. The regional spending category shows how spending by the school division generates additional economic activity in the region. The presence of the school division also impacts local property values by way of school quality and of graduates' increased earnings, which they spend in the local economy.

The report also looks at two long-term impact categories: human capital and social capital. Human capital in this case refers to the additional skills that students develop while they are in school. These additional skills result in higher wages for higher levels of education that the student completes. This section estimates the increased

lifetime earnings of WJCC high school graduates. The section on social capital examines the impact that graduates of the WJCC school system will have on society in terms of healthcare costs savings, reduced crime costs, and a reduced uptake of welfare services.

IMPACT ON REGIONAL SPENDING

Spending by the WJCC school division stimulates the local economy. Much of this spending finds its way into local households and businesses. Changes in school division spending would impact a significant number of local residents.

The WJCC School Division spends a substantial amount of money. The total budget for FY2012 was \$127,432,068. The total budget includes the Operating Budget, Grants, Capital Improvement Funds, State Operated Programs, and Child Nutrition Services. In our study we will focus on the operating budget, which was \$109,627,564, and the CIP (Capital Improvement Project) Funds, which were \$6,795,279. These total to \$116,422,843. The operating budget is comprised of employee salaries, employee benefits, and purchases that the school must make for daily functioning. The CIP Funds are used for improvements in facilities or for new buildings.

While many residents benefit from school division spending, spending that goes outside the region weakens its economic impact. In this report, we define the relevant region to include only Williamsburg and James City County. Because our data is organized according to zip code, and zip codes do not neatly fit county borders, parts of York County are inadvertently included in the region. As a result, our results may overestimate the impact by as much as 14%. Nevertheless, as much as 59.8% of the operating and CIP budgets "leak" out of the region in the form of employee benefits (21.3%), out-of-area purchases (18.3%), salaries of employees who live outside the

region (12.3%), and estimated State and federal taxes (7.9%). The remaining \$48,150,949 is retained in the region and circulates within the community.

The effect of regional spending is often broken down into three categories: the direct effect, the indirect effect, and the induced effect. The direct effect is the money spent directly by the school in the form of salaries and of payments to vendors from which the school gets its supplies. The vendors in turn must hire employees and buy materials, which is considered the *indirect effect*. Teachers, staff, and vendor employees spend their incomes, which stimulates the local economy, causing an *induced effect*.

These effects can be estimated using a software program called IMPLAN. IMPLAN is an input-output model that calculates the economic impact of changes in spending to a local area using data sets specific to that local area. When one enters the amount of regional spending (in this case, \$48,150,949) split up into the 440 IMPLAN spending categories, IMPLAN will calculate how that spending filters through the local economy until all of it is leaked. The impact summary displays the direct effect, indirect effect, and the induced effect, as shown below in Table 1.

Table 1: Regional Spending Impact of the WJCC Operating and CIP Budgets (2012)

| Impact | Spending | Employment |
|---------------------|---------------------|-------------------|
| Direct Effect | \$48,124,557 | 1287.73 |
| Indirect Effect | \$408,349 | 3.72 |
| Induced Effect | \$30,108,840 | 269.27 |
| Total Effect | \$78,641,746 | 1560.73 |

Source: WJCC Public Schools FY2013-2014 Budget, IMPLAN, and data provided by WJCC School Division

There are several ways to interpret the results. The most direct way is to compare the amount in the original budget with the total effect. Comparing the total effect of \$78,641,746 with the operating budget plus CIP funds of \$116,422,843 leads to a ratio of .68. By this measure, the average dollar spent by the school division has an economic impact of \$0.68 on the local economy. This measure reflects the large degree to which the first round of spending "leaked" outside of the region. If we had expanded the region under consideration to include the entire peninsula and Norfolk, we would have captured much more of this spending.

Another way to interpret the results is to exclude the first round of leakage. This is the approach of Michael Walden in his 2011 study, "The Economic Impact of the Virginia Beach Public School System." Following this method, we compare the total spending effect of \$78.6 million to the \$48.1 million of school expenditures that are retained in the region, which allows one to conclude that the average dollar contributed to the local economy by the school division generates \$1.63 in regional spending. This number is a really good measure of the regional multiplier, or of how much more spending occurs in the region from an initial outlay. However, by excluding the first round of leakage, it necessarily leads to a considerably higher estimate.

An average dollar from the Operating and CIP budgets *that is retained in the region* generates \$1.63 of local economic spending.

The impact of regional spending on employment is also shown in Table 1. Of the 1602 full time equivalent (FTE) jobs reported in the school budget for FY2012, 1267 are considered local. An additional 20 jobs are created through the direct effects of vendor

payments and CIP spending. Regional spending supported another 273 jobs as a result of indirect and induced effects. Each million dollars in the Operating and CIP budgets thus support an average of 13.4 local jobs.

In addition to the 1267.45 local employees directly supported by the school division, there are another 293 jobs supported by school division spending. Each million dollars in the budget supports an average of 13.4 local jobs.

Table 2 shows the indirect and induced effects by economic sector. These are the spending and jobs that the school supports beyond those that are supported by the school's payroll (\$46.1 million and 1267 jobs, which would otherwise be added to the service sector). The bulk of the impact is in the service sector.

Table 2: Regional Spending Impact of the WJCC Operating and CIP Budgets by Economic Sector (2012)

| Sector | Spending | Percent of Spending | Employment | Percent of Employment |
|---|---------------------|---------------------|---------------|-----------------------|
| Agriculture | \$19,334 | 0.06% | 0.24 | 0.08% |
| Mining | \$36,672 | 0.11% | 0.09 | 0.03% |
| Construction | \$216,666 | 0.67% | 1.89 | 0.64% |
| Manufacturing | \$431,173 | 1.33% | 1.81 | 0.62% |
| Transportation, Information, & Public Utilities | \$749,594 | 2.31% | 4.08 | 1.39% |
| Trade | \$4,961,935 | 15.28% | 72.31 | 24.66% |
| Service | \$25,354,709 | 78.06% | 208.43 | 71.07% |
| Government | \$712,271 | 2.19% | 4.42 | 1.51% |
| Total | \$32,482,353 | 100% | 293.27 | 100% |

Source: WJCC Public Schools FY2013-2014 Budget, IMPLAN, and data provided by WJCC School Division

An analysis of data for FY2013 yielded very similar results. This was to be expected because the operating budget is fairly stable and causes most of the economic impact. CIP spending, by contrast, varies dramatically from year to year, as can be seen in Table 3.

Table 3: WJCC’s Capital Improvement Project (CIP) Funds (2012 dollars)

| Year | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | Average |
|----------------------------|-------------|-------------|-------------|-------------|-------------|-------------|----------------|
| CIP Spending (in millions) | \$20.9 | \$21.3 | \$40.7 | \$17.6 | \$6.8 | \$6.1 | \$21.5 |
| CIP Local Spending (mill) | N/A | N/A | N/A | N/A | \$.64 | \$.23 | N/A |

Source: WJCC Public Schools FY2013-2014 Budget, IMPLAN, and data provided by WJCC School Division

The CIP budget has a particularly high rate of leakage due to out of area purchases. In FY2012, the CIP leakage was about 90%. In FY2013, it was even higher, at 96%. Even though both years were particularly low compared to previous years, this spending category has such a high rate of leakage that its economic impact on Williamsburg and James City County could be low even in years of high CIP spending.

IMPACT ON PROPERTY VALUES

Local schools can impact local property values in two important ways. First, high school graduates positively impact local economic activity, which in turn augments property values in the area. Second, higher performing schools raise the value of local residential property because of homebuyers’ preference for good schools when purchasing houses. With increased property values, there is an associated boost in property tax revenue.

On average, high school graduates earn more money than dropouts and consequently can spend more money in the local economy. This makes the economy more prosperous and attractive for residents. Thus, the higher spending from high school graduates, as compared to dropouts, is positively correlated with local property values.

We follow the direct method used by Walden in his Virginia Beach study to estimate the impact of a higher-educated labor force on local property values. Comparing local property values to local income gauges the change in property values when future incomes rise as a result of students graduating from high school. The 2008-2012 Comprehensive Annual Financial Reports (CAFR) from both Williamsburg and James City County provide the total real property values and personal income of the Williamsburg-James City County area. Unfortunately, the personal income data is only published through 2010.

The ratio of real property values to personal income in WJCC remains relatively constant from 3.26 in 2008, to 3.50 in 2009, and 3.37 in 2010. These numbers suggest that every additional dollar of local income is capitalized into local property values at a rate of \$3.26 in 2008, \$3.50 in 2009, and \$3.37 in 2010.

The most recent data from the U.S. Census Bureau indicates that the average annual earnings premium of high school graduates over high school dropouts is \$11,114.93 (2012 dollars). If a WJCC graduate remains working in the region after graduation, then the corresponding increased wages will be spent in the local community and thus be capitalized into local property value. The wage premium and its impact on local property values will remain in the WJCC area so long as the graduate stays in the

area permanently. Due to the fact that information is unavailable about what graduates do and where they settle after high school, we have decided to calculate the impact under the assumption that 100% of the graduates stay in the area. By no means do we think this is the case, but we are addressing the reality that an educated labor force attracts other similarly educated workers to the area. Since the region is growing in population, high school graduates from other regions moving in to the WJCC area will more than likely counterbalance the WJCC graduates who move out. This assumption is likely to produce an upper-bound estimate of the effect of graduates' spending on local property values. With this assumption in mind, the third column in Table 4 presents the associated increase in real property values using the entire earnings premium for each WJCC graduating class. Using the most recently available data from 2010, the additional spending of each WJCC graduating class adds \$25.8 million to local property values.

Table 4: Local Real Property Value and Property Tax Revenue Impacts of the Earnings Premium of WJCC Graduates

| Year | Number of Graduates | Associated Increase in Real Property Values (millions) | Associated Increase in Property Tax Revenues |
|-------------|----------------------------|---|---|
| 2008 | 716 | \$25.98 | \$189,283 |
| 2009 | 683 | \$26.58 | \$193,565 |
| 2010 | 689 | \$25.80 | \$188,005 |
| 2011 | 742 | N/A | N/A |
| 2012 | 771 | N/A | N/A |

Source: Williamsburg CAFR and James City County CAFR; author's calculations (Appendix A).

The Comprehensive Annual Financial Reports also share the real estate tax rates for Williamsburg and James City County. For the years 2008-2012, every \$100 of real property in Williamsburg was taxed at a rate of \$0.54. For the same years, every \$100 of real property in James City County was taxed at a rate of \$0.77. In order to use one tax

rate (each year) for the total property value that encompasses Williamsburg and James City County, we weighted the rate based on the portion of the property value that was due to Williamsburg property and the portion that was due to James City County property. Due to the larger portion of property value (approximately 80% each year) coming from James City County, the average weighted tax rate was \$0.73 per \$100 for each year between 2008 and 2012. Multiplying the increase in real property values by the weighted tax rate gives us the associated increase in property tax revenues, found in the fourth column of Table 4. Using the most recent available data from 2010, the additional spending of each WJCC graduating class adds \$188,005 in property tax revenue.

The additional spending of each WJCC graduating class adds \$25.8 million to local property values and provides \$188,005 in property tax revenue each year.

The second way that local schools impact property values is related to school quality. Research shows that houses in higher performing school divisions sell for higher prices than houses in lower performing school divisions (Brasington and Haurin 2004; Downes and Zabel 2002; Clark and Herrin 2000; Black 1999). People are willing to pay a premium to live in areas with better performing schools. Average test scores, such as Virginia’s SOL scores, ACT scores, and SAT scores can serve as proxies for school quality. The value of higher performing schools is capitalized into local property values.

When estimating the impact of school performance on residential property values, it is important to review the recent trends in WJCC school division performance. Figures 1, 2, 3, and 4 show the graphical trends in four measures—SOL English Reading

Performance, SOL Mathematics Performance, ACT scores, and SAT Reading & Math scores. Appendix C shares the corresponding tables. The data is from the Virginia Department of Education's SOL Division and State Level Reports, ACT.org, College Board, as well as from WJCC Public Schools. We made the decision not to use GPA as a performance measure because it is subjective and its meaning varies across school divisions.

The linear best-fit lines in Figures 1 and 2 show how the WJCC SOL English Reading and Mathematics passing rates have steadily increased since 2005. Students in WJCC have consistently higher average passage rates than students in Virginia as a whole. Interestingly, the gap between WJCC rates and Virginia rates has widened since 2005, suggesting that WJCC students are improving at a faster rate than average Virginia students. Above average SOL scores are an indicator of higher performing schools and are likely to draw people to the Williamsburg-James City County area.

As you can see in Appendix C (Tables C.1 and C.2), the English Reading passage rate dropped in 2012 and the Mathematics passage rate dropped in 2011. The years when passage rates declined coincide with years in which the SOL test was revised to ensure students are ready for college and their career once they graduate from high school. The percentage of all students passing the SOL English Reading and Mathematics tests in these years similarly dropped statewide. We did not include the years of these test-related score drops in our best-fit line graphs (Figures 1 and 2) because the drop in score is due to the change in the test rather than a change in student performance.

Figure 1: Percentage of All Students Passing SOL: English Reading Performance (2005-2011)

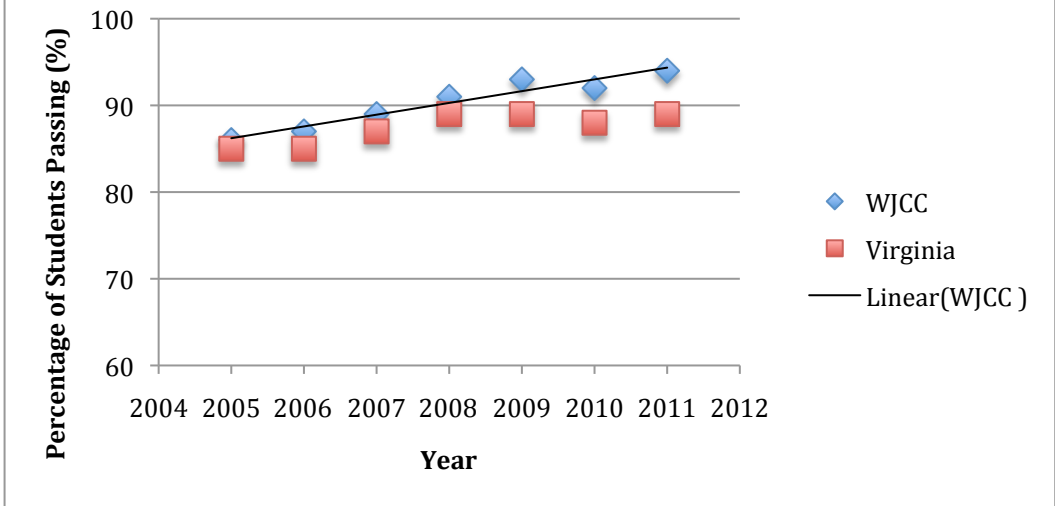
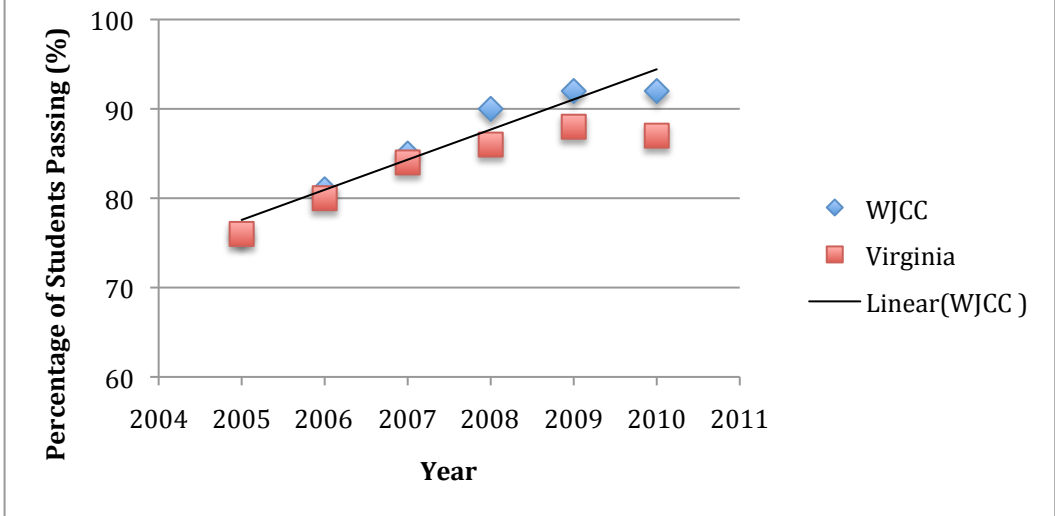
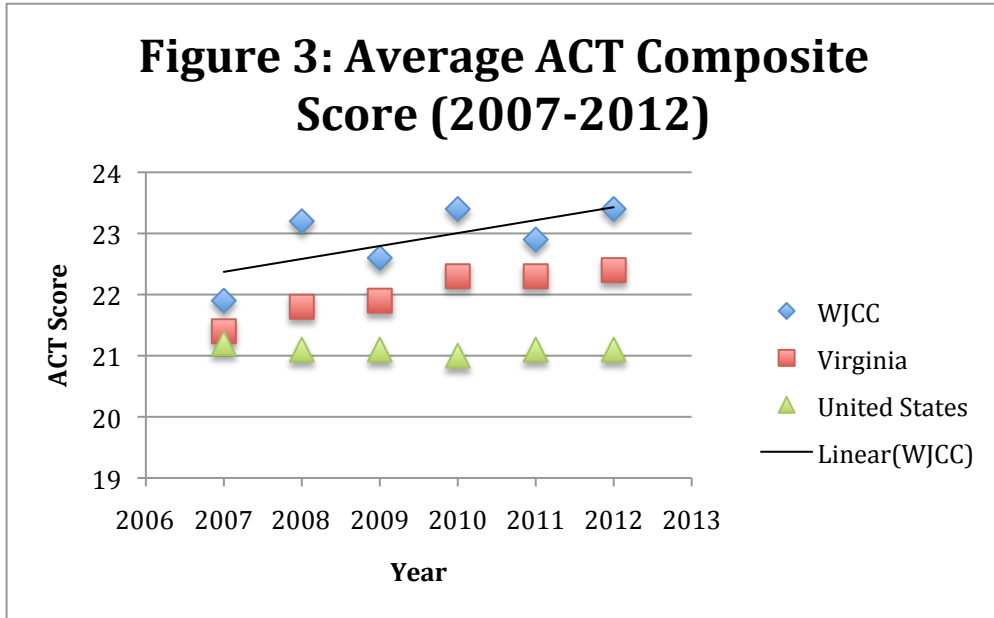


Figure 2: Percentage of All Students Passing SOL: Mathematics Performance (2005-2010)

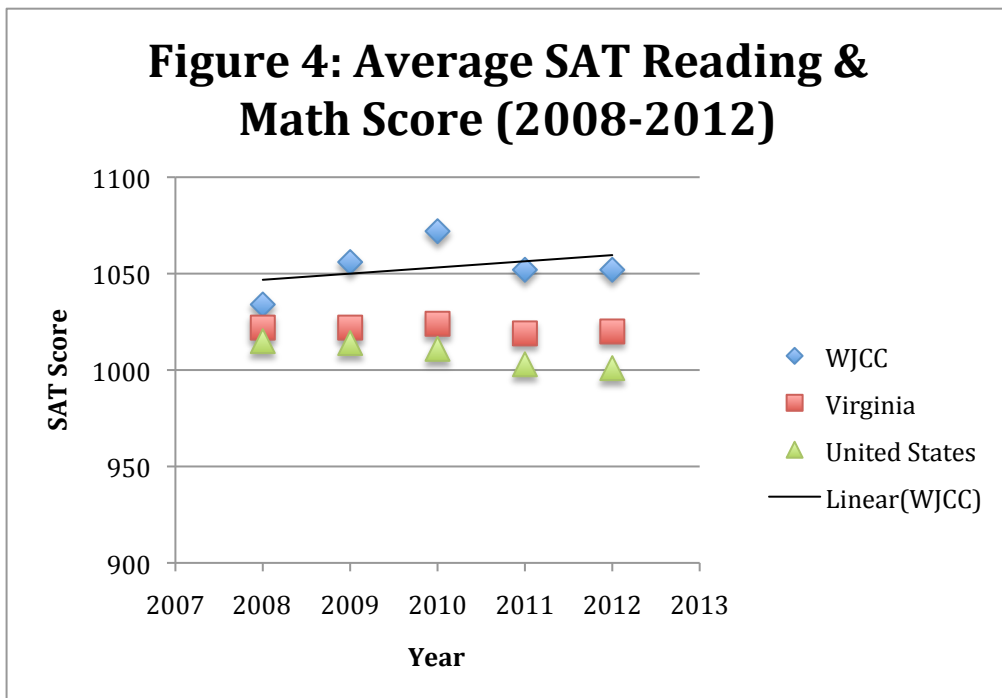


As shown in Figure 3, the average ACT composite scores in WJCC are generally increasing. The variability in average scores is likely due to the fewer number of students taking the ACT. WJCC has consistently higher scores than Virginia and the

United States, suggesting that in comparison, the Williamsburg-James City County area is attractive to homebuyers.



The average SAT Reading & Math scores, shown in Figure 4, display an improving trend from 2008 to 2012. Again, the WJCC average test scores are higher than the average of all the test-takers in Virginia as well as the United States.

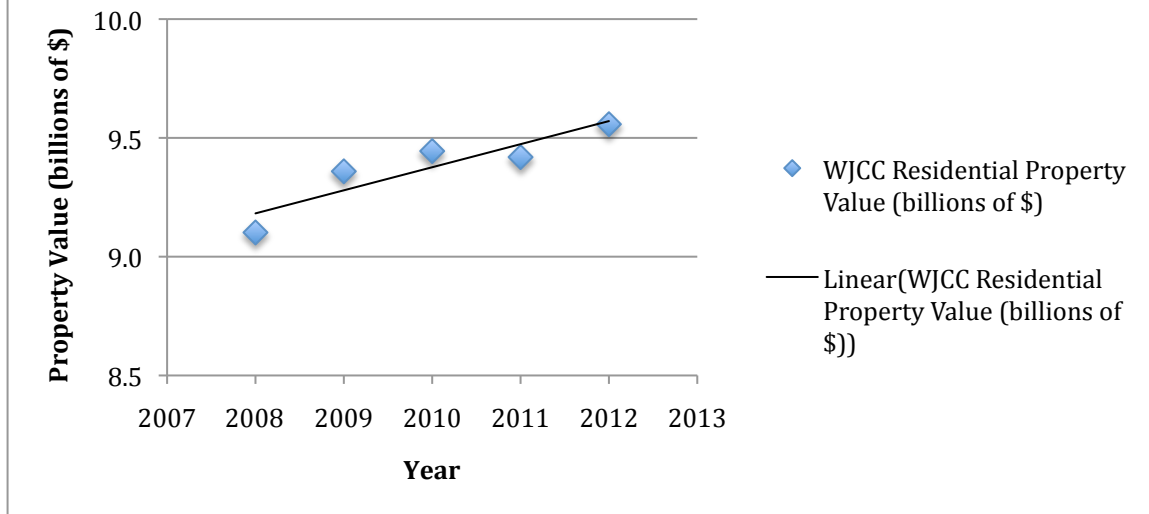


Using SOL passage rates, ACT scores, and SAT scores as proxies for school performance, it can generally be concluded that WJCC performance has improved between 2008 and 2012. Residential property values respond positively to the improved performance displayed in the WJCC division. Research finds that a one standard deviation improvement in test scores is associated with a 7.1% increase in residential property values (Brasington and Haurin 2004). We apply this finding to SAT score trends in WJCC compared to Virginia school divisions overall in order to estimate that, as a result of the improvement in WJCC student performance between 2008-2012, residential property values in the Williamsburg-James City County area are approximately \$28.6 million higher each year compared to the levels without the improvement in academic performance. The corresponding gain in property tax revenue is approximately \$208,978.

The recent improvement in WJCC’s academic performance results in local residential property values that are \$28.6 million more per year than levels without the improvement in academic performance. The corresponding yearly gain in residential property tax revenues to Williamsburg-James City County is \$208,978.

Figure 5 shows how the value of WJCC residential real estate has generally increased over the years. Residential property values can change for many reasons, including from impacts of other public services such as policing, or the economic recession. However, we now have a better estimate of how much of this positive change in property values is due to the better performance of schools in the Williamsburg-James City County area.

Figure 5: WJCC Total Real Residential Property Value (2008-2012)



IMPACT ON HUMAN CAPITAL

Williamsburg – James City County Public Schools increase the cumulative lifetime incomes of their students. It has been repeatedly documented that a person’s level of education strongly influences future earning potential (Hungerford and Solon 1987; Card 1998; Day and Newburger 2002; Hungerford and Wassmer 2004; Julian and Kominski 2011). A high school diploma acts as an important signal to potential employers and colleges of the student’s ability and work ethic, and therefore results in higher earnings for the student. The increase in earnings associated with a high school diploma is sometimes referred to as the “sheepskin effect,” or the wage increase above what would normally be attributed to an extra year of schooling (Hungerford and Solon 1987). Furthermore, the skills and knowledge that students acquire in high school translate into better job opportunities. U.S. Census Bureau researchers have discovered that people with higher levels of education are more likely to be employed full-time,

year-round (Julian and Kominski 2011). They found that among those who failed to graduate high school, only 38% will be employed full-time, year-round; whereas, 53% of those who graduate high school will be employed full-time, year-round. The percentage increases with more education.

A high school diploma is valuable in itself, but schools provide other benefits to the students beyond graduation. Strayer found that school quality, measured in student-to-teacher ratio and the percentage of teachers with a graduate degree, has a significant impact on the probability of college attendance, which in turn positively influences wages (2002). This is likely because students at higher quality schools are exposed to more information about college from their teachers, peers, and school counselors, compared to students at lower quality schools (Strayer 2002). While the research is unavailable about exactly how much of a college graduate's lifetime earnings are attributable to their high school experience, a higher quality school division can "claim" some of the additional earnings a student receives from having a greater chance of pursuing higher education.

Students' lifetime earnings are a part of the benefits that accrue to the local community because the students' parents, who are residents of the community, have an interest in their children's success. The parents pay property taxes, as well as state and federal taxes that are eventually funneled back into the school division. The students will be more successful if they have completed high school. It comes down to the fact that the school is providing a service, and the students' potential earnings reflect the return on investment for the parents. The community itself may not necessarily see all of the students' earnings being re-spent in the local economy, unless the students return to the area to live after finishing high school or college, but their parents will be satisfied with

their investment when their children get higher paying jobs and earn more money because they received a quality high school education.

This section uses data for five cohort years from 2008 to 2012 from the Virginia Department of Education, High School Graduates Postsecondary Enrollment Report. The numbers are based on the five-year graduation rate, which means that the data include the students who graduate in four years as well as those who graduate in five years. Each class cohort is broken down by gender and race, which we used to extrapolate the number of students from each gender-race combination who received a “federally recognized high school diploma.”¹ This information will also be used to show the number of students in each category who have enrolled in a four-year public or private Institution of Higher Education (IHE) within 16 months of earning a diploma and the number of students who enrolled in a two-year IHE within 16 months of earning a diploma.

In conjunction with the gender-race combination information, we used a detailed Census Bureau study that estimates the synthetic work-life earnings for each person based on their gender, race, and completed level of education (Julian and Kominski 2011). This will provide graduates earnings estimates that are closely tailored to the demographic make-up specific to the Williamsburg-James City County school system.

The table below illustrates the education outcome for each race-gender combination for all students in the 2008 FGI cohort who graduated with a high school diploma in 5 years or less.² “High School Graduate Only” means that the students graduated high school and earned a diploma, but they did not go on to attend any IHE. “Some College” means that the students were reported having enrolled in an IHE, but

¹ “Federally recognized high school diplomas include Standard, Advanced Studies, or International Baccalaureate (IB) diplomas.” GEDs, special, and modified diplomas are not included in this dataset.

² Detailed tables for the other academic years are available in Appendix D.

were not expected to graduate from either a two-year or a four-year IHE. The last two columns show the number of students in each race-gender category that will be expected to earn an associate’s degree or a bachelor’s degree. Information about the race category “Other” concerning further education attainment was not available.

Table 5: 2008 5-Year FGI Cohort Graduation and Degree Attainment Results

| | High School Graduate Only | Some College | Total Number of Students Expected to Earn Associate's Degree | Total Number of Students Expected to Earn Bachelor's Degree |
|-------------------|----------------------------------|---------------------|---|--|
| Asian - female | 5 | 3 | 1 | 4 |
| Asian - male | 5 | 3 | 0 | 3 |
| Black - female | 23 | 19 | 7 | 15 |
| Black - male | 20 | 17 | 6 | 13 |
| Hispanic - female | 3 | 4 | 1 | 3 |
| Hispanic - male | 3 | 3 | 1 | 3 |
| White - female | 64 | 101 | 22 | 100 |
| White - male | 56 | 90 | 20 | 90 |
| Other - female | 4 | N/A | N/A | N/A |
| Other - male | 4 | N/A | N/A | N/A |
| Total | 187 | 240 | 58 | 231 |

Source: Virginia Department of Education, High School Graduates Postsecondary Enrollment Report, 2008
Calculations by Author

To calculate these columns, we first figured out how many students were likely to graduate college and worked backwards. The last column was estimated by adding the number of students who reported enrolling in a four-year institution and those who reported enrolling in a two-year institution, but who would be expected to transfer. Bradburn and Hurst found that 25% of all first-time community college students transfer to any four-year college within 5 years (2001). From this total, we estimated that only a

fraction of those students who enroll will graduate. According to the National Center for Education Statistics, 59% of full-time undergraduate students will actually earn their bachelor’s degree within six years of enrolling (2011). They also reported that for students attending two-year colleges, 31% of those students are expected to earn an associate’s degree within three years. We used this to estimate the third column. The “Some College” column was calculated by subtracting the number of students who are expected to graduate, either from a two-year or a four-year IHE, from the total of all who enrolled in an IHE. The first column is the total number of students who earned a federally recognized high school diploma, minus the students who either enrolled in an IHE or graduated from an IHE.

Next, we used estimates from Julian and Kominski’s report on synthetic work-life earnings to estimate the difference in lifetime earnings for the total number of students in each race-gender category by their actual or expected level of education compared to their dropout counterparts (2011).³ The table below shows the calculations for income differences for a Hispanic male based on education level. For example, a Hispanic male high school graduate will earn \$181,341 more over his lifetime than a Hispanic male dropout.

³ A detailed table is available in Appendix E.

Table 6: Earnings Estimates for Hispanic Male

| Education Level | Median Synthetic Lifetime Earnings | Total Earnings in 2012 Dollars | Lifetime Difference in Earnings in 2012 Dollars |
|--------------------------|---|---------------------------------------|--|
| 9-12 th Grade | \$1,136,694 | \$1,212,143 | |
| HS Graduate | \$1,306,747 | \$1,393,484 | \$181,341 |
| Some College | \$1,679,364 | \$1,790,834 | \$578,690 |
| Associate's | \$1,837,607 | \$1,959,580 | \$747,437 |
| Bachelor's | \$2,080,558 | \$2,218,658 | \$1,006,514 |

Source: Median Synthetic Lifetime Earnings by Julian and Kominski (2011)
Other calculations by author.

Using the above information, we developed two estimates of the total lifetime income increment for each graduating class: a narrow estimate and a broad estimate. The narrow estimate includes the returns from graduating high school only. The broad estimate reflects the returns from earning a high school diploma as well as from pursuing higher education. The equation for the narrow estimate will combine the wage difference for high school graduates and the number of WJCC high school graduates for each race-gender category, as illustrated below:

I_{HMgrad} = lifetime income of Hispanic male with a high school diploma

I_{HMdrop} = lifetime income of Hispanic male without a high school diploma

h = number of Hispanic male WJCC high school graduates

$(I_{HMgrad} - I_{HMdrop}) (h)$ = **total income increment for WJCC Hispanic males**

Applying this method to all of the race-gender categories, we calculated the total value of the increment in income for each graduating class. The values listed below are in 2012 dollars.

Table 7: Additional Lifetime Income to WJCC Graduates, Narrow Estimate

| Academic Year | Class Size | Total Value of Increment |
|----------------------|-------------------|---------------------------------|
| 2008 | 716 | \$175,871,421 |
| 2009 | 683 | \$167,933,600 |
| 2010 | 689 | \$169,026,523 |
| 2011 | 742 | \$182,085,822 |
| 2012 | 771 | \$188,412,095 |

Note: Calculations by author

The fluctuations in the total value of the increment merely reflect changes in the number of students per class. When we take the average of the five graduating classes, we find that the returns from earning a high school diploma from the WJCC school division as opposed to dropping out are \$176,665,892 for each graduating class.

As mentioned previously, the broad estimate takes into account the differences in earnings based on level of education, including higher education. As the equation below illustrates, we calculated the difference in expected lifetime income of each level of education compared to the lifetime income of high school dropouts. We combined the difference with the number of students at the highest level of education they are expected to achieve.

Lifetime income of Hispanic male WJCC

Number of Hispanic male WJCC students:

students:

h = high school graduate

I_{HMdrop} = without HS diploma

s = completed some college

I_{HMgrad} = earned HS diploma only

a = earned Associate's degree

I_{HMSome} = completed some college

b = earned Bachelor's degree

I_{HMAssoc} = earned Associate's degree

I_{HMbach} = earned Bachelor's degree

$$(I_{HMgrad} - I_{HMdrop})(h) + (I_{HMSome} - I_{HMdrop})(s) + (I_{HMAssoc} - I_{HMdrop})(a) + (I_{HMbach} - I_{HMdrop})(b)$$

= **total income increment for WJCC Hispanic males**

We applied this equation to all of the race-gender categories in order to calculate the total value of the increment in income for each graduating class. The table below presents the results.

Table 8: Additional Lifetime Income to WJCC Graduates, Broad Estimate

| Academic Year | Class Size | Value of Increment |
|----------------------|-------------------|---------------------------|
| 2008 | 716 | \$511,816,053 |
| 2009 | 683 | \$472,610,439 |
| 2010 | 689 | \$484,388,347 |
| 2011 | 742 | \$509,519,986 |
| 2012 | 771 | \$501,643,166 |

Note: Calculations by author

When we take returns from higher education into account, the returns from earning a high school diploma from the WJCC school division as opposed to dropping out increase to \$495,995,598 per graduating class.

On average, each graduating class of the WJCC school division will realize an estimated total lifetime increment to their income ranging from \$176.6 million to \$495.9 million.

SOCIAL CAPITAL

Social capital refers to the wider impact of education on individuals and how they participate in society (Walden 2011). Researchers have found that education lowers government costs in three main areas: crime, health care, and welfare services. This section quantifies the benefits to society in terms of costs saved per high school graduate in each of these areas.

Farrington found that increased education is associated with a reduced involvement in criminal activity (2003). This relationship is primarily explained through two channels: first, education may promote behaviors that influence and decrease tendencies to commit crime; second, the increase in employment and income associated with education reduces the pressure to commit crime. There are many costs to society associated with crime: costs of policing, trials, sentencing, incarceration, parole, probation, compensation for victims, and government programs to reduce criminal behavior (Cohen 2004).

There is significant evidence showing that increased education is associated with improved life expectancy, healthier behaviors, and improved health outcomes (Muennig 2005; Culter and Lleras-Muney 2006). Because of their education, people have higher incomes and are

less likely to need Medicaid (Muennig 2005). These savings may be offset by the increased ability of educated persons to navigate the health care system and secure benefits, but this may be considered a benefit because people who take advantage of health care will ultimately be healthier.

Education has also been shown to reduce participation in welfare programs. This is primarily because most welfare programs are need-tested benefit programs, and educated individuals are less likely to need assistance (CRS 2004). As with Medicaid, the public savings of increased education may be offset by the ability of individuals to navigate the system, but the net reduction of expenditures exceeds the increase in requests (DePonte et al 1999). The three programs most easily measured are Temporary Aid for Needy Families (TANF), housing assistance, and Supplemental Nutrition Assistance Program (SNAP) (Waldfogel et al 2005).

To calculate total public savings, we used estimates for each of the above categories from Levin, Belfield, Muennig, and Rouse's report, "The Price We Pay: Economic and Social Consequences of Inadequate Education," (2007). They used 2004 data from the National Center for Education Statistics on high school graduates by gender and race. They then calculated a weighted average in proportion to the population to generate the reductions in public costs of a typical high school graduate, compared to a high school dropout. They calculated the savings for a high school graduate over the course of the student's lifetime by using a 3.5% discount rate.⁴ We converted their estimates into 2012 dollars, and then combined them with the WJCC graduation numbers for years 2008 to 2012.

⁴ The calculations of our sensitivity analysis using a 7.5% discount rate is available in Appendix E.

Levin et al estimated that each high school graduate reduces government expenditures on crime by \$32,300 over his or her lifetime (2007). In 2012, Virginia paid 98.43% of funding for the criminal justice system (NASBO 2013). This amounts to state-level savings of \$31,800 per additional graduate, or approximately \$24,517,800 in state savings for the class of 2012.

Each high school graduate will reduce government spending on Medicaid and other healthcare spending by \$49,100 (Levin et al 2007). In 2012, Virginia covered 50.74% of public health care funding (NASBO 2012). Therefore, Virginia saves \$24,900 per additional graduate and \$19,197,900 for the entire class of 2012.

Total lifetime savings from reduced welfare participation has been estimated at \$3,640 for each additional high school graduate (Levin et al 2007). In Virginia only 27.07% of welfare funding came from the state in 2012, representing a state savings of approximately \$935 per additional graduate, or approximately \$ 759,435 in total state savings for the class of 2012 (NASBO 2012).

Altogether, for each additional high school graduate, the total present value of public savings is \$85,040. Of this amount, the State of Virginia saves \$57,685. The class of 2012 saved the state \$44,475,135. The calculations for each category and class are presented in the table below. The “Total Savings” column combines the state and federal savings, which are listed below.

Each WJCC graduate saves society \$85,040 over his or her lifetime, of which Virginia saves \$57,685 and the federal government saves \$27,355.

Table 9: Total Savings from the Development of Social Capital of WJCC Graduates

| | Per Individual | Class of 2008 | Class of 2009 | Class of 2010 | Class of 2011 | Class of 2012 |
|------------------------------|----------------|---------------|---------------|---------------|---------------|---------------|
| Savings from Crime | \$32,300 | \$23,126,800 | \$22,060,900 | \$22,254,700 | \$23,966,600 | \$24,903,300 |
| Medicaid Savings | \$49,100 | \$35,155,600 | \$33,535,300 | \$33,829,900 | \$36,432,200 | \$37,856,100 |
| Welfare Savings | \$3,640 | \$2,606,240 | \$2,486,120 | \$2,507,960 | \$2,700,880 | \$2,806,440 |
| Total Savings | \$85,040 | \$60,888,640 | \$58,083,320 | \$58,592,560 | \$63,099,680 | \$65,565,840 |
| <i>Total State Savings</i> | \$57,685 | \$41,302,460 | \$39,398,855 | \$39,744,965 | \$42,802,270 | \$44,475,135 |
| <i>Total Federal Savings</i> | \$27,355 | \$19,586,180 | \$18,683,465 | \$18,847,595 | \$20,297,410 | \$21,090,705 |

Note: Calculations by author

CONCLUSION

The Williamsburg–James City County School Division has a notable impact in various areas of the local economy. This study has evaluated those impacts in order to quantify the benefits that accrue to the graduates, residents, and the community. The results of this study show that spending on schools has both immediate short-term effects and substantial long-term effects.

The school division has helped to boost regional spending in two main ways: through teachers and support staff who spend their incomes in the local economy and through capital improvement projects that support local businesses. The school division is one of the top employers in the area, with 1400 instructional and support staff and with \$46 million of the 2012 budget dedicated to the salaries of staff who live in the area. Funds devoted to capital improvement were approximately \$6.8 million in 2012. This study found that an average dollar of the school division’s operating and CIP budgets results in \$0.68 of regional spending. Of the money that stays in the Williamsburg-James

City County community, the average dollar results in \$1.63 of regional spending.

Also, the school division is responsible for a portion of the rise in property values in the community due to the presence of high school graduates and their additional spending compared to high school dropouts. Also, the division's overall rise in test scores has contributed to rising property values. In a given year, these two forces combined raise property values by \$54.4 million and increase tax revenues for local governments by almost \$397,000.

Considerable research has found that a person's level of education strongly influences their earning potential and that more education promotes more opportunities in employment. This study researched the economic value of degrees awarded by comparing the estimated lifetime earnings of high school graduates and their dropout counterparts. For each graduating class, the returns from earning a high school diploma from the WJCC division are worth between \$176.6 million and \$495.9 million.

This study further evaluated the future reduction in public costs associated with earning a high school diploma. Researchers have found that high school graduates are less likely to engage in crime and to rely on social services and are more likely to practice healthy lifestyle habits. As a result, each graduating class saves society an average of \$41.5 million in terms of reduced spending on crime, health care, and social and welfare programs.

The WJCC school division serves the community in innumerable ways. It provides employment opportunities for residents and boosts business for local vendors. It

supplies children with a quality education that will help them in their educational and career paths throughout their lives. The school division makes residents' homes more valuable and makes the community richer by giving back in the form of tax revenues. Dollar for dollar, the community cannot get a better deal.

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APPENDIX A: Calculating the Impact of High School Graduates' Annual Earnings Premium on Local Real Property Values and Property Tax Revenues

The annual earnings premium of a high school graduate over a high school dropout (\$11,114.93) is multiplied by the average ratio of real property value to personal income for the WJCC area (3.26 in 2008, 3.50 in 2009, and 3.37 in 2010) and further by the number of WJCC graduates in each year to give the values in the third column of Table 4 (Associated Increase in Real Property Values, in millions).

In order to determine an applicable tax rate for the WJCC area, the rate needs to be determined by the relative impact of the Williamsburg real estate tax rate of \$0.54 per \$100 and the James City County real estate tax rate of \$0.77 cents per \$100. Taking the proportions of real residential property value that are from Williamsburg (.18 every year from 2008-2012) and James City County (.82 every year from 2008-2012) and multiplying these by the appropriate tax rate for each area provides a weighted tax rate for the Williamsburg portion and JCC portion. Adding these two numbers for each year determines the average weighted tax rate for both areas combined (\$0.73 cents per \$100 for each year from 2008-2012).

The values in the third column in Table 4 are multiplied by the weighted tax rate of .0073 (\$0.73 cents per \$100) for each year between 2008-2012 to derive the associated tax revenues in the fourth column of Table 4 (Associated Increase in Property Tax Revenues).

APPENDIX B: Calculating the Impact of Improved WJCC School Division Performance on the WJCC Residential Property Values

The value of WJCC residential real estate is determined using data from the Williamsburg and James City County CAFRs. The value ranges from \$9.1 billion in 2008 to \$9.6 billion in 2012.

Research suggests a one standard deviation improvement in test scores is associated with a 7.1% increase in residential property values (Brasington and Haurin 2004). A standard deviation is based on the distribution of all the school division averages in Virginia. In 2012, the standard deviation of SAT Reading & Math scores across Virginia's school divisions was 77 points. Between 2008-2012, the WJCC SAT Reading & Math improved an average of 3.2 points per year (standard deviation of .042). Using the standard deviation and the impact on residential property values and property taxes in Williamsburg-James City County, the result of the improved academic performance of WJCC students is the following:

Estimate of the increase in property value: $\$9.6 \text{ billion} \times .042 \times .071 = \$28,627,200$

Estimate of the increase in property tax revenues: $\$156.768 \text{ million} \times .0073 = \$208,978$

APPENDIX C: Student Performance Measurement Results

Table C.1: Percentage of All Students Passing SOL: English Reading Performance (2005-2012)

| Year | Percentage of WJCC Students | Percentage of Virginia Students |
|-------------|------------------------------------|--|
| 2005 | 86% | 85% |
| 2006 | 87% | 85% |
| 2007 | 89% | 87% |
| 2008 | 91% | 89% |
| 2009 | 93% | 89% |
| 2010 | 92% | 88% |
| 2011 | 94% | 89% |
| 2012 | 82% | 75% |

Source: Williamsburg-James City County Public Schools; Virginia Department of Education School Division & State Report Card

Table C.2: Percentage of All Students Passing SOL: Mathematics Performance (2005-2012)

| Year | Percentage of WJCC Students | Percentage of Virginia Students |
|-------------|------------------------------------|--|
| 2005 | 76% | 76% |
| 2006 | 81% | 80% |
| 2007 | 85% | 84% |
| 2008 | 90% | 86% |
| 2009 | 92% | 88% |
| 2010 | 92% | 87% |
| 2011 | 78% | 69% |
| 2012 | 79% | 71% |

Source: Williamsburg-James City County Public Schools; Virginia Department of Education School Division & State Report Card

Table C.3: Average ACT Composite Score (2007-2012)

| Year | WJCC | Virginia | United States |
|-------------|-------------|-----------------|----------------------|
| 2007 | 21.9 | 21.4 | 21.2 |
| 2008 | 23.2 | 21.8 | 21.1 |
| 2009 | 22.6 | 21.9 | 21.1 |
| 2010 | 23.4 | 22.3 | 21 |
| 2011 | 22.9 | 22.3 | 21.1 |
| 2012 | 23.4 | 22.4 | 21.1 |

Source: Williamsburg-James City County Public Schools; ACT.org

Table C.4: Average SAT Reading & Math Score (2008-2012)

| Year | WJCC | Virginia | United States |
|-------------|-------------|-----------------|----------------------|
| 2008 | 1034 | 1022 | 1015 |
| 2009 | 1056 | 1022 | 1014 |
| 2010 | 1072 | 1024 | 1011 |
| 2011 | 1052 | 1019 | 1003 |
| 2012 | 1052 | 1020 | 1001 |

Source: Williamsburg-James City County Public Schools; College Board

Table C.5: WJCC Total Real Residential Property Value (2008-2012)

| Year | Property Value (billions) |
|-------------|--------------------------------------|
| 2008 | 9.102 |
| 2009 | 9.359 |
| 2010 | 9.444 |
| 2011 | 9.419 |
| 2012 | 9.558 |

Source: Williamsburg and James City County Comprehensive Annual Financial Reports (2008-2012)

APPENDIX D: Calculating the Expected Graduation Statistics for WJCC Classes 2008-2012

2008 Class Breakdown by Gender

| | |
|--------|-----|
| Female | 379 |
| Male | 337 |
| Total | 716 |

2008 Class Breakdown by Ethnicity

| | |
|----------|-----|
| Asian | 24 |
| Black | 120 |
| Hispanic | 21 |
| White | 543 |
| Other | 8 |
| Total | 716 |

Table D.1: 2008 5-Year Graduation and Degree Attainment Results

| Race – Gender Combination Category | Total Number Earning a High School Diploma | Percentage of Ethnic Group Enrolled in 4-Year IHE | Total Number Enrolling in 4-Year IHE | Percentage of Ethnic Group Enrolled in 2-Year IHE | Total Number Enrolling in 2-Year IHE | Number of Transfers from 2-Year to 4-Year IHE | High School Graduate Only | Some College | Total Number of Students Expected to Earn Associate's Degree | Total Number of Students Expected to Earn Bachelor's Degree |
|------------------------------------|--|---|--------------------------------------|---|--------------------------------------|---|---------------------------|--------------|--|---|
| Asian - female | 13 | 46% | 6 | 13% | 2 | 1 | 5 | 3 | 1 | 4 |
| Asian - male | 11 | 46% | 5 | 13% | 1 | 0 | 5 | 3 | 0 | 3 |
| Black - female | 64 | 31% | 20 | 33% | 21 | 5 | 23 | 19 | 7 | 15 |
| Black - male | 56 | 31% | 17 | 33% | 19 | 5 | 20 | 17 | 6 | 13 |
| Hispanic - female | 11 | 38% | 4 | 33% | 4 | 1 | 3 | 4 | 1 | 3 |
| Hispanic - male | 10 | 38% | 4 | 33% | 3 | 1 | 3 | 3 | 1 | 3 |
| White - female | 287 | 53% | 152 | 25% | 71 | 18 | 64 | 101 | 22 | 100 |
| White - male | 256 | 53% | 136 | 25% | 64 | 16 | 56 | 90 | 20 | 90 |
| Other - female | 4 | | | | | | 4 | N/A | N/A | N/A |
| Other – male | 4 | | | | | | 4 | N/A | N/A | N/A |
| Total | 716 | | 344 | | 185 | 46 | 187 | 240 | 58 | 231 |

2009 Class Breakdown by Gender

| | |
|--------|-----|
| Female | 355 |
| Male | 328 |
| Total | 683 |

2009 Class Breakdown by Ethnicity

| | |
|----------|-----|
| Asian | 19 |
| Black | 124 |
| Hispanic | 23 |
| White | 510 |
| Other | 7 |
| Total | 683 |

Table D.2: 2009 5-Year Graduation and Degree Attainment Results

| Race – Gender Combination Category | Total Number Earning a High School Diploma | Percentage of Ethnic Group Enrolled in 4-Year IHE | Total Number Enrolling in 4-Year IHE | Percentage of Ethnic Group Enrolled in 2-Year IHE | Total Number Enrolling in 2-Year IHE | Number of Transfers from 2-Year to 4-Year IHE | High School Graduate Only | Some College | Total Number of Students Expected to Earn Associate's Degree | Total Number of Students Expected to Earn Bachelor's Degree |
|------------------------------------|--|---|--------------------------------------|---|--------------------------------------|---|---------------------------|--------------|--|---|
| Asian - female | 10 | 47% | 5 | 37% | 4 | 1 | 1 | 4 | 1 | 4 |
| Asian - male | 9 | 47% | 4 | 37% | 3 | 1 | 2 | 3 | 1 | 3 |
| Black - female | 64 | 26% | 17 | 35% | 22 | 6 | 25 | 19 | 7 | 13 |
| Black - male | 60 | 26% | 15 | 35% | 21 | 5 | 24 | 17 | 7 | 12 |
| Hispanic - female | 12 | 22% | 3 | 22% | 3 | 1 | 6 | 3 | 1 | 2 |
| Hispanic - male | 11 | 22% | 2 | 22% | 2 | 1 | 7 | 2 | 1 | 1 |
| White - female | 265 | 50% | 131 | 29% | 76 | 19 | 58 | 94 | 24 | 89 |
| White - male | 245 | 50% | 122 | 29% | 71 | 18 | 52 | 89 | 22 | 82 |
| Other - female | 4 | | | | | | 4 | N/A | N/A | N/A |
| Other - male | 3 | | | | | | 3 | N/A | N/A | N/A |
| Total | 683 | | 299 | | 202 | 52 | 182 | 231 | 64 | 206 |

2010 Class Breakdown by Gender

| | |
|--------|-----|
| Female | 354 |
| Male | 335 |
| Total | 689 |

2010 Class Breakdown by Ethnicity

| | |
|----------|-----|
| Asian | 22 |
| Black | 123 |
| Hispanic | 20 |
| White | 511 |
| Other | 13 |
| Total | 689 |

Table D.3: 2010 5-Year Graduation and Degree Attainment Results

| Race – Gender Combination Category | Total Number Earning a High School Diploma | Percentage of Ethnic Group Enrolled in 4-Year IHE | Total Number Enrolling in 4-Year IHE | Percentage of Ethnic Group Enrolled in 2-Year IHE | Total Number Enrolling in 2-Year IHE | Number of Transfers from 2-Year to 4-Year IHE | High School Graduate Only | Some College | Total Number of Students Expected to Earn Associate's Degree | Total Number of Students Expected to Earn Bachelor's Degree |
|------------------------------------|--|---|--------------------------------------|---|--------------------------------------|---|---------------------------|--------------|--|---|
| Asian - female | 11 | 68% | 8 | 23% | 3 | 1 | 0 | 5 | 1 | 5 |
| Asian - male | 11 | 68% | 8 | 23% | 3 | 1 | 0 | 5 | 1 | 5 |
| Black - female | 63 | 31% | 19 | 33% | 20 | 5 | 24 | 19 | 6 | 14 |
| Black - male | 60 | 31% | 19 | 33% | 20 | 5 | 21 | 19 | 6 | 14 |
| Hispanic - female | 10 | 40% | 4 | 45% | 5 | 1 | 1 | 4 | 2 | 3 |
| Hispanic - male | 10 | 40% | 4 | 45% | 5 | 1 | 1 | 4 | 2 | 3 |
| White - female | 263 | 47% | 123 | 32% | 85 | 21 | 55 | 97 | 26 | 85 |
| White - male | 248 | 47% | 116 | 32% | 80 | 20 | 52 | 91 | 25 | 80 |
| Other - female | 7 | | | | | | 7 | N/A | N/A | N/A |
| Other - male | 6 | | | | | | 6 | N/A | N/A | N/A |
| Total | 689 | | 301 | | 221 | 55 | 67 | 244 | 69 | 209 |

2011 Class Breakdown by Gender

| | |
|--------|-----|
| Female | 379 |
| Male | 363 |
| Total | 742 |

2011 Class Breakdown by Ethnicity

| | |
|----------|-----|
| Asian | 13 |
| Black | 124 |
| Hispanic | 38 |
| White | 540 |
| Other | 27 |
| Total | 742 |

Table D.4: 2011 5-Year Graduation and Degree Attainment Results

| Race – Gender Combination Category | Total Number Earning a High School Diploma | Percentage of Ethnic Group Enrolled in 4-Year IHE | Total Number Enrolling in 4-Year IHE | Percentage of Ethnic Group Enrolled in 2-Year IHE | Total Number Enrolling in 2-Year IHE | Number of Transfers from 2-Year to 4-Year IHE | High School Graduate Only | Some College | Total Number of Students Expected to Earn Associate's Degree | Total Number of Students Expected to Earn Bachelor's Degree |
|------------------------------------|--|---|--------------------------------------|---|--------------------------------------|---|---------------------------|--------------|--|---|
| Asian - female | 7 | 54% | 4 | 23% | 2 | 1 | 1 | 2 | 1 | 3 |
| Asian - male | 6 | 54% | 3 | 23% | 1 | 0 | 2 | 2 | 0 | 2 |
| Black - female | 63 | 36% | 23 | 29% | 18 | 5 | 22 | 19 | 6 | 16 |
| Black - male | 61 | 36% | 22 | 29% | 18 | 5 | 21 | 18 | 6 | 16 |
| Hispanic - female | 19 | 42% | 8 | 26% | 5 | 1 | 6 | 6 | 2 | 5 |
| Hispanic - male | 19 | 42% | 8 | 26% | 5 | 1 | 6 | 6 | 2 | 5 |
| White - female | 276 | 53% | 145 | 23% | 64 | 16 | 67 | 94 | 20 | 95 |
| White - male | 264 | 53% | 139 | 23% | 61 | 15 | 64 | 90 | 19 | 91 |
| Other - female | 14 | | | | | | 14 | N/A | N/A | N/A |
| Other - male | 13 | | | | | | 13 | N/A | N/A | N/A |
| Total | 742 | | 352 | | 174 | 44 | 216 | 237 | 56 | 233 |

2012 Class Breakdown by Gender

| | |
|--------|-----|
| Female | 376 |
| Male | 395 |
| Total | 771 |

2012 Class Breakdown by Ethnicity

| | |
|----------|-----|
| Asian | 17 |
| Black | 136 |
| Hispanic | 39 |
| White | 546 |
| Other | 33 |
| Total | 771 |

Table D.5: 2012 5-Year Graduation and Degree Attainment Results

| Race – Gender Combination Category | Total Number Earning a High School Diploma | Percentage of Ethnic Group Enrolled in 4-Year IHE | Total Number Enrolling in 4-Year IHE | Percentage of Ethnic Group Enrolled in 2-Year IHE | Total Number Enrolling in 2-Year IHE | Number of Transfers from 2-Year to 4-Year IHE | High School Graduate Only | Some College | Total Number of Students Expected to Earn Associate's Degree | Total Number of Students Expected to Earn Bachelor's Degree |
|------------------------------------|--|---|--------------------------------------|---|--------------------------------------|---|---------------------------|--------------|--|---|
| Asian - female | 8 | 59% | 5 | 12% | 1 | 0 | 2 | 3 | 0 | 3 |
| Asian - male | 9 | 59% | 5 | 12% | 1 | 0 | 3 | 3 | 0 | 3 |
| Black - female | 66 | 28% | 18 | 19% | 13 | 3 | 35 | 14 | 4 | 13 |
| Black - male | 70 | 28% | 20 | 19% | 13 | 3 | 37 | 15 | 4 | 14 |
| Hispanic - female | 19 | 44% | 8 | 18% | 3 | 1 | 8 | 5 | 1 | 5 |
| Hispanic - male | 20 | 44% | 9 | 18% | 4 | 1 | 7 | 6 | 1 | 6 |
| White - female | 266 | 52% | 138 | 18% | 49 | 12 | 79 | 83 | 15 | 89 |
| White - male | 280 | 52% | 146 | 18% | 51 | 13 | 82 | 88 | 16 | 94 |
| Other - female | 16 | | | | | | 16 | N/A | N/A | N/A |
| Other - male | 17 | | | | | | 17 | N/A | N/A | N/A |
| Total | 771 | | 349 | | 135 | 34 | 286 | 217 | 41 | 227 |

APPENDIX E: Earnings Estimates for All Groups

| Male | | | | | Female | | | | |
|---------------------|----------------------|------------------------------------|---------------------------|---|---------------------|----------------------|------------------------------------|---------------------------|---|
| Race | Education | Median synthetic lifetime earnings | Total Earnings in 2012 \$ | Wage Difference From Dropout in 2012 \$ | Race | Education | Median synthetic lifetime earnings | Total Earnings in 2012 \$ | Wage Difference From Dropout in 2012 \$ |
| Hispanic | 9-12th grade | \$1,136,694 | \$1,212,143 | | Hispanic | 9-12th grade | \$811,885 | \$865,774 | |
| Hispanic | High School Graduate | \$1,306,747 | \$1,393,484 | \$181,341 | Hispanic | High School Graduate | \$1,021,242 | \$1,089,028 | \$223,253 |
| Hispanic | Some College | \$1,679,364 | \$1,790,834 | \$578,690 | Hispanic | Some College | \$1,301,068 | \$1,387,428 | \$521,653 |
| Hispanic | Associates Degree | \$1,837,607 | \$1,959,580 | \$747,437 | Hispanic | Associates Degree | \$1,446,134 | \$1,542,123 | \$676,348 |
| Hispanic | Bachelors Degree | \$2,080,558 | \$2,218,658 | \$1,006,514 | Hispanic | Bachelors Degree | \$1,701,767 | \$1,814,724 | \$948,949 |
| White, Not Hispanic | 9-12th grade | \$1,443,984 | \$1,539,830 | | White, Not Hispanic | 9-12th grade | \$947,568 | \$1,010,464 | |
| White, Not Hispanic | High School Graduate | \$1,690,285 | \$1,802,480 | \$262,650 | White, Not Hispanic | High School Graduate | \$1,183,917 | \$1,262,501 | \$252,037 |
| White, Not Hispanic | Some College | \$1,985,967 | \$2,117,788 | \$577,959 | White, Not Hispanic | Some College | \$1,406,249 | \$1,499,590 | \$489,126 |
| White, Not Hispanic | Associates Degree | \$2,086,488 | \$2,224,982 | \$685,152 | White, Not Hispanic | Associates Degree | \$1,607,609 | \$1,714,316 | \$703,852 |

| Male | | | | | Female | | | | |
|---------------------|----------------------|------------------------------------|---------------------------|---|---------------------|----------------------|------------------------------------|---------------------------|---|
| Race | Education | Median synthetic lifetime earnings | Total Earnings in 2012 \$ | Wage Difference From Dropout in 2012 \$ | Race | Education | Median synthetic lifetime earnings | Total Earnings in 2012 \$ | Wage Difference From Dropout in 2012 \$ |
| White, Not Hispanic | Bachelors Degree | \$2,847,953 | \$3,036,989 | \$1,497,159 | White, Not Hispanic | Bachelors Degree | \$2,028,096 | \$2,162,713 | \$1,152,250 |
| Black, Not Hispanic | 9-12th grade | \$1,124,778 | \$1,199,437 | | Black, Not Hispanic | 9-12th grade | \$861,353 | \$918,527 | |
| Black, Not Hispanic | High School Graduate | \$1,340,407 | \$1,429,379 | \$229,942 | Black, Not Hispanic | High School Graduate | \$1,070,827 | \$1,141,905 | \$223,378 |
| Black, Not Hispanic | Some College | \$1,601,729 | \$1,708,046 | \$508,609 | Black, Not Hispanic | Some College | \$1,308,183 | \$1,395,016 | \$476,489 |
| Black, Not Hispanic | Associates Degree | \$1,724,599 | \$1,839,071 | \$639,634 | Black, Not Hispanic | Associates Degree | \$1,463,652 | \$1,560,803 | \$642,277 |
| Black, Not Hispanic | Bachelors Degree | \$2,107,728 | \$2,247,631 | \$1,048,194 | Black, Not Hispanic | Bachelors Degree | \$1,859,380 | \$1,982,799 | \$1,064,272 |
| Asian, Not Hispanic | 9-12th grade | \$1,159,638 | \$1,236,610 | | Asian, Not Hispanic | 9-12th grade | \$942,418 | \$1,004,972 | |
| Asian, Not Hispanic | High School Graduate | \$1,292,822 | \$1,378,635 | \$142,025 | Asian, Not Hispanic | High School Graduate | \$1,059,678 | \$1,130,016 | \$125,044 |

| Male | | | | | Female | | | | |
|---------------------|----------------------|------------------------------------|---------------------------|---|---------------------|----------------------|------------------------------------|---------------------------|---|
| Race | Education | Median synthetic lifetime earnings | Total Earnings in 2012 \$ | Wage Difference From Dropout in 2012 \$ | Race | Education | Median synthetic lifetime earnings | Total Earnings in 2012 \$ | Wage Difference From Dropout in 2012 \$ |
| Asian, Not Hispanic | Some College | \$1,678,196 | \$1,789,589 | \$552,979 | Asian, Not Hispanic | Some College | \$1,394,305 | \$1,486,853 | \$481,881 |
| Asian, Not Hispanic | Associates Degree | \$1,843,014 | \$1,965,347 | \$728,737 | Asian, Not Hispanic | Associates Degree | \$1,600,797 | \$1,707,052 | \$702,080 |
| Asian, Not Hispanic | Bachelors Degree | \$2,437,516 | \$2,599,309 | \$1,362,699 | Asian, Not Hispanic | Bachelors Degree | \$2,061,186 | \$2,197,999 | \$1,193,027 |
| Other, Not Hispanic | 9-12th grade | \$1,320,118 | \$1,407,742 | | Other, Not Hispanic | 9-12th grade | \$902,420 | \$962,319 | |
| Other, Not Hispanic | High School Graduate | \$1,478,622 | \$1,576,768 | \$169,026 | Other, Not Hispanic | High School Graduate | \$1,135,015 | \$1,210,353 | \$248,034 |
| Other, Not Hispanic | Some College | \$1,757,852 | \$1,874,531 | \$466,789 | Other, Not Hispanic | Some College | \$1,321,789 | \$1,409,524 | \$447,205 |
| Other, Not Hispanic | Associates Degree | \$1,857,056 | \$1,980,320 | \$572,578 | Other, Not Hispanic | Associates Degree | \$1,513,536 | \$1,613,999 | \$651,680 |
| Other, Not Hispanic | Bachelors Degree | \$2,381,770 | \$2,539,863 | \$1,132,121 | Other, Not Hispanic | Bachelors Degree | \$1,866,935 | \$1,990,855 | \$1,028,536 |

APPENDIX F: Estimate of Savings from the Development of Social Capital using 7.5% Discount Rate

Table F.1: Estimate of Savings from the Development of Social Capital of WJCC Graduates, Discount Rate of 7.5%

| | Per Individual | Class of 2008 | Class of 2009 | Class of 2010 | Class of 2011 | Class of 2012 |
|-----------------------|----------------|---------------|---------------|---------------|---------------|---------------|
| Total Savings | \$15,450 | \$11,062,220 | \$10,552,350 | \$10,654,050 | \$11,463,900 | \$11,911,950 |
| Savings from Crime | \$5,770 | \$4,131,320 | \$3,940,910 | \$3,975,530 | \$4,281,340 | \$4,448,670 |
| Medicaid Savings | \$8,920 | \$6,386,720 | \$6,092,360 | \$6,145,880 | \$6,618,640 | \$6,877,320 |
| Welfare Savings | \$660 | \$472,560 | \$450,780 | \$454,740 | \$489,720 | \$508,860 |
| Total State Savings | \$10,470 | | | | | \$8,072,370 |
| Total Federal Savings | \$4,980 | | | | | \$3,905,380 |

APPENDIX G: The Economic Impact of Williamsburg-James City County Public Schools Poster



The Economic Impact of Williamsburg-James City County Public Schools

Alison Courtney, Jennifer Murray, and Mike Osman
Research Assistant: Raymond Schein



Regional Spending

Much of the money that the school division spends remains in the Williamsburg-James City County area and stimulates further spending, giving a vital boost to the local economy.

| Impact | Spending | Employment |
|-----------------|--------------|------------|
| Direct Effect | \$48,124,937 | 1,287.75 |
| Indirect Effect | \$49,549,349 | 1,311 |
| Total Effect | \$97,674,286 | 2,598.75 |

Findings:
From the \$116,422,843.20 that is spent in the operational budget and OIP funds, there is an economic impact of \$79,641,746.09 to the local economy. An average dollar from the budget retained in the region results in \$1.82 of total spending.

In addition to supporting the 1267 local employees on the school division's payroll, school spending directly supports another 20 employees and indirect city support is another 273 jobs. Each million dollars in the budget thus supports around 18.4 local jobs.

Human Capital

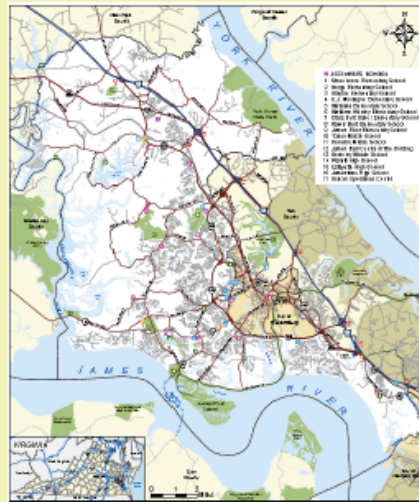
Schools are responsible for developing human capital, which is the skills and other knowledge that students acquire that yields valuable services to a firm over time. Research has found that having a high school diploma increases earnings and increases employment opportunities. Also, school quality impacts the probability of college attendance, which in turn positively influences wages. We calculated a "narrow estimate" which is additional lifetime income for WJCC graduates compared to dropouts. We also calculated a "broad estimate" which includes the returns from pursuing higher education based on each student's expected level of completion.

| Graduation Year | Class Size | Total Value of Investment | Graduation Year | Class Size | Value of Investment |
|-----------------|------------|---------------------------|-----------------|------------|---------------------|
| 2009 | 750 | \$171,214,411 | 2009 | 750 | \$171,214,411 |
| 2008 | 687 | \$157,055,081 | 2008 | 687 | \$157,055,081 |
| 2007 | 685 | \$156,939,433 | 2007 | 685 | \$156,939,433 |
| 2006 | 762 | \$168,049,422 | 2006 | 762 | \$168,049,422 |
| 2005 | 771 | \$180,412,089 | 2005 | 771 | \$180,412,089 |

Finding:
On average, each graduating class of the WJCC school district will realize an estimated total lifetime increment to their income ranging from \$178.4 million to \$486.8 million.

Project Goal

The goal of this project is to develop an estimate of the benefits that the public schools in Williamsburg and James City County provide to the local community.



General Facts

There are 15 schools within the school division.

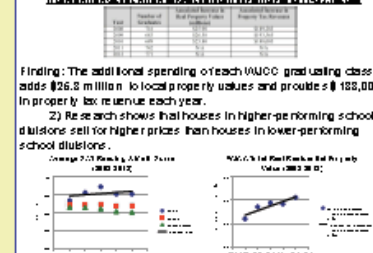
- 3 high schools
- 3 middle schools
- 9 elementary schools

Characteristics of WJCC schools in the 2012-2013 school year:

- 10,800 students
- 800 instructional staff
- 600 support staff
- 88.7% on-time graduation

Property Values

Schools can impact local property values in two important ways:
1) On average, high school graduates earn more and spend more money than dropouts.
2) Research shows that houses in higher-performing school districts sell for higher prices than houses in lower-performing school divisions.



Finding:
The recent improvement in WJCC's academic performance results in local residential property values that are \$28.4 million more per year than levels without the improvement in academic performance. The corresponding yearly gain in residential property tax revenues to Williamsburg-James City County is \$203,872.

Social Capital

Social capital refers to the wider economic impact of education on individuals and how they participate in society. Increased levels of education are associated with many positive factors, notably lower rates of crime and disability, healthier lives, reduced Medicaid enrollment and reduced utilization of welfare services. This is primarily explained through two channels:

- 1) Education may promote improved behaviors that influence lifestyles and quality of life.
- 2) Increases in income reduce reliance on government services.

| Per Capita Income | Class of 2008 | Class of 2009 | Class of 2010 | Class of 2011 | Class of 2012 | |
|--------------------|---------------|---------------|---------------|---------------|---------------|--------------|
| Average Per Capita | \$22,700 | \$23,150,000 | \$23,090,000 | \$23,374,700 | \$23,968,000 | \$24,900,000 |
| High School Grads | \$40,100 | \$24,150,000 | \$24,150,000 | \$24,416,900 | \$24,432,700 | \$27,200,000 |
| Dropouts | \$16,600 | \$2,200,000 | \$2,200,000 | \$2,200,000 | \$2,200,000 | \$2,200,000 |
| Total Income | \$16,600 | \$24,000,000 | \$24,000,000 | \$24,416,900 | \$24,432,700 | \$24,900,000 |
| Year Over Change | \$23,000 | \$46,300,000 | \$50,500,000 | \$18,744,800 | \$43,800,000 | \$44,475,000 |
| Year/Person Change | \$27,000 | \$18,100,000 | \$18,600,000 | \$18,600,000 | \$18,700,000 | \$18,800,000 |

Finding:
Each WJCC graduate saves society \$85,040 over his or her lifetime, of which Virginia takes \$67,836 and the federal government saves \$27,205.