Abstract Title Page

Title:
College enrollment patterns for rural Indiana high school graduates

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Abstract Body
Limit 4 pages single-spaced.

Background / Context:
Description of prior research and its intellectual context.

Postsecondary education is a fundamental tool for achieving upward mobility and economic growth. Students with an associate's or bachelor's degree earn substantially more in a lifetime and experience better working conditions and job benefits than students with only a high school diploma. Researchers have estimated that by 2018, 63 percent of job openings will require some postsecondary education and that the country will have 3 million fewer college graduates than the job market will demand (Carnevale, Smith, & Strohl, 2010). Faced with this projected demand for college-educated workers, most states in the Regional Educational Laboratory (REL) Midwest Region have committed to increasing the number of students who acquire college credentials (Lumina Foundation, 2013).

Achieving this goal requires understanding students' college enrollment patterns and the factors that influence different types of students. Indiana has taken multiple steps to improve the college readiness of students across the state by introducing initiatives aimed at raising students' expectations and high school achievement (Indiana Code 20–30–10–1, 2005; Indiana Code 20-30-10-4, 2006), by aligning high school standards with college and workplace expectations (Plucker, Wongsarnpigoon, & Houser, 2006), and by adopting new graduation requirements (Indiana Department of Education, 2011). Although these changes allow for greater access to a more rigorous high school curriculum, rural and non-rural students may use these resources in different ways.1 For instance, rural schools may not be able to offer the same advanced math, world language, Advanced Placement, International Baccalaureate, or dual-credit options as nonrural schools, and rural students may not take advantage of honors diploma offerings at the same rate as nonrural students.

Research on college choices and postsecondary educational attainment for students from rural areas is limited. Nationally, college enrollment rates are lower for students from rural areas (27 percent) than for students from cities (37 percent), suburbs (37 percent), and towns (32 percent). Smaller percentages of rural adults than urban adults earn a bachelor's degree (13 percent versus 17 percent) or a graduate or professional degree (7 percent versus 10 percent; Provasnik et al., 2007). Despite these discrepancies, research examining college enrollment or attainment often does not account for students' geographic context, nor has previous research used geographic information system data in the analyses (Byun, Meece, & Irvin, 2012; Turley, 2009). In addition, studies that do examine rural–nonrural disparities in college enrollment and attainment often use national datasets, making it difficult to apply findings to a specific state (for example, Byun et al., 2012; Hu, 2003). In fact, some research has suggested that studies of rural–nonrural differences should be conducted at a regional level by identifying clusters of rural districts sharing similar economic, historic, and demographic characteristics (Johnson & Strange, 2009).

Purpose / Objective / Research Question / Focus of Study:
Description of the focus of the research.

This study examines differences in public college enrollment rates as well as the usefulness of previously identified early college success predictors in predicting presumptive college eligibility for 2010 graduates of Indiana public rural and nonrural high schools. The report also presents methodologies that could be useful for examining rural– nonrural college enrollment patterns outside Indiana.

The study explored five research questions on 2010 graduates of Indiana public rural and nonrural high schools who enrolled in Indiana public colleges:

1. What proportion of graduates of rural and nonrural high schools enrolled in college, enrolled in different types of colleges (two- or four-year colleges of varying selectivity), and enrolled full-time?

2. Did graduates of rural and nonrural high schools differ in their academic preparation or eligibility for the school lunch program (a proxy for low-income status)?

3. Where are two- and four-year colleges located, and how does distance from high schools to colleges vary for graduates of rural and nonrural high schools who enrolled in Indiana public colleges?

4. What proportion of rural and nonrural high school graduates who enrolled in college had academic characteristics that made them "presumptively eligible" (see box 1) for two- or four-year public colleges of varying selectivity? What proportion who enrolled in a college undermatched with their level of presumptive eligibility?

5. After student- and school-level characteristics were controlled for among high school graduates who enrolled in a public college, did any rural–nonrural differences remain with respect to enrolling in a two

Setting:
Description of the research location.

This study used student data on 2010 Indiana public high school graduates who enrolled in Indiana public colleges in the fall after high school graduation to compare enrollment patterns of students from rural and nonrural high schools. The data were obtained from the Indiana state longitudinal data system and the Indiana Commission for Higher Education.

Population / Participants / Subjects:
Description of the participants in the study: who, how many, key features, or characteristics.

Study used administrative data from the Indiana state longitudinal data system and the Indian Commission for Higher Education, as described in previous section, "setting."

Intervention / Program / Practice:
Description of the intervention, program, or practice, including details of administration and

duration.

Not applicable.

Research Design:
Description of the research design.

This study uses three analytic samples to address the research questions. Research questions 1 and 2, which seek general information on differences among 2010 graduates of Indiana public high schools in rural and nonrural locales, use the high school graduates sample of 64,534 students. These students are primarily White (81 percent), with smaller percentages of Black (10 percent), Hispanic (5 percent), and Asian (1 percent) students. Slightly more than half (51 percent) the students are female, and almost a third (29 percent) are eligible for the school lunch program. Because a high school's geographic locale was a key variable in the study, graduates from high schools for which latitude and longitude data were missing were excluded from all analytic samples.

The remaining questions focus on the subgroup of students who enrolled in Indiana public colleges in fall 2010, which represents the majority (78 percent) of Indiana public high school graduates (U.S. Department of Education, 2012). The analytic sample of graduates enrolling in Indiana public colleges (30,624 students) was used to examine research question 3 on travel distance to college and question 5 on any rural–nonrural differences in enrollment in two-versus four-year colleges remaining after student and school characteristics were controlled for. The analytic sample for research question 4 on presumptive eligibility and question 5 on any remaining undermatching with students' college of enrollment after student and school characteristics were controlled for was limited to the subsample of graduates with valid grade point averages (GPAs; 24,810 students). This further limitation was required because GPA is used to determine a student's presumptive eligibility.

Data Collection and Analysis:
Description of the methods for collecting and analyzing data.

To answer research question 1, the percentage of Indiana high school graduates not attending any college and the percentages attending two- and four-year colleges in the fall after 2010 high school graduation were computed and compared for rural and nonrural high school students.
For research question 2, academic characteristics and the percentage of students eligible for the school lunch program were computed and presented in a table comparing graduates of rural and nonrural high schools. In addition, several maps displaying average academic characteristics in rural and nonrural schools were created to facilitate comparison.

For research question 3, geographic information system software (ArcMap 10.2; Esri, 2013) was used to create maps depicting the locations of colleges in Indiana, student enrollment in various types of colleges, and geographic proximity of postsecondary institutions to high schools. Geographic proximity analyses differed at the student and school levels. At the student level average distance traveled was calculated from high schools of graduation to colleges of enrollment. At the school level straight line distances were calculated between high schools and

the nearest two- and four-year colleges of varying selectivity (see appendix B for a detailed description of how distances were calculated).

For research question 4, a qualifications rubric based on GPA and ACT/SAT scores was created to determine the category of selectivity for which a student was presumptively eligible (see appendix B for a detailed description of the construction of the qualifications rubric and presumptive eligibility analysis). The selectivity ratings of the colleges of enrollment were compared with the presumptive eligibility ratings to show rural–nonrural differences for students enrolling in a college less selective than their presumptive eligibility suggested.

Finally, for research question 5, two regression models were estimated to show whether— after this study's control for student and school characteristics—rural or nonrural high school locale predicts enrollment in a two-year versus a four-year college and enrollment in a college less selective than the level for which a student is presumptively eligible

Findings / Results:
Description of the main findings with specific details.

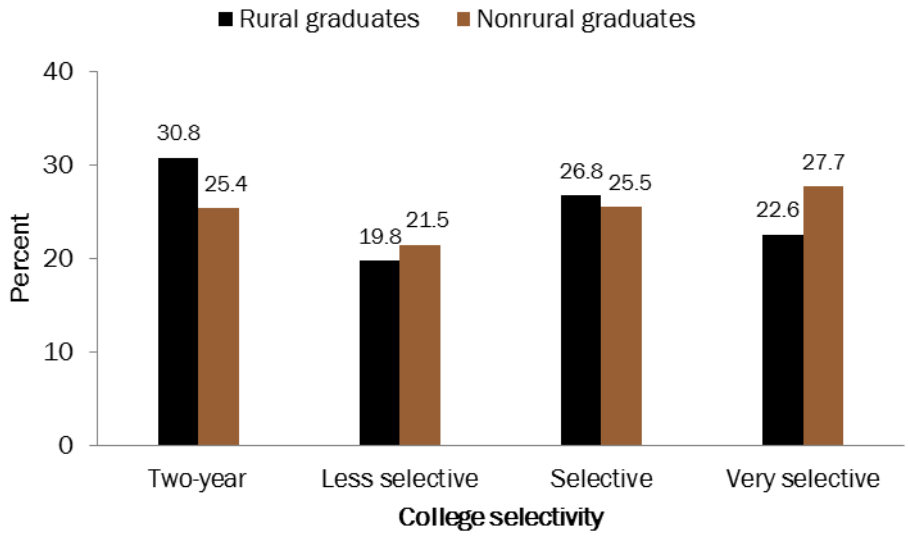
A similar proportion of graduates of rural and nonrural Indiana public high schools enrolled in college. However, rural graduates were more likely than nonrural graduates to enroll in a two-year college and less likely to enroll in a very selective four-year college (see Figure 1). Rural high school graduates had slightly lower eligibility for the school lunch program (a proxy for low-income status). Rural and nonrural graduates had similar academic preparation and similar levels of presumptive eligibility for colleges according to their academic qualifications (see Table 1). Yet, after controlling for student and school characteristics, the study found that rural high school graduates were more likely to enroll in two-year colleges and colleges undermatched with their level of presumptive eligibility (see Tables 3 and 4). Distance may have been a factor: the farther rural graduates' high schools were from colleges, the more likely graduates were to enroll in a two-year college or to undermatch with a college (see Figure 2).

Conclusions:
Description of conclusions, recommendations, and limitations based on findings.

REL Midwest staff discussed the results of this study with Indiana Department of Education leadership. To help bring these results to varying levels of the system, REL Midwest developed an infographic to accompany the report. This infographic is a useful tool for state agencies to share with local and regional agencies and for school personnel to discuss. The report has been referenced by blogs such as Politico, EdWeek and Virtual School Meanderings which helps disseminate the findings to state education agency personnel beyond Indiana and the Midwest.

Appendices
Not included in page count.

Figure 1. Graduates of rural high schools in Indiana in 2010 enrolled in two-year colleges at a higher rate and enrolled in very selective colleges at a lower rate than did graduates of nonrural high schools



Notes: Two-year colleges include Vincennes University, which is a four-year college with an open-admissions policy that grants primarily associate's degrees. Less selective, selective, and very selective colleges include four-year colleges only.

Source: Author's calculations based on data from the Indiana state longitudinal data system and Barron's Educational Series (2010).

Table 1. Number and percentage of 2010 graduates of Indiana rural and nonrural high schools, by student academic and socioeconomic subgroup

Student academic subgroup	Rural high school graduates		Nonrural high school graduates	
	Number	Percent	Number	Percent
Total	20,817	100.0	43,717	100.0
Grade 10 ISTEP+ math/English language arts composite				
Lower third of ISTEP+ composite	6,032	30.2	14,155	34.4
Middle third of ISTEP+ composite	7,120	35.7	13,060	31.7
Upper third of ISTEP+ composite	6,803	34.1	13,998	34.0
SAT score				
Lower third of SAT scores	3,724	32.4	7,922	33.4
Middle third of SAT scores	3,957	34.4	7,329	30.9
Upper third of SAT scores	3,819	33.2	8,488	35.8
ACT score				
Lower third of ACT scores	1,467	36.6	4,359	40.6
Middle third of ACT scores	1,022	25.5	2,327	21.7
Upper third of ACT scores	1,524	38.0	4,056	37.8
ACT or SAT score				
Has a score	12,433	59.7	26,737	61.2
Does not have a score	8,384	40.3	16,980	38.8
Advanced Placement exam				
Took and passed at least one exam	2,055	9.9	5,520	12.7
Took at least one exam but did not pass any	3,596	17.3	6,733	15.5
Did not take any exams	15,120	72.8	31,333	71.9
Eligibility for school lunch program				
Eligible	4,871	23.5	13,578	31.2
Not eligible	15,900	76.6	30,008	68.9

ISTEP+ is the Indiana Statewide Testing for Educational Progress—Plus.

Note: Lower, middle, and upper thirds of ISTEP+, SAT, and ACT scores are based on scores of students in the high school graduates analytic sample.

Source: Author's calculations based on data from the Indiana state longitudinal data system.

Table 3. Enrollment versus selectivity of colleges for which 2010 graduates of Indiana rural high schools were presumptively eligible

Actual enrollment	Presumptive eligibility			
Very selective college	57.7 (1,113)	24.9 (691)	3.0 (57)	8.8 (129)
Selective college	26.0 (502)	39.2 (1,086)	31.0 (591)	16.3 (239)
Less selective college	13.8 (267)	26.9 (746)	39.5 (754)	19.7 (288)
Two-year college	2.4 (47)	9.0 (250)	26.5 (505)	55.2 (809)
Total	100 (1,929)	100 (2,773)	100 (1,907)	100 (1,465)

Note: Percentages are based on 8,074 rural graduates with valid grade point average scores who enrolled in Indiana public colleges. Cells shaded in gray indicate graduates whose presumptive eligibility ranking was higher than the college in which they actually enrolled, and cells shaded in brown indicate graduates whose actual enrollment matched with or was higher than their presumptive eligibility ranking.

Note: Taken together, tables 3 and 4 show that rural high school graduates are more likely to enroll in colleges undermatched to their academic qualifications than nonrural high school graduates.

Source: Author's calculations based on data from the Indiana state longitudinal data system and Barron's Educational Series (2010).

Table 4. Enrollment versus selectivity of college for which 2010 graduates of Indiana nonrural high schools were presumptively eligible

Actual enrollmen	Presumptive eligibility			
	Very selective college Percent (number)	**Selective college Percent (number)**	**Less selective college Percent (number)**	**Two-year college Percent (number)**
Very selective college	66.9 (2,893)	29.1 (1,551)	4.5 (192)	10.3 (287)
Selective college	20.6 (891)	37.3 (1,987)	29.8 (1,278)	14.9 (416)

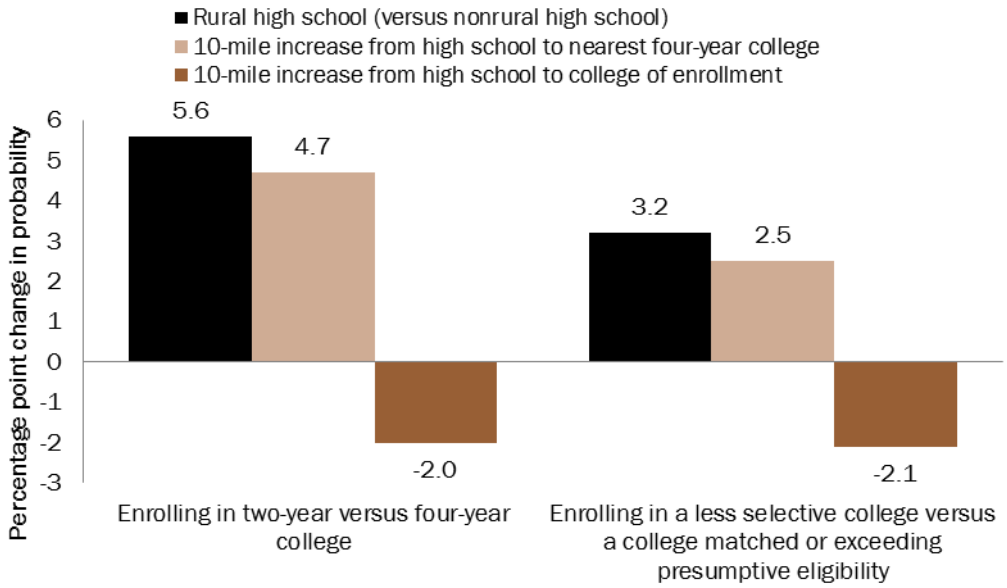
	Less selective college	11.5 (499)	27.1 (1,446)	45.7 (1,964)	25.8 (720)
	Two-year college	1.0 (41)	6.4 (343)	20.1 (862)	49.0 (1,366)
	Total	100 (4,324)	100 (5,327)	100 (4,296)	100 (2,789)

Note: Percentages are based on 16,736 nonrural graduates with valid GPA scores who enrolled in Indiana public colleges. Cells shaded in gray indicate graduates whose presumptive eligibility ranking was higher than the college in which they actually enrolled, and cells shaded in tan indicate graduates whose actual enrollment matched with or was higher than their presumptive eligibility ranking.

Note: Taken together, tables 3 and 4 show that rural high school graduates are more likely to enroll in colleges undermatched to their academic qualifications than nonrural high school graduates.

Source: Author's calculations based on data from the Indiana state longitudinal data system and Barron's Educational Series (2010).

Figure 2. Graduating from an Indiana rural high school in 2010 and distance to the nearest college significantly predicted the likelihood of enrolling in a two-year rather than a four-year college and the likelihood of undermatching



Note: Predicted probabilities of enrolling in a two-year versus a four-year college and undermatching are based on the "typical" high school graduate, or a graduate from a high school with average academic and sociodemographic characteristics.

Source: Author's calculations based on regression models using data from the Indiana state longitudinal data system, distance analyses (Esri, 2013), and U.S. Department of Education (2010).

Appendix A. References

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Appendix B. Tables and Figures
Not included in page count.