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# Using a Merit-Based Scholarship Program to Increase Rates of College Enrollment in an Urban School District: The Case of the Pittsburgh Promise

## **Cover Page Footnote**

This study was supported partially by the R. K. Mellon Foundation and The Heinz Endowments to the Pittsburgh Promise. All analyses and commentary are strictly those of the authors. Please direct all correspondence regarding this manuscript to Robert Bozick, RAND Corporation, 1776 Main Street, Santa Monica CA 90407. [rbozick@rand.org](mailto:rbozick@rand.org)

# Using a Merit-Based Scholarship Program to Increase Rates of College Enrollment in an Urban School District: The Case of the Pittsburgh Promise

By Robert Bozick, Gabriella Gonzalez, and John Engberg

*The Pittsburgh Promise is a scholarship program that provides \$5,000 per year toward college tuition for public high school graduates in Pittsburgh, Pennsylvania who earned a 2.5 GPA and a 90% attendance record. This study used a difference-in-difference design to assess whether the introduction of the Promise scholarship program directly influenced changes in rates of college enrollment among students graduating from Pittsburgh public high schools in years immediately following the launch of the program. Becker's (1964) standard human capital investment model, which predicts that youth make cost-benefit calculations to guide their college enrollment decisions, provides the framework for the analysis. Our analysis of data on two graduating classes prior to the scholarship's implementation (2005-06 and 2006-07) and three years following the scholarship's implementation (2007-08, 2008-09, and 2009-10) yielded mixed results. Findings showed that the scholarship had no direct effect on the overall rate of college enrollment. However, scholarship-eligible graduates were more likely to attend four-year schools in the years in which the scholarship was available.*

**Keywords:** college scholarship, college enrollment, difference-in-difference

Promise scholarships, a growing type of community-based financial support program, provide local high school graduates with funds to cover all or part of their college tuition expenses. Starting with the Kalamazoo Promise, initiated in Kalamazoo, Michigan in 2005, there are now approximately 30 Promise-like programs in operation, with 10 more currently in the planning process (Miller-Adams, 2013). As these programs are relatively new, the research base supporting their effectiveness is slim. To guide in the implementation and improvement of such initiatives, the present study provides one of the first empirical assessments of a Promise program's ability to increase enrollment in college among students eligible for the scholarship. Specifically, this study examines the initial implementation of the Pittsburgh Promise, which at the outset provided \$5,000 per year for up to four years of postsecondary schooling to public school students in Pittsburgh, Pennsylvania who exhibit academic success while in high school.

Our study addresses the following central research question: Did the introduction of the Promise scholarship program in Pittsburgh increase the likelihood that students in the district will continue on to college after high school graduation? In our analysis, we compare rates of college enrollment among scholarship-eligible students in the district before and after the introduction of the scholarship using a difference-in-difference methodology. As background for our analysis, we briefly describe the development of the Pittsburgh Promise, review the research to date on Promise programs and similar scholarship programs, and then outline our theoretical model to develop hypotheses.

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### *Development of the Pittsburgh Promise*

As tuition prices have skyrocketed over the past two decades (College Board, 2011), high schools and the communities in which they are located have grown concerned that efforts to prepare their students academically will be thwarted by the steep financial hurdles that families face in planning for college. These concerns are exacerbated in urban regions of the industrial Midwest, where shrinking job opportunities in traditional blue-collar production jobs have placed an even greater premium on postsecondary training. In response, a handful of communities in the Midwest and beyond have developed locally funded scholarship programs that provide their high school graduates with funds to cover all or part of their tuition expenses.

These programs, referred to colloquially as “Promise programs,” are created and subsidized by community-based institutions and philanthropists, and are typically embedded in broader strategies for local economic development. Promise scholarships aim to provide greater educational opportunities for local youth, with the hope that they will remain in or return to the region after college to build careers, form families, and contribute to the civic life of the community. In this way, local leaders have conceived these scholarship programs as a short-term promise to the youth of the community for educational support, with the long-term promise to the broader community that they will reap the benefits later down the road in the form of high-achieving schools, prospering neighborhoods, and a sustainable local economy.

Kalamazoo, Michigan implemented the first Promise program in 2005. Subsidized by an anonymous donor, the program awarded tuition subsidies to any graduate of a Kalamazoo public high school who lived in the Kalamazoo public school district for at least four years, on the condition that the student was accepted to and attended a public college or university in the state of Michigan. As a place-based scholarship program that emphasizes commitment to the community, the size of the subsidy was contingent on the number of years the student had been enrolled in the district. Using a sliding scale to determine the total amount awarded, those who were enrolled in the district since the 9<sup>th</sup> grade received 65% of the tuition subsidy, while those who were enrolled in the district since kindergarten received their tuition and fees paid in full. The Kalamazoo Promise was universal, with no stipulations for academic achievement or financial need.

In its inaugural year, the Kalamazoo Promise received considerable media attention and reporting for its novel approach, spurring a number of communities across the country to replicate it in some fashion (Miller-Adams, 2009). Table 1 provides a listing of the Promise programs currently in place, including their eligibility parameters and the benefits that each provides to eligible students. Eligibility can be universal, meaning that it is extended to all youth regardless of income or academic performance; based on income, meaning that it is extended only to those below a certain income threshold; or based on academic performance, meaning that it is extended only to those meeting certain academic requirements.

Note that Promise programs vary in their eligibility parameters and in their benefits. For example, El Dorado’s program covers the full tuition of their graduates at any postsecondary institution in the country, while Peoria’s program covers tuition limited to 64 credit hours at one school (Illinois Central College). Despite these differences, however, all Promise programs have three defining characteristics: They all focus on a geographically-bounded community (usually a school district); their eligibility requirements reflect long-term investments in that community, such that families can make choices about enrollment based on the program’s benefits (e.g., different levels of tuition support based on residential tenure); and they all seek to create and sustain a college-going culture in the community (Miller-Adams, 2013).

Pittsburgh, Pennsylvania implemented one of the most distinct Promise programs in fall 2007 (Pittsburgh Promise, n.d.). Unlike the majority of Promise programs, which are universal in their eligibility criteria, the Pittsburgh Promise included academic benchmarks as an explicit prerequisite to receive the benefit. This was intended to help boost human capital development in a school district plagued with falling

**Table 1. Promise Scholarship Programs in Operation as of October 2013**

Location	Program	First Eligible Class	Eligibility	Benefit
Arkadelphia, AR	Arkadelphia Promise	2010-11	Academic merit criteria	Tuition to a school anywhere in the U.S. equivalent to the highest tuition amount at a public university in Arkansas
Baldwin, MI	Baldwin Promise	2009-10	Universal	\$5,000 a year in tuition and fees at colleges and universities in Michigan
Bay City, MI	Bay Commitment	2007-08	Universal for first-generation students	\$2,000 toward tuition at Delta College or Saginaw Valley State University
Benton Harbor, MI	Benton Harbor Promise	2010-11	Universal	Unknown
Cleveland, NC	Cleveland County Promise	2011-12	Academic merit criteria	Tuition and fees at any public college or university in North Carolina
Dayton, OH	Montgomery County Ohio College Promise	2015-16	Income and academic merit criteria	Unknown portion of tuition to Sinclair Community College
Denver, CO	Denver Scholarship Foundation	2006-07	Income criteria	Up to \$6,000 in tuition at 40 colleges and universities in Colorado
Detroit, MI	Detroit College Promise	2008-09	Universal	\$600 a year toward tuition at any college or university in Michigan
El Dorado, AR	El Dorado Promise	2006-07	Universal	Tuition to a school anywhere in the U.S. equivalent to the highest tuition amount at a public university in Arkansas
Garrett, MD	Garrett County Scholarship Program	2008-09	Universal	Tuition at Garrett College
Hammond, IN	College Bound	2005-06	Academic merit criteria	Tuition at any public or private college in Indiana
Hazel Park, MI	Hazel Park Promise	2011-12	Universal	\$4,000 toward tuition at any college or university in Michigan
Hopkinsville, KY	Hopkinsville Rotary Scholars	2011-12	Academic merit criteria	Tuition for four semesters at Hopkinsville Community College
Jackson, MI	Jackson Legacy	2007-08	Universal	Two years of tuition at Jackson Community College, Baker College of Jackson, and Spring Arbor University
Kalamazoo, MI	Kalamazoo Promise	2005-06	Universal	Tuition and fees at any public college or university in Michigan
Lansing, MI	Lansing Promise	2011-12	Universal	60 credit hours at Lansing Community College or \$5,000 toward tuition at Michigan State University

**Table 1. Promise Scholarship Programs in Operation as of October 2013 (Continued)**

Location	Program	First Eligible Class	Eligibility	Benefit
New Haven, CT	New Haven Promise	2010-11	Academic merit criteria	Tuition at a public college or university in Connecticut or \$2,500 toward tuition at a private nonprofit college or university in Connecticut
Norphlet, AR	Leopard Challenge	2006-07	Academic merit criteria	Up to \$4,000 a year toward tuition and fees at colleges and universities in Arkansas
Northport, MI	Northport Promise	Unknown	Universal	Tuition to a public college or university in Michigan
Pensacola, FL	Pensacola Pledge Scholars	2011-12	Universal	\$2,000 a year toward tuition at University of West Florida and \$1,200 a year toward tuition at Pensacola State College
Peoria, IL	Peoria Promise	2007-08	Universal	64 credit hours of tuition at Illinois Central College
Phillips County, AR	Great River Promise	2010-11	Universal	Four semesters of tuition and fees at Arkansas Northeastern College
Pittsburgh, PA	Pittsburgh Promise	2007-08	Academic merit criteria	\$5,000 a year in tuition and fees at colleges and universities in Pennsylvania
Pontiac, MI	Pontiac Promise	2011-12	Universal	First two years of tuition at Oakland Community College
Saginaw, MI	Saginaw Promise	2011-12	Universal	\$2,000 a year toward tuition at a two-year school in Michigan and \$4,000 a year toward tuition at a four-year school in Michigan
Sparkman, AR	Sparkman Promise	2010-11	Academic merit criteria	Tuition and fees anywhere in the United States
Syracuse, NY	Syracuse Say Yes to Education	2009-10	Universal	Tuition at most SUNY & CUNY schools and 20 private college and universities in New York
Ventura, CA	Ventura College Promise	2005-06	Income criteria	Tuition and fees at Ventura College

Source: Upjohn Institute, October 2013.

graduation rates and subpar performance on state assessments. Similar to other Promise communities, Pittsburgh developed its scholarship program as part of a broader economic redevelopment strategy. In the 1970s and 1980s, Pittsburgh faced challenges that were part of a larger national trend in deindustrialization affecting a number of cities in the industrial Midwest Rust Belt region—including Kalamazoo, Michigan. The mass closure of once-thriving steel and manufacturing plants pushed the unemployment rate in Pittsburgh to 18.2% in January 1983. The population of the city quickly waned as local young people moved elsewhere to find jobs, leaving in their wake an aging population and urban decay. In the early 2000s, Pittsburgh had the second highest out-migration of single, college-educated youth among metropolitan areas in the United States (Franklin, 2003).

Faced with these challenges, the mayor of Pittsburgh, the superintendent of the Pittsburgh Public School District, and board members of the Pittsburgh Foundation (a local philanthropic organization) announced in December 2006 the launch of a scholarship system that eligible high school graduates within the district can use toward college expenses—i.e., the “Pittsburgh Promise.” High school graduates from the class of 2007-08, who were juniors at the time the scholarship was announced, were the first eligible recipients for scholarship funds. Similar to other Promise programs, students were eligible for the scholarship only if they graduated from a public or charter high school in the district and had been students in the district and residents of the city continuously since at least 9th grade, thus honoring the place-based intent of the program. However, unlike most other Promise programs at the time, students in Pittsburgh also needed to demonstrate academic commitment to receive the scholarship. Specifically, they needed to meet minimum grade point average (GPA) and attendance thresholds that have tightened over the course of the program. Table 2 depicts these eligibility requirement changes. Given the timing of the announcement (December 2006), the first eligible graduating class (2007-08) had the least amount of time to improve their academic standing to receive the award, while more recent classes had more time to do so.

During the years investigated in the present study, (2007-08 through 2009-10), the Pittsburgh Promise offered a maximum scholarship of \$5,000 a year for up to four years of college, for a possible total of \$20,000.<sup>1</sup> Students could only use the scholarship toward tuition, fees, books, and room and board at accredited two- or four-year public or private postsecondary degree programs in Pennsylvania. The Promise is a “last dollar scholarship,” meaning that need for support is calculated after federal and state grants and scholarships have been used but before loans or work study funds are applied. Promise recipients are required to apply for federal and state financial aid. Eligible students have five years after high school graduation to use the four years of funding, and they must maintain a minimum 2.0 GPA while in college to continue to receive support from the program.

Students in Pittsburgh submit applications for the scholarship during their senior year of high school. Program administrators then assess whether each applicant meets the eligibility requirements and determines the maximum amount of funds available, based on the year in which the student started school in the district. In July of each year, Promise administrators receive students’ final grades and confirmation of graduation and then submit the roster of scholarship recipients to the postsecondary institutions listed on the students’ Promise application. This prompts the postsecondary institution to update each student’s financial aid package to include the Promise scholarship. As of June 2015, \$64.3 million in scholarship funds had been awarded to 5,634 graduates of the Pittsburgh Public School District (Pittsburg Promise, n.d.).

### ***Past Research on Promise Scholarship Programs***

Prior to the development of the Promise, the most expansive merit-based scholarship programs were developed at the state level. The first, and best known, is Georgia’s Helping Outstanding Pupils Educationally (HOPE) scholarship program. Founded in 1993 and funded by gambling revenue, HOPE covers full tuition to Georgia’s public colleges for state residents with at least a 3.0 GPA. Since the launch of HOPE, more than a dozen states have created and implemented similar scholarship programs with a range of academic eligibility requirements and varying degrees of financial support (Zhang and Ness, 2010). By and large, the research base finds that these programs are associated with improved odds of postsecondary enrollment. For example, researchers have found the introduction of the HOPE scholarship was associated with a rise in college enrollment rates by estimates ranging from a 5% increase (Cornwell, Mustard, and Sridhar, 2006) to a 7-8% increase (Dynarski, 2000). Evaluations of similar state merit-based programs in Massachusetts (Goodman, 2008) and in New Mexico (Binder and Ganderton, 2004) created to duplicate

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<sup>1</sup> Starting in 2012, after our study concluded, the award increased to \$10,000 a year for a possible aggregate total of \$40,000.

**Table 2. Pittsburgh Promise Eligibility Requirements and Average College Costs**

	Pre-Promise Years		Promise Available Years		
	2005-06	2006-07	2007-08	2008-09	2009-10
Scholarship Eligibility Requirements					
Minimum GPA	NA	NA	2.00	2.25	2.50
Minimum Attendance	NA	NA	None	85%	90%
Average Cost of Tuition and Fees to Promise-Eligible Students					
Pennsylvania Four-Year Public School	\$8,600	\$8,990	\$4,462	\$4,989	\$5,560
Pennsylvania Two-Year Public School	\$5,289	\$5,630	\$870	\$1,034	\$1,210
Ohio Four-Year Public School	\$15,981	\$16,933	\$17,737	\$18,015	\$18,373
Ohio Two-Year Public School	\$5,779	\$6,219	\$6,458	\$6,375	\$6,305

*Note.* Tuition and fees are calculated from the National Center for Education Statistics' Integrated Postsecondary Data System. Tuition and fees for Pennsylvania schools in 2008, 2009, and 2010 indicate the average cost minus \$5,000 to reflect the adjustment for the Promise scholarship award.

HOPE's success, yielded postsecondary enrollment gains of a similar magnitude. Whether these results convey to community-based Promise programs, however, has not been demonstrated.

Being the first-established and longest Promise program in operation, the Kalamazoo Promise has to date garnered the most attention by researchers. A handful of published empirical analyses indicate that the establishment of the program in Kalamazoo has yielded benefits to schools in the city. For example, a qualitative study of 41 middle and high school faculty members in Kalamazoo found that teachers and principals were more likely to embrace high educational expectations for their students and were more likely to communicate those expectations to their students as a result of the Promise (Jones, Miron, and Kelaher-Young, 2012). Similarly, a qualitative study of 34 students in the district conducted by the same research team found that students in the district perceived a growth in their peers' aspirations to succeed in school since the scholarship became available (Miron, Jones, and Kelaher-Young, 2012). Lastly, using ACT data to make comparisons before and after the introduction of the scholarship, Andrews, DesJardins, and Ranchhod (2010) showed that once the Promise became available, students in Kalamazoo were more likely to send their ACT admission test scores to in-state schools (which honored the scholarship) and more likely to send their ACT admission test scores to more selective universities (such as the University of Michigan and Michigan State University). The findings from these studies suggest that Kalamazoo students are adjusting their postsecondary aspirations in response to the opportunities made available through the Promise program.

Initial research on the Promise scholarship program in Pittsburgh found that since the scholarship became available, high school enrollment rates in the district stabilized rather than continuing to decline; parents of recent transfers into the district identified the Promise as an important factor in their decision to move into the city; and the percentage of students in the district enrolling in college before and after the inception of the program increased slightly (Gonzalez, Bozick, Tharp-Taylor, and Phillips, 2011). The present study builds on this seminal research in Pittsburgh to assess whether and how the Promise may have influenced the decision to enroll in college among eligible students in the district. In focusing on the



implementation phase of the Pittsburgh Promise, our study provides empirical evidence to assess the magnitude of postsecondary enrollment gains that can be expected from community-based scholarship programs in their initial years of operation. The information gleaned from our analyses is particularly timely, as Promise programs are currently operating in approximately 30 communities with little empirical evidence to support their efficacy in improving the postsecondary prospects of local youth.

### *Theoretical Framework*

We approached our analysis of the initial implementation of the Pittsburgh Promise using a standard human capital investment model (Becker, 1964) to theorize the effect of a merit-based scholarship on college enrollment. Embedded in classic economic ideas about cost-benefit trade-offs, the human capital investment model, in simple terms, posits that attending college incurs costs in the short term (e.g., tuition, fees, room and board, foregone earnings) that are translated into benefits in the long term (e.g., greater career opportunities, steady employment, higher earnings, prestige, etc.). With these considerations in the balance, youth make the decision to enroll in college when they perceive the long-term benefits to outweigh the short-term costs, and conversely, youth forgo college when they perceive the short-term costs as too much to handle. Within Becker's model, scholarship programs like the Promise are theorized to induce college enrollment by substantially reducing one of the most critical and immediate short-term costs in the cost-benefit calculus: tuition and fees.

To illustrate the extent to which the Promise potentially altered the short-term costs for the average eligible student in Pittsburgh, we used the National Center for Education Statistics' Integrated Postsecondary Education Data System (IPEDS) to calculate mean tuition and fees in (current dollars) of two- and four-year public schools in Pennsylvania for the two years prior to the Promise (2005-06 and 2006-07) and three years after it became available (2007-08, 2008-09, and 2009-10). We adjusted the latter three years to reflect the cost with the Promise scholarship applied (i.e., we subtracted \$5,000) to provide a sense of how the cost of higher education changed for Promise eligible graduates in the years immediately before and after the scholarship was implemented. These cost averages appear in Table 2. As Pittsburgh is located 45 miles from the Ohio border, Table 2 also shows the average out-of-state total tuition and fees at comparable schools in Ohio as they provide the nearest out-of-state alternative.

An examination of cost differences across years reveals two notable shifts. First, a comparison of tuition and fees in 2006-07 (the school year right before the Promise was available) and in 2007-08 (the first year of the program) shows a sharp decline in the total cost for attendance. For Promise-eligible youth, *four-year* college attendance in 2007-08 cost less than *two-year* college attendance just one year prior. Moreover, in 2007-08 the cost of attending a two-year college dropped to around \$1,000. As the scholarship substantially reduces this financial barrier, we anticipated, per the human capital investment model, an increase in enrollment at both two- and four-year schools for students meeting the eligibility requirements. Second, the cost to Promise recipients for comparable schools in Ohio was substantially higher in 2007-08, 2008-09, and 2009-10, as students cannot use the scholarship outside of Pennsylvania. As such, we anticipated a decline in the share of Promise-eligible students attending out-of-state schools once Pittsburgh implemented the scholarship.

It is possible that this tuition discount component of individual cost-benefit calculations may be less of a factor for youth attending schools in disadvantaged urban areas like Pittsburgh, where a quarter of families with children under the age of 18 live in poverty and only one-tenth of the population has a bachelor's degree (U.S. Census Bureau, 2011). For these youth—who are unlikely to see their older peers continue on to college and who deal with the daily stressors associated with economic scarcity—cost-benefit calculations regarding investments in postsecondary education likely contain a greater sense of uncertainty. Low-income youth are far less likely to know the costs of college, understand the financial aid process, and calculate the

lifetime earning benefits associated with a college degree (Kane and Avery, 2004; Betts, 1996; Grodsky and Jones, 2007). Research in both sociology and economics on college enrollment decisions has found that in lacking these critical pieces of information, low-income youth inaccurately estimate the total cost-benefits of college enrollment, and, consequently, make less than optimal postsecondary choices (Altonji, 1993; Beattie, 2002).

The administrators of the Pittsburgh Promise have attempted to substantially reduce this uncertainty by providing direct outreach to schools complemented by community-based marketing efforts. However, qualitative interviews with students in Pittsburgh revealed that they have incomplete information regarding the program's operation (Gonzalez et. al, 2011). The majority of students interviewed lacked clarity on at least one of the program's academic requirements, sample members were most confused about funding levels, and none of the students interviewed were aware that the scholarship was awarded as a "last dollar" supplement (Gonzalez et al., 2011). It is worth noting that these interviews were conducted in 2010, three years after the launch of the scholarship program, when presumably information about it would be more widely known (Gonzalez et. al, 2011). Thus, it is likely that students experienced the same or an even greater level of uncertainty about the scholarship during the years immediately after the scholarship became available.

We theorized that a finding of an association between the introduction of the Promise and an increase in the odds of postsecondary enrollment would provide evidence aligning with the standard human capital investment model where youths' enrollment behaviors respond to the immediate attenuation of short-term costs. Conversely, we posited that, in the case of a finding of null effects of the Promise on college enrollment, one viable explanation would be uncertainty in the cost-benefit calculation that weakens the predictive validity of the standard human capital model.

As one of the first studies to estimate the effects of a Promise scholarship on college enrollment, we view our analysis as a preliminary foundation for exploring these theoretical possibilities, among others, in understanding how tuition subsidies can potentially support the transition to college among inner-city youth.

## Analytic Approach

Our study employs a difference-in-difference design to assess whether the introduction of the Promise scholarship program directly influenced changes in rates of college enrollment among students graduating from public high schools in the City of Pittsburgh in the years immediately following the launch of the program.<sup>2</sup> A difference-in-difference design is a quasi-experimental method that allows us to eliminate some sources of confounding variation by comparing outcomes pre- and post the enactment of a policy/program—in our case, the Promise program—for two comparable sets of individuals. Under the logic of a difference-in-difference design, if the introduction of the Promise scholarship program induced a change in

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<sup>2</sup> As an alternative method, we had considered a regression discontinuity (RD) design that would compare college enrollment outcomes among those immediately above the eligibility thresholds (or "cut point") as the treatment group with those immediately below the eligibility thresholds as the comparison group. For the RD to produce unbiased estimates, the number of students distributed around the eligibility thresholds must be sizeable for adequate statistical power to detect program effects. Our data do not meet this requirement, as there are few (approximately 25 students) below 5% of the attendance threshold in each year the scholarship became available. Additionally, the thresholds need to be firmly maintained. There is some anecdotal evidence that in the first year of the program, a small number of students petitioned to establish their eligibility after final grades were assigned, which complicates the application of the RD design. Further, a RD design only estimates the marginal effect of the program, i.e., the effect of the program on those near the cut point. This level of information is less informative for communities considering the overall or "average" benefit of instituting a Promise program. The difference-in-difference approach is better suited for this initial analysis as it has no distributional requirements around eligibility thresholds, and the estimator produces an average program effect for the entire district that is less sensitive to strict adherence to eligibility thresholds.

college enrollment within the district, we would expect that, on average, rates of college enrollment (CE) in the years in which the scholarship became available (*PROMISE AVAILABLE*) would be higher than rates of college enrollment in the years before the scholarship became available (*PRE-PROMISE*):

$$(1) \quad CE_{PROMISE\ AVAILABLE} - CE_{PRE-PROMISE} > 0$$

This first order difference is at the aggregate level, representing changes in enrollment for *all students* in the district. However, as the scholarship is only awarded to those who meet the eligibility requirements, the enactment of the program should, in theory, affect only those students who are eligible for Promise. By definition, Promise-eligible students are more academically prepared (i.e., they meet predefined GPA and attendance criteria). Therefore, they are more likely to attend college than their peers who are not eligible regardless of the availability of a scholarship program. As a result, irrespective of the Promise, the difference between college enrollment rates (CE) of Promise-eligible students (*ELIGIBLE*) and non-eligible students (*NON-ELIGIBLE*) should be greater than zero:

$$(2) \quad CE_{ELIGIBLE} - CE_{NON-ELIGIBLE} > 0$$

Within a difference-in-difference framework, we can then consider those who meet the eligibility requirements in the years before the enactment of the scholarship as our control group and those who meet the eligibility requirements in the years after the enactment of the scholarship as our treatment group under the assumption that both groups of students—by living in the City of Pittsburgh, by receiving public education in the Pittsburgh Public School District, by experiencing adolescence and high school during approximately the same historical time period, and by maintaining similar academic profiles—are essentially comparable. Assuming there are no other systematic changes in the district that would substantially alter patterns of college enrollment, the difference in college enrollment  $\eta$  among Promise eligible students before the scholarship was introduced (the control conditions) and after the scholarship was introduced (the treatment conditions) can be attributed directly to the Promise. To obtain  $\eta$ , we substitute the difference calculated in equation 2 into the difference calculated in equation 1 (hence the name “difference-in-difference”):

$$(3) \quad CE (PROMISE\ AVAILABLE_{ELIGIBLE - NON-ELIGIBLE}) - CE (PRE-PROMISE_{ELIGIBLE - NON-ELIGIBLE}) = \eta$$

This resulting difference  $\eta$  assesses whether the introduction of the scholarship bolsters the college enrollment advantage for those who are eligible for the scholarship relative to those who are not eligible. If  $\eta > 0$ , we have strong evidence in support of the efficacy of the scholarship program.

To obtain an estimate of  $\eta$ , we applied maximum likelihood estimation techniques to a structural model of the following form:

$$(4) \quad p(CE) = \alpha + \beta AVAILABLE + \delta ELIGIBLE + \eta AVAILABLE \times ELIGIBLE + \gamma \mathbf{X}$$

In this model, the probability  $p$  of a student in Pittsburgh enrolling in college ( $CE$ ) is a function of a constant  $\alpha$ , a variable  $AVAILABLE$  that indicates whether or not the student graduated from high school before or after the scholarship program became available in the district, a variable  $ELIGIBLE$  that indicates whether or not the student met the eligibility requirements for the scholarship program, and a multiplicative interaction term  $AVAILABLE \times ELIGIBLE$  between the two indicator variables. Our estimate of  $\beta AVAILABLE$  indicates the change in college enrollment before and after the enactment of the program for those who are not eligible for the scholarship. Our estimate of  $\delta ELIGIBLE$  indicates the difference in

college enrollment between those who are eligible and those who were not eligible for scholarship in the years prior to the enactment of the program.

Our key parameter of interest is  $\eta$ —our difference-in-difference parameter—which indicates whether the difference in college enrollment between those who are eligible and those who are not eligible for the scholarship is higher after the enactment of the scholarship program than in the years immediately prior. We estimated this model by pooling data on five graduating high school classes within the Pittsburgh Public School District: 2005-06, 2006-07, 2007-08, 2008-09, and 2009-10. As the Promise first became available for the graduating class of 2007-08, graduates in 2005-06 and 2006-07 who met the eligibility criteria for the scholarship served as the pre-program enactment control group, and graduates in 2007-08, 2008-09, and 2009-10 who were eligible for the scholarship served as the post-program-enactment treatment group.

Three key criteria needed to be met to produce an unbiased estimate of our difference-in-difference parameter  $\eta$ : (1) there could be no other major district initiatives geared toward college enrollment launched during the defined study periods; (2) the characteristics of the population of eligible students must have been approximately the same before and after the launch of the scholarship program; and (3) the difference between program eligible-and program-ineligible students ( $CE_{ELIGIBLE} - CE_{NON-ELIGIBLE}$ ) must have been parallel over time for the control group prior to the launch of the program. We used the following methods to ensure we met these three key criteria.

First, we ensured that the period of observation pre- and post-intervention was free of other systematic changes within the district that could also potentially influence changes in college enrollment. To this end, we chose the class of 2006 as a starting point for our analysis because it corresponded with the arrival of a new superintendent and the adoption of a new math, science, and English curriculum within the district—both of which occurred in 2006. Including graduates prior to 2006 would have risked the possibility of confounding changes in college enrollment due to the Promise with changes in enrollment due to the change in leadership and the new curriculum. We used the class of 2010 as an endpoint to our observations as it was the most recent class for which data was available at the time of our study.

Second, those eligible for the Promise must have been comparable before and after the implementation of the program in order to assert that the Promise was responsible for any observed changes in college enrollment. For example, if greater proportions of youth from affluent families became eligible for the Promise between 2007 and 2010, an observed increase in enrollment after the implementation of Promise could have been due to the enhanced resources of students who were eligible for the Promise and not due to the Promise itself. To mitigate this possibility, we included a vector  $\mathbf{X}$  of time-invariant student-level control variables (i.e., sex, race/ethnicity, eligibility for free or reduced-price lunches, limited English proficiency, and age at graduation) whose relationship with CE was captured in the estimated parameters  $\gamma'$ . Additionally, we included high school and graduating-class fixed-effects to control for individual aspects of the schools the students attended or their particular graduating class (such as shared norms and values of their peers) that may have differed before and after the introduction of the Promise.

Lastly, we needed to ensure that the difference between program-eligible and program-ineligible students ( $CE_{ELIGIBLE} - CE_{NON-ELIGIBLE}$ ) was parallel over time prior to the launch of the program. This “parallel trend” assumption was necessary because the underlying trend of the non-eligible group provided the baseline against which we evaluated post-treatment differences with the eligible group. An erratic or unstable baseline would have made it difficult to statistically detect an effect of the Promise. As will be graphically depicted later in Figure 1, the difference in college enrollment trends in Pittsburgh immediately prior to the Promise met this parallel trend assumption.

## Data

To estimate our difference-in-difference model, we combined two data sources: secondary enrollment data maintained by the Pittsburgh Public School District and postsecondary enrollment data maintained by the National Student Clearinghouse. We used the former data set to identify students who graduated from Pittsburgh Public Schools and met the three eligibility criteria for the scholarship; we used the latter data set to identify whether these graduates enrolled in college after finishing high school.

We based our analysis on 8,718 students who graduated with a diploma from one of the ten public high schools in the Pittsburgh Public School District in one of five years: 2005-06, 2006-07, 2007-08, 2008-09, and 2009-10. This included only those who received a regular diploma; GED recipients are not eligible for the Promise scholarship. The Pittsburgh Public School District does not maintain grade point average and attendance data for students enrolled in the district's four charter schools, and the district's four charter schools do not maintain data in a systematic way that is comparable with the district. Therefore, while the scholarship is available to those attending charter schools in Pittsburgh, we limited our analysis only to public high school graduates.

### *Dependent Variable*

The key dependent variable in our analysis was college enrollment, which was determined using data from the National Student Clearinghouse, a non-profit organization that maintains transcript files for 92% of institutions in the United States (primarily to provide enrollment verification services to financial aid lenders and degree verification services to prospective employers). Through an agreement with the Pittsburgh Public School District, the National Student Clearinghouse provided information on the name of the college or university in which their graduates had enrolled, as well as their dates of enrollment.<sup>3</sup> From this data, we constructed two categorical measures of college enrollment.

The first measure of college enrollment is a binary variable coded 1 if the sample member had enrolled in any postsecondary institution by October 1 of the year in which they graduated from high school, and 0 if they had not. We used this time-referenced approach because earlier cohorts have more time to enroll in college than later ones have. This time referencing was necessary because comparing graduates across years without doing so would bias overall enrollment rates in favor of those in the pre-Promise years.<sup>4</sup>

The second measure of college enrollment is a nominal variable indicating the student's type of postsecondary institution attended: enrollment in a two-year school in Pennsylvania, enrollment in a four-year school in Pennsylvania, enrollment in a school of any level outside of Pennsylvania, and no postsecondary enrollment. For ease of expression, we refer to the first two categories as two-year schools and four-year schools, respectively. There were not enough students in the out-of-state sample attending two-year schools to differentiate patterns of two- and four-year enrollment, so we only estimated the odds of enrolling in any school outside of Pennsylvania.

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<sup>3</sup> The National Student Clearinghouse maintains data for more than 92% of all postsecondary institutions in the United States. Given that coverage is not complete, it is possible that a small number of our sample members were enrolled in college but misclassified as not enrolled. However, the schools missing from their records tend to be smaller trade schools. Therefore, any bias due to incomplete coverage and misclassification should have minimal influence on our overall findings.

<sup>4</sup> We used October 1 as a cut point to maintain comparability with the U.S. Census "Current Population Survey," which measures school enrollment in their October survey supplement.

### *Key Predictor Variables*

*Promise Availability.* A simple form of the model would include a binary variable, *AVAILABLE*, set equal to “1” for all students who graduated after the Promise program became available, and “0” for all students who graduated before the Promise became available. Rather than including this single binary variable, we allow for much more flexible time trends that vary by high school. We include 49 binary variables (10 high schools multiplied by 5 graduating classes minus 1 for an omitted category) to accommodate any factors affecting college attendance that change over time in ways that are unique to each school. The inclusion of these binary variables—e.g., “high school and graduating class fixed-effects”—controls for aspects of the schools the students attend (such as policies and programs) or their particular graduating class (such as shared norms and values of their peers) that may influence the college enrollment decisions of all students whether or not they are Promise eligible.<sup>5</sup> These high school and graduating class fixed-effects collectively make the variable *AVAILABLE* superfluous in our difference-in-difference model specification. In our sample, 3,594 students graduated in the pre-Promise years (1,885 graduates in 2005-06 and 1,709 graduates in 2006-07), and 5,124 students graduated in the Promise-available years (1,802 in 2007-08; 1,636 in 2008-09; and 1,686 in 2009-10).

*Promise Eligibility.* For each graduate, we determined whether they met the three 2009-10 eligibility requirements to receive the Promise scholarship: (1) earned a minimum of a 2.5 GPA, (2) maintained a minimum attendance record of 90%, and (3) attended a public or charter school within the district continuously since at least the 9th grade. As stated earlier, the eligibility requirements have changed since the program’s inception, becoming more academically stringent over time. For our analysis, we applied the 2010 eligibility requirements across all five graduating classes. Applying different eligibility requirements to each year would potentially conflate enrollment responses to the scholarship program with changes in the thresholds for each criterion. Using a single set of eligibility requirements facilitates a more straightforward interpretation of the estimated coefficients. We chose the 2010 requirements as they provide a more useful gauge of how the program may potentially work moving forward in Pittsburgh. We created a binary variable coded “1” if the sample member met the 2009-10 eligibility requirements and “0” if they did not. This binary variable corresponds to *ELIGIBLE* in our difference-in-difference model specification. In sensitivity analyses not shown, we estimated our models when applying the 2007-08 and 2008-09 requirements to all graduates in the sample, and our findings were consistent across specifications.

A handful of instances where there were missing data on some of these criteria precluded us from classifying students as eligible or ineligible. These instances appeared mostly in the class of 2005-06, where less-thorough enrollment histories made it unclear whether some graduates met the continuous enrollment criterion. For these cases, we created a separate binary variable to indicate that their eligibility could not be determined. The distribution of eligibility status across all graduating classes and the distributions for the rest of the variables used in our analysis appear in Table 3. Across all five years, the percentage of high school graduates meeting the 2009-10 eligibility requirements hovered just under 50%.

*Difference-in-Difference Variable.* The key variable of interest in our difference-in-difference model specification is  $AVAILABLE \times ELIGIBLE$ . This variable is created by multiplying the two variables described above. The  $AVAILABLE \times ELIGIBLE$  variable is equal to one for all students who graduated after the Promise became available *and* met the 2010 eligibility requirements; it is zero for all other students. The coefficient on this interaction,  $\eta$ , is the estimated effect of the Promise on college enrollment.

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<sup>5</sup> The inclusion of high school and graduating class fixed-effects adjust the standard errors for correlation among observations (i.e., students) that are nested within schools. The parameter estimates for the high school and graduating class fixed-effects are suppressed in all tables, as they are simply control variables and not of practical relevance to the policy questions posed in our study.

**Table 3. Characteristics of Pittsburgh Public School Graduates: 2005-06 through 2009-10**

	<u>Pre-Promise Years</u>		<u>Promise Available Years</u>			<u>All Years</u>
	<u>2005-06</u>	<u>2006-07</u>	<u>2007-08</u>	<u>2008-09</u>	<u>2009-10</u>	
Promise Eligible						
No	49.9	49.6	50.9	49.5	51.4	50.3
Yes	46.3	49.6	49.1	49.4	48.6	48.5
Undetermined	3.8	0.8	0.0	1.2	0.0	1.2
Sex						
Female	55.7	53.5	55.8	54.4	53.0	54.5
Male	44.4	46.5	44.2	45.6	47.0	45.5
Race/Ethnicity						
Asian	1.8	1.9	1.1	1.1	1.2	1.4
Black	51.0	50.4	49.6	51.0	55.5	51.5
Hispanic	0.6	0.4	0.8	1.1	0.8	0.7
White	45.6	45.1	45.9	43.7	38.9	43.9
Other	1.1	2.2	2.6	3.3	3.6	2.5
Free/Reduced-Price Lunch Eligible						
No	57.8	55.8	57.5	50.0	41.5	52.7
Yes	42.2	44.2	42.5	50.0	58.5	47.3
Limited English Proficiency						
No	99.3	99.4	99.1	98.7	98.9	99.1
Yes	0.7	0.6	0.9	1.3	1.1	0.9
Age at Graduation						
	18.3	18.3	18.3	18.3	18.3	18.3
Total	1,885	1,709	1,802	1,636	1,686	8,718

### *Control Variables*

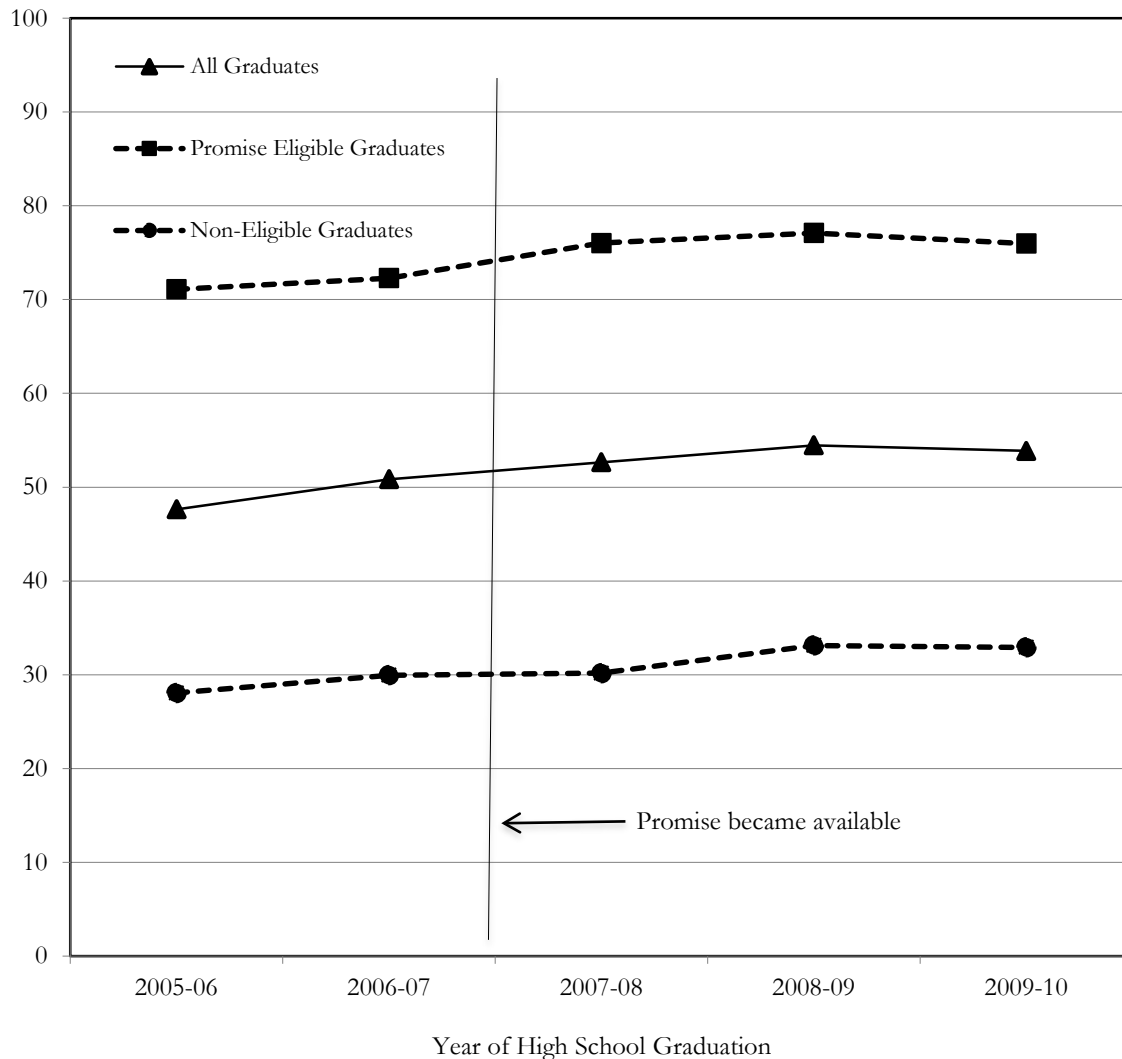
In our models, we control for a set of sociodemographic characteristics (**X**) that are known to shape patterns of college enrollment (see, for example, Bozick and Lauff, 2007) and are available in Pittsburgh Public School District's secondary enrollment data files: sex, race/ethnicity, eligibility for free or reduced-price lunches, limited English proficiency, and age at graduation. Also, note that although not structurally included in **X**, the 49 "high school and graduating class fixed-effects" (included as part of *AVAILABLE*) serves to control for all time-invariant aspects of students' schools and their particular graduating classes. In our multivariate analyses, we report the parameter estimates for all the control variables. However, because there is already a large volume of literature that examines their relationship with college enrollment, and because they are not central to our evaluation of the Promise, we do not discuss their associated coefficients.

## Findings

As a prelude to our difference-in-difference analysis, we plotted college enrollment rates by Promise eligibility status as well as for all graduates (Figure 1). It is first worth noting that, on average, on-time enrollment rates of high school graduates in Pittsburgh are about 6 to 12 percentage points lower than the national average of 60% for high school seniors in 2003-04 (Bozick and Lauff, 2007). This is not surprising given the social and economic challenges faced by urban public school districts in the Rust Belt region. Those challenges notwithstanding, there was a sustained increase in enrollment across the period of our study, from 48% among graduates in 2005-06 to 54% among graduates in 2009-10.

As expected, those eligible for the scholarship program enrolled in college at substantially higher rates than their peers who met the eligibility requirements. For example, in 2007-08, the year in which the

**Figure 1. Percent of Pittsburgh Public School Graduates Enrolled in College**





Promise first became available, 76% of eligible graduates enrolled in college compared with 30% of non-eligible graduates. However, across the period of our study—both before and after the introduction of the scholarship program—differences between eligible and non-eligible graduates remained constant (around 42-45 percentage points).<sup>6</sup> This suggests that the availability of the Promise scholarship did not distinctly induce a change in behavior among graduates eligible for the award, but this analysis does not account for changes in the composition of the student body or differences between schools during this period. We then formally tested whether the availability of the Promise affected college enrollment, controlling for student and school characteristics.

Table 4 shows the estimates of our difference-in-difference model, estimated using the maximum-likelihood logit link function. Coefficients from logit regression models can be interpreted in terms of their direction and statistical significance: statistically significant coefficients greater than zero indicate a positive relationship with postsecondary enrollment net of the other variables, and statistically significant coefficients less than zero indicate a negative relationship with postsecondary enrollment net of the other variables.

Among our key policy variables, the coefficient for Promise eligibility is significant ( $\delta = 1.59$ ) at  $p < 0.01$ , indicating that during the pre-Promise years, those who were eligible for the Promise had a higher likelihood of attending college than those who were not eligible. Our main variable of interest is the difference-in-difference term  $\eta AVAILABLE \times ELIGIBLE$ . This interaction term has a positive coefficient ( $\eta = 0.15$ ), but it does not reach statistical significance, which indicates insufficient evidence to conclude that the probability of Promise-eligible youth attending college is contingent on the availability of the scholarship. In other words, the enrollment advantage that Promise-eligible youth hold over non-eligible youth does not differ before and after implementation of the scholarship program.<sup>7</sup>

While there are no detected effects of the Promise scholarship program on college enrollment *overall*, there may be changes in the *type* and *location* of colleges that high school graduates in Pittsburgh decide to attend, which are obscured when using an aggregated measure of college enrollment as the outcome. As described earlier, the Promise scholarship is a “last-dollar” subsidy applicable only to schools within Pennsylvania, and therefore varies in terms of its role in offsetting the cost of attendance depending on the type and location of the school. To explore these possibilities, we replaced our binary measure of college enrollment with our nominal measure that disaggregates enrollment by type and location of school. We then re-estimated our difference-in-difference using a multinomial logit link function.<sup>8</sup> With four separate outcomes—four-year school within the state, two-year school within the state, out-of-state school, and no postsecondary enrollment—the number of contrasts and estimated parameters increases substantially. Therefore, for clarity of presentation, we show only the estimated coefficients for the difference-in-difference parameter for our key enrollment outcome comparisons in Table 5. The rest of the parameter estimates are available from the authors upon request.

<sup>6</sup> The difference in college enrollment rates between program eligible and program ineligible students ( $CE_{ELIGIBLE} - CE_{NON-ELIGIBLE}$ ) is approximately parallel over time prior to the launch of the program, satisfying the “parallel trend” assumption required for an efficient difference-in-difference estimator.

<sup>7</sup> In analyses not shown, we estimated the models separately for key sociodemographic groups (males vs. females, White vs. non-White students, students eligible for free or reduced-price lunch vs. students not eligible for this benefit, limited-English-proficient students vs. English-proficient students). Our estimate of  $\eta AVAILABLE \times ELIGIBLE$  was comparable and consistent across models, suggesting that the Promise was neither more nor less effective for different subgroups of students. Results are available upon request from the authors.

<sup>8</sup> The multinomial logit model requires the assumption of “independence of irrelevant alternatives,” which assumes that including or removing outcome categories does not affect the relative odds among the other outcome categories. To this end, we conducted a Hausman test (Hausman and McFadden, 1984), which indicated that our four-category outcome used in the models presented here meet this requirement.

**Table 4. Parameter Estimates from a Logit Regression Model Predicting College Enrollment**

	<u>Coefficient</u>	<u>Standard Error</u>
<i>Control Variables</i>		
Sex		
Female (reference)	--	--
Male	-0.17**	0.05
Race/Ethnicity		
Asian	0.00	0.22
Black	0.10	0.10
Hispanic	-0.69*	0.32
White (reference)	--	--
Other	0.03	0.03
Free/Reduced Price Lunch Eligible		
No (reference)	--	--
Yes	-0.38**	0.06
Limited English Proficiency		
No (reference)	--	--
Yes	-0.20	0.22
Age at Graduation	-0.54**	0.05
<i>Key Predictor Variables</i>		
Eligibility		
Not Promise Eligible (reference)	--	--
Promise Eligible	1.59**	0.08
Eligibility Undetermined	-0.21	0.29
Difference-in-Difference Parameter		
Promise Available x	0.15	0.10
Promise Eligible		

*Note.* All models control for high school and graduating class fixed-effects.

N = 8,718

\*  $p < .05$

\*\*  $p < .01$

**Table 5. Select Difference-in-Difference Parameter Estimates from a Multinomial Logit Regression Model Predicting Type of College Enrollment**

	<u>Coefficient</u>	<u>Standard Error</u>
<i>Difference-in-Difference Parameter:</i>		
<i>Promise Available x Promise Eligible</i>		
Two-Year School vs. No Enrollment	0.11	0.14
Four-Year School vs. No Enrollment	0.36**	0.13
Four-Year School vs. Two-Year School	0.25	0.16
Out-of-State School vs. Two-Year School	0.17	0.23
Out-of-State School vs. Four-Year School	-0.08	0.23
Out-of-State School vs. No Enrollment	0.29	0.22

*Note.* Estimated effects are net of sex, race/ethnicity, free/reduced price lunch eligibility, limited English proficiency, age at graduation, high school and graduating class fixed-effects.

N = 8,718

\*  $p < .05$

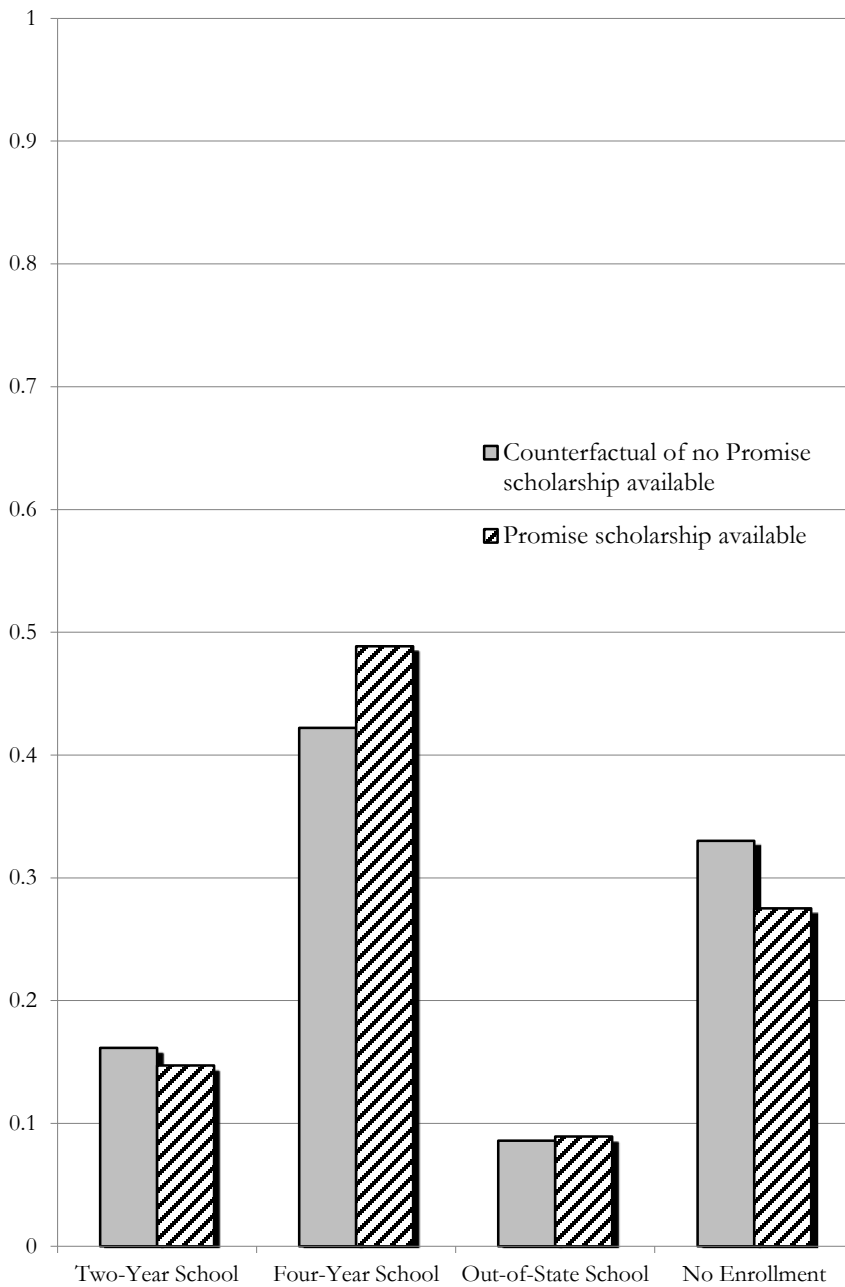
\*\*  $p < .01$

We find some support for the proposition that the Promise scholarship, as a last dollar subsidy, may influence the decision to enroll in a four-year school. The difference-in-difference estimate for the four-year school versus no enrollment contrast yields a positive coefficient ( $\eta = 0.36$ ), significant at  $p < 0.01$ . This indicates that the difference between Promise-eligible and non-eligible students in the odds of attending a four-year school (versus not enrolling) was higher in the years in which the Promise was available than in the years before it was available. Although we expected to see positive changes in the probability of enrolling in a Pennsylvania school due to the scholarship's applicability to schools within the state, neither the four-year school versus out-of-state school difference-in-difference parameter estimate nor the two-year school versus out-of-state school difference-in-difference estimate reached statistical significance.

Interaction terms, such as our difference-in-difference parameter, are often difficult to interpret in a multinomial context with multiple outcomes and contrasts. Therefore, we used the parameter estimates from the model to calculate the predicted probability of enrollment at each type of school for those students who were eligible for the scholarship in the years during which the Promise was offered. First, we predicted the enrollment probabilities under the hypothetical case in which the Promise was not available to these students. We compared this to the predicted probabilities under the actual situation in which the Promise was available. These probabilities appear graphically in Figure 2. In calculating these predicted probabilities, we set the rest of the covariates at their mean.

This figure reveals two points of note. First, in accord with non-significant coefficients shown in Table 5, the probability of attending a two-year school or an out-of-state school changes very little when the Promise program is introduced. Despite the scholarship having made two-year schools cheaper and out-of-state schools relatively more expensive, enrollment in these schools was for the most part unaffected. Second, the

**Figure 2. Predicted Probability of Postsecondary Enrollment for Promise Eligible Graduates**



probability of enrollment in a four-year school increased from 0.42 to 0.49, while the probability of not enrolling in college declined from 0.33 to 0.28. Note that this does not necessarily mean that students who would have otherwise forgone college are now deciding to attend four-year schools. Although this is a possibility, an alternative possibility is that some students who would not have enrolled now enroll in two-year colleges and that some who would have enrolled in two-year colleges now enroll in four-year colleges. This could leave the two-year college enrollment rate relatively unchanged as the other two rates change.

In separating out these different postsecondary destinations, we are able to detect some “promise” for the Promise scholarship program, mainly in terms of four-year school enrollment. Following the introduction of the program, the probability of enrolling in a four-year school in Pennsylvania increased

among those who were eligible for the scholarship. Furthermore, the Promise does not appear to bolster the enrollment of students into four-year schools within the state at the expense of two-year schools within the state or out-of-state schools.

## Discussion

As community-driven, merit-based college scholarship programs like the Promise are developed and implemented in additional cities and evolve where the program already exists, the ability of these programs to support the high school-to-college transition among local youth will remain a critical benchmark by which such programs are deemed successful. Promise programs are intended to spur economic development by increasing rates of college enrollment among local youth who, in turn, invest in schools, neighborhoods, and the civic life of their communities as adults. Hence, the first step in evaluating the efficacy of these programs is to ascertain their ability to enhance postsecondary opportunities for current high school graduates. The present study, which evaluates the Pittsburgh Promise in its formative years, finds mixed evidence supporting this measure of program efficacy.

In the three years immediately after the Promise became available to Pittsburgh public high school graduates, the on-time college enrollment rate was higher than the two-years immediately before. Specifically, on-time college enrollment rose from 48% among graduates in 2005-06 (two years prior to the Promise) to 54% among graduates in 2009-10 (three years after the Promise was put into place). For any school district, particularly an urban public school district in the Rust Belt— a region beset by an array of social and economic challenges—any uptick in college enrollment is welcome. However, our first analysis, which did not distinguish among college type, did not find evidence that this overall rise could be directly attributable to the enactment of the Promise. Enrollment rates between Promise-eligible graduates and Promise-ineligible graduates did not differ significantly before and after the award became available, providing little evidence that the scholarship directly altered the behaviors of its targeted recipients. We graphically depicted these null findings with respect to *overall* rates of college enrollment and confirmed them in our difference-in-difference analysis.

In terms of theoretical implications, we framed our analysis around the standard human capital investment model (Becker, 1964), which predicts that youth make cost-benefit calculations to guide their college enrollment decisions. In this model, youth weigh short-term costs (e.g., tuition, fees, room and board, forgone earnings) with long-term benefits (e.g., greater career opportunities, steady employment, higher earnings, and prestige). The Promise should reduce one of the most immediate and salient costs—tuition and fees—and thus, spur enrollment. That we found null effects on average suggests that youth in Pittsburgh in the initial years of the scholarship program may not have had sufficient information about the scholarship to make optimal decisions about enrolling in college. This accords with qualitative research findings that youth in the district were uncertain about the eligibility requirements and award amounts (Gonzalez et. al, 2011). With students lacking accurate information about the scholarship program, the standard human capital investment model is likely to be less capable of predicting school investment behaviors, as evidenced in our examination of college enrollment in the aggregate.

Though we do not find changes directly attributable to the Promise when evaluating *overall* enrollment rates, we find important differences when looking at the *types* of schools that graduates choose to attend and how those postsecondary destinations vary once the scholarship becomes available. Recall that for Promise eligible youth, the scholarship brought the cost of a four-year school down to about the cost of a two-year school and made the cost of a two-year school extremely low. Accordingly, we found that the difference between Promise eligible and non-eligible students in the likelihood of attending a four-year school (relative to not enrolling in college at all) was higher in the years in which the Promise was available than in the years

before it was available. Specifically, the probability of enrollment in a four-year school among those eligible for the Promise increased from 0.42 to 0.49. While we do not explore variation among these four-year schools with respect to more fine-grained measures of selectivity, this does accord with the aforementioned research in Kalamazoo (Andrews et. al, 2010), which found that the Promise may redirect students to more ambitious postsecondary options—in our case, four-year colleges and universities. In relative terms, enrollment in four-year institutions can be ambitious for public school students in the inner-city who were on the fence about attending college in the first place.

Though the Promise seeks to support postsecondary ambitions, it limits those ambitions—at least for those participating in the program—to schools within Pennsylvania. In reducing the costs of in-state tuition substantially, we expected that there would be an increase in in-state enrollment following the implementation of the program. Recall that research in Kalamazoo found an increase among students sending their ACT scores to in-state schools (Andrews et. al, 2010). However, we did not find any evidence to support similar behaviors in Pittsburgh. Enrollment contrasts between in-state schools and out-of-state schools did not differ in the years prior to and following the implementation of the scholarship program. While we do not have data on student motives, we speculate that it could be because students who set their sights on out-of-state schools are highly motivated toward these particular schools and already have the resources to attend. Hence, they may be unaffected by scholarship funds geared toward schools that are not in their original choice sets. More research is needed to understand whether and how these programs affect youth who aspire to move outside the state.

As mentioned at the outset, there are approximately 30 Promise-like programs in operation, with 10 more currently in the planning process (Miller-Adams, 2013). To date, there is little evidence regarding the ability of these scholarship programs to bolster the college-going rate of students in the community. In the absence of research on Promise programs, evaluations of state-sponsored, merit-based scholarship programs (such as Georgia’s HOPE scholarship program) provide the nearest plausible benchmark for gauging potential program efficacy. These evaluations find that students positively respond to the provision of tuition subsidies, from a 5-point average increase in enrollment (Cornwell et. al, 2006) to a 7-8% average increase in enrollment (Dynarski, 2000). However, our analysis of the Pittsburgh Promise found largely null effects, on average. It could be that Promise programs may be less effective at supporting postsecondary enrollment than state-level programs are, as states typically have a broader infrastructure in place to administer programs (compared with districts that usually have one or two staff members providing logistics and oversight). It could also be the case that programs like HOPE cover tuition in full, while the Pittsburgh Promise provides only a partial subsidy. Further, because state-level programs affect the lion’s share of their student population, colleges around the state are prepared to utilize the scholarship funds as a means to recruit students and to develop their financial aid packages. As Promise programs evolve and adapt, it is possible that we may eventually see college enrollment effects that are comparable to those observed for state-sponsored, merit-based scholarship programs.

Despite the many strengths of our study, readers should keep one limitation in mind when interpreting our results: our period of observation (2005-06 through 2009-10) coincides with the arrival of a new superintendent and the implementation of a new math, science, and English curriculum in the district (both approximately two years before the launch of the Promise program). In theory, these may have contributed to improvements in the college-going rate in the district *in addition to the Promise*, and thus the effects we observe may be partly attributable to these concurrent activities. We feel our empirical estimates are unlikely biased by these changes for two reasons. First, it takes time for new administrators and new curriculum to take hold and influence more distal academic outcomes—especially ones that are strongly shaped by student’s economic resources, such as college enrollment. If anything, a new administrator and curriculum should most immediately affect changes in student performance and hence eligibility for the Promise.

However, we find no evidence of this, as scholarship eligibility remained constant across the five years of the study.

Second, we anticipate these changes to be gradual, with later classes more affected than earlier ones. To counter this, our models included a control for year of graduation, which should attenuate the threat of bias from any factors that have a general correlation with time rather than with the arrival of a new scholarship program. From a practical perspective, most scholarship initiatives like the Promise are unlikely to be implemented in a vacuum. Instead, most districts intend them to be part of a larger strategy to improve student preparedness for college. As such, our estimate of the effect of the Promise provides a reasonable gauge of the scholarship's potential efficacy for districts that will employ similar initiatives concurrently.

## Conclusion

The present study provides one of the very first empirical assessments of a Promise program's ability to support college enrollment in the initial years of its implementation. We urge readers to use caution when interpreting our findings. While our study employs quasi-experimental methods, the data are observational and cannot unequivocally establish a causal linkage between program implementation and postsecondary enrollment. Additionally, most Promise programs are universal in their eligibility; therefore, the findings from Pittsburgh, which uses academic prerequisites, may not neatly extrapolate to other Promise programs currently in operation.

As an initial foray into this area of evaluation, our study undoubtedly raises more questions than it answers: Will the initial gains we observed be sustained over time? Will postsecondary enrollment rates increase as the scholarship award increases? Are certain subgroups of students more responsive to the award than others? Do Promise programs in other cities, with different scholarship eligibility requirements and benefits, yield the same findings? At present, our evaluation of the Pittsburgh Promise is one of the few that has tracked graduates beyond high school, and despite its noted limitations, it is the only data source that can produce the analyses presented here. More research will be needed to ascertain the full benefits and limitations of Promise programs as they gain traction and evolve.

### Nexus: Connecting Research to Practice

- As Promise programs develop and expand, their presence in the financial aid landscape will be more salient. Financial aid offices in states where Promise programs operate should flag applicants from school districts where the scholarship is offered and provide such information when extending financial aid offers so that prospective students know the true price tag once the scholarship discount has been applied. Such communication efforts can potentially enhance the Promise's ability to encourage enrollment.
- Many Promise programs sustain payment to students contingent on their performance in college. For example, Pittsburgh requires that Promise scholars maintain at least a 2.0 GPA while enrolled in college to continue to receive the tuition discount. Financial aid offices can use such to alert students when they are close to losing their eligibility for the scholarship (e.g., recording just above a 2.0 GPA).
- Local philanthropic organizations considering implementing a Promise program in their own communities should be mindful that increases in college enrollment in the initial years of the program may be modest.

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