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An Economic Evaluation of the Costs and Benefits of Providing Comprehensive Supports to Students in Elementary School

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Abstract

There is growing evidence that out-of-school factors, such as physical and mental health, family support, and social and emotional development, significantly affect student learning (Berliner 2009). To address challenges related to poverty, schools are being charged with serving as a focal point in providing and coordinating support services for students and their families (Adelman and Taylor 2002; Dryfoos 2002). In many schools these support services are provided in fragmented ways that do not address the needs of all students or engage teachers in connecting these services to the academic mission of the school (Walsh and DePaul 2008). An emerging school-based model, broadly termed "comprehensive student support" (Walsh et al. 2016), is designed to overcome such fragmentation. In this paper, we build upon previous effectiveness work with an economic evaluation of a successful support model, *City Connects*. We find that the benefits of the program exceed the costs, indicating that the program is a sound investment and should be considered an option to address the needs of students and to prevent future crises from disrupting their learning.

Keywords Economic evaluation · Induced costs · Benefit-cost analysis · Comprehensive student support · City connects · Community-based partnerships

Introduction

Students come to school with a diverse range of strengths and needs that extend well beyond the traditional academic mission of formal schooling. There is growing evidence that out-of-school factors, such as physical and mental health, family support, and social and emotional development, significantly affect student learning (Berliner 2009). Challenges related to these factors include health issues (Basch 2011), trauma (Porche et al. 2011), hunger (Alaimo et al. 2001), and homelessness (Fantuzzo et al. 2012). Poverty also affects student learning through lack of access to resources (Dearing and Taylor 2007), higher levels of stress (Conger and Conger 2008), and unpredictable systems of support (Dearing 2008; Rothstein 2010). When schools focus primarily on achievement in literacy and mathematics and do not attend to these out-of-school influences that affect learning, their effectiveness is limited (Berliner 2009; Schreiber 2002).

To address the challenges related to poverty, schools can serve as a focal point in providing and coordinating support services for students and their families (Adelman and Taylor 2002; Dryfoos 2002). Governmental and community-based agencies are increasingly working together with schools to support students and families (Henig et al. 2015). Schools typically provide some student support programs that supplement traditional classroom instruction in the areas of physical education and health, counseling, and other extracurricular activities. However, in many schools, these support services are provided in fragmented ways where different teams,

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programs, and district initiatives are adopted without an integrated, cohesive approach that connects to the mission of the school (Walsh and DePaul 2008).

Comprehensive student support approaches were developed to address this fragmentation to more effectively address the needs of students by systematically integrating student support into the everyday, business-as-usual practices of schooling (Walsh et al. 2016). These models use the term "comprehensive" because they address broad areas of development and needs, such as physical and mental health, expanded learning time inside and outside the school, positive school climate, opportunities for parent education and family counseling, and social services for families in need (Moore et al. 2014).

One common feature of comprehensive student support is that services are typically provided through partnerships with institutions in the community that specialize in one or more of these areas. Through such a comprehensive approach, schools form strategic relationships with a range of community partner organizations to help meet student academic, social and emotional, health, and family and community needs in ways that go beyond what a resource-constrained school can provide on its own. Another commonality across approaches is the coordination of services based on needs assessments and periodic reviews of student progress. Various terms—*integrated student support*, *wraparound services*, *community schools*, and *collective impact*—all refer to slightly different versions of the same model (Dryfoos 2002; Moore et al. 2014; Oakes et al. 2017). Many districts across the USA have adopted such models. For example, the New York City Department of Education has expanded the number of community schools since 2014 to address the consequences of poverty and became the largest community school system with over a hundred community schools (Johnston et al. 2017).

A leading program of comprehensive student support is City Connects. The program's mission is to address the needs and strengths of students in academic, social/emotional, health, and family domains by building individualized support plans, providing in-school support, and monitoring student progress and needs. City Connects leverages external services through community-based organizations and service providers. The heart of City Connects' theory of change is the use of coordinators at each program site who work closely with teachers to assess the strengths and needs of every student and connect students with appropriate services (Boston College Center for Optimized Student Support 2014).

Similar to many supplemental support programs, City Connects provides supports at different levels of intensity, including prevention and enrichment services that reach many students, early intervention supports for fewer students, and intensive or crisis intervention services that are typically provided to a small number of students. However, there are two important ways in which the model is distinct. First, City Connects works with the school's administration, teachers, and student support teams to integrate the model into the school and to form a cohesive approach across various programs targeting discipline, such as Positive Behavior Interventions and Supports (PBIS) or Multi-Tiered Systems of Support (MTSS), socio-emotional learning, and psychological support. Second, the program focuses on all students, not just those in crisis, to increase engagement and health broadly so that students can access the full value of schooling.

For the sake of replication and future prevention policy, it is critical that the program's economic costs and benefits be evaluated in addition to the program's effects (Chatterji et al. 2001; O'Connell et al. 2009; Crowley et al. 2014). An economic evaluation of City Connects can also shed light on the potential for school-community partnerships to offset cost burdens to schools (e.g., Rice 2001; Heers et al. 2016), but empirical work supporting this is needed. In this paper, we estimate the costs and economic benefits of City Connects. We find that the benefits of the program exceed the costs, indicating that the program is a sound investment and should be considered an option to address the needs of students and to prevent future crises from disrupting learning.

City Connects

The City Connects program is notable for taking a whole-school approach to assess and address the challenges that prevent students from reaching their full potential in the classroom. City Connects coordinators are master's-level licensed school counselors or social workers who receive extensive training prior to being placed in schools. They receive additional support and professional development as they integrate their role and the program into the daily operation of student support, school climate, discipline, and similar programming. Coordinators frequently use the Student Support Information System, a proprietary web-based database developed by City Connects to monitor academic performance, individual student plans, and service referrals and providers (Boston College Center for Optimized Student Support 2014). Coordinators spend between 45 and 90 min with each classroom teacher twice per year to review all children enrolled. This process, called *Whole Class Review*, covers four main dimensions: (1) academic, (2) social emotional, (3) health, and (4) family (Boston College Center for Optimized Student Support 2014). Coordinators use this information with other student data to develop tailored plans for each student, identifying relevant supports available within and outside the school.

Coordinators manage the school's student support team (SST). Traditionally, SSTs vary in composition across schools but typically include the principal/vice principal, school nurse, school counselor or psychologist, social and emotional learning staff leads, and teachers. The SST reviews student cases referred

by teachers due to intensive risk in academics, behavior, or development. They often refer students for special education assessments and provide referrals to families to seek external psychological care. When the City Connects model is adopted, the City Connects coordinator holds weekly SST meetings to review specific cases where students would benefit from support both within and outside the school, often preventatively and prior to the child being in crisis. Attendees vary based on the case and can include the child's parents or guardians. The team uses the City Connects Student Support Information System, called MyConnects, to make a plan and to monitor the child's progress over time. This is a fundamental change in the use and mission of the SST by moving to a more preventative structure over time, by monitoring student progress, and through the involvement of parents and guardians.

The coordinator builds and maintains relationships with organizations in the community to expand student access to services. Twice per year, coordinators meet with community partners to ensure that the partnership is working smoothly and that students are well matched to the services offered. Coordinators, with support from the City Connects program, maintain data on each partner service to be able to match services to a child's strengths and needs based on the service type, geographical location, schedule, transportation requirements, and family capacity to support participation. Examples of community partner organizations may include dental services, health and mental health services, mentoring and tutoring programs, and afterschool extracurricular activities. The program also prioritizes the inclusion of families and caregivers in the process of supporting and referring students for services. Notably, duplicative services are avoided and management of service match and student progress over time is monitored systematically.

Effectiveness of City Connects

City Connects has been found to positively impact student achievement and attainment (Walsh et al. 2014). The program has also been found to reduce the gaps in achievement among students who are the first in their families to attend school in the USA (Dearing et al. 2016). Teachers in City Connects schools reported that participating in the Whole Class Review and collaborating with the coordinator deepened their understanding of the barriers their students faced and felt more supported in their roles (Sibley et al. 2017).

This benefit-cost study relies upon the program's effects on student achievement and attainment as these outcomes have direct implications for long-term economic benefits. In a study examining the effects of the program on attainment, Lee-St. John et. al. (2018) estimated the likelihood of school dropout at age 16 or above for Boston Public School (BPS) students who attended City Connects schools ($N = 2265$) for grades k-5 compared with those attending non-program schools ($N = 19{,}979$) using discrete event history analysis. The study reported that attending a school with City Connects for 6 years in grades K-5 resulted in a log odds ratio of − 0.689, or a 48% reduction in odds of dropping out. This is equivalent to a Cohen's d type effect size of − 0.380 after multiplying the log odds by the ratio of root 3 to π, a transformation method proposed by Borenstein et al. (2009).

Walsh et al. (2014) examined the program's impact on achievement on the Massachusetts Comprehensive Assessment System tests by comparing students who attended City Connects elementary schools ($N = 1901$) to matched students who never attended City Connects ($N = 2794$) using weighted propensity score models. The study found that attending a City Connects school for 6 years had positive effects on achievement in English Language Arts (0.15 SD 6th grade, 0.33 SD 7th grade, 0.33 SD 8th grade) and Mathematics (0.18 SD 6th grade, 0.33 SD 7th grade, and 0.45 SD 8th grade).

Methods

Following the ingredients method, we identify the cost of City Connects as it was delivered in schools to produce positive effects (Levin 1975; Levin et al. 2018). This method identifies the resources ("ingredients") required to successfully replicate an intervention and the expected impacts on educational outcomes. By design, our analyses are intended to highlight the change in costs that result from City Connects to describe how this approach differs from standard practice (business-as-usual). The research questions addressed by this work are as follows:

1. What are the ingredients required to implement City Connects and how does the City Connects model differ from business as usual practices? What is the total cost of the program to produce effects?
2. What are the economic benefits of City Connects? Does the benefit-to-cost ratio indicate that the program is a sound investment?

Methods to Estimate the Costs of City Connects

We collaborated with program administrators to identify our initial ingredients list following the model's theory of change. The program shared implementation data, including numbers of schools and students served, staffing, services provided, and community partnerships from the effectiveness evaluation period 1999–2009. Publicly available data on the schools and relevant initiatives were obtained from BPS.

We collected detailed site-level data on resource allocation and community partnerships within two BPS elementary

schools implementing City Connects during 2014. The schools were selected by the program to reflect schools that were included in the effectiveness analyses with staff who could provide information about resource allocation (additional sample details available in Bowden et al. 2015; Bowden et al. 2018). For each site, data were collected via site visits and semi-structured interviews with City Connects coordinators and school staff, following a protocol with questions regarding personnel, facilities, materials, and other inputs.

We collected data on services provided by community partner organizations from 10 organizations (5 per school) to represent a range of tiers with differing structures regarding fixed and variable costs. To reduce the burden of participation on these organizations, our interview and data collection process were expedited. Interviews focused on the relationship between the partner, the school, and City Connects, as well as identifying the primary ingredients used by the partners to serve students. Our sample of community partner-provided services represents a range of types and intensity of services; we conducted interviews to estimate the induced costs of community partner-provided services due to City Connects. We then extrapolated an estimate of the total costs of additional services that were induced by City Connects based on the types and intensities of services in our sample and how they proportionally mapped on to the total services provided by City Connects. Following the ingredients method described above, these costs include personnel, materials and equipment, facilities, and other resources.

To ensure that our estimate reflected the change in resources due to City Connects, we also collected data on business-as-usual practices of providing supplemental student supports in four non-City Connects BPS elementary schools. City Connects is a "service mediation intervention" in that the program's theory of change or production of impacts relies upon induced changes in services that mediate the effect (Bowden et al. 2017). Thus, identifying the contrast in resources allocated to student support services between schools that participate in City Connects and those that do not requires in-depth qualitative data on school processes.

The non-City Connects BPS schools in our sample were identified by the City Connects program as being in one or both of the earlier effectiveness samples, and, similar to the City Connects schools, where there were administrators present that could describe the school's current and past efforts in identifying student need and in providing comprehensive services. We collected data through semi-structured interviews with school leaders, such as principals or assistant principals and teachers, and followed up via email. Artifacts related to student support services, such as forms, handouts, presentation slides, or links to online databases, were collected during the site visits. The interview protocol focused on the processes and personnel involved in student support. Specifically, the protocol included hypothetical questions about how the school would provide support if a student exhibited particular types of challenges, including signs that a student is facing major disrupters in life such as homelessness or loss of parents, is in crisis behaviorally, or has experienced a sudden drop in academic performance and engagement.

We also collected data on each school's partnership-based service providers to understand better how the services leveraged by City Connects coordinators added to or replicated practices among non-City Connects schools. We estimate the cost of these services by identifying an analogue community partner service among City Connects schools for which we directly estimated the cost of the service and the share of the students served by the partner and applied this cost estimate to the business-as-usual schools. The intention of this component of the analysis is to acknowledge that schools in Boston typically have partnerships with external community-based organizations. Thus, applying the full value of all services used in City Connects schools would over-estimate the resources received by students in those schools.

We were concerned about social desirability bias in responses rather than accurate description of support, where school staff might respond to our questions about the school's approach to supplemental services by giving an idealized picture rather than actual school practices. The City Connects team at Boston College reviewed the protocol within the context of BPS. Following the recommendation in Dillman et al. (2014), we piloted our draft interview protocol prior to data collection and incorporated feedback from that process.

We synthesized data through an inductive story-line creation following the constant comparative method (Miles et al. 2014, pp. 72–75). We identified emerging themes: (a) screening and evaluating student needs, (b) classifying the intensity of need, (c) identifying services that are provided by the school directly, (d) identifying services provided by community partners, and (e) monitoring how student needs changed and improved. We also searched for examples under each theme, a process called "interpretive memoing," to summarize the findings (Creswell 2013; Merriam 2009).

We use national average prices from publicly available sources to reflect the value of each resource regardless of the idiosyncrasies of the local market. Price values for ingredients in the category of personnel are from the US Department of Labor's Bureau of Labor Statistics (BLS)—Occupational Employment Statistics—May 2015 National Occupational Employment and Wage Estimates United States. Personnel ingredients include staff at the City Connects central office at Boston College, coordinators at school sites, school principals and teachers, and staff at community partners including volunteers. Fringe benefits were estimated using rates reported by the US BLS via the National Compensation Survey (US Bureau of Labor Statistics 2014). For additional details on wages and benefits, please see Online Appendix A.

We estimate volunteer time based on the specific tasks associated with their service. For example, the average hourly wage for teacher assistants was applied to those volunteers who provide tutoring or mentoring services. The federal minimum wage was assigned to volunteers doing simple/low-skill tasks. We test the sensitivity of these assumptions by including an additional analysis using a wage rate based on the volunteer's education level. The patterns of results are not changed by this test.

We used the yearly rental price per square feet reported by *Entrepreneur* magazine (Eha 2013) to reflect the value of the program's office space. Prices for school facilities were obtained from *Peter Li Education Group* (Spaces4Learning 2012), using the national median price for a new K–12 school (per sq. ft.), uprated by 33% to adjust for land acquisition and furnishing costs. The prices of facilities were annualized over 30 years at a 3.5% rate of interest.

Our results are in 2018 US dollars and reflect average US national prices. When necessary, prices were adjusted for inflation using the Consumer Price Index and amortized using a 3.5% discount rate. We present average per-student annual costs and the present value of 6 years of program receipt, using a 3.5% discount rate, to reflect the treatment dosage that the sample in Lee-St. John et. al. (2018; Walsh et al. 2014) received.

Methods to Estimate the Benefits of City Connects

We estimated economic benefits of City Connects based on the program's effects on educational attainment, measured as a reduction in the high school dropout rate, and educational achievement, measured by increases in math and ELA test scores in grades 6–8 (Lee-St. John et. al. 2018; Walsh et al. 2014) as described above. There is extensive literature on the economic benefits of these outcomes and consensus on their value (e.g., Belfield and Levin 2007a, 2007b, 2009). By not including other potential benefits, such as social and emotional outcomes and behavior, grade retention, and teacher effects, we will likely understate the value of the benefits and provide a conservative estimate. We do not include these benefits to reduce the risk of double-counting given the potential overlap or correlation among these outcomes and high school graduation.

To estimate the economic benefits of the effects on attainment, the outcomes reported by Lee-St. John et. al. (2018) were transformed from dropout prevention rates into high school graduation rates using publicly available data from BPS. In 2012, 72% of BPS students graduated within 5 years of starting high school (Massachusetts Department of Elementary and Secondary Education 2012). We combined this graduation rate with the Lee-St. John et al. (2018) data to estimate the graduation rate, the dropout rate, and the portion of students who remained in school. The dropout rate for BPS (the comparison group) was 15% and the graduation rate was 72%; therefore, the remaining 13% of students were assumed to remain in school for a 6th year. We apply the same proportions to the results reported in Lee-St. John et. al. (2018). We assume that the 7-percentage point difference in dropout rates was reflected as additional graduates and that the portion of students who remained in school without graduating (13%) remained unchanged.

Results for educational achievement are from Walsh et al. (2014). As described above, effect sizes ranged from 0.15 to 0.45, with higher gains in later grades. To be conservative, we assume an average effect size gain of 0.3 across all students. Following these outcome estimates, if City Connects is delivered to 100 students, the program will yield seven new high school graduates (instead of high school dropouts) and the remaining students are considered unaffected. Again, our estimate of results is conservative because we do not include benefits to students who would have graduated anyway but nonetheless benefited in other ways from the services linked to City Connects. Alternatively, if City Connects is delivered to 100 students, each one is assumed to have an effect size gain of 0.3 in academic achievement.

To derive the economic benefits of City Connects, we apply the well-established lifetime model of educational status following the methods and principles described by Karoly (2012). Specifically, we compare lifetime profiles of earnings and related economic benefits by level of educational attainment and take the difference between the profiles for a high school graduate or college enrollee versus a dropout. Similarly, we compare lifetime profiles for students with higher academic achievement to those with lower academic achievement. On average, persons with lower attainment and achievement face worse economic outcomes both immediately and over a lifetime (up to age 65). They have lower incomes, worse health status, exhibit greater criminality, and rely more on government welfare subventions. We calculate these outcomes in dollars and discount them back to be expressed as present values in kindergarten.

We adapt and update estimates on the gains from attainment and achievement from studies by Belfield and Levin (2007a, 2007b, 2009). For earnings, these studies use data from the Current Population Survey to estimate differences by education level. Earnings data are calculated by gender and race and then pooled to yield a national average lifetime earnings stream for each education level. These differences are very large, even from the perspective of their present value at kindergarten. High school graduates earn over $100,000 more than dropouts and college graduates earn over $300,000 more. For health differences, the estimates use evidence from Schoeni et al. (2011). Conservatively, each year of education adds 0.008 quality-adjusted life years (QALYs) annually during adulthood, equivalent to a "health annuity" of $600 from kindergarten to age 65. These studies use crime

differences by education level from Lochner and Moretti (2004) and welfare differences by education level from Waldfogel et al. (2007). In total, the lifetime differences by education are very large. We calculate that each new high school graduate yields social benefits of $281,120 over a dropout, in 2018 US dollars.

Findings

Costs of City Connects and Induced Changes in Supplemental Services

As summarized in Table 1, City Connects systematically assesses and manages resources provided to students to support their comprehensive strengths and needs. Costs are primarily driven by personnel, mainly the coordinators at each school supported by the program's central staff, as well as time from school administrators and teachers. We also include time from parents/caregivers spent interacting with coordinators, materials and equipment necessary for extensive data tracking, and facilities for coordinator work and meeting space. Additional details on the quantities of ingredients can be found in Online Appendix A. The estimated direct cost of City Connects for 6 years of participation is approximately $1480 per student on average.

The supplemental support services induced by the program over the 6 years of participation are estimated at about $7740 per student on average. These costs were borne by various entities, including in some cases the partners themselves funded by philanthropic or government grants, participation fees for students and parents, the schools, and family health insurance in the case of some clinical services. These external services include intensive clinical counseling or psychiatric services for students; many of which are provided by state initiatives like Children's Behavioral Health Initiative (CBHI) and

Table 1 Contrast between City Connects and business-as-usual in comprehensive student supports

City Connects	Business-as-usual in BPS
Screening and evaluation of student needs	
Whole Classroom Review twice a year to review every student's strengths and needs with teachers	No systematic screening process to prevent crisis
Preventative mission and responsive as needed	Primarily responsive to urgent crises
Academic, social emotional, health, and family domains	Academic and one or two more domains depending on student population
Student support team meetings are led by the coordinator, focus on establishing plans and monitoring progress, team members, and agenda guided by student cases	SST meetings focus on severe needs and referrals for IEPs, may include assistant principals, specialists, teachers, counselors, school nurses, and/or other staff
In addition to regular training, annual coordinator and principal trainings with City Connects	Training varies by school
Classifying intensity of student need	
Collaborating with other tiered systems of support, three tiers of support are based on the intensity of need: Prevention and enrichment for minimal risk (e.g., tutoring, academics, athletics, arts), Early-intervention for moderate needs (e.g., mentorship, dental care, clothes, food), and intervention for severe needs (e.g., psychological services)	Tiered approaches with varying intensity observed in all schools (e.g., Positive Behavior Intervention Support, Multi-Tiered Systems of Support, Response to Intervention)
Services directly provided by schools	
In addition to typical programming, coordinators support school climate, provide individual and group counseling, and other services	Common programs included tutoring, academic specialists, family coordinator, and socio-emotional learning program
Community Partners	
Coordinators build and maintain partnerships, match students to partner services, and monitor student participation and improvement	Partnerships depend largely on the capacity of school leadership
39–47 community partners per school, providing 1363–5270 services	4–9 community partners per school
Monitoring of student progress	
City Connects Student Support Information System	No systematic approach, varies by school
Coordinators are responsible for tracking and following up with students	Principal or assistant principal is responsible

MassHealth (i.e., the combination of Medicaid and the Children's Health Insurance Program in Massachusetts).

We analyzed the extent to which comparison schools and City Connects schools performed similar activities: (i) screening and evaluation of student needs, (ii) classifying intensity of student need, (iii) services directly provided at schools, (iv) partnership building, (v) services provided by community partners, and (vi) monitoring of student progress. All six types of activities were observed in non-City Connects schools to varying degrees as described in Table 1. The principal or assistant principal led the schools' efforts, often with counselors or social workers and classroom teachers, who were often the referral source for support. Unlike City Connects schools, the process of identifying student need was seldom systematic or covering entire schools. Schools commonly provided before- and after-school tutoring and academic enrichment programs. Administrators in non-City Connects schools spent on average 0.25 FTE (full time equivalents), mainly identifying needs and responding to students in crisis. An average time commitment of teachers at non-City Connects schools was 167 teacher-hours, and time from other support personnel such as social workers, school psychologists, and nurses was also identified. We estimate that together, the direct costs of student support services over 6 years in comparison schools total approximately $800 on average per student.

Partnerships with service providers in the community at business-as-usual schools are similar in domains and levels of intensity as City Connects schools, but the number of partners per non-City Connects school ranged from four to nine. Most of these partners in business-as-usual schools fell into one of three categories: after-school, summer enrichment, and counseling programs. We estimate the cost of induced services over 6 years in non-City Connects schools to be approximately $3640 on average per student.

Table 2 summarizes the total direct and induced costs of City Connects, net of the costs of business-as-usual as described above. In summary, City Connects incurs additional costs for coordinators and central office staff, parents, facilities, materials, and equipment, offset by efficiencies gained in school staff time such as principals and teachers. City Connects leverages additional supplemental support services for students provides by external partners valued at approximately $840 per student per year, for a total cost of $5410 per student over 6 years in present value 2018 national average prices.

Benefits and Benefit-Cost Ratio

As discussed above, each new high school graduate yields social benefits of $281,120 on average. When this benefit per new graduate is multiplied by the yield of additional graduates produced by City Connects schools (7%), the social benefit of the program for this outcome is estimated at $19,680. Alternatively, if each student obtains effect size gains in achievement of 0.3, the social benefits are $10,250 per City Connects student. As shown in Table 3, taking the average of these two estimates, we calculate that the benefits of City Connects are conservatively valued at $14,960 per participant (as a present value at kindergarten age).

The benefits of City Connects exceed the costs by $9550 per student, as shown in Table 3. The total cost of City Connects per student is $5410 and the benefits per student are $14,960. The benefit-to-cost ratio is about 3. In other words, for each dollar invested in City Connects, society can expect around $3 in return. Our findings are robust to sensitivity tests that show positive returns ranging from the worst-case scenario 1.26 to the best-case 6.38 (additional information is available in Online Appendix B). A break-even analysis further supports our findings. If we consider only achievement gains, the benefits of City Connects equal the costs until the gains fall below an effect size of 0.15 (relative to reported effect sizes of 0.15–0.45). If we consider only the effects on high school graduation, the benefits of City Connects equal the costs until the yield of new graduates falls to two per 100 participants. That is, if the program improves the high school graduation rate by only 3 percentage points, it will break even (relative to reported 7 percentage point gains). These robustness checks show that City Connects could be half as effective in increasing graduation and still break even.

It is likely that the benefits of City Connects exceed the amounts calculated here, possibly by a large magnitude. Our calculations are conservative: they exclude labor productivity spillovers, the deadweight loss of distortionary taxes, and other consequences (such as intra-family effects) that cannot be monetized; they also do not count any benefits that accrue while the students are in school (see the discussions in Belfield and Levin 2007a; Trostel 2010; and Karoly 2012). In addition, the benefits of high school graduation assume that nonmarginal students (those who would have graduated or enrolled in college without the program) receive no benefit from the program. Finally, projections suggest greater adversity for those with low skills (Autor 2014); by using current cross-sectional data, we have likely understated the returns to education over the long run.

Limitations and Opportunity for Future Work

The main methodological challenge of this work was accurately reflecting the contrast in resources received among students in City Connects and non-program schools in a retrospective analysis. During data collection, we asked participants about how their schools changed over time to better understand how the model may have changed over time in treated schools and to understand how BAU practice in non-treated schools changed over time as well. This approach was not without limitation because it relied upon staff having

Table 2 Costs of City Connects and comparison schools, per student

Ingredients	City Connects estimate	Comparison estimate	Total costs
Direct Costs			
Personnel			
Central program staff	$40	$ -	$40
Coordinators	$190	$ -	$190
School Staff	$20	$130	($110)
Parents	< $10	$ -	< $10
Materials and Equipment	< $10	< $1	< $10
Facilities	$10	< $10	$10
Subtotal	$270	$130	$140
Induced costs	$1400	$560	$840
Total	$1670	$690	$980
Present value cost (6 years)	$9200	$3800	$5410

Notes: Present value based on 6 years participation (K–5), discounted to kindergarten using 3.5% discount rate, expressed in constant 2018 dollars using national average prices

accurate records of school support systems over time. Due to complexity of conducting a benefit-cost analysis retrospectively, we were only able to collect in-depth data from a small sample of schools and their community partner service providers. Future prospective studies should employ a cost-effectiveness framework to collect data on changes in resource allocation across treatment groups, and their external community partner providers to build upon this work.

Conclusion

The benefit-cost results for City Connects are substantial. For policy consideration, we summarize our results by simulating the costs and benefits of the model for a class cohort of 100 kindergarten students. The total cost of City Connects would be $541,000 and the social benefits would amount to $1,496,000. From society's perspective, investing in City Connects for a cohort of 100 students would result in net benefits of about $955,000.

This analysis provides strong evidence that the benefits of City Connects exceed the costs, even under the most conservative assumptions and models. In addition to the benefits associated with increased educational attainment and achievement, the model may also benefit society by improving the capacity and efficiency of the community partners. Interestingly, the external community partner services leveraged were comprehensive, without any apparent gaps in goals, intensity, or type of support provided. During interviews, almost all partners stated that City Connects coordinators helped to streamline their communication with the school. One program mentioned that this was such a significant advantage that, when expanding to new schools, they preferred City Connects schools. From society's perspective, increased efficiency in school–community partnerships and increased capacity to serve students as a result of City Connects are benefits of the program. These benefits may be underestimated, but they are not neglected, as benefits associated with increased efficiency in delivering services and better matches between students and services should be captured in the positive effects of the model.

From the perspective of the school, the model also offers efficiencies because the school receives the City Connects program at a fraction of the total cost. Schools pay for about 10% of the total costs of the program through staff time, providing facilities and some materials. The resources received for this investment (totaling around $1.2 million) result in benefits for the school and school district providing strong evidence for this approach as a comprehensive school-based support model. Future research should prospectively explore site-level variation in costs and external services, nonacademic benefits, teacher effects, community partner service financing, and the extent to which comprehensive student support programs offset costs to schools and community partners by streamlining the service referral and provision processes.

Table 3 Benefit-cost analysis of City Connects

Present value cost per student	$5410
Present value benefits per student	$14,960
Net present value (B-C)	$9550
Benefit-cost ratio (B/C)	2.76

Notes: National average prices and benefits in constant 2018 dollars. Present value based on 6 years participation (K-5), discounted back to kindergarten using 3.5% discount rate

Author's Contributions HL, BB, and RS conceived the study. BB lead the design, coordinated the conduct of the study, collected data, performed analyses, interpreted the data, and drafted the manuscript. RS supported design, developed and piloted instruments, collected data, performed analyses, supported interpretation of the data, and helped draft the manuscript. HL provided expert guidance and supported interpretation and drafting the manuscript. AM and AW collected data, performed analyses, supported interpretation of the data, and helped draft the manuscript. All authors read and approved the final manuscript.

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Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Ethical Approval This work was conducted under Teachers College, Columbia University IRB Protocol Number 14–312, in accordance with the ethical standards of the 1964 Declaration of Helsinki and its later amendments. The data collected here focused on processes, administration, and records, and was considered exempt. Boston Public Schools also approved this work.

Informed Consent All participants freely agreed to participate in this study and IRB rules were followed to obtain informed consent.

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