The Economics of University-School-Community Partnerships: A Case Study Benefit-Cost Analysis of REACH

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Background

University-school partnerships are a popular strategy for leveraging university and community resources to address comprehensive needs of schools (Miller & Hafner, 2008; Rogge & Rocha, 2004). These arrangements can be mutually beneficial. Schools can take advantage of university expertise, faculty research and clinical services, and support provided by students. At the same time, universities benefit from opportunities for their students to gain practical experience while learning from, building relationships with and supporting their surrounding communities. For these reasons, partnerships between universities and local schools are a natural fit and have been in existence since at least the late 1700s (Harkavy & Hartley, 2010).

Purpose and Research Questions

Nonetheless, due to the complex nature of the partnerships and the non-random ways schools are selected into these partnerships, rigorous evaluation has yet to establish their effectiveness (Heers, Van Klaveren, & van den Brink, 2016). Further, the many types of resources that go into partnerships from multiple sources calls for investigation of their cost-effectiveness. The purpose of this study is to fill this gap in the literature by providing a causal estimate of the impact of Raising Educational Achievement Coalition of Harlem (REACH), one specific university-school-community partnership in New York City. We also assess whether the program is worthwhile in economic terms via a benefit-cost analysis. We address the following research questions:

- Did REACH improve students' learning at the partnering six Harlem public schools?
- Did REACH also improve other related outcomes such as attendance, graduation, school climate, and social and emotional outcomes?
- What resources are required to implement the REACH partnership?
- What is the economic value of the outcomes of REACH, as measured by benefits in monetary terms?
- What is the net economic impact of REACH?

Setting

The sample comprises approximately 1,757 students per year in six Harlem schools – three elementary schools, two secondary schools, and one high school – over nine years (2008-2009-2016-2017). We match each treatment school to 3 comparison schools in adjacent neighborhoods. This one-to-many matching technique produces the best balance statistics. Table 1 shows descriptive statistics for REACH schools.

The Intervention

The intervention comprises activities across five domains – Leadership, Teaching and Learning, Family and Community Engagement, Physical and Mental Health, and Expanded Learning Opportunities. In each domain, the school and university partner collaboratively plan activities to help the school meet its goals. Leadership coaches support school leaders in needs assessment and aligning activities in each domain to goals. Services in each domain are provided by university staff, graduate student interns and volunteers, faculty, and community agencies.

Data and Methods

We use administrative data provided via an agreement with the New York City Department of Education including school leader characteristics, student demographics, test scores, attendance, advanced course-taking, and graduation rate outcomes, and results of a school climate survey.

Several elements of the selection process and criteria for schools partnering with the university to form REACH could potentially lead to either positive or negative bias; schools were previously low-performing, had experienced principals with established partnerships, and were in the neighborhood of Harlem in proximity to Columbia University.

While these factors could lead to potential bias, we take advantage of them to the extent they are observable, along with the phase-in of REACH over time and the sharp geographic restriction, to address these factors in a difference-in-differences with matching design. Because REACH was geographically constrained, we use propensity score matching to match to otherwise similar schools in adjacent neighborhoods that would have been likely to participate in REACH due to factors outlined above except they are ineligible due to location. We further exploit differences in the timing of implementation of REACH across schools to perform a difference-in-differences analysis of changes over time in REACH schools compared with matched comparison schools. Matching should net out preexisting differences between REACH and comparison schools based on observable factors, and difference-in-differences should net out time invariant, unobservable school-level characteristics; the combined method is thus stronger than either individually (Smith & Todd, 2005; Stuart et al., 2014).

We include costs estimated using the ingredients method to capture the resources required to replicate the program and distribution of burden of who provides or pays for those resources. We convert the estimated impacts into estimated economic benefits, or the social value of each impact based on its shadow price or the willingness to pay for a good or service that does not have a market price (Boardman, Greenberg, Vining, & Weimer, 2018).

Findings

Tables 2-3 present our difference-in-differences with matching findings for elementary/middle school grades and high school grades, respectively. At the elementary and middle school levels, there are modest improvements in attendance and moderate increases in ELA scores. There are surprisingly negative effects on school climate measures. In our high school models, there are positive and significant effects on high school graduation and math and science test scores. We run several robustness checks and sensitivity analyses, including tests for differential mobility and attrition and tests for parallel trends and find our results are generally robust.

Table 4 presents findings of the benefit-cost analysis, including benefits based on the value of increased ELA achievement and increased probability of high school graduation. Both are based on prior shadow prices of the literature (Belfield, Levin & Rosen, 2012; Levin & Belfield, 2009). These are likely a lower-bound estimate of the total social benefits, as they exclude the economic value of benefits to the university and instead focus on benefits to schools and students. Even so, the benefits exceed the costs by a factor of almost 2.

Significance

Given their complexities, university-school-community partnerships are difficult to study from both an economic perspective and in terms of impact evaluation. However, they are increasingly common as a way to leverage university and community resources in support of children and surrounding neighborhoods. We provide preliminary causal and economic evidence that, when implemented with rigor and fidelity, such partnerships hold great promise for improving educational outcomes and represent an efficient use of scarce resources.

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Tables

Table 1. Descriptive Statistics for REACH and Peer Schools (2016-2017 School Year)

	REACH Schools	
	Mean	SD
ELA Scale Score	292.95	8.54
Math Scale Score	280.36	15.16
Rate of Attendance (%)	87.64	4.30
Rate of Graduation (%)	75.63	1.39
Demographics		
Black (%)	51.92	13.87
Hispanic (%)	40.60	13.75
Special Education (%)	42	73
Observations	5	

Table 2. Difference-in-Differences Results, K-8 Schools, Matching at School Level

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Attendance	ELA	Math	Leadership	Teaching and Learning	Family and Community Engagement	Physical and Mental Health
In REACH After Treatment	0.0128**	0.128*	0.104	-0.321	-0.413	0.305	-0.340*
	(0.00535)	(0.0699)	(0.0853)	(0.276)	(0.278)	(0.368)	(0.178)
Ever in a REACH School	-0.00990	-0.0494	-0.113	-0.569*	-0.379*	-0.543*	0.125
	(0.00781)	(0.125)	(0.110)	(0.319)	(0.188)	(0.282)	(0.538)
Constant	0.936***	0.438*	0.368	-0.153	-0.248	0.00535	2.925***
	(0.0101)	(0.249)	(0.256)	(0.273)	(0.278)	(0.346)	(0.477)
Time Fixed Effects	X	X	X	X	X	X	X
Observations	32,345	31,507	32,076	20,917	20,336	20,196	20,574
R-squared	0.033	0.205	0.144	0.193	0.117	0.206	0.786

Robust standard errors clustered at the school level in parentheses, ***
p<0.01, ** p<0.05, * p<0.1

Table 3. Difference-in-Differences Estimates of Effects of REACH on High School Outcomes, School-Level Matching

	(1) Grad rate	(2) APs Taken	(3) Math Regents	(4) ELA Regents	(5) Science Regents	(6) Attdnc.	(7) Dropouts
In REACH After Treatment	0.0638*	0.24	5.66**	3.062	9.127***	0.00613	0.00697
	(0.0336)	(0.141)	(2.196)	(3.677)	(1.656)	(0.0214)	(0.0098)
Ever in a REACH School	-0.0503	-0.205**	-4.211**	-5.864**	-9.671***	0.00708	-0.0103
	(0.0396)	(0.0683)	(1.727)	(2.311)	(1.089)	(0.0298)	(0.0112)
Constant	0.932***	1.455***	67.92***	87.61***	79.45***	0.830***	-0.0138
	(0.0405)	(0.222)	(6.589)	(6.907)	(3.319)	(0.0247)	(0.0105)
Time Fixed Effects	X	X	X	X	X	X	X
Student Demographic Controls	X	X	X	X	X	X	X
Observations	10,661	4,188	971	537	996	54,331	10,661
R-squared	0.089	0.058	0.112	0.234	0.152	0.014	0.006

Table 4. Benefit-Cost Analysis

	Total	Per student
ELA achievement	$ 1,019,060	$ 580
Graduation benefits	$ 4,392,500	$ 2,500
Total benefits	$ 5,411,560	$ 3,080
Costs	$ 2,740,920	$ 1,560
Net benefits	$ 2,670,640	$ 1,520
Benefit-cost ratio	1.97	1.97