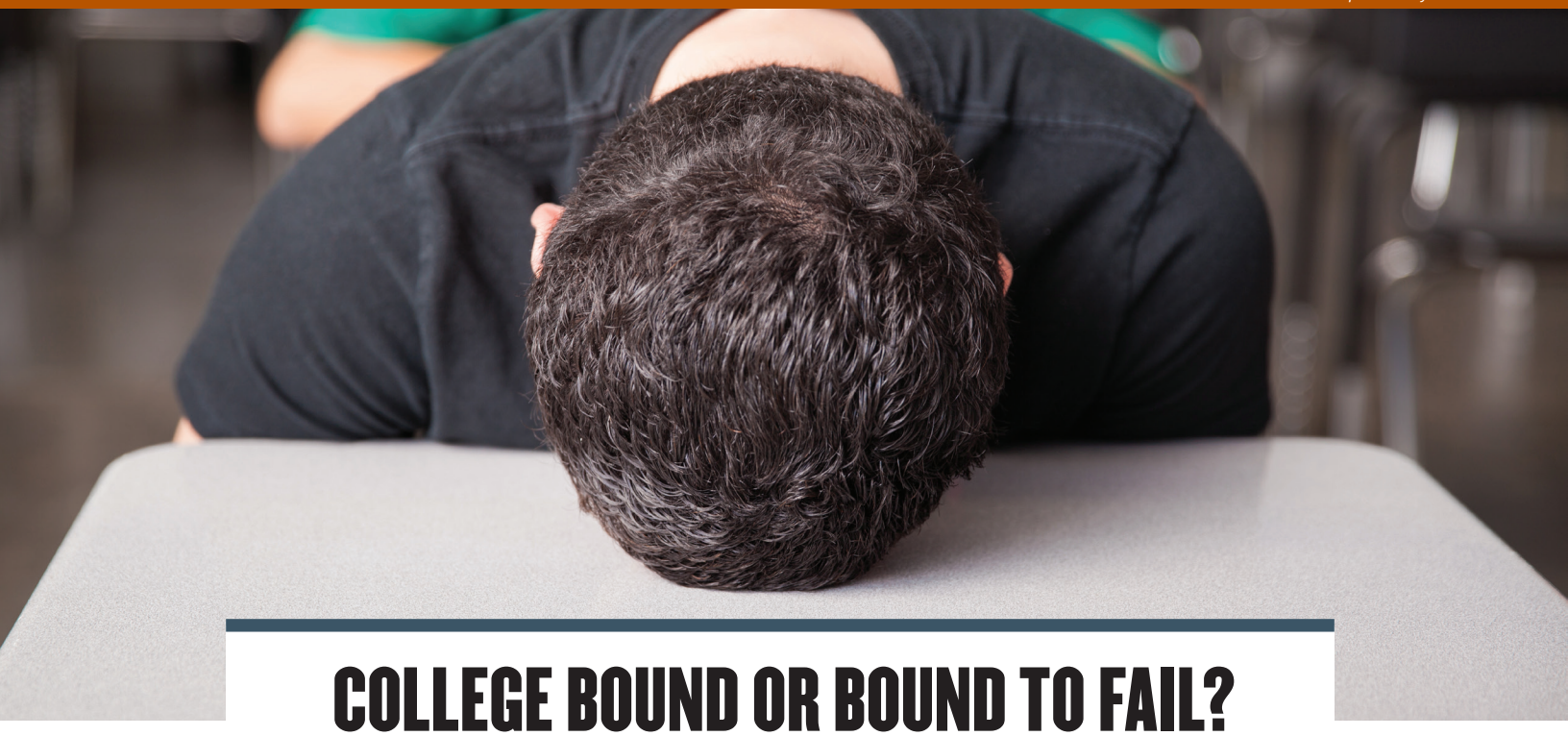

COLLEGE BOUND OR BOUND TO FAIL?

Determinants of Indiana's High School Graduation and College-Going Rates

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Abstract

Educational attainment is increasingly important to Indiana's workforce and economy. Both high school graduation rate and postsecondary credential attainment must increase in order to meet future workforce demands. This research analyzed the most commonly tested graduation rate independent variables and applied eight of them (academic expenditures, attendance rate, community college attainment, discipline rate, free and reduced lunch, special education, student-teacher ratio, and vocational education) to both Indiana's high school graduation rates and the college enrollment rates of these graduating seniors at the school corporation level. Data describing the graduating class of 2013 from 283 Indiana public school corporations were gathered from the Indiana Department of Education, Indiana Commission for Higher Education, Indiana Office of Management and Budget, and United States Census Bureau. Using a least squares regression in Microsoft Excel, it was found that the most significant variables for high school graduation were academic expenditures, community college attainment, discipline rate, free and reduced lunch, and vocational education. This is consistent with the current body of knowledge in the field, as much of the variation in high school graduation rates is attributed primarily to socioeconomic, not academic or funding, variables. The most significant variables for the college-going rate were community college attainment, free and reduced lunch, and vocational education. These findings indicate a need for further research on socioeconomic factors impacting specifically high school students' home environments, student engagement in the classroom and in extracurricular activities, data tracking students from primary school through the workforce, and data at the classroom and building levels.

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Keywords

student achievement, high school graduation, college attainment, public education, Indiana, college enrollment

INTRODUCTION

Higher levels of educational attainment increase career potential, community quality, and individual well-being. High school graduation is a requisite for nearly all jobs, and it is projected that 503,000 of the 930,000 job vacancies in the United States in 2018 will require a postsecondary credential (Bureau of Labor Statistics, 2011). Studies have shown that higher levels of education increase individuals' happiness, civic engagement, and overall well-being (Helliwell & Putnam, 2004).

Indiana's state government recognizes these benefits and invests its resources accordingly. The state consistently spends more of its budget on primary and secondary education than on any other single area (Office of Management and Budget, 2014). Indiana has one of the most generous systems of state financial aid in the nation, and the Indiana Commission for Higher Education has set a "big goal" of 60% of Indiana's population holding a quality postsecondary credential by 2025 (Sendelweck, 2012). However, Indiana faces significant challenges in reaching this goal. The high school graduation rate is stagnant at 89% (Department of Education, 2015). In 2013, only 35 percent of Hoosiers held a postsecondary credential (Lumina Foundation, 2016). Furthermore, only 66% of 2013 high school graduates entered college (Townsley, 2015). The college-going rate must be higher in the traditional college-going population in order to reach the "big goal" and meet shifting workforce needs.

While the state of Indiana invests heavily in programs aimed at increasing educational attainment, there is a decided lack of research on what actually determines high school graduations rates and college-going rates across the state. This study aims to fill that gap by focusing on two key questions: What factors determine high school graduation rates in Indiana? What factors determine college enrollment rates in Indiana?

METHODS AND MODELS

The range and number of academic, funding, and socioeconomic factors impacting student success adds a great deal of complexity to research in the areas of high school graduation and college-going rates. This study used two regression models to measure which variables are positively and negatively correlated with student success. Quality specific data has historically been difficult to attain; however, the relatively recent push for accountability

at the high school level has made this data much more accessible.

In this study, two two-tailed *t*-tests (one for each of the dependent variables) were used with significance levels of .95 and border values of 1.969 based on 272 degrees of freedom to find which variables correlated with high school graduation and college-going rates. The significance of variables with a *t*-statistic greater than 1.650 in absolute value was confirmed by *p*-values less than .05. The elasticities of each of the independent variables were found relative to each of the dependent variables to give a comparable measure of the variables' impact on high school graduation rate and college-going rate.

This study analyzed data from 283 school corporations in Indiana. These data focused on the graduating class of 2013, as these were the most recent complete data available. Moreover, in an attempt to avoid biases from major differences in instructional style, student recruitment, and funding, data from only traditional public schools were used. Charter schools, private schools, treatment centers for at-risk youth, and adult education centers were excluded. All data were gathered from federal and state government sources (see Table 1).

Source	Data Obtained
Indiana Commission for Higher Education	College-going rate
Indiana Department of Education	Attendance rate Discipline rate* High school graduation rate Free and reduced lunch Special education Student-teacher ratio* Vocational education
Indiana Office of Management and Budget	Academic expenditures*
United States Census Bureau	Community college attainment

*Raw data were manipulated to account for school size or to find ratio.

Table 1. Data obtained from federal and state agency publications.

Variable	Min.	Max.	Mean
Dependent			
High school graduation rate	65.50%	100.00%	90.24%
College-going rate	37.50%	96.57%	61.81%
Independent			
Academic expenditures	$272.19	$12378.88	$6069.80
Attendance rate	93.47%	97.95%	95.97%
Community college attainment	4.8%	73.9%	17.15%
Discipline rate	0.00%	5.03%	0.73%
Free and reduced lunch	5.39%	94.62%	45.78%
Special education	6.30%	24.76%	14.62%
Student-teacher ratio	9.35	20.69	15.08
Vocational education	0.3%	18.8%	6.3%

*There were 283 observations for each variable.

Table 2. Descriptive statistics for all variables.

The eight independent variables considered were chosen based on the data available, previous literature, and correlation between the variables. The same dependent variables were used for both the high school graduation rate model and the college-going rate model. Descriptive statistics are displayed in Table 2. The definitions for these variables can vary greatly between education studies and between states. Below are the definitions used in this study.

Dependent Variables

- *High school graduation rate:* The percentage of students in the senior class cohort, those who should be graduating, who actually graduated in 2013 with any type of Core 40 or general diploma. Those who graduated with special education certificates are not considered graduates by the Indiana Department of Education and therefore were not included in this rate.

- *College-going rate/college enrollment rate:* The percentage of students graduating in 2013 who enrolled in any type of college or university part- or full-time within one year of their high school graduation.

Independent Variables

- *Academic expenditures:* The average number of dollars of state funding per student at the school corporation level spent on salaries for those people who work directly with students (including teachers, aides, and administrators), textbooks, and instructional supplies. Expenditures were found in this study by adding the Student Academic Achievement and Student Instructional Support percentages from the Indiana Office of Management and Budget's *Dollars to the Classroom* and multiplying that by the average number of state dollars spent per pupil in each school district. They do not include overhead or operational costs such as payroll administration or facility maintenance.

- *Attendance rate:* The average number of days students were in attendance in the school corporation divided by the total number of days in the academic year.

- *Community college attainment:* The percentage of working age adults in the school district with a two-year or four-year college degree.

- *Discipline rate:* The percentage of students expelled in the high schools in each school corporation. Rates were found in this study by adding the number of students expelled in all of the high schools in each district and dividing by the sum of students in those same schools.

- *Free and reduced lunch:* The percentage of students in the school corporation receiving free and reduced lunch. This is a measure of poverty in the schools.

- *Special education:* The percentage of students in the school corporation categorized in special education by the Indiana Department of Education. The agency considers most students with disabilities that require special instruction or other academic accommodations to be special education students.

- *Student-teacher ratio:* The ratio found in this study by dividing the total number of students in each school corporation by the total number of teachers.

- *Vocational education:* The percentage found by dividing the total number of course hours taught through career and technical education by the total number of course hours taught in the high schools in each school corporation. This includes those hours taught at vocational education centers.

The eight independent variables can be divided into three categories: the socioeconomic variables are attendance rate, community college attainment, discipline rate, free and reduced lunch, and special education. These variables are determined primarily by the community and the population of students attending the school, not by the school itself. The school-controlled variables are student-teacher ratio and vocational education. The state spending variable, academic expenditures, is categorized on its own as it is primarily controlled by the state legislature.

RESULTS AND DISCUSSION

The regression revealed that high school graduation rates significantly correlated with five of the eight variables tested and that college-going rates significantly correlated with three of the variables. Consistent with existing literature, socioeconomic variables correlated with student success the most. One school-controlled variable, vocational education, was significant in both models, and the state funding variable was significant in the high school graduation rate model.

Socioeconomic Variables

Socioeconomic factors such as poverty rate have fairly consistently been found to be the primary determinants of high school student achievement (Haile & Nguyen, 2008; Mishel & Roy, 2007). This study confirmed that this finding is true for Indiana. Socioeconomic factors are still the largest predictors of school success. Three of the socioeconomic variables—community college attainment, discipline rate, and free and reduced lunch—were significant in the high school graduation model (see Table 3). Community college attainment and free and reduced lunch were also significant in the college-going model.

Socioeconomic Variables						
	High School Graduation Rate			College-Going Rate		
Variable	*t*-Statistic	Sign of Coefficient	Elasticity	*t*-Statistic	Sign of Coefficient	Elasticity
Attendance rate	0.96	P	0.582	0.48	P	0.521
Community college attainment	**2.32**	**P**	**0.018**	**6.58**	**P**	**0.090**
Discipline rate	**-2.34**	**N**	**-0.008**	-1.71	N	-0.010
Free and reduced lunch	**-3.31**	**N**	**-0.049**	**-6.51**	**N**	**-0.176**
Special education	-0.03	N	-0.004	1.25	P	0.040

*Results in boldface are considered significant for this study.

P = Positive

N = Negative

Table 3. Regression results and elasticities for the five socioeconomic variables tested.

As expected, community college attainment is positively correlated with both high school graduation and college-going rates. This variable has a *t*-statistic of 2.32 and an elasticity of 0.018 for high school graduation rate, and a *t*-statistic of 6.58 and an elasticity of 0.090 for college-going rate. Valuation of education is highly cultural. Those communities with higher levels of education attainment likely value education more highly and share these values with their children.

Discipline rate is significantly correlated with high school graduation rate. The *t*-statistic of -2.34 and elasticity of -0.008 indicate that the greater the number of students expelled from a school, the lower the graduation rate. This makes sense as students expelled would not graduate from that school and because high levels of violence, drug use, or alcohol use are not conducive to a positive learning environment. Discipline rate was not significant in the college-going rate model (*t*-statistic of -1.71), likely because expelled students are removed from the graduating group and therefore from the denominator used to determine college-going rate.

Of all eight variables tested, free and reduced lunch has the largest impact on both high school graduation rates and college-going rates. The *t*-statistics of -2.34 for high school graduation rate and -6.51 for college-going rate indicate that this variable is strongly significant in both models. It has the largest elasticities of any of the variables, -0.049 for graduation rate and -0.176 for college-going rate. The impact of free and reduced lunch is negative, meaning that the higher the percentage of students qualifying for the program (and the higher the level of poverty in the school district), the lower the high school graduation and college-going rates. This result likely has both cultural and practical determinants. School districts with higher levels of free and reduced lunch have lower levels of community college attainment (the variables are correlated at a level of -0.40) and likely value college education less strongly. Poverty can be a barrier to student performance as many students need to work during high school and have the additional stress of high poverty. Furthermore, even with a strong system of financial aid, first-generation and low-income students are much less likely than their higher income peers to enter college (Townsley, 2015).

Special education is not significant in either model. Many special education students graduate from high school, and those who do not typically receive special education certificates. The inclusion of those graduating with waivers and exclusion of special education certificates in the graduation rate numerator (and therefore the college-going rate denominator) could explain the lack of significance of this variable.

The discouraging truth in these results is that schools in lower socioeconomic areas are less likely to have a higher graduation or college-going rate than peer schools in higher socioeconomic areas. The socioeconomic climate of a school is difficult to overcome when trying to improve student achievement.

School-Controlled Variables

Factors controlled by the schools are largely insignificant in determining overall student success. Student-teacher ratio is not significant in either model (see Table 4). Vocational education is significant in both models, but with mixed effects.

School-Controlled Variables						
	High School Graduation Rate			College-Going Rate		
Variable	*t*-Statistic	Sign of Coefficient	Elasticity	*t*-Statistic	Sign of Coefficient	Elasticity
Student-teacher ratio	1.55	P	0.034	0.46	P	0.018
Vocational education	**2.86**	**P**	**0.024**	**-4.04**	**N**	**-0.061**

*Results in boldface are considered significant for this study.

P = Positive

N = Negative

Table 4. Regression results and elasticities for the two school-controlled variables tested.

Student-teacher ratio has a *t*-statistic of 1.55 for high school graduation rate and 0.46 for college-going rate. These are below the critical value of 1.65, indicating that student-teacher ratio is not significantly correlated with either high school graduation rates or college-going rates in Indiana. The Indiana administrative code caps the student-teacher ratio at 30 to 1 (515 IAC 6.1-4-1). The relative lack of variation in this variable likely limits its significance in these models.

Vocational education is significantly correlated with both high school graduation and college-going rates. Its *t*-statistic is 2.86 and its elasticity is 0.024 for high school graduation rate, indicating a positive correlation. For college-going rate, the *t*-statistic is -4.04 and the elasticity is -0.061, indicating a negative correlation. The vocational education variable measures the amount of instruction delivered through career and technical education. This includes courses in health sciences, agriculture, and business as well as courses such as welding and building trades (Department of Education, 2014). The focus on career outcomes may explain the positive correlation with graduation rate as it gives students a goal. The career focus may also explain the negative correlation with college-going rate. Many students enrolled in career and technical education can, and do, enter directly into the workforce (Department of Education, 2014). The causation may go the other way as well. The school with the highest college-going rate in the state, West Lafayette High School, also has the lowest amount of vocational education. This could be because of an assumption that the vast majority of their students will attend college.

Funding Variable

This model found no significant positive correlation between academic expenditures and student achievement. In fact, the *t*-statistic and elasticity for academic expenditures are negative (-2.02 and -0.038, respectively) in the high school graduation model, indicating a negative correlation between state spending and high school graduation rate (see Table 5). Indiana's public school funding formula rewards "complexity dollars" to those schools with the highest socioeconomic challenges. The correlation between academic expenditures and free and reduced lunch is 0.40, likely explaining the negative correlation between academic expenditures and high school graduation rate. A *t*-statistic of -1.04 indicates that academic expenditures are insignificant in the college-going rate model. While the state does spend a large portion of its budget on primary and secondary education, at current levels the spending is not enough to overcome socioeconomic and other factors.

School-Controlled Variables						
	High School Graduation Rate			College-Going Rate		
Variable	*t*-Statistic	Sign of Coefficient	Elasticity	*t*-Statistic	Sign of Coefficient	Elasticity
Academic expenditures	**-2.02**	**N**	**-0.038**	-1.04	N	-0.035

*Results in boldface are considered significant for this study.

P = Positive

N = Negative

Table 5. Regression results and elasticities for the state spending variable tested.

CONCLUSION

Student achievement and education will continue to be subjects of research, discussion, and controversy. This study found that socioeconomic variables are the most likely determinants of high school graduation and college-going rates in Indiana high schools and found one possible policy solution. While the continued importance of socioeconomic variables is discouraging, increasing vocational education in those schools with lower high school graduation levels may help increase the percentage of students graduating.

Further research should continue to analyze those factors that may determine academic achievement in Indiana high schools. As the data collection capabilities of the National Student Clearinghouse continue to improve, this research could follow students from high school graduation and college enrollment through college success and job placement, greatly enriching the research. Future research could focus on individual buildings and classrooms and on specific programming such as tutoring or athletics as the data becomes more readily available.

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