IMPACT OF A LOW-COST POSTSECONDARY ENROLLMENT INTERVENTION: EVIDENCE FROM LOUISIANA

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Abstract

It is well understood that postsecondary education increases lifetime earnings, yet the complexity of the college application process creates a barrier to postsecondary enrollment. This paper investigates a whole-school external application assistance program run by a nonprofit student support services organization, Career Compass of Louisiana. We use panel data of Louisiana high schools in a difference-in-differences framework and find that exposure to Career Compass increases postsecondary enrollment by 3.9 percentage points. Moreover, the effect of exposure is larger in school districts with a majority of black students as well as districts with a majority of low-income students. By providing services to all schools within a district, the program is able to achieve low costs relative to similar programs and effects that are in line with many more expensive programs, suggesting that scaling this model to new areas could provide a cost-effective approach to increasing postsecondary enrollment among high school graduates.

1. INTRODUCTION

Education is widely recognized as a central mechanism for improving career opportunities and lifetime earnings. In particular, postsecondary education provides access to higher paying jobs, and college graduates benefit from lower unemployment rates. However, students face a complex set of hurdles, including course and test requirements for admission, the college application process itself, and identifying financial resources to pay tuition and related expenses (Page and Scott-Clayton 2016). Although high schools provide some support, school counselors must balance student support toward college-readiness and the college application process with many other student needs (Parsad et al. 2003).

Previous research has documented the complexity of the college application process and found that students may lack critical information to successfully navigate the process (Avery and Kane 2004; Hoxby and Turner 2015; Goodman 2016). Consequently, students lacking adequate postsecondary guidance and application support face barriers to entry to higher education. According to a survey conducted by the Consortium on Chicago School Research, among students who said they planned to attend a four-year college in the fall after high school graduation, approximately 20 percent did not apply to a single four-year institution (Roderick et al. 2008).

This study focuses on the effectiveness of a college coaching program that combines in-person student coaching with a low-cost operating model. The program, Career Compass of Louisiana, provides comprehensive assistance related to college applications—from ensuring that students take the ACT and submit scores to relevant schools, to application fee waivers and assistance with scholarship applications. The program expanded incrementally over a period of more than ten years with support from grants and charitable foundations. Moreover, the program's expansion has occurred at the school district level with services provided to all students. This enables us to examine how program effects vary across a wider range of student characteristics than have been treated by similar programs elsewhere.

We gather data on Louisiana high schools over time, including the percentage of students who enroll in a postsecondary program the year after graduation. These school-level data also include school characteristics by year, as well as data on income and unemployment, which are available by parish and effectively serve as district-level controls. Finally, we collect data on the expansion of Career Compass, which grew to serve new areas over time with district-level expansions in which all high schools within a school district would receive services after the program moved into the area. Using this panel dataset, we investigate the impact of Career Compass in a difference-in-differences framework. We are able to control for school characteristics and investigate how the program's effect varies across different types of schools.

We find positive and significant impacts of exposure to Career Compass with graduates at high schools exposed to Career Compass more likely to enroll in postsecondary programs. College enrollment, measured by the fraction of high school graduates who enroll in some type of college the year after graduation, increases by 4–6 percentage points in schools with the program. The effect is more pronounced in schools with majority enrollment composed of black students, and in schools with a majority of low-income students. Our analysis suggests that the effect is approximately 3 percentage points higher for majority black-enrolled schools than the average across all schools.

Similarly, the effect is 1–2 percentage points higher for majority low-income-enrolled schools than for all schools.

The paper proceeds as follows: Section 2 discusses prior research on programs designed to assist students with the college application process and provides background information on Career Compass of Louisiana. Section 3 describes sources of data and the empirical approach for evaluating the effectiveness of the program. Section 4 summarizes results of the evaluation. Section 5 discusses different robustness checks on the estimates. Finally, section 6 discusses the findings and concludes.

2. BACKGROUND

A large body of research has documented the benefits of additional education, which has led to a longstanding emphasis on encouraging students to pursue postsecondary education. The percent of adults aged 25 years and older completing at least four years of college has grown from less than 5 percent in 1940 to 33.4 percent in 2016 (Snyder, de Brey, and Dillow 2017). However, the percentage of high school seniors enrolling in a two- or four-year college immediately after high school has been relatively flat in recent years, hovering just below 70 percent from 2005 to 2015; lower income and black or Hispanic students continue to see enrollment rates lower than high-income and white students (Snyder, de Brey, and Dillow 2017). In an effort to continue expanding access to postsecondary education, especially for disadvantaged students, a number of interventions to improve college access have been developed and implemented.

Most often, such student support programs have targeted those perceived to be in the greatest need. One of the most robust programs implemented to date provides tutoring, mentoring, and financial support to students living in a large public housing project in Canada—with average costs of $13,400 per student—while producing significant increases in high school graduation rates and increasing the postsecondary enrollment rate by 19 percent (Oreopoulos, Brown, and Lavecchia 2017).[1] However, not all service-intensive programs have been as successful. For example, Upward Bound's longstanding program of tutoring and intensive instruction during the summer has shown no evidence of increases in college enrollment despite the program's high average cost of $4,725 per student (Seftor, Mamun, and Schirm 2009).

An alternative and lower-cost approach for encouraging students to pursue postsecondary education is to focus intensively on the transition from high school to college. These programs often use a combination of informational services and mentoring or coaching to help students identify and complete college requirements and navigate the processes to apply for admission and financial aid. Table 1 summarizes a number of recent studies that have evaluated the effectiveness of these types of programs. Programs with greater amounts of in-person interaction generally raise program costs but also tend to exhibit larger increases in enrollment. Another group of programs has focused on testing different service modalities to try to identify low-cost options to accomplish program goals, although results demonstrating their benefits in terms of increasing enrollment are limited (Hoxby and Turner 2013; Avery 2014; Castleman and Page 2015). Over time, additional programs have been established with more nuanced goals, such

1. Program costs are average costs per student for all years of service and are provided by the study authors in 2010 Canadian dollars.

Table 1. Previous Research on Programs to Increase Postsecondary Enrollment

Study	Program	Population	Key Features	Cost per Student	Change in Enrollment
Constantine et al. (2006)	Talent Search	Low-income students or students whose parents did not attend college in Florida, Indiana, and Texas	In-person advising on study skills, course selection, college orientation, and help with financial aid and applications	$313	6—18%
Bos et al. (2012)	SOURCE	Economically disadvantaged high school students in Los Angeles, California	In-person near-peer advising	$1000	3.4%
Oreopoulos and Ford (2016)	LifeAfterHighSchool	School-wide treatment at high schools with a low postsecondary transition rate in Ontario	In-person group workshops	$194	5.2%
Carrell and Sacerdote (2017)	Field Experiment	Students in New Hampshire on the margin of applying to college	In-person near-peer mentoring by college students	$300	6%
Avery (2014)	The Amherst Telementoring Program	High-achieving, low-income students	Use of telementoring for advising students	$100[a]	3.5%
Castleman and Page (2015)	Field Experiment	College-intending high school seniors (started or completed FAFSA)	Use of automated text messaging to provide information and offer support	$7	−1.6% to 7.1%
Bettinger et al. (2012)	H&R Block FAFSA Experiment	Low-income students	Assistance completing FAFSA	$88	8.1%
Cunha, Miller, and Weisburst (2018)	Go Center Program	Schoolwide treatment at high schools with low past college enrollment rates in Texas	Full-time school-based counselor and peer-group to influence college-going culture	$400	3.4%

Note: Table 1 provides a summary of key elements from previous studies examining programs with a focus similar to Career Compass. FAFSA = Free Application for Federal Student Aid.

[a] Represents only the cost of incentives paid to participating students. The full cost of operating the program was not reported.

as targeting more selective schools or schools whose graduates typically accumulate less debt (Avery 2010; Castleman and Goodman 2018).

Another common finding across many of these studies is that a program's effectiveness depends in part on the types of students served, with higher-ability and more disadvantaged students tending to benefit more from intervention. Most college-going interventions have targeted these types of students aiming to make the most efficient use of program resources. However, school-wide programs could potentially offer some benefits, such as creating more positive attitudes toward college or avoiding potential stigmatizing effects (Oreopolous and Ford 2016; Cunha, Miller, and Weisburst 2018). Despite a large and growing number of studies on college-going interventions, the targeted focus of most of these programs limits our understanding of the effectiveness of similar programs for students just outside the boundaries of program targets, or for students in general.

Career Compass

This paper focuses on the twelfth-grade college and career-coaching program administered by Career Compass of Louisiana, a college access program with a specific focus on removing obstacles and guiding public school students in exploring the full range of postsecondary opportunities—technical, community, and four-year colleges and universities—attempting to find the right match for each student rather than

encouraging students to attend a specific type of institution. Career Compass provides one-on-one assistance via coaches during school hours to help students navigate the postsecondary application process, which includes goal-setting through a College Success Plan, career aptitude assessments, career and technical education options, high school course selection, selection of programs of study, financial aid awareness (including Free Application for Federal Student Aid [FAFSA]), and even financial assistance with college application and exam registration fees for low-income students.[2] By working with all students in a school, Career Compass seeks to help foster a culture of college readiness and avoids singling out students who are high-performing or who may be in greater need of assistance. Moreover, by serving all schools in a district, coaches are able to support multiple schools in an area, making more efficient use of coach time and bringing down per-student costs relative to a one-school-one-coach program.

The Career Compass coaches are trained to be knowledgeable about application requirements of postsecondary institutions near each school, as well as common choices for students in Louisiana and awareness of how to identify requirements for other institutions of interest to a student. The coaching program begins with one-on-one meetings between the coach and student to identify goals and develop a College Success Plan. All high school seniors are required to attend meetings and participating schools provide time during school hours for these meetings. After that point, students are expected to complete steps identified by the coach, with scheduled follow-up meetings to report back on progress and provide accountability to ensure they are making progress toward successfully completing all required application steps. Students who are more prepared or have additional support from parents may require only one follow-up meeting, while students needing additional support may meet repeatedly with the Career Compass coach to help them create and execute a realistic plan based on their interests and qualifications. Not all students will complete the checklist, but among those who do, 98 percent apply to at least one college. While postsecondary enrollment is the focus of this study, Career Compass matched a sample of students to the National Clearing House and estimated that 75 percent of students they serve not only enroll but remain in their programs through the first year.

All students at participating schools are considered treated by the program in years when the program is active because they are exposed to information and encouraged to complete necessary steps even if they choose not to do so. By working with all students at each school and training coaches to focus meetings on each student's particular needs, Career Compass is able to achieve lower costs—per-student annual costs average $110 to $150, depending on year and site. Relative to programs that assign a full-time coach to each school, Career Compass also benefits by having each coach visit multiple schools within a district to meet with students.

Career Compass was founded in 2006 in a single district and has grown gradually over time, serving public high schools in twenty-five of Louisiana's sixty-four traditional school districts by the end of the study period in 2013. There is not a formal selection

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2. Financial assistance includes information about Louisiana-specific financial support for postsecondary education, including TOPS, a scholarship program for residents attending college in state, and Go Grants, which provide need-based financial support. These programs are available to treated and untreated students but their availability may increase student responses to program assistance, increasing the estimated impact of the program relative to other areas.
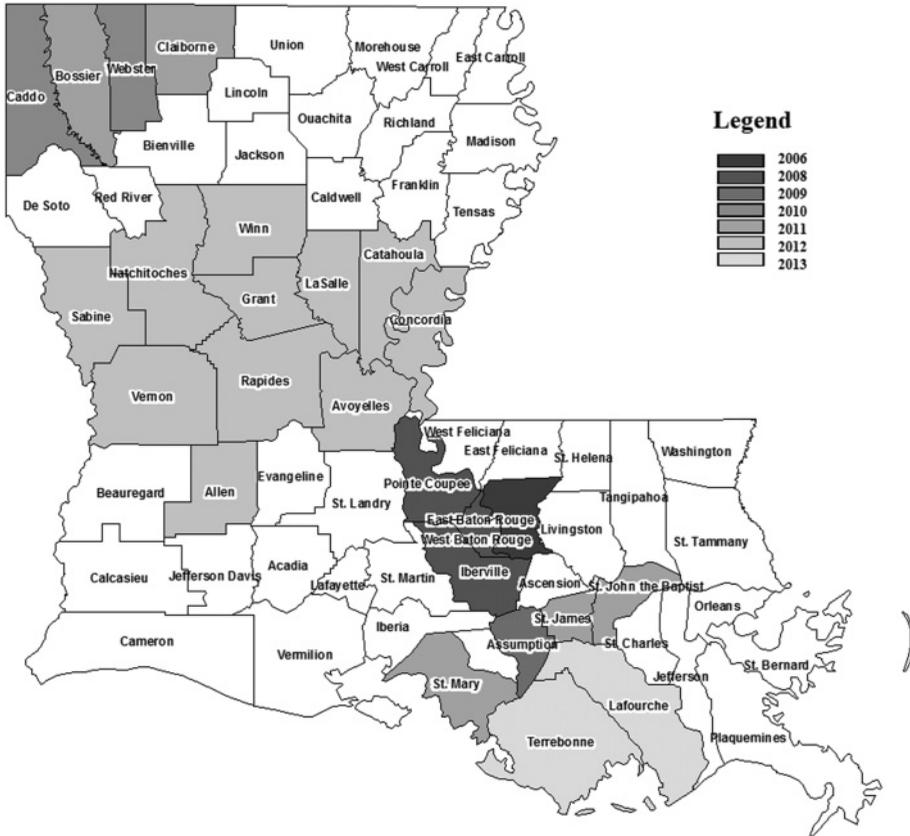
Notes: The expansion path of Career Compass is represented by darkness of shading, which corresponds to the start year in each treated parish. Control districts are shown as white.
Sources: Career Compass of Louisiana and Louisiana Department of Education.

Figure 1. Career Compass Locations Shaded by Start Year

process for Career Compass to offer the services within a district. Rather, Career Compass has aimed to expand services to all districts where funding could be secured. The program's expansion has been driven by a combination of resources from the school district in some areas and financial support from private and community foundations in other areas. Districts served are illustrated in figure 1, with treated schools representing close to 40 percent of the sixty-four traditional school districts in the state in the final year of analysis.[3] Early-adopting school districts were geographically close to the initial district and were supported by contracts with districts that had heard of the program's early successes based on observed increases over time in applications and enrollment within schools where the program had been implemented. The program's largest expansions to new areas were funded by local foundations, including the Orchard Foundation in central Louisiana and the Community Foundation of North Louisiana. This combination of funding sources used by Career Compass has helped the program serve

3. Most school districts in Louisiana align with parish boundaries. A small number of city and special districts are excluded from our analysis.

a variety of school districts including a mix of high- and low-income sites as well as districts with above and below average school performance relative to the state as a whole. Although Career Compass has no selection process per se to provide services in a district, the choices of districts or community foundations to fund the program raises the potential for systematic differences in unobservable characteristics between treated and untreated districts (which may bias estimates of program impact). In particular, districts that select into the program may be implementing complementary programs, investments, or initiatives that can help to increase college enrollment, which could introduce an upward bias into estimates of the impact of Career Compass. Similarly, the private and community foundations may decide to support the program in districts that are uniquely positioned to benefit from the program leading to upward bias in estimates of impact.

The Career Compass model focuses on district-level expansions in part to achieve economies of scale. By having coaches work with multiple schools in an area, the program is able to achieve lower per-student costs and avoid excessive travel among coaches who might otherwise be assigned to multiple schools across districts. While district-level decisions to expand the program raise concerns about selection into the program, these district-level engagements provide services to all schools regardless of any school-level desire to participate in the program. This ensures that the program is implemented at a wide range of schools, including schools with more and less pre-treatment effort to encourage postsecondary education. The timing of Career Compass expansion at the district level is not known to correlate with any other major district-led programs to encourage postsecondary enrollment. Moreover, given the nature of school district budgets, which are tied to long-term decisions about local tax revenues, it is possible that a commitment to this program comes at the expense of other school support programs, which could introduce a downward bias into estimates of the program's impact. By comparing enrollment rates for treated school years with enrollment rates for untreated school years, the analysis can be expected to be less sensitive to selection bias than a district-level analysis. However, in addition to providing a variety of tests for selection on observable characteristics of the schools, we also conduct a variety of robustness checks to validate our results with subsamples of the treated school years. Of particular note, as an additional test for potential selection, we limit the analysis to only those schools where foundation (or non-district related), funds supported the program's expansion. The specific foundations that have helped expand Career Compass either have a specific geographic focus or were previously active in a particular area, and decisions by those foundations to fund Career Compass relate to expected benefits to the community relative to other community investments, rather than broader decisions about which districts within Louisiana might be best served by the program. The potential for favorable selection into the program should be lower when funding and locally led efforts to implement the program come from a third party outside of the schools or district.

3. DATA AND EMPIRICAL APPROACH

We investigate whether Career Compass increases college enrollment and how the program's impact varies across schools with different student characteristics. Our primary outcome variable is the percentage of high school seniors who enroll in a postsecondary

institution as freshmen the following year, commonly referred to as the first-time freshmen rate. Those data, along with a broad set of high school characteristics, are available from the Louisiana Department of Education (LDOE). Administrative data on program exposure were obtained from Career Compass of Louisiana. These data are matched with additional school-level and district-level characteristics from the National Center for Education Statistics Common Core of Data. We also match economic data at the parish level, which coincide with district boundaries. In particular, income and unemployment statistics are obtained from the U.S. Internal Revenue Service and U.S. Bureau of Labor Statistics, respectively. Our data are structured as a panel, spanning the years 2003 to 2014, and encompassing all public high schools in the state of Louisiana for the time frame of analysis. The data include 99 schools that receive Career Compass services and 139 schools used as controls.

Before 2011, LDOE only collected data on college enrollment from public post-secondary institutions in Louisiana, which represent the vast majority of placements but are incomplete and may bias our assessment of the impact of Career Compass.[4] Starting in 2011, LDOE also collected college enrollment data from the National Student Clearinghouse (NSC), which includes enrollment in postsecondary institutions throughout the United States.[5] The limited time horizon of NSC data reduces our ability to provide a comprehensive assessment of the impact of Career Compass on enrollment. To provide a more complete assessment, we first study the entire time frame using in-state enrollment as the outcome variable. Then, we run the analysis twice for the 2011-14 time frame, once using only in-state enrollment and once with enrollment captured by NSC. We compare the coefficients to determine if in-state enrollment serves as an adequate proxy for measuring changes in student outcomes across the entire sample period.

Descriptive statistics are presented in table 2 for the pooled sample, as well as the control group and treated schools divided into groups based on when the program was adopted.[6] On average, high schools in Louisiana enroll 709 students, and have a graduating class of 121 students. Among high school graduates, an average of 45.5 percent pursue postsecondary education and become first-time freshmen in the first fall semester after graduation. Among treated schools, those in early-adopting districts had higher pretreatment rates of enrollment, while middle- and late-adopting districts exhibited slightly lower pretreatment rates of enrollment. Average spending per pupil in Louisiana is $10,600, which supports an average full-time equivalent (FTE) teacher–student ratio of 1:13, and counselor–student ratio of 1:262. Expenditures at treated sites are similar to control sites, aside from higher levels of spending among middle-adopting districts (although the average number of teachers and counselors is lower among treated schools aside from a higher number of counselors in early-adopting schools). In aggregate, 55.5 percent of students receive free or reduced-price

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4. In 2012, the LDOE reported that 92 percent of those high school graduates who pursue postsecondary education stayed instate. For more details, see www.louisianabelieves.com/resources/library/high-school-performance.
5. NSC includes more than 3,600 colleges and universities, enrolling 98 percent of all students in public and private U.S. institutions. For more information, see www.studentclearinghouse.org/about/.
6. Early exposure includes school districts that began the program in 2008 or 2009. Middle exposure includes school districts exposed in 2010 or 2011. Late exposure includes school districts exposed in 2012 or 2013. Figures A.1 and A.2 in the Appendix display the average characteristics of treated schools for each year of expansion.

Table 2. Summary Statistics

| | All | Control | By Exposure Time | | |
			Early	Middle	Late
Enrollment	709.4	758.1	586.6	742.2	564.0
	(457.3)	(495.3)	(272.3)	(424.1)	(337.5)
Graduate count	121.3	132.6	87.00	135.8	86.6
	(104.6)	(112.7)	(60.84)	(97.2)	(86.4)
First time freshman percentage	0.455	0.462	0.483	0.441	0.429
	(0.117)	(0.114)	(0.091)	(0.116)	(0.129)
Free or reduced-price lunch %	0.555	0.543	0.635	0.582	0.583
	(0.186)	(0.196)	(0.176)	(0.214)	(0.127)
Log income	3.79	3.81	3.74	3.84	3.83
	(0.18)	(0.19)	(0.09)	(0.06)	(0.16)
Full time equivalent teachers (per 100 students)	7.77	8.49	6.94	7.11	6.89
	(0.84)	(0.11)	(0.44)	(0.66)	(0.62)
Guidance counselors (per 100 students)	0.381	0.420	0.546	0.360	0.224
	(0.483)	(0.617)	(0.089)	(0.149)	(0.078)
Share of white students	0.600	0.619	0.387	0.417	0.680
	(0.287)	(0.291)	(0.234)	(0.264)	(0.243)
Share of black students	0.351	0.339	0.601	0.552	0.239
	(0.285)	(0.284)	(0.232)	(0.279)	(0.226)
Expenditure per pupil (in $1,000s)	10.6	10.8	10.5	11.6	10.5
	(3.2)	(3.8)	(0.9)	(1.5)	(1.1)
Unemployment rate	6.8	6.7	5.2	8.3	8.0
	(2.0)	(2.2)	(0.9)	(1.5)	(1.4)
N (districts)	62	36	4	7	14

Notes: Table 2 presents descriptive statistics (mean and standard errors) of key variables for control and treatment schools (by exposure time). Early exposure includes school districts exposed between 2008 and 2009. Middle exposure includes school districts exposed between 2010 and 2011. Late exposure includes school districts exposed between 2012 and 2013. The statistics presented are for one year prior to exposure. Standard deviations are in parentheses. The number of school observations in the data set is 2,856. The first-time freshmen percentage is based on students attending schools within Louisiana. The estimates exclude East Baton Rouge and Orleans school districts because new school districts were formed out of the existing district in the case of East Baton Rouge and major structural changes were implemented after Hurricane Katrina in the case of Orleans. Data for expenditure per pupil, log income, and unemployment rate are measured at the school district level.

Sources: Career Compass of Louisiana, Louisiana Department of Education, Common Core of Data, Internal Revenue Service, and Bureau of Labor Statistics.

lunch statewide, with a slightly higher rate among treated schools. The demographic composition of high schools is 60 percent white and 35 percent black and is similar across treated and control schools, although there is considerable variability by district and thus within a particular time frame of adoption. In general, the demographic composition and income levels of the student body exhibit considerable variation across schools, but have been relatively consistent within schools over time. We exploit this fact to estimate the impact of exposure on schools with a higher concentration of students found in prior research to benefit most from similar programs, specifically schools with a majority black and majority low-income student body.

We use a difference-in-differences approach to compare changes in enrollment rates for treated schools before and after exposure to Career Compass relative to changes in untreated schools over the same time. This econometric approach accounts for differences in college enrollment across schools and over time. The econometric specification is a fixed-effects equation as follows:

$$Y_{it} = \alpha_{it} + \delta_i + \Upsilon_t + \beta \, CareerCompass_{it} + \eta X_{it} + \varepsilon_{it}, \tag{1}$$

where Y_{it} is the first-time freshmen percentage, which is the percentage of high school graduates who enroll in college in the first fall after graduation, for school i in year t, $CareerCompass_{it}$ is an indicator variable taking the value 1 if a school i is exposed to Career Compass in year t and 0 otherwise, X_{it} represents the set of covariates being controlled in the regression, and ε_{it} represents random errors. Here, δ_i and Υ_t capture school-fixed effects and time-fixed effects, respectively. The parameter of interest is the coefficient on the *CareerCompass* indicator variable.

A key concern in interpreting the difference-in-differences results as a valid estimate of the program's effect is the potential for selection into the program to introduce bias into the results. We explore the potential for selection into the program using event study graphs, several placebo analyses, and a linear probability model. The event study graph follows the equation:

$$\begin{aligned}
Y_{it} = {} & \alpha_{it} + \delta_i + \Upsilon_t + \beta_{-3} \, CareerCompass_{i,t-3} + \beta_{-2} \, CareerCompass_{i,t-2} \\
& + \beta_{-1} \, CareerCompass_{i,t-1} + \beta_{+1} \, CareerCompass_{i,t+1} \\
& + \beta_{+2} \, CareerCompass_{i,t+2} + \beta_{+3} \, CareerCompass_{i,t+3} + \varepsilon_{it},
\end{aligned} \tag{2}$$

where Y_{it} is the first-time freshmen percentage for school i in year t, $CareerCompass_{it}$ is an indicator variable taking the value 1 if a school i is exposed to Career Compass in year t and 0 otherwise, and ε_{it} represents random errors. Here, δ_i and Υ_t capture school-fixed effects and time-fixed effects, respectively. β_i where $i = \{-3, -2, -1, +1, +2, +3\}$ are the coefficients of interest indicating the impact of exposure measured in time periods before or after actual exposure. Although not as straightforward a test of selection, we also estimate a linear probably model to see if lags of our dependent variable can predict whether or not schools will be selected into the program, with model details and results shown in the Appendix.

4. RESULTS

As a preliminary assessment of program impact, we examine the basic trend in first-time freshmen enrollment before and after exposure, illustrated in figure 2. The data show a sharp rise in the average first-time freshmen percentage across schools in the first few years after exposure, which then plateaus at a level much higher than pretreatment levels.[7] However, as shown in the graph, the distinct rise in first-time freshmen percentages after exposure is not to be taken at face value as the true impact of treatment because it may be influenced by time trends, school effects, and a variety of other factors.[8]

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7. The values for first-time freshmen percentage used for this graph are based on in-state enrollment. Because in-state enrollment data are available over a longer time horizon, those in-state enrollment rates are used as the primary variable of interest. Table 4 shows how results compare between in-state enrollment and NSC data for the shorter period of time when both measures are available (which supports the focus on in-state enrollment as a proxy to measure the impact of treatment).

8. While our preferred analysis uses a difference-in-differences approach controlling for common factors at treated and control schools that would influence changes in enrollment over time, results from an analysis including
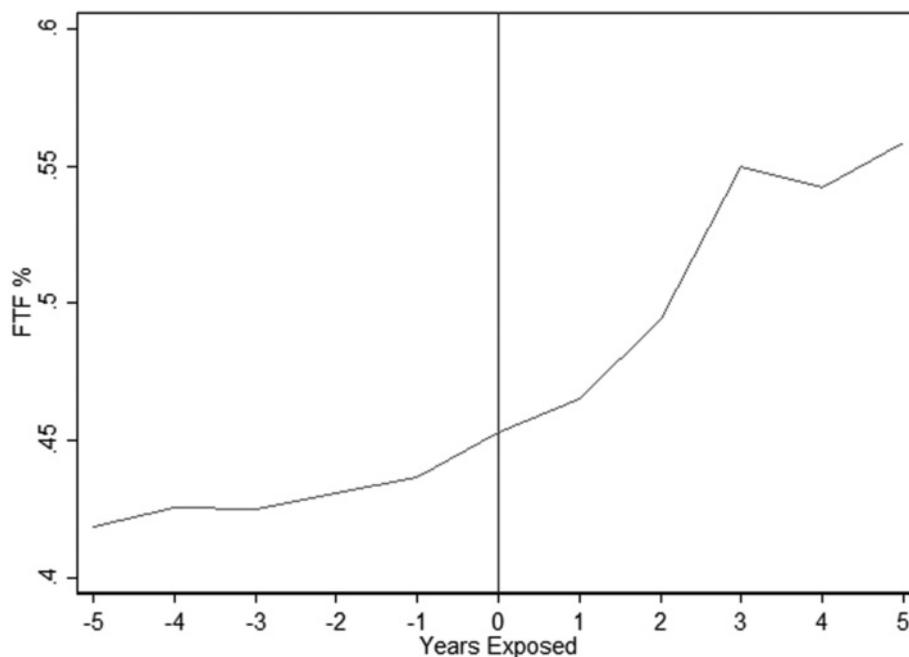
Note: FTF = first-time freshmen.
Sources: Career Compass of Louisiana and Louisiana Department of Education.

Figure 2. Impact of Exposure to Career Compass by Years Exposed

To further explore how enrollment rates changed over time at treated schools relative to untreated schools, we present several event study graphs in figure 3. The event study for all schools shows no detectable pretreatment trend and an increase in postsecondary enrollment in the years after treatment began.[9] Event study graphs are also provided for several subsets of schools and all show similar patterns of no detectable pretreatment trend and an increase in first-time freshmen percentage after treatment. This is true in schools with majority black students, schools with majority white students, as well as lower and higher income schools, which are defined as having a percentage of students qualifying for free or reduced-price lunch that is below or above the statewide average, respectively. Interestingly, the effect in all cases seems to grow with time, suggesting that the program targeting high school seniors may become more effective over time as coaches return to the same schools or as potential spillover effects among underclassmen who are better prepared or motivated by the start of their senior year.

Table 3 presents the main results of the difference-in-differences analysis. Results from a basic model are summarized in column 1, which implies that exposure to

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only treated schools are provided in table A.1, relying on identification from only the differential timing of expansion.

9. While a different functional form than the main specification, to test for reverse causality we also use a linear probability model of selection into the program on lags of the outcome variable. As shown in table A.2, parameter estimates on the lag values are insignificant, providing further support of no pretreatment trend in postsecondary enrollment that might cause districts to select into the program.
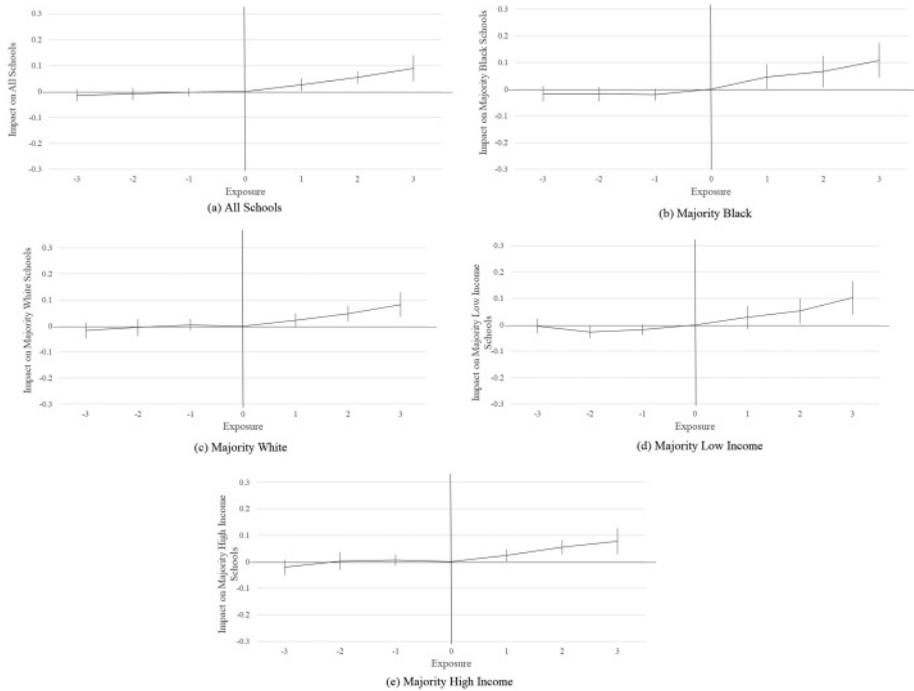
Sources: Career Compass of Louisiana and Louisiana Department of Education. Empirical specification for event study graphs is presented in equation 2.

Figure 3. Event Study Graphs for the Impact of Career Compass on College Enrollment Rates

Table 3. Main Results

	(1)	(2)	(3)	(4)	(5)
CareerCompass	0.0600***	0.0422***	0.0404***	0.0392***	0.0394***
	(0.0062)	(0.0121)	(0.0112)	(0.0117)	(0.0118)
Expenditure per pupil		X	X	X	X
Free or reduced-price lunch		X	X	X	X
Log income		X	X	X	X
FTE teachers			X	X	X
Guidance counselors			X	X	X
Unemployment rate				X	X
Share of white students					X
Observations	2,856	2,856	2,856	2,856	2,856

Notes: Table 3 presents the results of difference-in-differences regressions on enrollment rates. The coefficient of interest is *CareerCompass*. Standard errors, shown in parentheses, are clustered at the parish level. Column 2 controls for expenditure per pupil, free or reduced-price lunch eligibility, and log income. Column 3 controls for full-time equivalent (FTE) teachers per 100 enrolled students, and guidance counselors per 100 enrolled students in addition to controls used in column 2. Column 4 controls for unemployment rate in addition to controls used in column 3. Column 5 controls for share of white students in addition to controls used in column 4. Coefficients for controls are not shown.

***$p < 0.01$.

Sources: Career Compass of Louisiana and Louisiana Department of Education.

Table 4. Results Using 2011 through 2014 Data

|	Within-LA Enrollment		NSC enrollment	
	(1)	(2)	(3)	(4)
CareerCompass	0.0285***	0.0297**	0.0271***	0.0266**
	(0.0095)	(0.0121)	(0.0096)	(0.0127)
Expenditure per pupil		X		X
Free or reduced-price lunch		X		X
FTE teachers		X		X
Guidance counselors		X		X
Share of white students		X		X
Observations	952	952	952	952

Notes: Table 4 presents the results of difference-in-differences regressions on enrollment rates for the years 2011 through 2014 using enrollment within Louisiana (LA; columns 1 and 2) and National Student Clearinghouse (NSC) enrollment (columns 3 and 4). The coefficient of interest is *CareerCompass*. Standard errors, shown in parentheses, are clustered at the parish level. Columns 2 and 4 control for expenditure per pupil, free or reduced-price lunch eligibility, full-time equivalent (FTE) teachers per 100 enrolled students, guidance counselors per 100 enrolled students, and share of white students. Coefficients for controls are not shown.

***$p < 0.01$; **$p < 0.05$.

Sources: Career Compass of Louisiana and Louisiana Department of Education.

Career Compass increases postsecondary enrollment by 6 percentage points. The addition of controls for socioeconomic, demographic, and school resources to account for differences between treated and untreated schools reduces the estimated impact, with richer models suggesting Career Compass increases enrollment by about 4 percentage points across specifications. Results in column 2 include controls for expenditure per pupil, free or reduced-price lunch, and log income, and show an estimated impact of 4.2 percentage points increase in college enrollment. Results from models with additional controls are provided in the remaining columns of table 3, showing little variation in the estimated impact after adding controls for the number of FTE teachers per 100 enrolled students, guidance counselors per 100 students, unemployment rate, and the share of white students.

To investigate potential bias introduced by our restriction to in-state enrollment, we limit our analysis to the time period 2011–14, when we also have data on out-of-state enrollment and conduct the analysis twice, once using each measure. Results of this analysis are summarized in table 4. Columns 1 and 2 show results using only data on enrollment within Louisiana and the columns 3 and 4 present results from comparable models but using postsecondary enrollment data from NSC, which also capture out-of-state enrollment. These two metrics both produce similar estimates of treatment effect, though the estimates are lower than what is found using the full range of years and schools. To investigate whether differences in schools new to Career Compass during this narrower time horizon might be driving the lower estimate, in figure 4 we plot the first-time freshmen percentages for each newly treated school one year after treatment. We find that newly treated schools with first-time freshmen in 2011 and beyond do not appear heavily skewed toward lower or higher levels of performance than Career Compass schools in earlier years. However, the narrow time span and smaller number of observations limit the generalizability of this analysis. More generally, the results
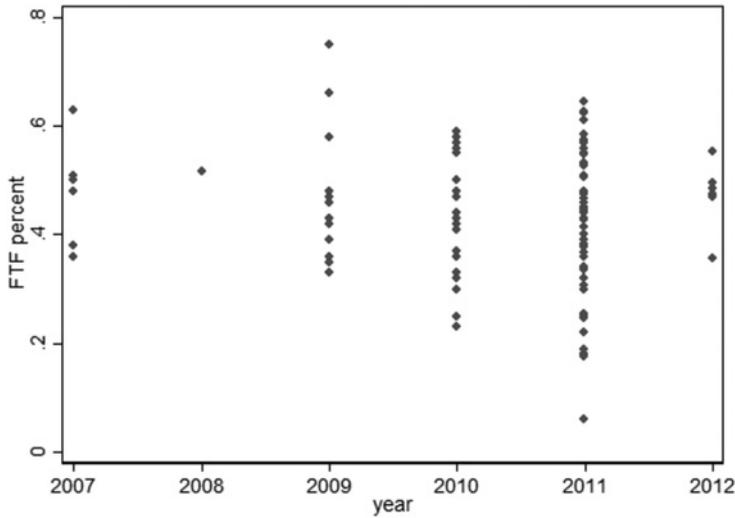
Note: FTF = first-time freshmen.
Sources: Career Compass of Louisiana and Louisiana Department of Education.

Figure 4. Dot Plot of Enrollment Rates One Year After Exposure

support the use of in-state enrollment in our full sample to assess program impacts given that estimates from comparable models are not statistically different across the two metrics. Below, we explore more fully how differences in school characteristics might influence the impact of the program.

Because Career Compass provides services to all students at a school and all schools within a district, our main results are not directly comparable to estimated program effects of many other programs given that most other programs focus on serving students with lower than average likelihood of enrolling in college, who are often recruited or targeted based on income and race. Therefore, general results that include the full range of students may not be indicative of the program's impact on students targeted in other college coaching programs. To provide additional intuition about the effectiveness of Career Compass relative to other programs represented in the literature, we investigate heterogeneity in program impacts across different types of schools.

Our analysis of heterogeneity in impact by race is summarized in panel A of table 5. Columns 1 and 2 present estimated treatment effects on schools with a majority of black students enrolled, and columns 3 and 4 present estimated treatment effects on schools with a majority of white students. We identify schools as majority black schools where over 50 percent of the enrolled students are black, and those where over 50 percent of enrolled students are white as majority white schools. Estimates from the models with the richest set of controls suggest an increase in enrollment of 7.5 percentage points for majority black schools, and an increase in postsecondary enrollment of 3.6 percentage points for majority white schools.[10] These results show that the treatment effect is higher for majority black schools.

10. We test the hypothesis that the impact on majority black schools is the same as that on majority white schools and reject the null hypothesis at 99 percent confidence level with a χ^2 statistic of 12.95.

Table 5. Heterogeneity of Results

	(1)	(2)	(3)	(4)
Panel A: Impact by Race of Students in Schools				
	Majority Black		**Majority White**	
CareerCompass	0.0908***	0.0746***	0.0471***	0.0355***
	(0.0199)	(0.0221)	(0.0115)	(0.0114)
Observations	816	816	1,824	1,824
Panel B: Impact by Income levels of Students in Schools				
	Lower Income		**Higher Income**	
CareerCompass	0.0752***	0.0586***	0.0496***	0.0378***
	(0.0195)	(0.0206)	(0.0101)	(0.0105)
Observations	972	972	1,884	1,884
Expenditure per pupil		X		X
Free or reduced-price lunch		X		X
FTE teachers		X		X
Guidance counselors		X		X
Unemployment rate		X		X
Share of white students		X		X

Notes: Table 5 presents the results of difference-in-differences regressions on enrollment rates for heterogeneity of results by race (panel A) and by income levels (panel B). In panel A, the estimates are presented by group including schools with majority black enrollment (columns 1 and 2) and schools with majority white enrollment (columns 3 and 4). In panel B, the estimates are presented by group with schools that are lower income (columns 1 and 2) and schools that are higher income (columns 3 and 4). The coefficient of interest is *CareerCompass*. Standard errors, shown in parentheses, are clustered at the parish level. Columns 2 and 4 control for expenditure per pupil, free or reduced-price lunch eligibility, full-time equivalent (FTE) teachers per 100 enrolled students, guidance counselors per 100 enrolled students, and unemployment rate. Column 4 controls for expenditure per pupil, free or reduced-price lunch eligibility, FTE teachers, guidance counselors per 100 enrolled students, and share of white students. Coefficients for controls are not shown.

*** $p < 0.01$.

Sources: Career Compass of Louisiana and Louisiana Department of Education.

We conduct a similar analysis of heterogeneity in impact by income, which is summarized in panel B of table 5. Columns 1 and 2 present estimated treatment effects on schools with relatively low-income students, and columns 3 and 4 present estimated treatment effects on schools with relatively high-income students, based on the percent of students receiving free or reduced-price lunch. We find that the impact of treatment is larger at low-income schools than at high-income schools, with effects of 5.9 and 3.8 percentage points, respectively.[11] While the program is designed to serve all students in a district, these results are consistent with previous studies showing generally larger effects when targeting lower income students, which tend to have lower pretreatment enrollment rates (suggesting that broader application of these programs to all students can be expected to lower the size of the program's impact).

Finally, we explore heterogeneity based on funding source, which also provides an additional test of exogeneity in the selection process. A key concern of this empirical

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11. We test the hypothesis that the impact on lower income schools is the same as that on higher income schools and reject the null hypothesis at a 95 percent confidence level with a χ^2 statistic of 4.05.

Table 6. Impact by Funding Source

	Community Foundation		Self-Financed	
	(1)	(2)	(3)	(4)
CareerCompass	0.0537***	0.0352**	0.0768***	0.0448**
	(0.0073)	(0.0152)	(0.0121)	(0.0168)
Expenditure per pupil		X		X
Free or reduced-price lunch		X		X
FTE teachers		X		X
Guidance counselors		X		X
Share of white students		X		X
Observations	2,568	2,568	1,956	1,956

Notes: Table 6 presents the results of difference-in-differences regressions of treatment on enrollment rates at community foundation financed school districts and self-financed districts. The coefficient of interest is *CareerCompass*. Standard errors, shown in parentheses, are clustered at the parish level. Columns 2 and 4 control for expenditure per pupil, free or reduced-price lunch eligibility, full-time equivalent (FTE) teachers per 100 enrolled students, guidance counselors per 100 enrolled students, and share of white students. Coefficients for controls are not shown.

*** $p < 0.01$; ** $p < 0.05$.

Sources: Career Compass of Louisiana and Louisiana Department of Education.

approach is whether districts that are particularly well-suited to benefit from the program due to unobservable differences are systematically selecting into the program. If unobservable characteristics are correlated with the decision to dedicate funds and implement the program, districts that are beneficiaries of third-party funding are likely to have a weaker correlation between those unobservable characteristics and the district's ex ante likelihood of adopting the program. Results for schools funded by community foundations and those paid for by school districts are provided in table 6. Across both groups, effects are positive, significant, and of a similar magnitude to the pooled analysis, though somewhat smaller among schools that benefitted from third-party funding. This finding is consistent with the hypothesis that schools electing to dedicate funds to implement the program may differ in unobservable ways that introduce some upward bias. Nonetheless, when limiting the analysis to districts receiving financial support, the program is found to increase college enrollment by 3.5 percentage points.

Robustness Checks

We use several robustness checks to support our findings. First, for treated schools, we test if exposure to Career Compass has an impact on school-level characteristics, including FTE teachers per 100 enrolled students, guidance counselors per 100 enrolled students, enrollment level in schools, share of students receiving free or reduced-price lunch, share of black students enrolled, and share of white students enrolled. The event study graphs of figure 5 show that there are no notable trends in the characteristics of schools before or after Career Compass began. We estimate a difference-in-differences regression to test whether Career Compass had an effect on changing school characteristics. Results in table 7 show no evidence that Career Compass has an impact on those characteristics, which reduces concern that the estimated effects could be driven by composition changes in student characteristics or changes in school characteristics in treated schools that occur simultaneously with the introduction of the program.
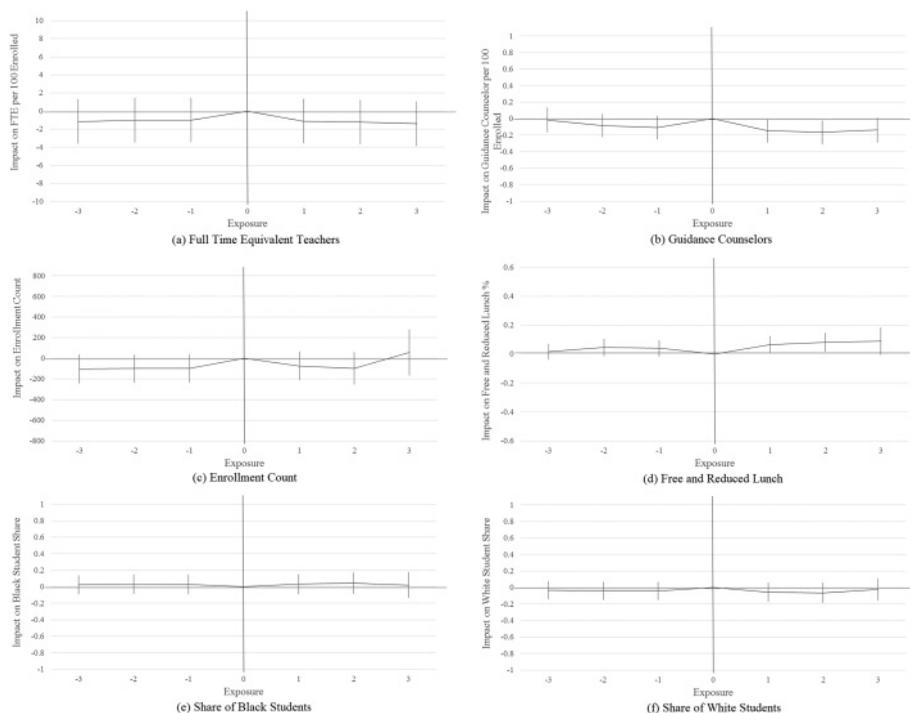
Note: FTE = full-time equivalent.
Sources: Career Compass of Louisiana and Louisiana Department of Education. Empirical specification for event study graphs is presented in equation 2.

Figure 5. Event Study Graphs for the Impact of Career Compass on School-Level Characteristics

Table 7. Impact of Career Compass on School Level Characteristics

	FTE per 100 Enrolled	Guidance Counselors per 100 Enrolled	Enrollment Count	Free or Reduced-Price Lunch %	Black %	White %
	(1)	(2)	(3)	(4)	(5)	(6)
CareerCompass	1.779	0.0992	22.82	0.0054	−0.0047	−0.0014
	(1.895)	(0.0974)	(18.16)	(0.0098)	(0.0072)	(0.0079)
Observations	2,856	2,856	2,856	2,856	2,856	2,856

Notes: Table 7 presents the results of difference-in-differences regressions for impact of exposure to Career Compass on school-level characteristics for treated schools. Column 1 shows the impact on full-time equivalent (FTE) teachers per 100 enrolled students. Column 2 shows the impact on guidance counselors per 100 enrolled. Column 3 shows the impact on enrollment levels in treated schools. Column 4 shows the impact on free or reduced-price lunch eligibility share. Column 5 shows the impact on share of black students. Column 6 shows the impact on share of white students. The coefficient of interest is *CareerCompass*. Standard errors, shown in parentheses, are clustered at the parish level. Coefficients for year fixed effects and school fixed effects are not shown.

Sources: Career Compass of Louisiana and Louisiana Department of Education.

We also conduct placebo tests for younger students who should not be influenced by the program. Dropout rates are available by grade and used as alternative outcome variables for grades 9, 10, and 11.[12] Results in table 8 show no significant effect on dropout

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12. Dropout data reported by LDOE are heavily censored to protect the identity of students who dropped out and the published number of school years with single-grade dropout rates is notably smaller than the full sample used across most analyses.

Table 8. Impact on Dropout and Graduation Rates

	(1)	(2)	(3)	(4)
Panel A: Impact on Ninth and Tenth Grades				
	Ninth Grade		**Tenth Grade**	
CareerCompass	−0.0072	−0.0018	0.0006	0.0035
	(0.0199)	(0.0221)	(0.0033)	(0.0045)
Observations	442	442	382	382
Panel B: Impact on Eleventh and Twelfth Grades				
	Eleventh Grade		**Twelfth Grade**	
CareerCompass	−0.0106***	−0.0077***	0.0243***	0.0129**
	(0.0039)	(0.0025)	(0.0039)	(0.0059)
Observations	334	334	1,904	1,904
Expenditure per pupil		X		X
Free or reduced-price lunch		X		X
FTE teachers		X		X
Guidance counselors		X		X
Share of white students		X		X

Notes: Table 8 presents the results of difference-in-differences regressions on dropout rates for ninth, tenth, and eleventh graders, and completion (graduation rates) for twelfth graders for the years 2008 through 2014. Panel A presents dropout rates for ninth graders (columns 1 and 2), and tenth graders (columns 3 and 4). Panel B presents dropout rates for eleventh graders (columns 1 and 2), and completion/graduation rates for twelfth graders (columns 3 and 4). The coefficient of interest is *CareerCompass*. Standard errors, shown in parentheses, are clustered at the parish level. Columns 2 and 4 control for expenditure per pupil, free or reduced-price lunch eligibility, full-time equivalent (FTE) teachers per 100 enrolled students, guidance counselors per 100 enrolled students, and share of white students. Coefficients for controls are not shown.

$^{***}p < 0.01$; $^{**}p < 0.05$.

Sources: Career Compass of Louisiana and Louisiana Department of Education.

rates for students in ninth or tenth grade. However, students in eleventh grade exhibit a small significant decrease in dropping out. This could be a beneficial spillover of Career Compass if students in lower grades are aware of the support offered by the program, especially given the increased likelihood that students in adjacent grades interact or share courses—that is, eleventh graders would be more likely to be influenced by the improved outlook of their twelfth grade peers. We also examine graduation rates for twelfth graders, a potential mechanism for increasing college enrollment given that students must graduate in order to enroll in college.[13] We find a positive and significant effect of approximately 1.3 percentage points, implying that some of the program's benefit may be in aiding or encouraging students with completing requirements during twelfth grade to graduate and become qualified to enroll in college.

5. DISCUSSION AND CONCLUSION

This research studies the impact of exposure to Career Compass, a college coaching nonprofit organization, operational in half of Louisiana's school districts. As in a number of previous studies, we find extra guidance beyond that provided by in-school

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13. Graduation rates are examined rather than twelfth-grade dropout rates because the number of school-year values suppressed in graduation rate data is much lower than in dropout data published by LDOE.

guidance counselors creates a significant and positive impact on postsecondary enrollment. Specifically, we find that exposure to Career Compass leads to a 3.9 percentage point increase in postsecondary enrollment among high school seniors after controlling for a rich set of school and district characteristics. Furthermore, the effect is stronger for schools with a majority of black or a majority of low-income students. We find that the impact among students at schools with majority black enrollment is roughly 4 percentage points higher than at majority white schools, and the impact at lower income schools is 2 percentage points higher than at higher income schools. We show that treated schools have no difference in pretreatment trends relative to controls across a wide range of characteristics and that compositional changes are not the cause of the increase in enrollment (however, we are not able to rule out selection on unobservable district characteristics). If districts that implement the program are uniquely positioned to benefit from Career Compass services, the analysis may produce estimates of treatment that are biased upward. On the other hand, because local school districts rely on sales and property taxes that are relatively stable over time, the decision by districts to fund the program may come at the expense of other services, which could bias estimates of treatment downward.

Although these estimates of program impact are comparable to those found in prior studies investigating similar programs, the unique approach taken by Career Compass suggests that this may be a more promising model than many others tested to date. The program is designed to operate at low cost, averaging $110 to $150 per student, which includes treating more disadvantaged students and those who may be likely to attend college even without the program. Aside from the H&R Block FAFSA Experiment, which costs $88 per student but leveraged unique access to a family's tax data, other lower-cost programs have ranged from $194 to upward of $300 per student. Many programs have limited their focus to only disadvantaged students as a way to narrow the program's focus and save costs, but the combination of clustering services within a school district and focus on having highly trained coaches meet with students until they complete the required steps of a semi-customized College Success Plan enables Career Compass to serve the full spectrum of students while maintaining low per-student costs relative to most programs previously studied. This inclusive approach to providing services may provide additional benefits, as treated students will not feel stigmatized by program participation and this may generate positive peer effects. This approach could also provide a political benefit for districts looking for parental or taxpayer support, knowing that all students will receive services from the program. Additional data are needed to more fully assess the benefits of the Career Compass model relative to other programs (including types of schools students attend and longer-term outcomes), yet our research confirms that this low-cost postsecondary intervention has a significant impact on increasing college enrollment and is cost-effective compared to many similar programs. There are a number of potential mechanisms through which these programs could be helping students, including completing graduation requirements, accessing financial aid, application assistance, and identifying particular programs of interest. In addition to exploring longer-term outcomes, future research should explore these mechanisms to identify the most effective approaches to increasing college enrollment.

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APPENDIX

Table A.1. Main Results Excluding Untreated

	(1)	(2)	(3)	(4)	(5)
CareerCompass	0.0603*** (0.0060)	0.0581*** (0.0128)	0.0404*** (0.0112)	0.0550*** (0.0122)	0.0553*** (0.0124)
Expenditure per pupil		X	X	X	X
Free or reduced-price lunch		X	X	X	X
Log income		X	X	X	X
FTE			X	X	X
Guidance counselor			X	X	X
Unemployment rate				X	X
Share of white students					X
Observations	1,188	1,188	1,188	1,188	1,188

Notes: Table A.1 presents the results of the main model after dropping all untreated schools. The coefficient of interest is *CareerCompass*, which is identified in this analysis solely off the differential timing of adoption by districts that participate in the program. Standard errors, shown in parentheses, are clustered at the parish level. Column 2 controls for expenditure per pupil, free or reduced-price lunch eligibility, and log income. Column 3 controls for full-time equivalent(FTE) teachers per 100 enrolled students, and guidance counselors per 100 enrolled students in addition to controls used in column 2. Column 4 controls for unemployment rate in addition to controls used in column 3. Column 5 controls for share of white students in addition to controls used in column 4. Coefficients for controls are not shown.

***$p < 0.01$.

Sources: Career Compass of Louisiana and Louisiana Department of Education.

Table A.2. Linear Probability Model

|	
L1	0.2999
	(0.3676)
L2	0.0267
	(0.3778)
L3	−0.1283
	(0.3431)

Notes: Table A.2 presents the results of linear probability model. L1, L2, and L3 represent lags of the outcome variable by years 1, 2, and 3, respectively. The model includes school- and time-fixed effects. Standard errors, shown in parenthesis, are clustered at the parish level.

Sources: Career Compass of Louisiana and Louisiana Department of Education.
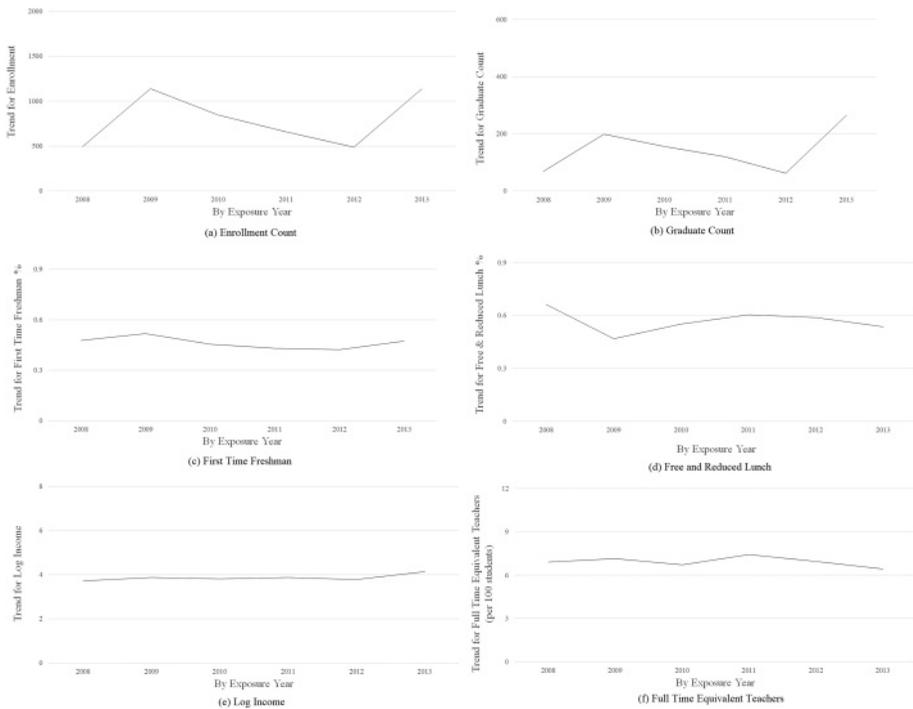
Sources: Career Compass of Louisiana and Louisiana Department of Education.

Figure A.1. Trends for the Characteristics of Treated Group by Year of Exposure to Career Compass
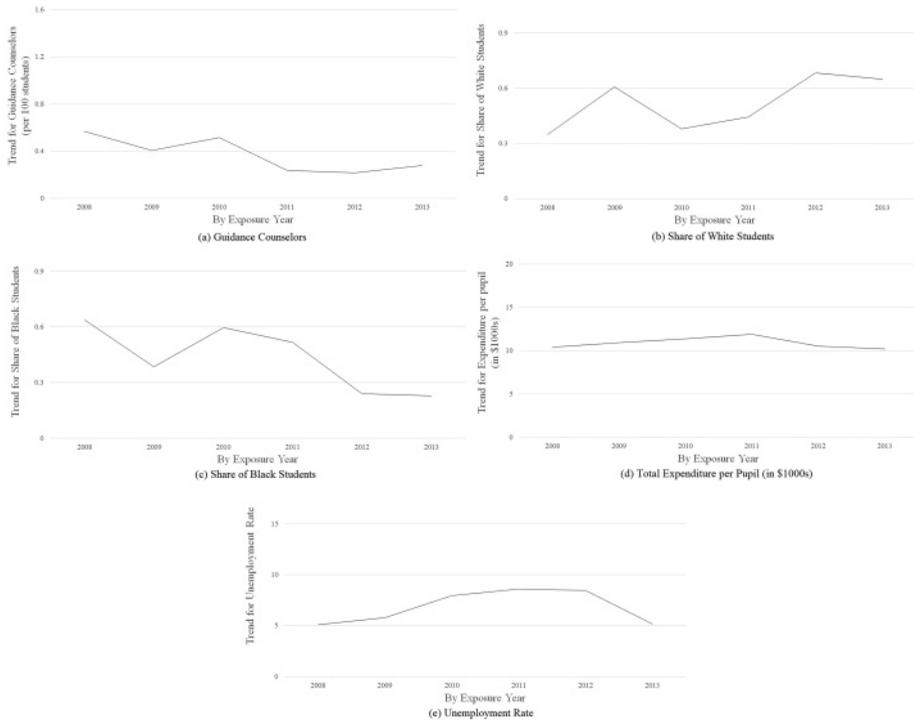
Sources: Career Compass of Louisiana and Louisiana Department of Education.

Figure A.2. Trends for the Characteristics of Treated Group by Year of Exposure to Career Compass