



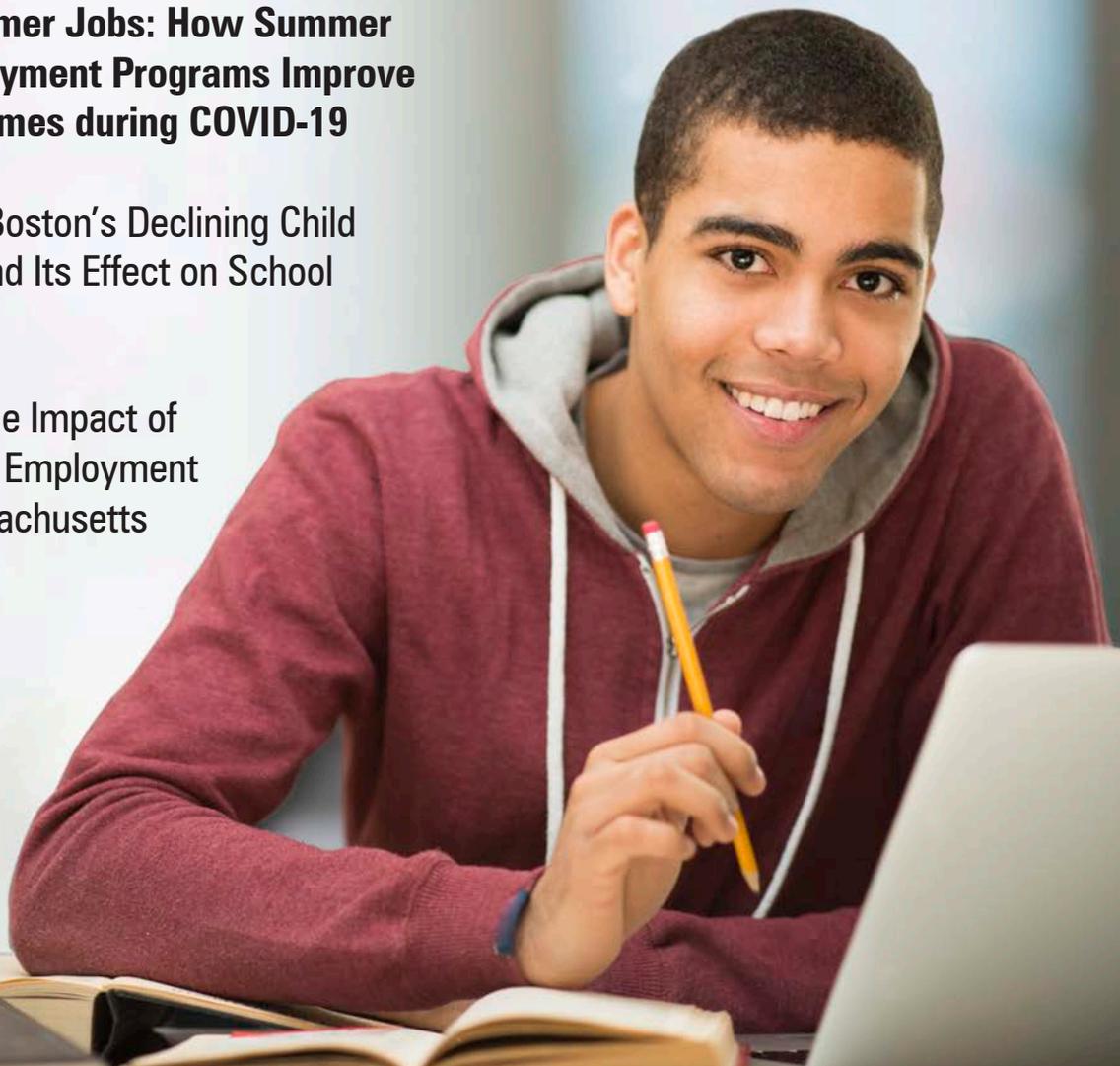
Mass Benchmarks

THE JOURNAL OF THE MASSACHUSETTS ECONOMY

Saving Summer Jobs: How Summer Youth Employment Programs Improve Youth Outcomes during COVID-19

Kids Today: Boston's Declining Child Population and Its Effect on School Enrollment

Measuring the Impact of COVID-19 on Employment across Massachusetts



Mass Benchmarks

2020 | volume 22 issue 1

MassBenchmarks, published by the University of Massachusetts in cooperation with the Federal Reserve Bank of Boston, provides timely information about the Massachusetts economy, including reports, commentary, and data about the state's regions and industry sectors that comprise them.

The editors invite queries and articles on current topics involving the Massachusetts economy, regional economic development, and key growth industries from researchers, academic or professional economists, and others. Topical information and a brief biography of the author should be sent to info@donahue.umassp.edu.

Links to past issues, latest news, updates, and additional research on the Massachusetts economy can be found at www.massbenchmarks.org.

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Boston’s sharp decline in middle-income families with children (many who move to the suburbs) has moved in lockstep with increasing numbers of students of color in segregated Boston schools. That trend is counterproductive, given growing evidence that students of all backgrounds who attend diverse schools have better academic, social, and economic outcomes.

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The next issue of *MassBenchmarks* will report on a study that measures change in Massachusetts due to COVID-19. The study will create an index based on counties and six combinations that account for occupations in the state. The combinations include essential and non-essential occupations, human-to-human interaction, required physical presence, and working remotely.

FROM THE PRESIDENT



The economic freefall triggered by COVID-19 has cast our state and nation onto uncharted, troubled waters. Overnight, unemployment has soared and sectors of the economy have been compromised. That goes as well for home and community life. To shed light on these unfolding developments, this issue of *MassBenchmarks* explores the state's economy, public policy, and societal priorities, including health care, community life, and education.

Our regular feature, *Notes from the Board*, observes that one in three workers in Massachusetts (non-payroll and gig workers included) filed for unemployment insurance following the onset of the pandemic. To date, industries that offer face-to-face services have been hit hardest. The new world of COVID-19 points to an annualized decline in Gross State Product that may top 20 percent.

Social distancing, wearing of masks, and testing programs in the workplace and in public are crucial to our economic recovery. Reopening the economy ahead of schedule would likely trade off temporary gains for longer-term pain, the Board's members agreed. In restoring the economy (and for that matter community life), consumers and employees must feel safe. The workplace must adapt with innovative technologies and social arrangements.

The *State of the State* feature, authored by UMass Amherst professor and *MassBenchmarks* Executive Editor Robert Nakosteen, delves deeper into this economic quagmire. Through May 30, unemployment mushroomed from historically low levels to over 15 percent. The pain was felt most in the service sectors of the economy. The leisure and hospitality industry, which includes restaurants, hotels, museums, and other related services, topped all others in the freefall, followed by retail trade, health and social assistance, and professional and business services. Additionally, small businesses carried a disproportionate weight of the burden and the pain was geographically widespread. In April, no Massachusetts municipality escaped double digit unemployment (Boston's was lowest at 14.4 percent.).

This issue's two lead articles identify challenges accompanying investment in Boston's school children through education and summer employment programs. The first lead article, by Professor Alicia Sasser Modestino of Northeastern University, emphasizes that summer youth employment programs develop skills and behaviors that lead to better long-term academic, employment, and criminal justice outcomes. Unfortunately, these programs are at risk from consequences of COVID-19. Boston's response has been a \$4.1 million investment in virtual internships, an Earn and Learn program, and other initiatives.

The journal's second lead article, by Peter Ciurczak and Luc Schuster of Boston Indicators and Antoniya Marinova of the Boston Foundation, dissects Boston Indicators' empirical study, *Kids Today*. The study, which tracks the flight of middle-income families with children from Boston and its public-school system, shows alarming segregation among Boston's schools with students of color. It also shows that half of Boston's children from middle- and higher-income families leave the city when they become school-aged. The trend, add the authors, is especially troubling, given strong evidence that multiculturalism benefits students from all backgrounds.

Endnotes, written by Collin Perciballi and Chris Steele of Conway, Inc., previews a study-in-progress that will measure employment outcomes by occupation and geography across the state in the COVID-19 "era." The study, scheduled to run in the next issue of *MassBenchmarks*, will create an index based on counties and on six combinations that define occupations across the state. The combinations include essential and non-essential occupations, human-to-human interaction, required physical presence, and remote work.

Like its predecessors, this issue of *MassBenchmarks* explores—intellectually and empirically—the intersection of our economy with public policy issues. That objective has never been more timely.

A handwritten signature in black ink that reads "Martin T. Meehan". The signature is fluid and cursive.

Martin T. Meehan, President
University of Massachusetts

NOTES FROM THE BOARD

Human and Economic Toll of the COVID-19 Pandemic

During our most recent editorial board meeting, board members discussed the unprecedented human and economic toll of the COVID-19 pandemic. Between March 15 and May 30, Massachusetts received over 1.4 million new claims for unemployment insurance, including over 457,000 through the Pandemic Unemployment Assistance program, which extends coverage to non-payroll and gig economy workers. This represents nearly 1 in 3 of the Commonwealth's 3.8 million workers. In April, the official state unemployment rate was 15.1 percent. As we enter June, current and continuing unemployment claims imply an unemployment rate of over 20 percent. On an annualized basis, it appears that the gross state product in Massachusetts may decline on the order of 50 percent in the second quarter. Of course, an annualized rate of change assumes the quarterly rate of change persists for an entire year, which appears unlikely.

Nevertheless, state economic performance in the second quarter of 2020 is shaping up to be the worst in the recorded history of the Commonwealth. While board members agreed that the economic damage from COVID-19 is probably greatest in the current quarter, they were similarly unanimous that projecting the path of the economy is highly uncertain and more about future epidemiological conditions than economic fundamentals. Adding to the pandemic's unprecedented effects are protests that erupted across the nation in response to the tragic police killing in Minneapolis, which occurred after the Editorial Board met.

Thus far, the pain associated with our dramatic reversal of fortune is being disproportionately borne by sectors of the economy that require face-to-face interaction, rely upon domestic and international travel, or involve other pandemic-inconsistent behaviors. These include the entire sector designated Leisure and Hospitality, including restaurants, hotels, museums, theaters, and amusement parks. Retail and other broadly defined service industries have largely shut down apart from online and curbside sales and essentials such as groceries. Leading employers and numerous healthcare and higher education institutions face major financial challenges brought upon or worsened by the pandemic. Across the Commonwealth, small businesses and densely populated urban areas, especially those most reliant on frontline service jobs, have shouldered the heaviest burden thus far. Both the public health and the economic consequences of the pandemic are exacerbating socioeconomic and regional inequalities that have long plagued the Commonwealth.

Recovery Scenarios and Outlook

The outlook for the Massachusetts economy, and the pace at which it will recover from the pandemic, depend heavily on an effective public health response in coming months. As the economy opens across the country, our economic future will depend not only on the schedule for reopening but on adherence to social distancing and the continued wearing of masks, both in the workplace and in public. Key to a sustainable reopening will be a comprehensive and scientifically sound testing program, addressing asymptomatic and potentially contagious individuals as well as antibody testing. To date, testing capacity has proved inadequate and often inaccessible to most individuals and employers.

The more optimistic recovery scenarios assume high compliance with social distancing requirements, including mask wearing. In these recovery scenarios, the economy—both national and state—starts a steady but slow comeback later this year. What some have termed the “swoosh” recovery scenario (resembling the Nike logo) also assumes no subsequent waves of the virus at levels that require additional broad shutdown orders. In the less optimistic scenarios, poor compliance with public health guidance and/or subsequent viral waves extend the length and depth of the downturn, including the possibility of a second and very economically costly shutdown.

An additional wild card is whether the public will fully reengage as shutdowns are lifted and restrictions that have limited commercial, recreational, and business activities are loosened. If consumers, workers, and employers feel unsafe to resume their normal activities and spending patterns, the lifting of restrictions alone may be insufficient to permit many of these businesses, particularly smaller firms, to survive. For example, simply reopening the economy does not mean that consumers will feel comfortable riding public transit, eating out, making travel plans, or attending live events.

More permanent changes in behavior and preferences seem likely, but it is not yet clear what form they will take. One obvious implication of the distancing guidelines is that they significantly reduce the productivity of a number of industries. For example, restaurants will be required to space tables farther apart than normal, considerably reducing the

number of paying customers they can serve at any given time. Additionally, the widespread adoption of telecommuting during the shutdown will likely make it a more attractive option for employers. This could have significant negative implications for local and regional commercial real estate markets in the longer run. On the other hand, reduced commuting would help relieve some of the severe congestion and housing pressure in the Boston area and even provide associated environmental benefits.

Policy for the Future

Meanwhile, the pandemic is accelerating experimentation with different work technologies affecting all levels of education; the trend towards automation more broadly is threatening less skilled and routine jobs. At the same time, the pandemic and changing technologies are creating economic opportunities. For example, there is emerging demand for services. Examples include online and hybrid instruction; cleaning services to meet rigorous new protocols; and new demands for workers in clinical laboratories, engaging in contact tracing, and PPE production.

In these uncertain and difficult times, policymakers are well advised to heed the Hippocratic command to, “first, do no harm.” At the state and local level, where balancing the budget is a constitutional requirement, this means taking action to avoid imposing painful cuts to the Commonwealth’s cities and towns, school districts, community colleges and universities, and programs that serve the state’s most vulnerable residents. Cuts to critical services and programs may serve as a “double whammy” for a number of the Commonwealth’s most vulnerable communities, which have already been deeply affected by the pandemic. Furthermore, in the current environment, state and local budget cuts would directly undermine a nascent economic recovery by relegating more Massachusetts workers to the unemployment line and the MassHealth rolls. This pandemic has made it very clear how reliant we are on frontline workers. In Massachusetts, state and local government employs 11 percent of all workers, including most of the state’s educators and all of its public safety and first responders.

The case for substantial federal fiscal aid to the states is compelling. Even if such aid is forthcoming, numerous state fiscal forecasts make it clear that our state and local leaders will not likely be spared from some very difficult choices in the months ahead. State leaders should consider tapping current revenue reserves and exploring new revenue options even as they understandably seek cost-cutting efficiencies in these difficult times.

While raising tax rates during a downturn may seem counterintuitive to many (and, admittedly, painful to small business owners and others whose incomes have fallen in the wake of the pandemic), in a depressed economy operating substantially below its capacity, the overall economic cost of a tax rate increase may be justifiable by the positive impact of added government spending. This is mainly due to the fact that more public spending will circulate through the local economy while some of the private funds used to pay the increased tax would be saved rather than spent. As the economy recovers, any tax rate increases can be returned to their current level as key fiscal and economic benchmarks are achieved, an approach recently deployed to automatically lower the state income tax.

The coming months will be very difficult but, if our households, businesses, and institutions can be protected from the pandemic’s spread and sufficiently buffered from its economic aftermath, the Commonwealth will be much better positioned to recover more quickly whenever both economic and public health conditions return to some semblance of normalcy. While that may begin as soon as later this year, a full recovery from recent economic and fiscal shocks will take much longer.

*Prepared by Executive Editor Robert Nakosteen
June 9, 2020*

THE STATE OF THE STATE ECONOMY
ECONOMIC CURRENTS



Uncertainty in the Face of COVID-19

ROBERT NAKOSTEEN

Following the outbreak of COVID-19, the Massachusetts unemployment rate, in an instant, soared from historically low levels to rates of more than 16 percent. The service sector—largely face-to-face establishments—has accounted for the largest number among the 968,000 newly unemployed in the state from March 15 through early June. Leading the way is the Leisure and Hospitality industry, followed by Retail Trade, Health and Social Assistance, and Professional and Business Services. In reopening the economy, two simulations reveal the tradeoff between economic prosperity and health of the state's population.

INTRODUCTION

Normally the analysis of the state economy exhibits incremental changes in economic data. Rarely does the magnitude of these changes defy recent experience. The “sudden stop” economy, propelled by the COVID-19 pandemic, has produced economic data that are difficult to comprehend or put into context. The goal here is to portray as many dimensions of the state’s current economic condition as recent data will allow. The lag in data availability will limit the ability to assess current conditions adequately, as the time series of data describing the state is limited to April and May, with partial series for June. Even so, this report will use available data to describe the breadth and depth of the sudden stop in the economy.

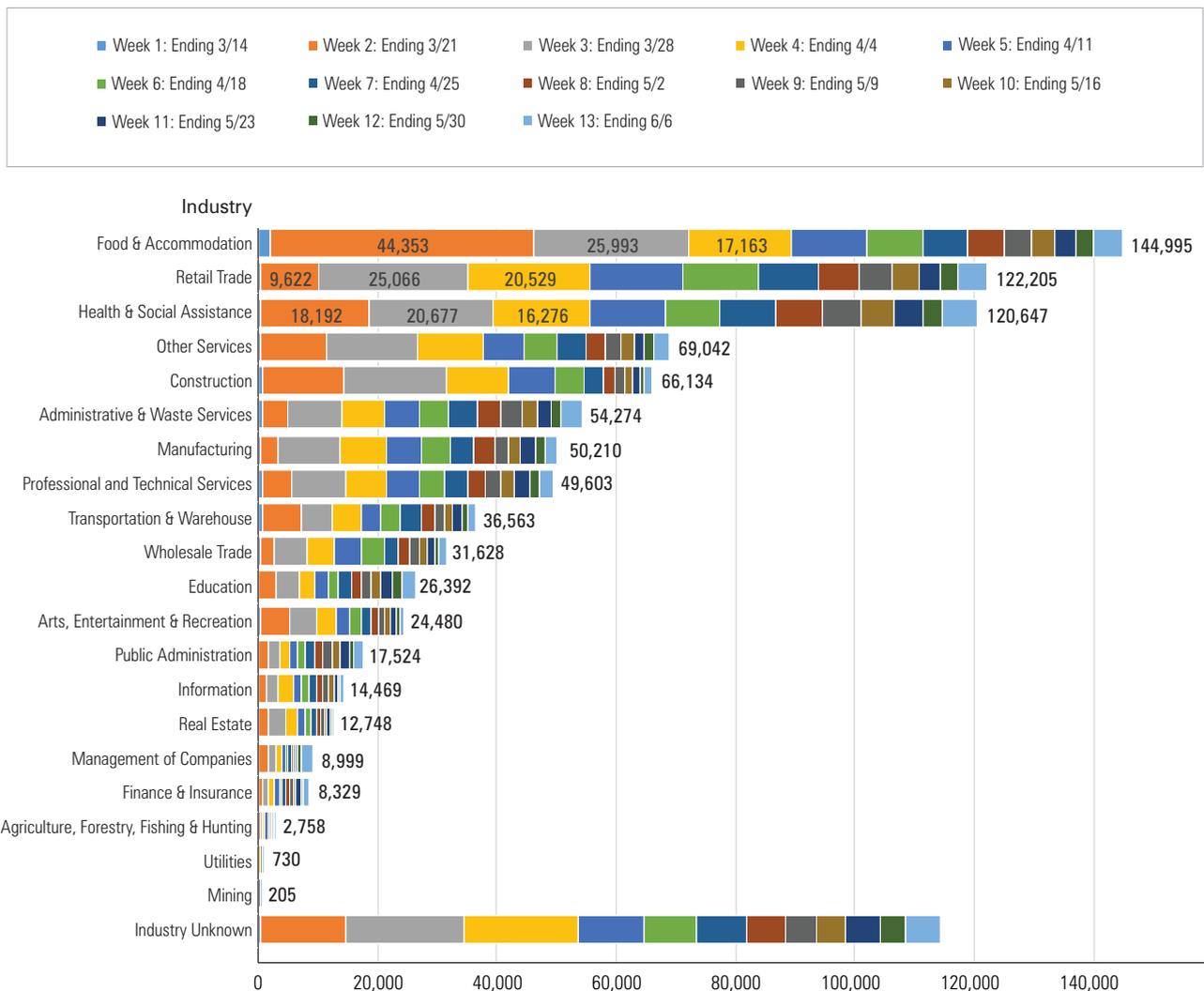
EMPLOYMENT AND UNEMPLOYMENT

Both the national employment/unemployment data have either stabilized or improved modestly in recent weeks. This development is the result of the massive federal government fiscal intervention, and the partial reopening of the economy.

The most immediate data source for measuring the effect on employment in the current situation is the initial claims for Unemployment Insurance, heretofore UI. These data are released weekly and are specific to the industrial sector in which the worker was engaged before becoming unemployed.

The striking features of the UI data are both the magnitude of newly unemployed, over 960,000

Figure 1. Weekly Initial Unemployment Claims by Industry
From Week Ending March 14 to Week Ending June 6, 2020



Source: Massachusetts Executive Office of Labor and Workforce Development; UMDI analysis.

Note: Data represent claimants under Unemployment Insurance (UI) only and do not include claimants under the Pandemic Unemployment Assistance (PUA) program, which was designed to provide unemployment benefits for categories of employees not usually covered by UI, such as the self-employed and gig workers.

since March 15, as well as those sectors most seriously affected. Broadly speaking, the service sector, largely face-to-face establishments, has seen the largest number of newly unemployed. Leading the way is the Leisure and Hospitality industry, which includes restaurants, hotels, museums, and other related services. Retail Trade, Health and Social Assistance, Professional and Business Services, Other Services, and Construction follow. Continued standard unemployment claims were over 565,000 as of the week ending June 6. This total is even greater when new and current claimants under the Pandemic Unemployment Assistance (PUA) program, which topped 594,000 since April 20, are included. A more complete picture of the sector-specific job losses

is provided by the absolute declines in employment by industry, both in the state and nationally.

To avoid seasonality issues, year-over-year changes in employment are calculated. The picture that emerges is consistent with the UI data. Between May 2019 and May 2020, the state lost 605,000 jobs and the nation lost over 17 million jobs. In both cases, the largest job loss came in the Accommodation and Food Services sector as businesses across it were closed to nonessential uses. In the state, the job loss in that sector was 179,400, roughly 30 percent of this sector's total, and a decline of over 57 percent of its year-earlier figure. The other sectors with the most serious job losses fall in line with the patterns evident in the UI data.

Table 1. Change in Employment by Industry in Massachusetts and the United States, May 2019 and May 2020

Industry	Change in Employment (N)		Change in Employment (%)	
	Massachusetts	United States	Massachusetts	United States
Accommodation and food services	-179,400	-5,448,100	-57.4%	-38.6%
Retail trade	-71,600	-1,950,200	-20.4%	-12.5%
Construction	-59,200	-1,446,700	-9.3%	-7.1%
Health care and social assistance	-47,100	-1,031,000	-33.8%	-17.5%
Other services	-45,800	-1,246,500	-72.1%	-51.5%
Arts, entertainment, and recreation	-39,200	-435,000	-24.2%	-5.8%
Administrative and waste services	-34,900	-1,371,000	-7.6%	-6.1%
Transportation, warehousing and utilities	-28,400	-514,700	-27.3%	-8.4%
Educational services	-27,900	-1,466,200	-15.1%	-15.7%
Government	-23,900	-386,600	-13.8%	-10.3%
Manufacturing	-20,200	-1,122,000	-8.3%	-8.7%
Wholesale Trade	-13,200	-336,600	-10.7%	-5.7%
Professional and technical services	-6,500	-303,400	-1.9%	-3.2%
Real estate and rental and leasing	-3,500	-88,600	-4.7%	-3.7%
Management of companies and enterprises	-2,100	-167,900	-4.3%	-7.3%
Finance and insurance	-1,400	-275,000	-1.5%	-9.6%
Mining and logging	-400	36,900	-0.2%	0.6%
Information	-300	-111,000	-27.3%	-14.9%
Total	-605,000	-17,663,600	-16.4%	-11.7%

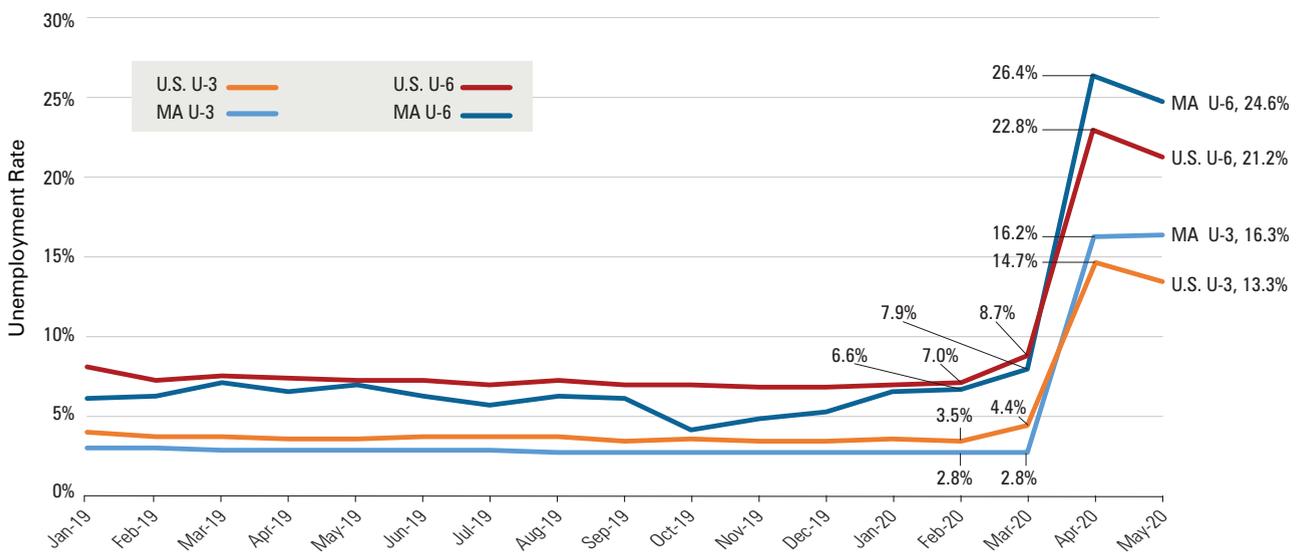
Sources: Massachusetts Executive Office of Labor and Workforce Development, Current Employment Statistics (CES-790); U.S. Bureau of Labor Statistics, Current Employment Statistics (CES); UMDI analysis

The time series of the state and national unemployment rate illustrates the magnitude of the sudden impact of the COVID-19 shutdown. In an instant, the unemployment rate spiked from historically low levels to rates approaching or more than 15 percent. For both Massachusetts and the nation, the U-3 and U-6 versions of the unemployment rate are displayed. The U-3 unemployment rate does not include those marginally attached to the labor force, including individuals who have stopped looking for work, and those who are working part-time and would prefer full-time work. The numbers of those marginally attached to the labor force are reflected in the U-6 unemployment rate and have increased right along

with the headline unemployed. The latest U-3 and U-6 unemployment rates, for May, currently stand at 16.3 and 24.6 percent, respectively, for Massachusetts.

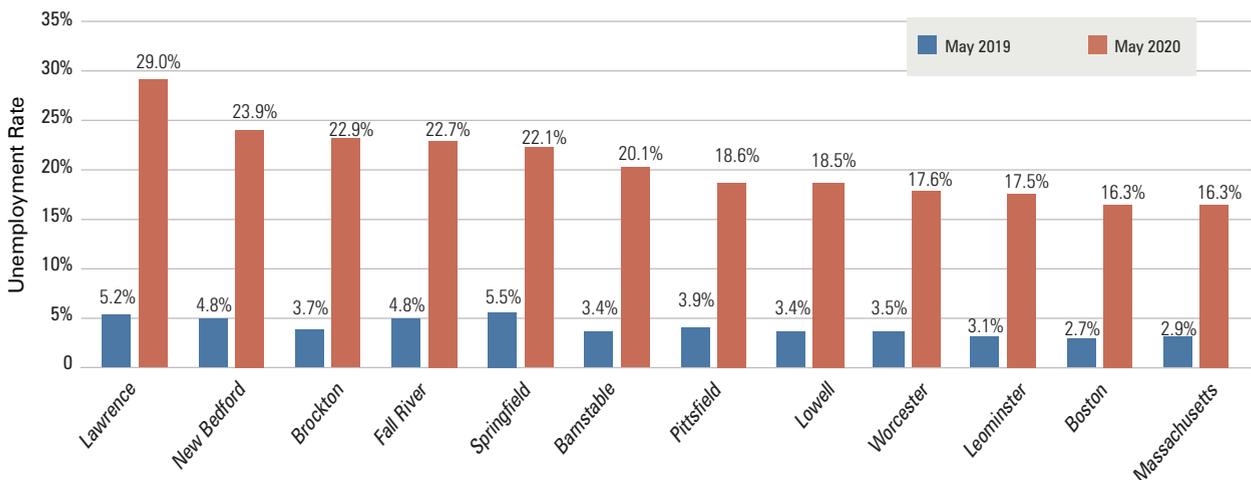
Perhaps the most vivid illustration of the sudden-stop impact can be seen in unemployment data by city. Again, year-over-year data are reported for May. At the extreme, Lawrence experienced an increase in its unemployment rate from 5.2 percent to 29 percent. New Bedford, Brockton, Fall River, Springfield, and Barnstable all suffered from rates above 20 percent in May. No city in this group escaped with less than double-digit unemployment rates, with the lowest recorded by Boston at 16.3 percent.

Figure 2. Monthly Unemployment Rates in Massachusetts and the United States, May 2019 and May 2020



Sources: Massachusetts Executive Office of Labor and Workforce Development, Local Area Unemployment (LAU); Dr. Alan Clayton-Matthews

Figure 3. Unemployment Rates by City, May 2019 and May 2020
Not Seasonally Adjusted



Sources: Massachusetts Executive Office of Labor and Workforce Development, Local Area Unemployment (LAU)

Logan International Airport

No industry has experienced a near full stop more than airlines, both passenger and freight. For context, the Transportation, Warehousing and Utilities industry suffered a loss of 28,400 jobs compared to employment levels in May 2019. These are dramatically illustrated by data on Logan International Airport traffic. Outright travel restrictions, as well as the close confinement of air travel, have resulted in precipitous declines of traffic at Logan. Passenger traffic, both inbound and outbound, has declined by over 97 percent, from nearly 2 million passengers each way to fewer than 50,000. Total flights declined by nearly 80 percent. Mail and freight, while not exhibiting the same percentage declines seen in passenger services, experienced drops of over 50 percent. Only Express Services was spared these large declines.

Table 2. Total Flight, Passenger, and Cargo/Mail through Logan Airport, May 2019 and May 2020

Flight Statistics	May-19	May-20	Change (N)	Change (%)
Total Arriving Flights (InBound)	18,998	3,735	-15,263	-80.3%
Total Departing Flights (OutBound)	19,010	3,720	-15,290	-80.4%
Total Deplaning Passengers (InBound)	1,958,511	101,209	-1,857,302	-94.8%
Total Enplaning Passengers (OutBound)	1,920,832	102,119	-1,818,713	-94.7%
Total Airport Mail (lbs.)	2,339,072	1,213,061	-1,126,011	-48.1%
Total Airport Express/Small (lbs.)	33,678,723	35,892,357	2,213,634	6.6%
Total Airport Freight (lbs.)	25,021,333	7,185,100	-17,836,233	-71.3%

Source: MassPort, Monthly Airport Traffic Summary for Boston-Logan International Airport for May 2020

WHAT LIES AHEAD

Professor James Stock of Harvard University, and a member of the MassBenchmarks Editorial Board, has developed national simulations of future economic and health outcomes based on two factors: how fast regulations allow openings to proceed; and second, to what extent non-work social distancing is maintained. These simulations demonstrate the striking tradeoff between economic progress and limiting the death count from COVID-19.

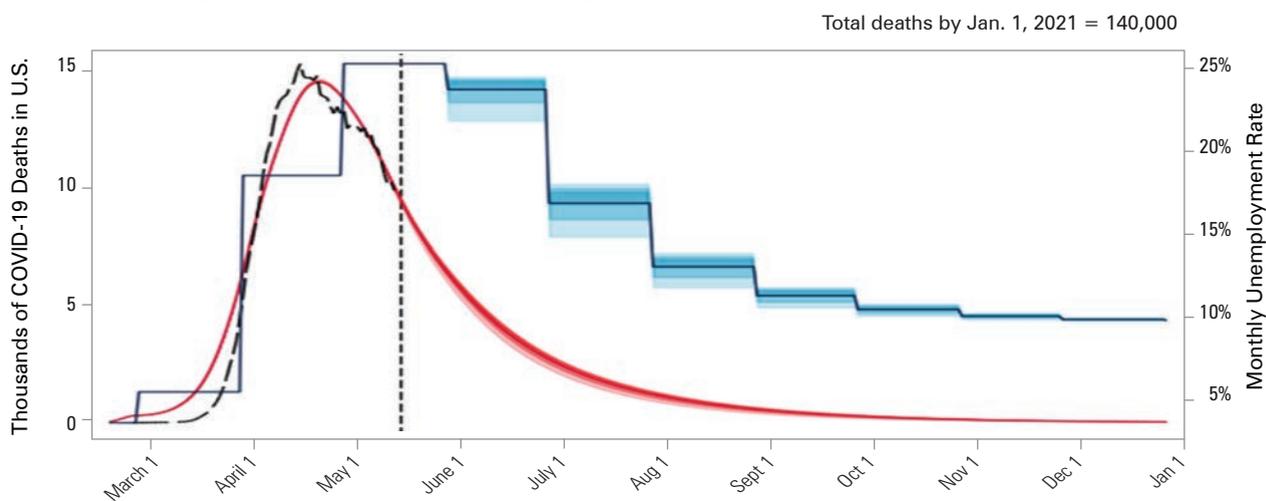
The first simulation, shown on the following page, models a “Slow reopening and non-work social distancing.” To the right of the vertical dotted line, the graph displays simulated monthly unemployment rates, surrounded by blue prediction bands, and simulated weekly deaths, surrounded by red prediction bands. In this simulation, the unemployment rate falls to 10 percent by January of 2021. This is considerably lower than the high point unemployment rate of nearly 25, but higher than

the rate of below 5 percent that the U.S. was experiencing prior to the advent of the pandemic. The tradeoff is a death count that falls to nearly zero by the same date, dropping monotonically from its current magnitude.

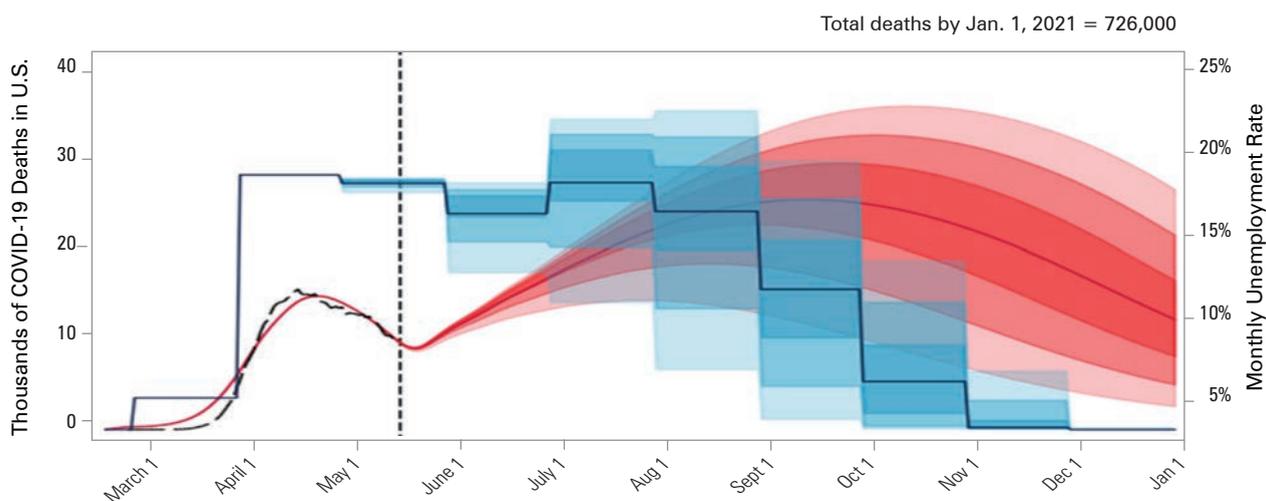
In sharp contrast to the first simulation, the second models a “Fast reopening with reduced non-work social distancing.” Under these assumptions, the unemployment rate falls quickly and to a level below 5 percent. The tradeoff is a death count that rises precipitously in coming months and remains stubbornly high, with the base count of approximately 15,000 per week in the U.S. by the end of the year. Note that these prediction bands are considerably wider than in the first simulation, suggesting greater uncertainty if the nation follows this regime. It is especially sobering that the weekly death count under this simulation rises to 25,000 to 30,000 weekly, or even higher at the top end of the prediction band, before falling back to its current weekly count.

Figure 4. Model Simulations: COVID-19 Deaths and Unemployment Rate in the U.S., March 2020 – January 2021

A. Slow Reopening with Non-Work Social Distancing



B. Fast Reopening with Reduced Non-Work Social Distancing



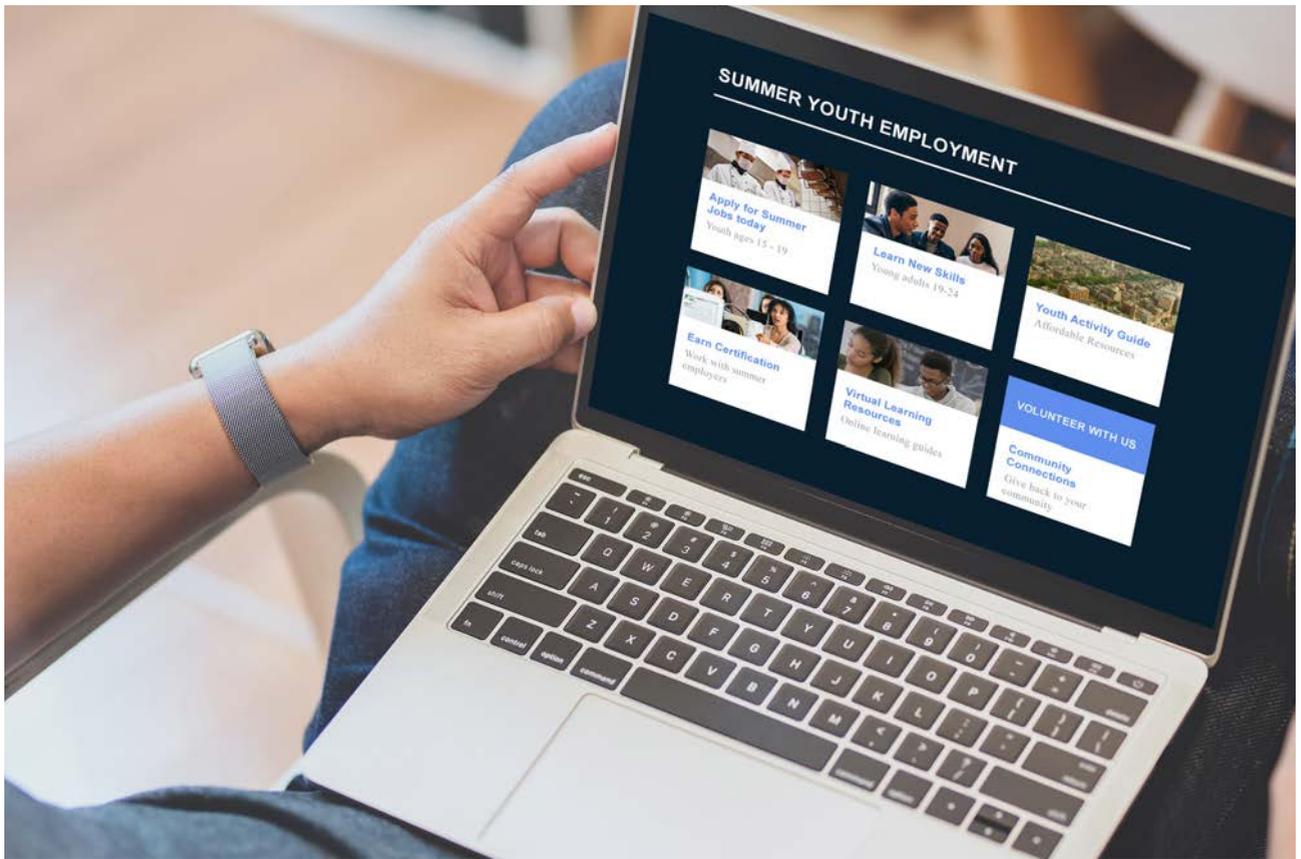
Actual COVID-19 deaths and unemployment shown to left of vertical line • Vertical line denotes start of simulated reopening
 ■ Prediction intervals for COVID-19 deaths
 ■ Prediction intervals for unemployment rate
 Base case: IFR = 0.6% • Bands are 0.3%-0.9% • Quarantine = 0% • Unemployment gap is calibrated to lost hours

Source: Baqaee, Farhi, Mina, Stock (May 2020) NBER WP 27244
 Note: Simulation assumes governors follow White House/CDC guidelines requiring 2-week declines to reopen.

What is the takeaway from these simulations? First, there is a simple way to reduce the numbers of deaths from COVID-19: Wear masks and maintain non-work social distancing. Second, if the economy is opened quickly and accepted methods of containing the virus are not honored, the economy will certainly recover more quickly, but at a terrible toll of human life and suffering. The direction the nation goes is a matter of

profound social policy. It implicates the very nature of the social contract. ◀

ROBERT NAKOSTEEN is a professor of economics at the Isenberg School of Management at UMass Amherst and Executive Editor of this journal.



Saving Summer Jobs: How Summer Youth Employment Programs Improve Youth Outcomes during COVID-19

ALICIA SASSER MODESTINO

Recent research demonstrates that summer youth employment programs develop skills and behaviors that lead to better long-term academic, criminal justice, and employment outcomes. Still, the economic disruption from the COVID-19 pandemic has placed these programs at risk at the exact moment when youth unemployment has skyrocketed. To adapt, the City of Boston, following scenario analysis, has invested \$4.1 million in virtual internships, a peer-to-peer COVID-19 education campaign, a public works program, and an Earn and Learn initiative, which allows students to take summer school courses, enroll in college courses for credit, and earn certifications such as Google's IT Support Professional certificate.

Over the past few decades, the labor market has become more challenging and competitive as employer expectations for a variety of skills have risen. Many believe that early work experience—such as that provided by summer jobs—can keep teens out of trouble, improve soft skills, and provide alternative postsecondary pathways for youth, especially those from low-income families living in high poverty neighborhoods. In response, policymakers and business leaders have joined together to create summer youth employment programs (SYEPs) across many U.S. cities. Recent research has demonstrated that SYEPs develop skills and behaviors among youth that lead to better long-term academic, criminal justice, and employment outcomes. Yet, the economic disruption caused by the COVID-19 pandemic has placed these programs in jeopardy at the exact moment when youth unemployment has skyrocketed.

INTRODUCTION: THE IMPORTANCE OF YOUTH EMPLOYMENT

Like all recessions, the economic disruption due to the COVID-19 pandemic has had a disproportionate impact on the employment prospects for youth. The unemployment rate for youth age 16 to 19 years nearly tripled from 11 percent in February to 31.9 percent in April, as many businesses that employ youth—such as retail, eating and drinking establishments—were forced to shut down to reduce the spread of infection.¹ Although youth were not the only ones affected, the teen unemployment rate is currently more than twice the overall rate for the population.² In addition, only 33.9 percent of youth were either employed or looking for work as of May 2020, far below the historical peak of 59.3 percent in August 1978.³

In today's historically slack labor market where most employers are hoping to recall workers who have been recently furloughed, the job prospects for the least skilled and the least experienced are quite dim. Postsecondary education and training have become a requirement for many jobs that previously required only a high school degree.⁴ Employer expectations are also higher for work readiness, communication, and other soft skills that are difficult for youth to demonstrate without a track record of work experience.⁵ Together, these hurdles make it hard for many young people to enter and move up in the labor market, especially those from low-income families in high poverty neighborhoods.⁶ Even in good times, over half of unemployed teens report that they are looking to get their first job, indicating that there are fewer pathways for teens to enter the labor market than in decades past.⁷ Moreover, youth are less likely to work in industries that have been identified as among the first to reopen—such as healthcare, construction, and manufacturing—making Summer Youth Employment

Programs (SYEPs) even more crucial for employing teens this summer.⁸

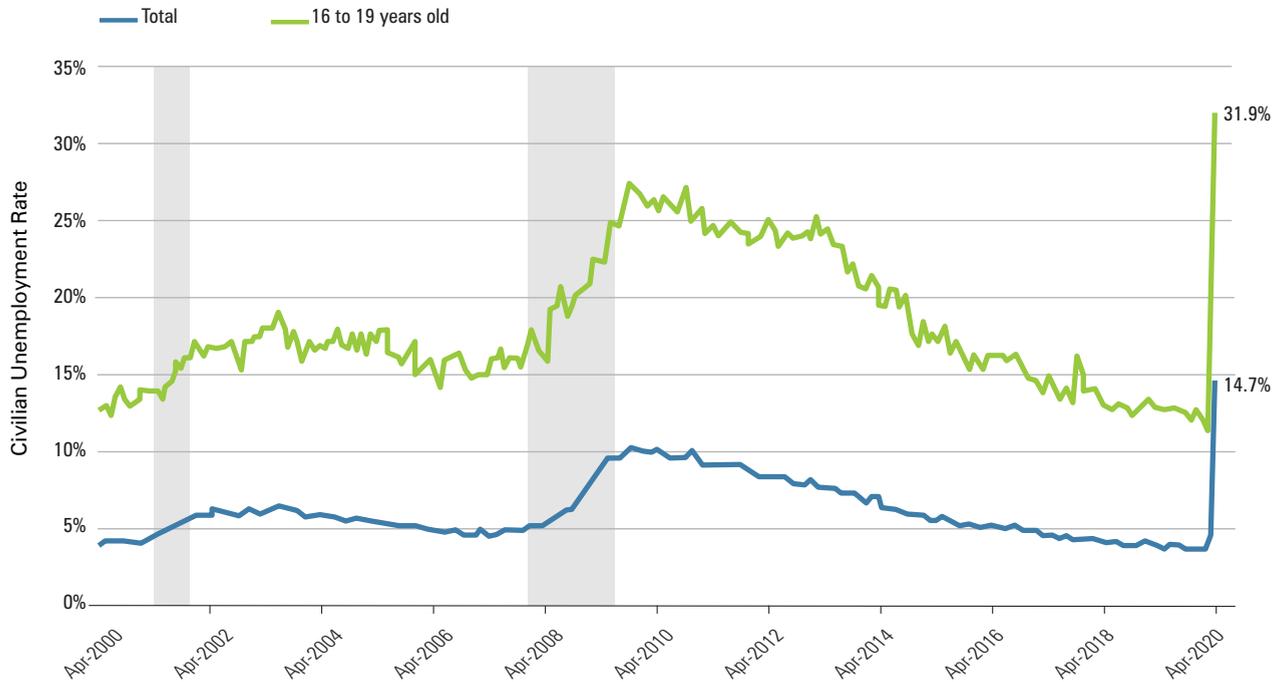
Yet, city and state governments face both steep budget shortfalls and large logistical hurdles to mounting their summer job programs this year. At the beginning of April, New York City canceled its summer job program, which typically employs upwards of 75,000 youth each year. New York City officials stated that the uncertainty regarding how the virus will continue to “affect social distancing guidelines, worksite availability, and provider and site staffing as we head into late spring and summer makes it difficult to ensure” that the program can operate safely and efficiently.⁹ In other cities such as Boston, Chicago, Philadelphia, and Washington, D.C.—cities with smaller summer job programs that face a less severe COVID-19 outbreak than New York—government, nonprofit, and business leaders are currently considering a range of options to preserve as much of the summer youth experience for as many youth as possible.¹⁰ These include online learning, virtual internships, peer-to-peer mentoring, and public works programs. In designing these alternative experiences for youth this summer, it will be important for policymakers and practitioners to keep in mind how best to replicate the skills that youth typically gain from having a summer job that have been linked to improvements in longer-term criminal justice, academic, and employment outcomes for youth down the road.

POLICY INTERVENTION: SUMMER YOUTH EMPLOYMENT PROGRAMS

Early work experience—such as that provided by summer jobs—is widely believed to foster positive work habits and interpersonal skills that can enhance future employment prospects and earnings potential—especially for low-income, inner-city youth.¹¹ Initially, the motivation behind many summer jobs programs was to keep youth off the streets and out of trouble during program hours while improving soft skills such as self-efficacy, impulse control, and conflict resolution.¹² Increasingly, policymakers also seek to use SYEPs as a vehicle to provide meaningful employment experiences that can lead to a career or some type of postsecondary education. This new focus stems from the recognition that one of the major underlying causes of rising racial inequality is the diminished economic opportunity arising from non-white teens being disproportionately located in neighborhoods with few job opportunities, failing schools, and high crime rates.¹³

These programs can be quite large in scale and range in size with roughly 10,000 youth employed each summer through the Boston program to upwards of 75,000 in New York City. Typically, youth aged 14 to 24 can

Figure 1. Civilian Unemployment Rate
Seasonally Adjusted



Source: U.S. Bureau of Labor Statistics.

participate but the majority of participants are between 16 and 19. Participants typically work a maximum of 25 hours per week for six weeks from early July through mid-August and are paid the minimum wage. Youth may be placed in either a subsidized position (e.g., with a local nonprofit, community-based organization, or city agency) or a job with a private-sector employer that pays the youth directly. In addition, programs in some cities provide job-readiness training (e.g., Boston) and/or social-emotional learning (e.g., Chicago).

Yet SYEPs are often constrained by a lack of funding, with most intermediaries braiding together funding from state, local, and philanthropic sources each year.¹⁴ Funding from the federal government was cut sharply during the early 1990s under the assumption that in a full-employment economy, employers would hire youth without any government subsidy. SYEPs received a temporary boost in federal dollars during the Great Recession from the American Recovery and Reinvestment Act, but now only receive a small portion under the Workforce Innovation and Opportunity Act. As a result, program slots have not been sufficient to meet demand—even in good times. In Boston, roughly half of those applying must enter a lottery, and among those who do not win program slots, only one in four finds a job on their own.¹⁵

Prior studies of year-round workforce development programs aimed at youth and young adults have provided

mixed results. Often these earlier initiatives failed to improve employment without very high levels of investment, suggesting that other interventions could be more effective and efficient at achieving the same goals.¹⁶ When students work too many hours, this ultimately decreases high school graduation and college attendance rates and inhibits later economic success.¹⁷ Indeed, the association between hours of work and school performance follows an inverted-U pattern, with students who work moderate hours performing at a higher level than students who work more or not at all.¹⁸

Yet summer jobs programs differ from these earlier programs in several important ways. First, SYEPs primarily serve younger youth, who are more likely to still be enrolled in school and less likely to have already engaged in criminal activity. As such, SYEPs may act as a preventive measure compared to previous youth employment programs that were targeted at “opportunity” youth who had already dropped out of school and were struggling in the labor market. Second, SYEPs occur during the summer months when youth are often idle, offering fewer conflicts with academic work and/or extracurricular activities. In fact, SYEPs may help ameliorate summer learning loss among low-income and at-risk youth when school is out of session by providing the opportunity to practice existing skills or learn new skills on the job.¹⁹ Finally, some SYEPs incorporate program features—such as a formal career readiness curriculum, greater exposure

to private sector employers, and job-skill ladders across summers—that specifically address deficits arising from a lack of opportunities among at-risk youth.

With funding from the William T. Grant Foundation, I have been engaged in a multi-year evaluation with the Boston Mayor’s Office of Workforce Development (OWD) to assess the impact of the city’s summer jobs program on criminal justice, academic, and employment outcomes, with a specific focus on reducing inequality across groups. Unlike other studies, our evaluation captures both short-term behavioral changes as well as improvements in longer-term outcomes in an attempt to better understand the program’s mechanisms, so that limited SYEP funds can be used most effectively.

Because more youth apply to the program than there are program jobs available, participation in the Boston SYEP is assigned by lottery. This means we can assess the effectiveness of the program by comparing participants to a random set of similar applicants who did not win spots in the program. We measure changes in short-term behaviors with regard to soft skills, community engagement, academic aspirations, and job readiness that occur during the summer, using a survey administered immediately before and after the program. Longer-term criminal justice, academic and employment outcomes are evaluated during the 12 to 18 months after the program ends using data from administrative records. We then link these two datasets to determine which short-term behaviors are potentially driving the improvements in longer-term outcomes for youth.

HOW CAN SYEP PROVIDE YOUTH WITH MEANINGFUL EXPERIENCES?

Even when the job market is relatively good, youth placed with an employer through the summer jobs program are more likely to work, work more hours per week, and have more meaningful work experiences than the control group. Both survey and administrative data from the Boston SYEP show that during the summer of 2015 only one-quarter to one-third of youth in the control group

had worked.²⁰ This is likely an indication of the difficulty that youth face in securing their own employment during the summer, even when there is a relatively low unemployment rate.

Figure 3 provides descriptive information about the summer employment experiences reported by both the treatment group and control groups on the end-of-summer survey. Survey respondents in the control group who found a job worked fewer hours per week than SYEP participants. (See panel A.) Yet, participants had less variation in the type of daily work they performed with over half working at a day care or day camp. (See panel B.) Regardless of which job they held, SYEP participants were more likely than their counterparts in the control group to report that they would consider a career in the type of work they did, had an adult they considered a mentor and whom they could use as a reference in the future, and felt better prepared to enter a new job. (See panel C.)

Understanding the skills that youth acquire over the summer can help inform policymakers and practitioners about the mechanisms by which SYEPs can lead to better long-term academic, criminal justice and employment outcomes. Below I describe four primary channels through which SYEPs have the potential to improve youth outcomes:

1. Improving behaviors correlated with adult success.

Some SYEPs, including the Boston program, offer a curriculum aimed at improving non-cognitive skills such as responsibility, positive work habits, self-efficacy, conflict resolution, and grit—attributes that have been shown to be important for adult success.²¹ In addition, the early work experience provided by SYEPs gives youth the opportunity to engage in tasks that help them develop a sense of agency, identity, and competency with the potential to boost attendance and reduce the likelihood of dropping out.²² SYEPs also help develop strong, supportive, and sustained

Figure 2. Evaluation Model for Assessing the Link between Short-Term and Long-Term Outcomes

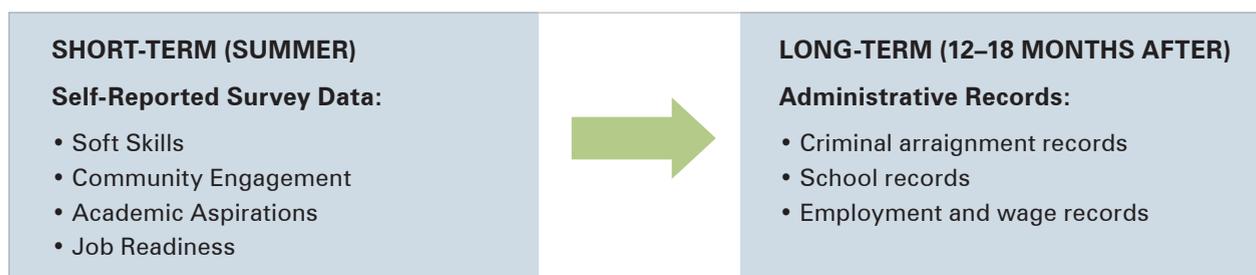
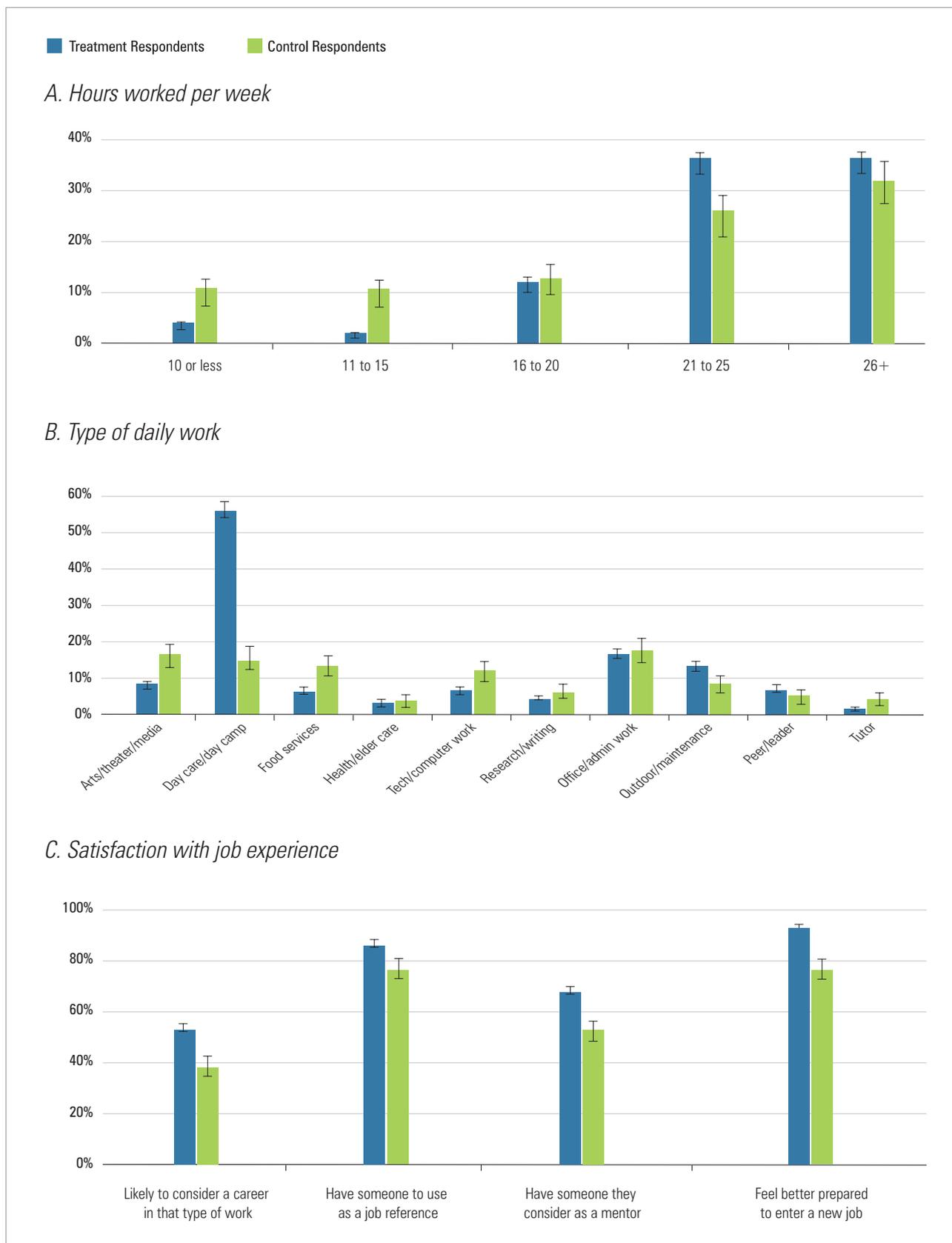


Figure 3. Differences in Job Experiences for Boston SYEP Treatment and Control Groups



Source: Author’s calculations based on data provided by the Boston Mayor’s Office of Workforce Development.

Notes: This figure displays descriptive information about the self-reported summer employment experiences among individuals responding to an end-of-summer survey of both the treatment group and control groups to assess whether the Boston SYEP provides a meaningful intervention. Individuals in the treatment group work more hours per week, are more likely to work in day cares and day camps, and are more satisfied with their job experience. Black whisker error bars indicate the 95% confidence interval.

relationships with adults and peers that are critical in reducing delinquency and criminal offending as youth move from adolescence into adulthood.²³

2. Increasing career and academic aspirations.

One of the stated objectives of the Boston SYEP is to provide youth with meaningful employment experiences that can lead to alternative pathways—whether obtaining career training or attending college.²⁴ These program objectives are based on the observation that greater exposure to employment provides youth with experiences that can shape their goals by raising career and academic aspirations—both of which can lead to better school and employment outcomes, particularly for disadvantaged youth living in neighborhoods with few job opportunities.²⁵

3. Reducing opportunities to engage in delinquent behavior.

Many summer jobs programs were initially established to keep kids off the streets and reduce violence during the summer. As such, SYEPs may limit opportunities for youth to engage in delinquent activity or disrupt risky behaviors due to a lack of supervision or guardianship.²⁶ By providing youth with a set of socially productive activities, SYEPs may decrease the risk of exposure to, or participation in, violence and delinquent behavior that could lead to truancy, suspension, dropout, and arrests.²⁷

4. Providing direct income support to youth and their families.

Wages earned from employment in the program can also help reduce poverty and provide resources that lead to better long-term outcomes. According to the end-of-summer survey, roughly half of youth participating in the Boston SYEP indicate that they help pay one or more household bill and one in five report that they are saving for college tuition.²⁸

To explore how the Boston SYEP affects youth behavior in the short-term, I measure program impacts as outcomes where there was a significant improvement among participants over the summer as well as a significant difference relative to the control group at the end of the summer. To minimize the possibility of selection bias due to survey response rates, I control for observable characteristics such as age, gender, race, ethnicity, socioeconomic status, and limited English proficiency using a regression model.

The self-reported survey data indicate that youth participating in the Boston SYEP experienced significant improvements across a variety of short-term behaviors

and skills. Table 1 shows the change over time for the pre-/post-program survey responses of the treatment group as well as the difference between the post-program responses for the treatment versus the control group. The first panel shows that the share of participants reporting that they plan to attend a four-year college or university increased significantly by nearly 5 percentage points during the summer and was 11 percentage points higher than the share of the control group reporting similar academic aspirations at the end of the summer. Coincidentally, the share of SYEP participants who reported saving for college also increased by 5 percentage points and was significantly higher than that of the control group at the end of the summer.

SYEP participants also indicated sizeable growth in job readiness skills during the summer, many significantly greater than those reported by the control group. (See section B of Table 1.) This included large increases in the share of participants reporting that they had prepared a resume and a cover letter, practiced interviewing skills with an adult, and developed answers to typical interview questions. Work habits also improved markedly with a significant increase in the share of participants who reported knowing “how to be on time” and “how to organize my work and keep to my schedule.”

Section D of Table 1 indicates that participants’ attitudes toward their communities improved greatly (by 15 percentage points), and that these outcomes were significantly better than those reported by the control group at the end of the summer. Given that many SYEP job placements are with community-based organizations in the participants’ neighborhoods, it could be that the program provides youth with an opportunity for more positive social engagement within their communities. Although smaller in magnitude, participants also showed significant improvements in social skills and behaviors—such as managing emotions, asking for help, and resolving conflict with a peer—measures that were also significantly higher relative to the control group by the end of the summer. These improvements might reflect additional soft-skills development stemming from the program’s career readiness curriculum that are then practiced on the job throughout the summer.

Across all of these domains—academic, job readiness, community engagement, and social skills—improvements were larger among African-American and Hispanic youth, suggesting that the Boston SYEP has the potential to reduce inequality across groups.

HOW DO SYEPS AFFECT LONGER TERM OUTCOMES FOR YOUTH?

Although summer jobs programs have the potential to enhance youth outcomes along several dimensions, only

a handful of studies in several cities have rigorously evaluated such programs. These studies typically use a randomized design to compare impacts for youth who were randomly selected into the program to youth who applied but were not selected. Thus far, the literature has focused on long-term outcomes captured by administrative data on criminal activity, academic achievement, and employment and earnings. While this research has demonstrated encouraging results in some cities—particularly for criminal justice and academic outcomes—a limitation of this work has been a lack of information on the mechanisms driving these improved outcomes. We build on this literature by linking the survey data on changes in self-reported behaviors over the summer to administrative records on subsequent criminal justice, academic, and employment outcomes to shed light on what works for whom, under what conditions, and why.

Criminal Justice Outcomes

Studies in Chicago, New York, and Boston have documented strong and similar impacts of summer jobs programs on reductions in crime—particularly violent crime. For example, participating in Chicago’s One Summer Plus program was found to decrease violent crime for youth in the treatment group by 43 percent over 16 months relative to the control group, with much of the decline occurring during the year after participation.²⁹ Similarly, participating in the New York City SYEP reduced the probability of incarceration and mortality from external causes, including homicides, suicides, and accidents.³⁰

I find that the Boston SYEP also has a significant impact on reducing the frequency of criminal arraignments among youth. I test the program’s impact on each of these outcomes separately in Figure 4. Panel A plots

Table 1. Change in Short-Term Skills and Behaviors for Boston SYEP Participants

	Treatment Group of Lottery Winners				Treatment Control	
	1. Pre-Program Mean	2. Post-Program Mean	3. Post-Pre Difference		4. Post-Difference	
A. Academic aspirations						
I plan to enroll in a four-year college or university	0.681	0.730	0.049	**	0.110	***
I am saving for school tuition	0.062	0.114	0.052	***	0.043	**
B. Job readiness skills						
I have all key information to apply for a job	0.810	0.882	0.072	***	0.094	***
I have prepared a resume	0.408	0.701	0.293	***	0.245	***
I have prepared a cover letter	0.234	0.437	0.204	***	0.217	***
I have developed answers to the usual interview questions	0.679	0.771	0.092	***	0.069	**
I have practiced my interviewing skills with an adult	0.548	0.649	0.101	***	0.064	**
C. Work Habits						
I know how to be on time	0.431	0.540	0.110	***	0.081	***
I know how to organize my work and keep to my schedule	0.418	0.510	0.092	***	0.086	***
D. Community engagement and social skills						
I have a lot to contribute to the groups I belong to	0.319	0.466	0.147	***	0.156	***
I feel connected to people in my neighborhood	0.220	0.368	0.148	***	0.212	***
I know how to manage my emotions and my temper	0.442	0.497	0.055	***	0.065	**
I know how to ask for help when I need it	0.445	0.487	0.042	***	0.116	***
I have a mentor	0.476	0.677	0.201	**	0.152	***
I know how to constructively resolve a conflict with a peer	0.366	0.422	0.057	***	0.136	***
Number of youth	663	663	663		1,327	

Source: Author’s calculations based on data provided by the Boston Mayor’s Office of Workforce Development.

Note: ***indicates statistical significance at the 1% level; **at the 5% level.

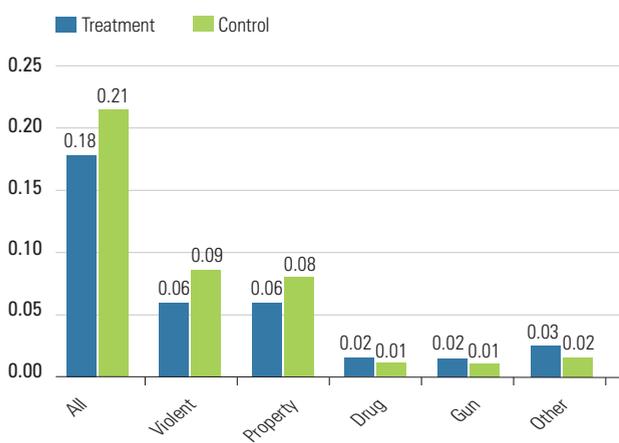
post-program means for the treatment versus the control group by type of crime. Panel B plots the intent-to-treat (ITT) estimate of the difference along with the 95 percent confidence interval. Despite no significant difference in the overall number of arraignments per youth, violent-crime arraignments among the treatment group were 35 percent lower relative to the control group, with roughly -0.031 fewer arraignments per youth. A similar impact was found for property crimes (-0.022 fewer arraignments per youth or a relative decline of -29 percent). There were no significant changes in arraignments for the other types of crimes (gun, drug, or other), although there was a slight uptick in drug and other crimes—such as disturbing the peace—which may be why the decline in the overall number of arraignments is not statistically

significant.³¹ For the former, it could be that the additional income from working is spent on crime-inducing goods such as drugs. For the latter, it may be that incidents such as disturbing the peace continue to occur as frequently as before but no longer escalate into violent crimes. Interestingly, the effects of reducing crime persisted beyond the summer months, suggesting that something beyond keeping youth busy during the summer could be at play.

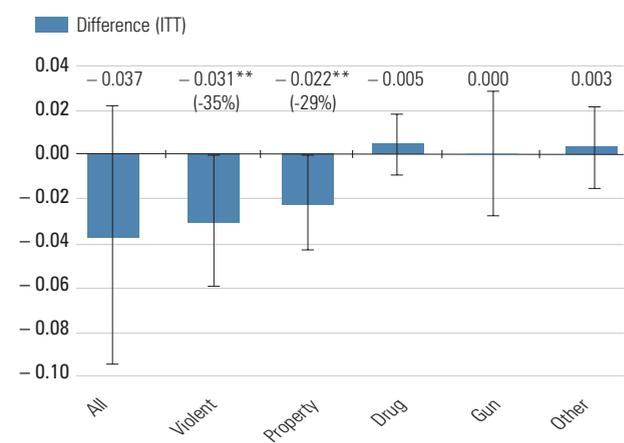
What might be driving the reduction in crime observed for Boston SYEP participants? It could be that participating in the SYEP disrupts some of the youth activities during the summer months to the point where it also reduces the frequency to engage in delinquent behavior even after the program has ended. Alternatively,

Figure 4. Impact of the Boston SYEP on Criminal Activity

A. Average Number of Arraignments per Youth



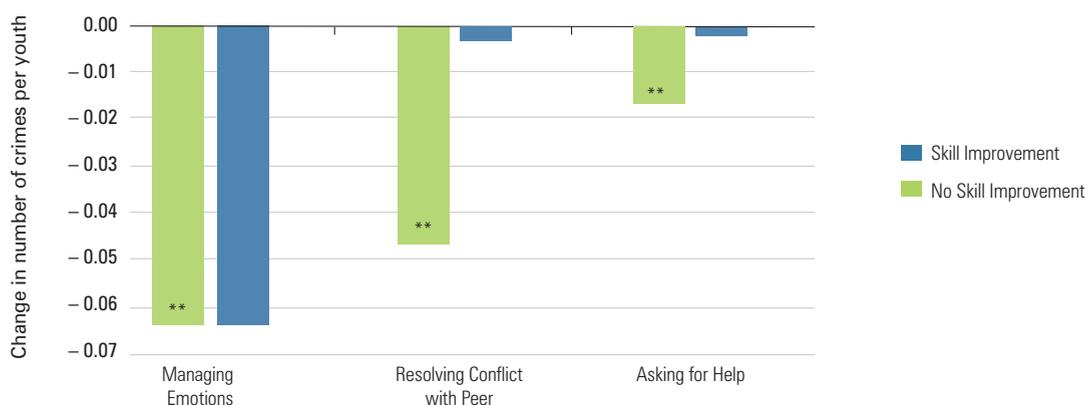
B. Program Effect



Source: Author's calculations based on data provided by the Massachusetts Department of Criminal Justice Information Services and Office of the Commissioner of Probation.

Note: *Indicates difference is statistically significance at the 10 percent level; ** at the 5 percent level; and *** at the 1 percent level. Black whisker error bars indicate the 95% confidence interval.

Figure 5. Correlation between Improvements in Behaviors among SYEP Participants and Subsequent Criminal Activity



Source: Author's calculations based on data provided by the Massachusetts Department of Criminal Justice Information Services and Office of the Commissioner of Probation.

Note: ***indicates statistical significance at the 1% level, **at the 5% level.

it could be that the Boston SYEP affects youth behaviors during the summer that are correlated with delinquency and crime. If such behavioral changes are lasting, this could explain why the reduction in arraignments continues to accumulate over time.

Figure 5 explores this idea by examining how the changes in behaviors and skills observed during the summer are correlated with the relative reduction in arraignments after the program ends. Although participants demonstrated significant gains over the summer in a variety of behavioral skills and attitudes, only those related to better soft skills appear to be correlated with subsequent reductions in criminal arraignments. Improvements in soft skills such as managing emotions, asking for help, and resolving conflict with a peer were associated with a larger reduction in criminal arraignments for both violent and property crimes. In contrast, improvements in other short-term program measures such as job readiness and academic aspirations did not play a meaningful role in reducing the number of arraignments per youth.

Academic Outcomes

Although prior literature on SYEP has found strong positive impacts for reducing crime, the evidence on improving academic outcomes is more mixed. For example, participating in the New York City SYEP is associated with small but significant increases in taking and passing statewide high school exams for the treatment group

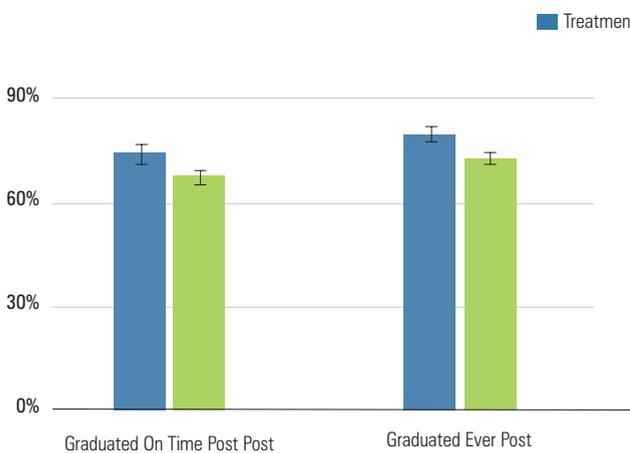
relative to the control group.³² Another study finds significant increases of 1 to 2 percent in school attendance during the year following participation, with larger improvements for students aged 16 years and older with prior low baseline attendance.³³ However, other research indicates that the program did not have a positive effect on longer-term academic outcomes, such as graduating from high school or college enrollment.

Similar to these prior studies, I assess the impact of the Boston SYEP on academic outcomes by comparing the treatment versus the control group during the 1-2 years following the intervention. I measure multiple outcomes of interest during this post-intervention period, including attendance, course performance, standardized test taking and scores, dropout, and high school graduation. Figure 6 demonstrates that the Boston SYEP raises the likelihood of graduating from high school on time by 5.3 percentage points (8% improvement) and of graduating at any point after participating in the program by 4.1 percentage points (6% improvement). Part of this is due to preventing dropout after participating in the summer jobs program.³⁴

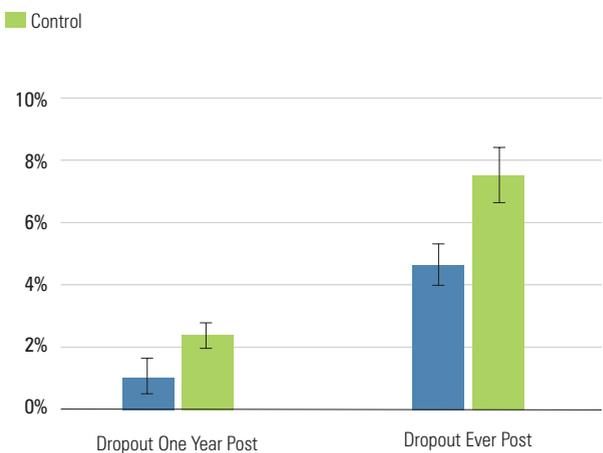
These improvements in high school dropout and graduation rates appear to be driven by better attendance in the year after being selected for the program. Attendance rates improved by 2.9 percentage points or 4 school days and chronic absenteeism fell by 6.3 percentage points, including a reduction in days truant. Given

Figure 6. Impact of the Boston SYEP on High School Dropout and Graduation

High School Graduation Rate



Dropout Rate



Source: Author’s calculations based on data from administrative data on program participation provided by the City of Boston Office of Workforce Development. Administrative data from school records provided by the Massachusetts Department of Elementary and Secondary Education.

Notes: This figure presents estimates of the program’s impact on both dropout and high school graduation. The sample includes youth who were matched in both the 2014-15 and 2015-16 school years. Each coefficient is from a separate probit regression where the dependent variable is the likelihood of the outcome listed and the controls include SYEP participation through another intermediary, demographic characteristics (age, gender, race, primary language spoken, limited English, public assistance, homelessness, and disabled status), academic characteristics (grade level, enrollment in a BPS school, high need special education status, participation in the METCO program, switching schools within the school year, and switching schools across school years), and school fixed effects. The coefficients reported in the table are the marginal effects, estimated at means. Black whisker error bars indicate the 95% confidence interval.

that attendance typically falls as youth age, this suggests that the SYEP might operate as a preventive intervention for chronic attendance among school-age youth. Table 2 shows that the Boston SYEP had a greater impact on students with prior chronic absenteeism as well as youth of legal dropout age (e.g., 16 years or older), with both groups experiencing an additional 4 percentage point boost to their attendance rates compared to the average student in the treatment group. Finally, there is a strong correlation between better attendance and high school graduation rates and changes in behaviors over the summer such as increasing aspirations to attend college, gaining basic work habits (e.g., showing up on time), and improving social skills (e.g., managing emotions and asking for help).

Employment Outcomes

Unlike criminal justice or school outcomes, the impact of summer jobs programs on employment after participating in a program has been difficult to detect. There may be several reasons for this. First, youth may have been less apt to seek work immediately after participating. Since they were able to work during the summer, they may have chosen to spend more time on school or other activities. As such, program impacts may not be observable until youth are out of school, which would necessitate following individuals longer than one year.

Indeed, prior studies examining the link between SYEPs and subsequent employment and earnings find

little evidence of any permanent improvement that can be attributed to summer jobs programs. Two studies find that the New York City SYEP initially increases average earnings and the probability of employment, but the effects subsequently faded.³⁵ Another study using machine learning to identify subgroup impacts in Chicago finds that employment improved only for participants more likely to be younger, enrolled in school, Hispanic, female, and less likely to have an arrest record.

Similarly, I find that employment and wage rates for the treatment group were higher during the academic year after participating in the Boston SYEP compared to the year before, but not significantly different from those of the control group. The one exception was older youth, who showed a small but statistically significant increase of two to three percentage points in employment. Across demographic groups, Table 3 shows that both employment and wages were higher for African American males age 19-24 years during the year after participating in SYEP relative to the control group.³⁶

Linking the one-year employment outcomes to the short-term behavioral impacts, it appears that employment increased more rapidly among participants reporting improvements in job readiness skills, such as preparing a resume/cover letter and practicing interviewing techniques. Employment also increased more rapidly among those reporting they felt more prepared for a new job, but not among those reporting having gained a reference or a mentor.³⁷

Table 2. Impact of the Boston SYEP on School Attendance by Subgroups

	Coefficient on Winning the Lottery* Group Dummy				
	Marginal Students	Age 16+	Male	Limited English	Public Assistance
Attendance Outcomes					
Attendance rate	0.037 ** (0.016)	0.042 *** (0.013)	0.008 (0.012)	-0.004 (0.018)	-0.006 (0.016)
Increased attendance rate	0.050 (0.053)	0.086 * (0.050)	0.015 (0.047)	-0.016 (0.080)	-0.080 (0.056)
Decreased attendance rate	-0.031 (0.054)	-0.099 ** (0.050)	-0.022 (0.048)	0.127 (0.081)	0.078 (0.059)
Attendance rate >=90%	0.065 * (0.049)	0.109 ** (0.046)	0.043 (0.049)	0.078 (0.102)	-0.052 (0.066)
Average days attended	8.146 (4.329)	5.039 (3.429)	0.847 (3.056)	-1.798 (5.584)	-1.878 (3.796)
Unexcused absences	0.567 (1.391)	-1.864 (1.504)	-0.339 (1.532)	0.056 (2.503)	3.135 (2.345)

Source: Author's calculations based on data from administrative data from school records provided by the Massachusetts Department of Elementary and Secondary Education.

Note: ***indicates statistical significance at the 1% level, **at the 5% level.

Table 3. Impact of the Boston SYEP on Employment and Wages

	All Youth			African American Males Age 19-24		
	Pre-Program: 2015 Q1	Post-Program: 2016 Q1	Difference	Pre-Program: 2015 Q1	Post-Program: 2016 Q1	Difference
Employment						
Treatment group	8.9%	21.6%	12.7	31.3%	55.6%	24.3
Control group	9.6%	26.3%	16.7	33.3%	48.5%	15.2
Difference	-0.7	-4.7	-4.0	-2.0	7.1	9.10*
Wages (quarterly)						
Treatment group	\$1,302	\$1,784	\$482	\$1,355	\$1,948	\$593
Control group	\$1,358	\$1,807	\$449	\$1,601	\$1,732	\$131
Difference	-\$56	-\$23	\$33	-\$246	\$216	\$462**

Source: Author's calculations based on Massachusetts Division of Unemployment Assistance.
 Note: ***indicates statistical significance at the 1% level, **at the 5% level.

A SUMMER LIKE NO OTHER

The evidence to date indicates that summer youth employment programs have the potential to reduce delinquent behavior, enhance academic performance, and boost employment for some groups. These improvements in long-term outcomes can be linked directly to the behaviors and skills that youth acquire over the summer through the program, such as better soft skills, higher academic aspirations, and more developed work habits and job readiness skills. Moreover, the impacts appear to be greater for at-risk youth such as those who are more likely to engage in delinquent behavior or have chronically low school attendance. Compared to behavioral programs, summer jobs also provide experience that can lead to future employment or postsecondary education. Working across these multiple dimensions, summer job programs have been shown to reduce inequality across racial and ethnic groups.³⁸

Despite a price tag of roughly \$2,000 per participant, the positive impacts associated with the reduction in crime and the improvements in high school graduation indicate that the benefits of summer jobs programs certainly exceed the costs. In addition, the positive impacts associated with SYEP can also lay a strong foundation upon which additional interventions can be layered to achieve more sustained and meaningful outcomes. For example, due to limited funding and capacity, few SYEP participants can roll over into year-round employment programs and, in fact, their jobs end abruptly at the end of the summer with no chance for continuation. Providing greater linkages between summer and year-round employment programs could enable school-age SYEP participants (e.g., ages 14-18) to continue to build on their positive summer experiences. Similarly, providing older SYEP participants (e.g., ages 19-24)

with opportunities to apply for full-time work, enroll in community college, or enter an apprenticeship program could reduce the number of opportunity youth who are idle. These are important investments that are even more important given the current economic and social disruption caused by COVID-19.

A number of cities are forging ahead with their summer jobs programs, seeking to make modifications that include more virtual options, rather than canceling their programs outright. For example, Philadelphia's program will focus on career exposure, financial literacy, digital literacy, and brand identity with youth taking part in three digital courses, where they will have the opportunity to earn a maximum of \$595.³⁹ Chicago, which normally employs 30,000 youth each summer, recently announced that youth will be working virtually for the city and other government agencies, although officials were unclear how many would be employed and what these virtual jobs would entail.⁴⁰

In Boston, the Mayor's Office of Economic Development conducted a survey of community-based organizations and employer partners to determine how many youth could be supported under different scenarios compared to last year. If there were no restrictions on operations, roughly 90 percent of the previous year's jobs could be supported. With social distancing measures limiting capacity at daycares and day camps that account for a large share of summer jobs, only 70 percent of last year's jobs would be supported. If all interactions had to be virtual, half the jobs would be lost.

To employ the same number of youth as last summer, it is likely that SYEPs will need to develop multiple tracks given that no one alternative will be able to be brought to scale or meet the needs of all youth. Moreover, these tracks will need to be flexible depending on

Wages earned from employment in the program can help reduce poverty and provide resources that lead to better long-term outcomes.

what reopening conditions might unfold. The City of Boston has invested an additional \$4.1 million in summer jobs this year to develop the following four new tracks that will be used to employ youth this summer:

- **Earn and Learn:** To ameliorate the learning loss from the school year, Boston city leaders have negotiated agreements to enable students to take summer school courses, enroll in college courses for credit, and earn certifications such as Google's IT Support Professional certificate. Recognizing that youth may need additional supports to be successful at completing college level coursework, the Office of Workforce Development will assign career coaches to monitor students' progress and provide help when needed.
- **Virtual Internships:** To help support companies and community-based organizations as they move jobs online, a platform developed by Northeastern University helps match Boston youth with appropriate job opportunities. The tool allows for projects that can be completed by teams of youth under the guidance of a manager or mentor. And the platform offers a dashboard for supervising youth online and ensuring that virtual employment experiences are a meaningful alternative to traditional in-person jobs.
- **Peer-to-Peer COVID-19 Campaign:** To educate youth about COVID-19 and safe practices, community-based organizations in Boston will engage youth in developing a peer-to-peer marketing campaign to disseminate public health messages. One of the important aspects of this track will be to provide an opportunity to capture the voices of young people during the pandemic through Photovoice or other methods.
- **Public Works Program:** To provide youth with at least one in-person option, city leaders in Boston have expanded their public works programs to employ youth in the maintenance of parks and other outdoor recreational spaces. To ensure the safety of youth and their family members, the City of Boston allocated part of its summer jobs budget to purchase appropriate Personal Protective Equipment (PPE) and increase supervision to ensure appropriate social distancing. Other

alternatives such as employing opportunity youth ages 18-24 to help support activities for the 2020 Census and/or contact tracing are also being discussed.

Regardless of the options that cities choose to pursue, keeping youth safe should be the primary focus this summer. An important secondary consideration is to ensure that youth are engaged and developing the skills that have been shown to pay off down the road. Where possible, we should find opportunities to study what youth experience this summer to understand how these alternative tracks affect long-term outcomes. Given that a vaccine is still 12-18 months away from widespread distribution, this learning can help inform summer jobs programs for 2021 and also point to ways in which SYEP can expand even when life returns to normal especially since the demand for most SYEPs exceed current funding levels even in good times.

Finally, let us not forget that SYEPs provide important income support for low-income youth and their families. Wages earned from employment in the program can help reduce poverty and provide resources that lead to better long-term outcomes. In Boston, roughly half of youth participating in the Boston SYEP indicate that they help pay one or more household bill and one in five report that they are saving for college tuition. Expanding summer jobs programs during COVID-19 can provide income to those who most need it as a time when it is most needed. It is also an investment in future skill development among youth. That will continue to pay dividends once we have moved past the current crisis. 

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Kids Today: *Boston's Declining Child Population and Its Effect on School Enrollment*

PETER CIURCZAK, ANTONIYA MARINOVA
AND LUC SCHUSTER

A sharp decline in Boston's middle-income families with children has left the city's increasingly segregated schools to low-income students and students of color. That is a key finding in the data-driven January 2020 report, *Kids Today*, by Boston Indicators. Half of Boston's children from middle- (and high-) income families leave the city when they become school-age. When looking at race, we see Black and Latino students frequently attend Boston schools that enroll not just majority students of color, but majority students of their own race and ethnicity.

Diversity makes cities vibrant, dynamic, adaptive and strong. Recently, Boston has gotten much more racially diverse, its population evolving from 20 percent people of color in 1970 to 56 percent today. We also have diversity across industries, with people working in areas ranging from higher education, healthcare, technology, to tourism and hospitality. This has made our economy more flexible and resilient to downturns in the national economy.

But there is a way in which the rich tapestry of our city has eroded: We're rapidly losing families with children. Even though our city's total population has increased from a low point in 1980, we've actually lost school-age population at the same time. And, if it were not for immigration, Boston's school-age population would have decreased even further.

Boston has experienced an especially sharp decline in middle-income families with children, with many moving to the suburbs. Over the same time frame, students of color and low-income students have become increasingly segregated in Boston public schools. This is troubling in light of the large, growing body of evidence that students from all backgrounds who attend diverse schools have better academic, social, behavioral, and economic outcomes.

This article presents nine key findings from *Kids Today*, a report released by Boston Indicators in January 2020.*

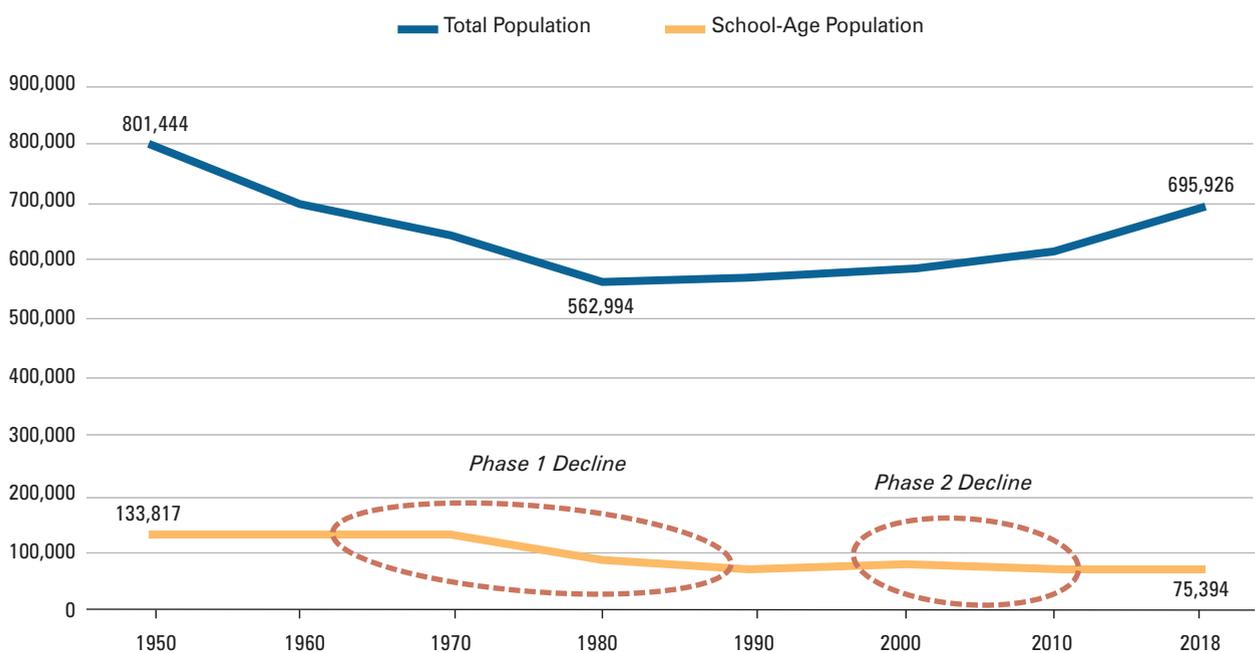
Even though Boston's population has rebounded significantly since 1980, our school-age population has mostly declined.

Boston lost 30 percent of its population from 1950 to 1980, though it has experienced a strong resurgence. Despite this overall rebound, our school-age population has actually continued declining. (Throughout this piece we define school-age using the standard Census category of 5–17 years of age.) Today, our population is only 13 percent below the city's 1950 high water mark, but our school-age population is barely half of what it was in 1950.

One way to think about this long-term picture is to isolate two separate periods of school-age population decline, both of which were driven in part by declining fertility rates nationwide. During the first period, from 1970 to 1990, Boston's school-age population dropped by more than 58,000, a decline exacerbated by local factors like court-ordered school desegregation and suburbanization of the Boston region. From 1990 to 2000, Boston's school-age population rebounded slightly.

Nevertheless, this increase was more than offset by a second decrease of more than 13,000 between 2000 and 2010. This phase was driven principally by declines among white and Black children. In fact, while Boston lost many more white school-age children during the 1970 to 1990 phase, it has lost more Black children in

Figure 1. Long-Term Total Population and School-Age Population Trends in Boston



Source: 1970, 1980, 1990, 2000 and 2010 U.S. Census, 2018 American Community Survey.

* See www.bostonindicators.org for the full report.

recent years. Specifically, Boston lost roughly 8,400 Black school-age children and 4,700 white school-age children between 2000 and 2017. Our Asian school-age population remained roughly level since 2000, and our Latino school-age population increased by roughly 3,700. Boston has also experienced a sharp drop in middle-income families, as they've increasingly been pushed out of the city due, in part, to a dearth of affordable market-rate housing. (We describe some of these housing dynamics later in this piece.)

Strikingly, even as Boston lost school-age children over these two time periods, we quickly regained population at all other age levels. By the early 2010s, our total population had rebounded to its 1970 level, and it has grown steadily ever since.

Many similar U.S. cities have seen school-age population declines.

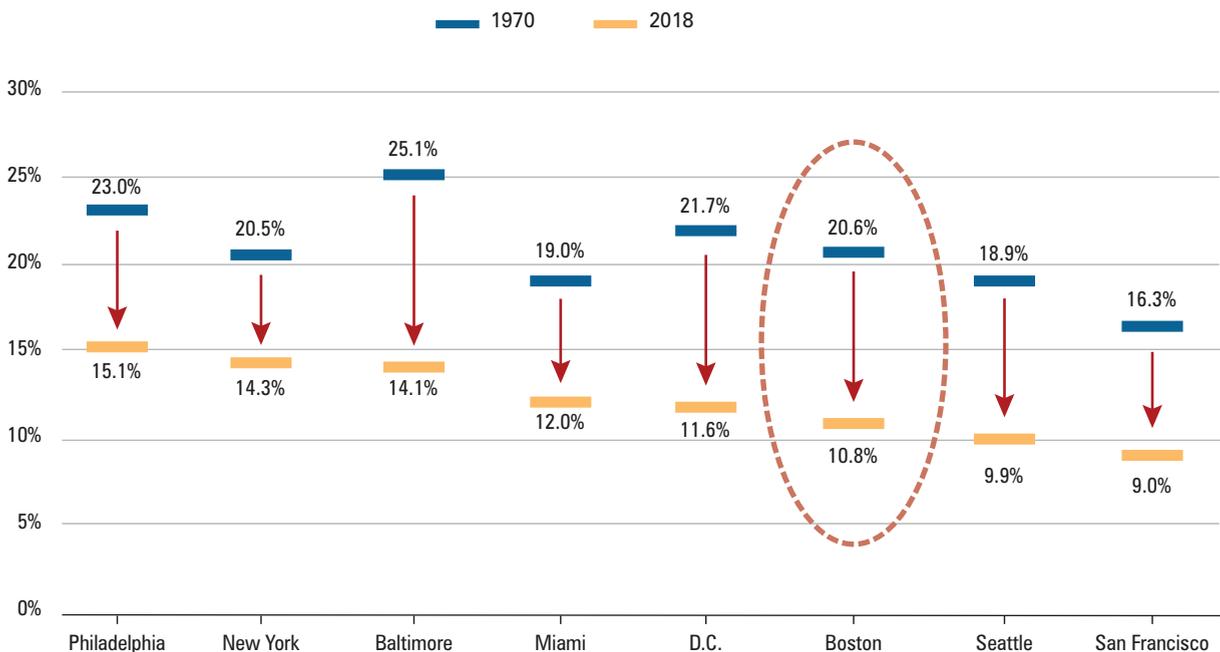
The graph below compares Boston to a subset of similar cities based on size, demographics, and density. Each of these cities has a school-age population share that is lower than the national average, and all saw declines over this timeframe. Boston's school-age population share was the fourth highest among these cities in 1970; today, we are third from the bottom, behind only San Francisco and Seattle. These losses are likely being driven by many different factors—e.g., declining fertility rates

and perceptions of school quality in urban areas—but it is clear that the rapidly rising cost of housing is among the most common push factors for families leaving major U.S. cities. A 2015 *Governing Magazine* analysis of housing size and affordability found that affordable 3+ bedroom homes in Boston made up just 17 percent of units listed on the market at any given time. In San Francisco, that number falls to just 6 percent.¹ There is even some evidence that rapidly rising housing costs can lead families to have fewer children, suggesting an interplay between rising housing costs and declining fertility rates. Studies in both the United States and England have found that as rising housing costs make it harder for young couples to make ends meet, fertility rates of women in their 20s and 30s have declined.²

Boston has lost middle-income families with children.

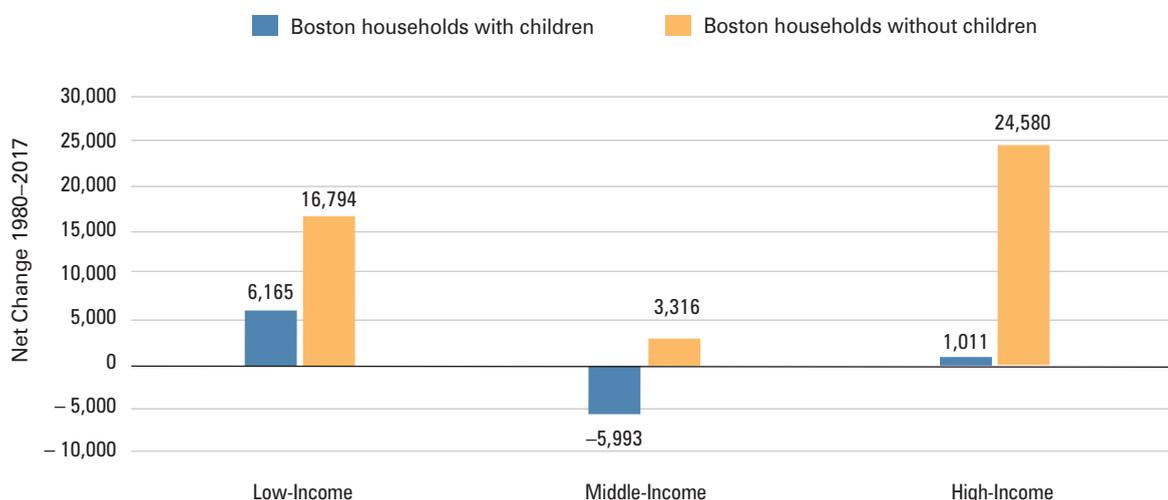
There is an important income dynamic to these population trends. Cities across the U.S. are rapidly losing families in the middle of the income distribution. These families tend to be above the income cutoff for subsidized housing programs and earn below what it takes to afford the fast-rising housing costs in many of these high-income cities. In Boston, there are almost 6,000 fewer middle-income households with children compared with 1980, even though the city's total population has grown.

Figure 2. Shrinking 5–17 Year-Old Population Shares across Select Cities



Source: 1970 U.S. Census, 2018 American Community Survey.

Figure 3. Households in Boston by Income and Presence of Children



Note: This report’s income analyses define “middle-income” as households earning between 100 and 200 percent of median household income in Boston (roughly between \$61,300 and \$122,600 in 2017). We use 100 percent of median income in Boston since it is roughly equivalent to 60 percent of the area’s median income (or “AMI”) for a household of three. (Incomes are higher across the Boston area than they are in Boston proper.) We go up to the 200 percent of the city median income threshold to capture a meaningful share of the total population within our middle-income bucket.

When looking at change just among households *without* children, we see that Boston experienced increases across all three income categories, but with an especially large increase among high-income households without children—up almost 25,000 between 1980 and 2017. This mirrors the story across high-density cities nationwide, with many of them increasingly becoming home to childless professionals and empty nesters.

Much of what is driving these changes in household composition by income is the broader macroeconomic trend of increasing income inequality nationwide. Over the past few decades, the gains of economic growth have increasingly gone to those at the very top of the income distribution, and wages at the middle of the income distribution have stagnated as a result.³

We’ve seen growth in high-skill, high-pay parts of the economy (e.g., science and technology) paired with growth in low-skill, low-pay parts of the economy (e.g., service and hospitality). We’ve seen much slower growth for decent-paying jobs in the middle of the income distribution. Wage polarization is fundamentally a national issue, but it is a heightened problem in cities like Boston, where economic growth has been especially uneven. In fact, Boston has the seventh highest income inequality among major U.S. cities, according to a recent Brookings Institution analysis.⁴

These national trends interact with local factors like rising housing costs to exacerbate challenges for middle-income families. In a well-functioning housing market, where supply for family-friendly housing (i.e., townhomes, triple-deckers, apartments with two

or more bedrooms) can rise to meet demand, middle-income households should be able to afford market-rate housing options without receiving public subsidies. But many parts of Boston and our broader region have limited the production of new housing, and costs have skyrocketed as a result. As of September 2019, median rent for three-bedroom apartments listed on the market in Boston was \$2,550 per month.⁵ Families would have to earn \$115,000 per year for annual rent payments to not exceed 30 percent of their income, a common benchmark for assessing whether a household is “housing cost burdened.”

Despite these challenges, Boston has made significant progress towards providing income-restricted housing options to help lower-income residents afford to remain in the city. Today, almost one in five housing units citywide (19 percent) is income-restricted in one way or another. Some of these units are in longstanding public housing developments, some have been created by private affordable housing developers, and some are affordable set-aside units created through the city’s Inclusionary Development Policy. The growth in these income-restricted units is one reason that a meaningful number of low-income residents have been able to continue living in a city like Boston, where our market rate housing stock has otherwise become increasingly unaffordable. And while the city’s Department of Neighborhood Development argues that this is the largest share of income-restricted units of any major U.S. city, there is still tremendous unmet need for income-restricted housing, and there is no question that we need to continue to do more.⁶

Roughly half of Boston's middle- and high-income children leave the city when they become school age.

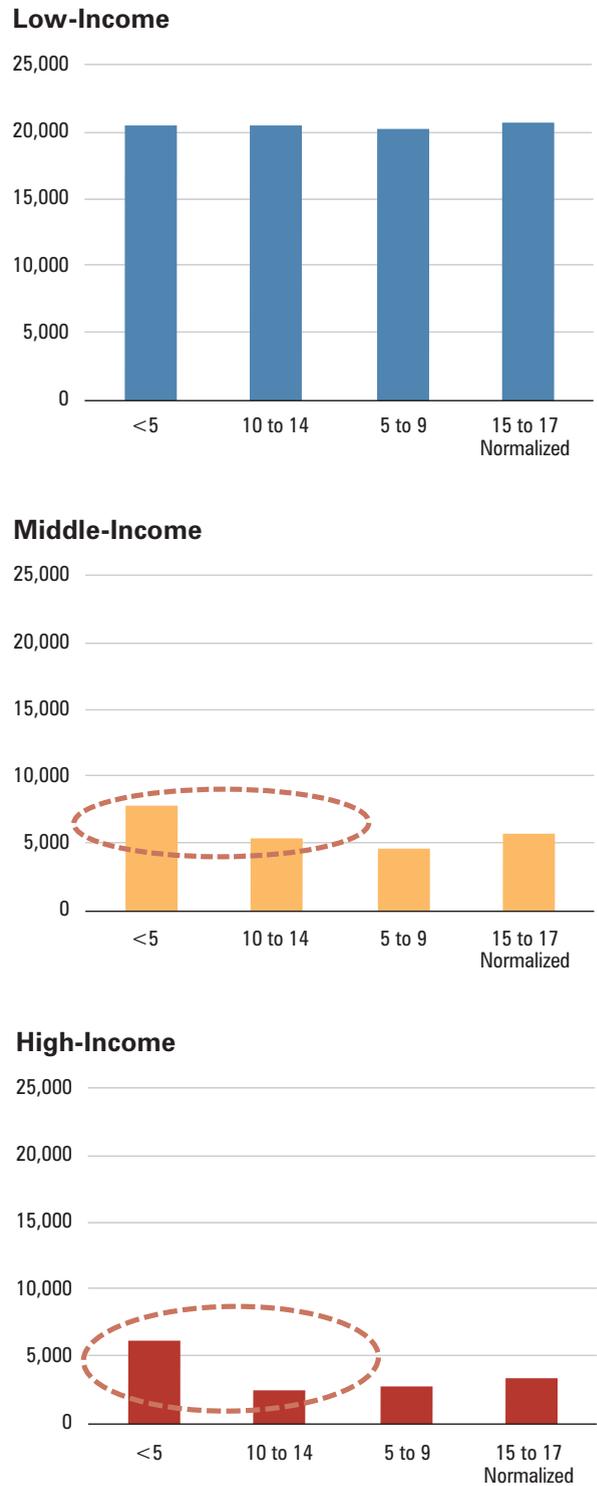
Boston's decline in families with children is even more conspicuous when focusing on those with school-age children five to 17. Many families do remain in Boston when they have babies and preschoolers, but there is a significant drop-off when these children turn five (roughly the age for beginning kindergarten). Boston has about 35,000 residents aged younger than five but only 28,500 aged five to nine. Both age groupings capture five distinct years of life. In other words, about 18 percent fewer children are old enough to attend early elementary school grades (five to nine years old) than do infants, toddlers and preschool-age children (up to four years old).*

These declines are especially pronounced for middle- and high-income children, as shown below. Among high-income households, for instance, Boston is home to more than twice as many zero-to-four-year-olds as five-to-nine-year-olds (roughly 6,300 compared to 2,700). We see a similar, although slightly less dramatic, drop among middle-income families when their children turn school age. By contrast, there is no drop-off at all for low-income children living in Boston.

Many higher-income Boston suburbs have seen school-age population increases, while mid-sized urban centers have tended to see decreases.

Just as Boston lost school-age children, many suburbs saw complementary increases. Suburbs to the west of Boston, many of which are higher income, have seen some of the region's largest gains. Towns like Winchester, Belmont and Sudbury each saw school-age population increases of more than 30 percent since 2000. Some of these families come from Boston itself, moving to the suburbs once their children become school-age, while many others move to Boston's suburbs from elsewhere in the U.S. Still others come from abroad, and instead of settling in Boston, move elsewhere in the region, seeking lower housing costs and community ties to their countries of origin.⁷ Whether or not these assessments are fair, perceptions that K-12 schools fare better in the region's higher-income suburbs is another driving factor behind some of these geographic moves.

Figure 4. Size of Boston's Under-17-Year-Old Age Groups by Income Level



* Note that the data in this section are rough estimates with very large margins of error because they are based on American Community Survey data from small numbers of respondents in each identified age/race/income subgroup. Though we're analyzing a snapshot in time, we compare the number of children across different age buckets and interpret that change as reflective of people moving in and out of the city. The broad magnitude and direction of trends presented in these graphs indicate real dynamics on the ground in Boston, but precise numbers should not be drawn from these graphs.

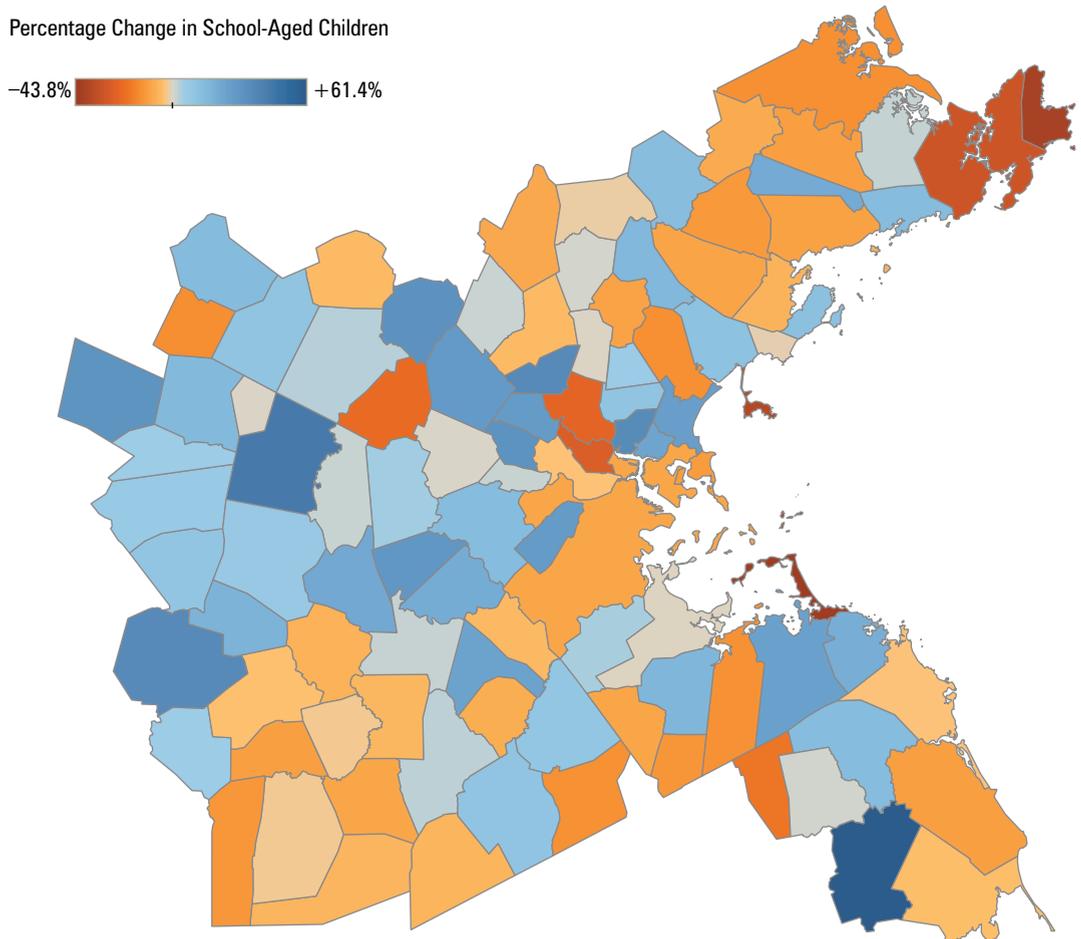
The map below shows the percentage change in school-age children for every municipality in Greater Boston. Smaller, mid-size cities, particularly those on the North Shore, have seen the largest declines in their school-age population. Gloucester alone lost over 30 percent of its school-age children since 2000. Beverly and Peabody each saw declines of 11 percent.

When we focus on Boston and its immediate neighbors, some interesting patterns also emerge. Using the Mystic River as a dividing line, every city north of the river and bordering Boston saw school age population gains. Collectively, Chelsea, Everett and Revere increased their school-age population by 29 percent, or more than 5,000 students. Just south of the Mystic, though, Boston, Somerville and Cambridge all saw significant losses of school-age populations.

Generations ago, Boston educated almost twice as many students in its public schools.

So far, we’ve focused on trends among school-age children and their families in Boston; next, we analyze how these changes have played out in terms of who is attending Boston’s schools. Boston was once home to many more families, with almost twice as many children enrolled in our public schools. Back in 1940, Boston’s population was nearly 800,000, compared to just under 700,000 in 2018. In 1940, Boston’s public schools educated as many as 110,000 students; today, it is down to 66,000. Moreover, within Boston, parents are increasingly turning to Commonwealth charter schools to educate their children. Charter school enrollment rose from around 2,000 students in 2000 to around 12,000 by 2019. Through all this change,

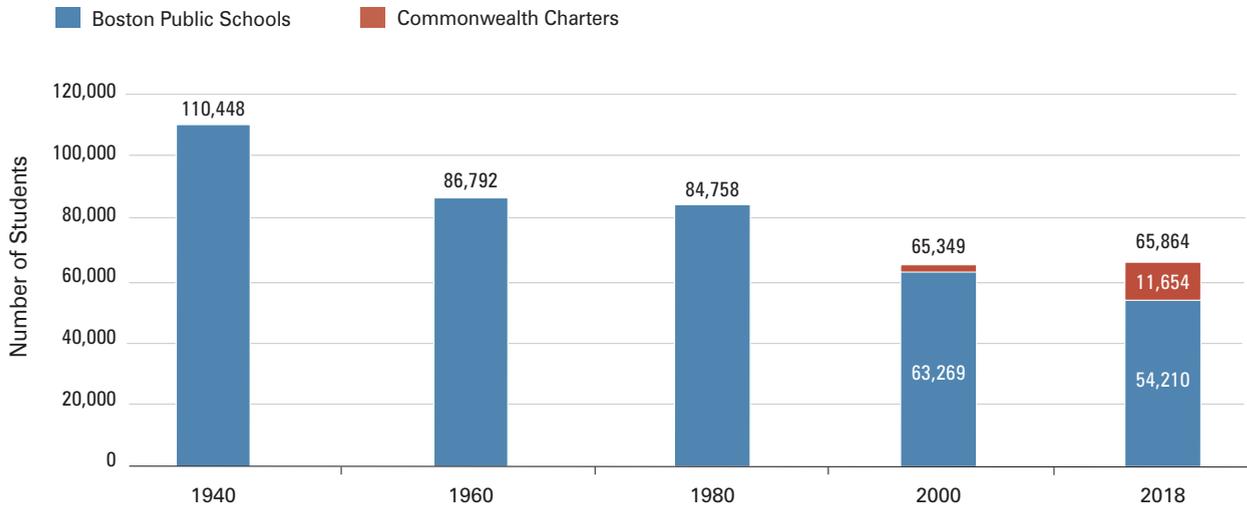
Figure 5. Percentage Change in School-Aged Populations across Greater Boston’s Cities and Towns



Note: The American Community Survey used throughout this paper has rougher estimates for smaller cities and towns outside Boston. To work around these issues, this map uses state administrative data that adds up enrollment for children attending all schools in a city or town.

Source: 2000 and 2019 Department of Elementary and Secondary Education, School Attending Children.

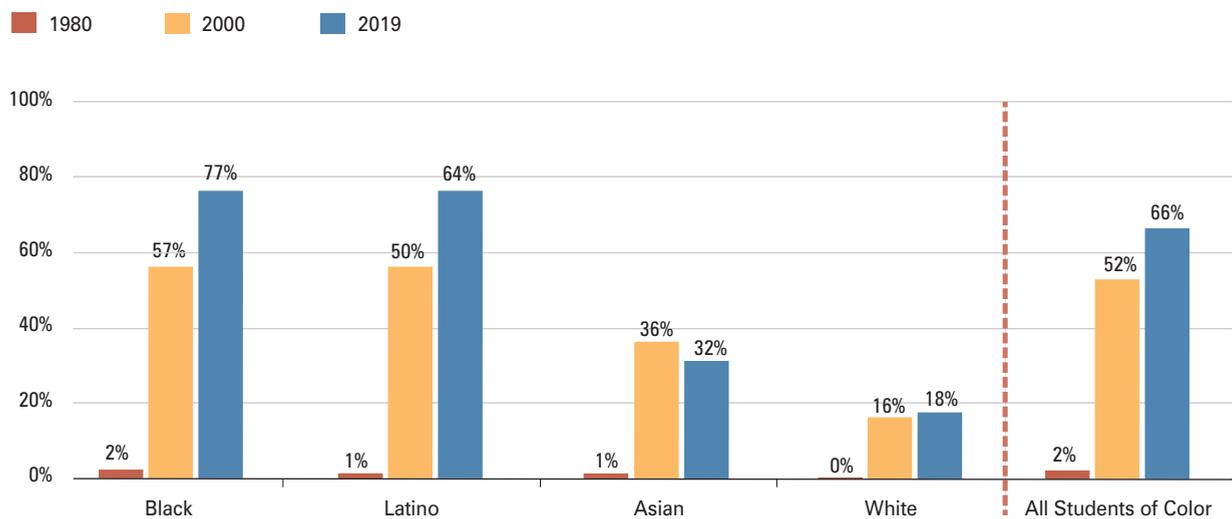
Figure 6. Boston Public School Populations by Selected School Years



Note: "Boston Public Schools" includes Horace Mann schools.

Source: Reforming Boston Schools, 1930–2006 (public school data for 1940 and 1960). 1980, 2000 and 2019 Department of Elementary and Secondary Education

Figure 7. Percentage of Students by Race/Ethnicity Attending Schools Where at Least 90 Percent of Students Are of Color



Source: Massachusetts Department of Elementary and Secondary Education, Enrollment by Race/Gender, and Boston Public Schools.

the pace of Boston’s population growth and economic development sometimes feels jarring, but we have in the past accommodated many more residents, including many more families with children.

Students of color in Boston increasingly attend intensely segregated schools.

These population trends have contributed to Boston’s public schools—including Horace Mann and Commonwealth charters—once again becoming racially and

socioeconomically segregated. More than three-quarters (77 percent) of Black students and nearly two-thirds (64 percent) of Latino students attend schools in which 90 percent or more of all enrolled students are students of color. Such schools are often considered “intensely segregated”—a definition popularized by the *Civil Rights Project* at UCLA and now used widely in analyses of school segregation.

Overall, fully two-thirds (66 percent) of all students of color in 2019 attended intensely segregated schools—a

share dramatically higher than even a few decades ago. In 1980, for example, several years after Boston’s court-ordered desegregation plan took effect, only two percent of non-white students in Boston attended intensely segregated schools.

Black and Latino students frequently attend schools that enroll not just majority students of color, but majority students of their own race.

Racial groups across Boston’s schools are often isolated from each other. In 82 of the city’s schools, more than half of all students are from a single race/ethnicity. The isolation of Black and Latino students is particularly pronounced: They frequently attend schools where they are not just majority students of color, but majority students of their own race. In 2019 for instance, 42 percent of Latino students attended schools in which students of their own race formed the majority—up from 11 percent in 1980.

Similarly, nearly half of all Black students in 2019 attended schools where they made up most of the student body (a decrease from 2000 of about 20 percentage points). What’s more, Black students in 2019 accounted for two-thirds or more of all students in ten schools across Boston.

Boston’s continuing residential segregation appears to be a key factor in the student enrollment patterns shown above. The more segregated people’s homes are from the homes of residents who are different from them, the further a district needs to spread some students out

to balance the schools’ population. School districts can influence the integration of schools independent of housing patterns, but doing so is difficult in areas with high residential segregation—especially if school assignment systems prioritize assigning students to schools closer to their homes, as Boston’s do. It is then perhaps not surprising that seven of the ten schools with the highest concentration of Latino students are in East Boston, a neighborhood in which nearly six in ten residents are Latino. And all ten schools with the highest enrollment of Black students are in Mattapan, Roxbury or Dorchester. Three-quarters of Mattapan residents and just over half of Roxbury residents are black; in Dorchester, black residents form a plurality of 44 percent.⁸

Students from low-income families increasingly attend schools where they constitute the (often vast) majority.

Students in Boston’s public schools are disproportionately more likely to come from low-income families than city residents more broadly. In 2014, more than three quarters (77 percent) of Boston students qualified as low income, compared with 38 percent of residents overall. And unfortunately, over the past 25 years, these students have become even more concentrated in a greater number of schools.

Students from low-income families increasingly attend schools where they constitute (often the vast) majority. In 2014—the last year for which comparable data on this low-income indicator are available—nearly

Figure 8. Percentage of Students of Each Race Enrolled in Schools Where Students of Their Own Race Comprise the Majority

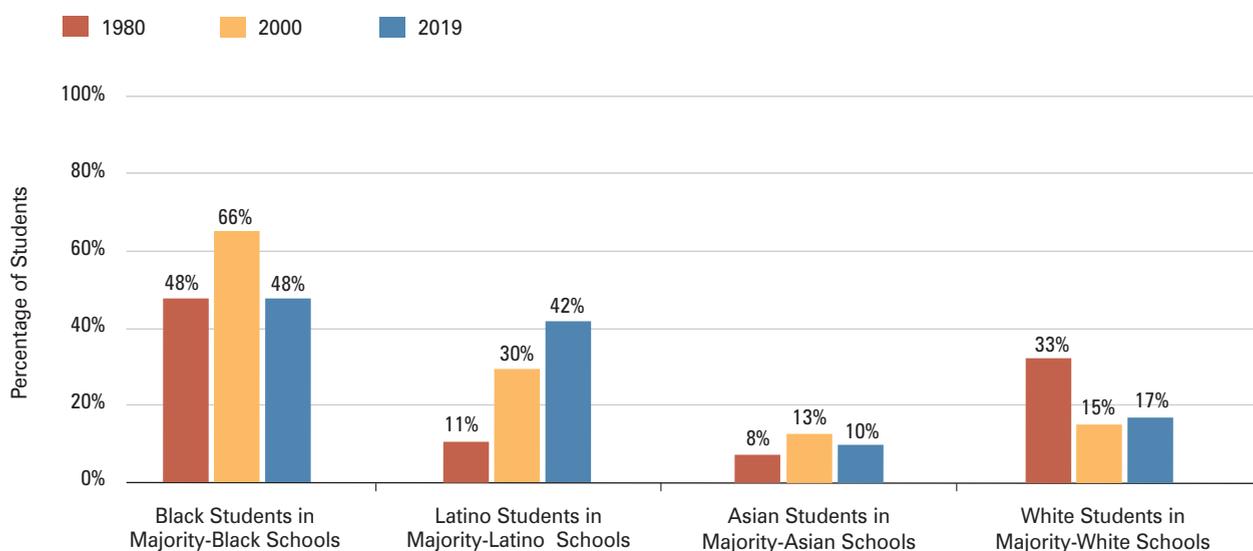
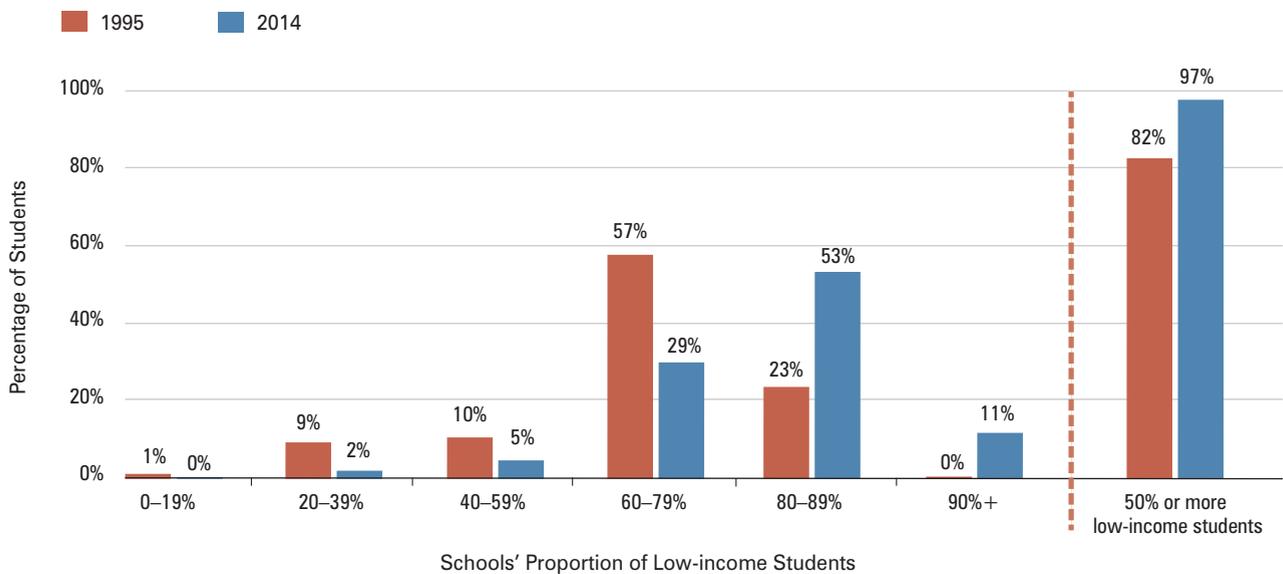


Figure 9. Percentage of Low-income Students Enrolled by Schools' Proportion of Low-income Students



all schools (134 out of 140) had majorities of students from low-income families, and nearly all low-income students (97 percent) attended such schools. Furthermore, nearly two-thirds of low-income students (64 percent) attended schools where more than eight in ten students were also from low-income families. By comparison, in 1995, when 61 percent of Boston students came from low-income families, only about a quarter (23 percent) attended such schools.

Overall, the population that makes up Boston's public schools is not representative of the city's population as a whole, both in terms of race and income. School-age children of color in Boston make up the majority of Boston's public schools, as large numbers of families with school-age children are moving out of the city, replaced by households without children. What these findings indicate is that families with the means to relocate to seek out their desired educational experiences are doing so. In 2019, only 10 out of 139 schools had a shares of people of color similar to that of Boston as a whole. All but four schools are majority low-income—gravely unrepresentative and imbalanced in terms of resident income distribution in the city. These data raise serious questions about the city we are becoming, as it is unclear whether or not the priorities of families with school age children in Boston are reflected. Given that so many families would prefer to send their children elsewhere, it is clear that they are unsatisfied, indicating dangerous inequalities forming in access to education. Clearly, we must ask what this means for the future of the city. 

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Measuring the Impact of COVID-19 on Occupations across Massachusetts— a Study in Progress

COLLIN PERCIBALLI AND CHRIS STEELE

The next issue of *MassBenchmarks* will report on a study that attempts to measure change in Massachusetts employment due to COVID-19. The study will create an index that combines counties and occupational type. To create its measurement index, the researchers will separately classify occupations as essential and nonessential, each with one of three characteristics: human-to-human interaction; required physical presence, or working remotely. Finally, a comparative scoring model will assess employment density by county for each occupation.

WHAT TO EXPECT

The first confirmed case of COVID-19 in Massachusetts was identified on February 1. It was not until March 10 that the governor announced emergency measures. Shut-downs began in earnest around March 15. We are still trying to understand what this crisis and disease will mean for Massachusetts. In addition to its health and societal impacts, coronavirus will have profound effects on the economy, but they will be uneven.

For the fall issue of *MassBenchmarks*, we plan to report on a study of occupational data across the 14 counties of Massachusetts, indexing the expected impacts of COVID-19 based on occupations. If real-time data are available at that time, we will compare them with the actual change in employment across occupations to see if there is a correlation between these occupational categories and changes in employment due to COVID-19.

Massachusetts has the distinct advantage of a diversified economy. Information technology, biotech, banking, finance, manufacturing, and service industries all have a significant presence here. Given the likely results of the coronavirus disruptions, it is possible that we will see different effects on each of these industries. There will also be profound economic impacts on people. Instead of focusing on industries as other studies have done, we propose to examine the possible impacts of the coronavirus on the state's predominant occupations.

PREMISE

Given the social distancing guidelines' varying impacts on occupations, there is value in hypothesizing the impacts on employment levels across these occupations in different areas. By classifying occupations by both their essential nature (i.e., critical jobs needed to maintain infrastructure services) and social distancing ability, we can hypothesize employment impacts in Massachusetts across geographic subsets by creating an index. We expect the COVID-19 pandemic to affect employment in these ways:

- Essential occupations will largely maintain employment levels or experience noticeably fewer layoffs than non-essential occupations.
- The nature of work will change for both essential and non-essential occupations, depending on the level of social distancing possible. This can be summarized in three categories:
 - ◇ occupations where human-to-human interaction is required
 - ◇ occupations where physical presence is required, but not direct human-to-human interaction (such as manufacturing and assembly jobs)
 - ◇ occupations where remote work is possible

The study will not attempt to predict COVID-19 case numbers or mortality rates among occupations, as an ANHD study did for New York City. Instead, it will hypothesize how areas will be affected differently by employment impacts according to occupation.

METHODOLOGY

Define the geography. Classify the occupation and assign a factor. Score each occupation geographically based on employment levels of that occupation. Compare the index with actual changes in employment.

Defining the geography

Utilizing the labor data resource EMSI, which provides detailed information on occupations across various geographic subsets, we can analyze occupations by

- State
- Metropolitan Statistical Area (MSA)
- County
- ZIP Code

Analyzing occupations at the state level, however, is too broad to help formulate policy. Massachusetts has several regional economies which vary by mix of occupations and industries. More granular geographic analysis is required. Massachusetts has seven MSAs, which are regional economies made up of several counties. The challenge here is that MSAs often straddle state boundaries; they can encompass counties across various states. For example, the Providence-Warwick MSA largely consists of Rhode Island counties, but includes Bristol County, Massachusetts. Considering ZIP codes as the geographic unit of study is also problematic. ZIP codes often do not align with municipal jurisdictions. This makes it difficult to collect and compare data from multiple sources.

With these challenges in mind, the county level becomes the best geographic unit for analyzing occupational impacts in the state. With 14 counties in the Commonwealth, there are enough geographies to compare impacts.

Classifying Occupations

We classify occupations into the following categories to gauge the COVID-19 impact on Massachusetts employment:

- Essential occupations—human-to-human interaction
- Essential occupations—physical presence required
- Essential occupations—remote enabled
- Non-essential occupations—human-to-human interaction
- Non-essential occupations—physical presence required
- Non-essential occupations—remote enabled

We will use the “essential” vs. “non-essential” definitions defined by the LMI Institute and C2ER study, which relied on the DHS Cybersecurity and Infrastructure Security Agency (CISA) guidance on what qualifies as “critical infrastructure workforce.” We will then apply our own judgment when classifying the occupation based on human-to-human interaction, physical presence, or remote work possibility.

The higher the score, the lower the expected COVID-19 impact on employment levels.

Scoring the Index and analyzing the results

After classifying each occupation, we will obtain data on the employment density of each occupation for each

county in the Commonwealth. We will then use a comparative scoring model to assess the employment density of each county for that occupation. The scores will be combined into an index to demonstrate the expected impact of COVID-19 on occupations. 

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Table 1. Essential and Non-Essential Definitions and Scores Based on COVID-19 Impact on Employment Levels

Employment Type Relative to Physical Exposure	Score Level: Employment Impact Based on Economic Opening and Reopening Rules
Essential occupations— human-to-human interaction	6 (low employment impact)
Essential occupations— physical presence required	5
Essential occupations— remote enabled	4
Non-essential occupations— remote enabled	3
Non-essential occupations— physical presence required	2
Non-essential occupations— human-to-human interaction	1 (high employment impact)

Table 2. Examples of Differing Occupations and Impact Types

Occupation	Employment Type Relative to Physical Exposure
SOC 29-1141— Registered Nurse	Essential occupation— human-to-human interaction
SOC 45-2092— Farmworkers and Laborers	Essential occupation— physical presence required
SOC 25-2022— Middle School Teachers	Essential occupation— remote enabled
SOC 15-2051— Data Scientists	Non-essential occupation— remote enabled
SOC 25-4013— Museum Technicians and Conservators	Non-essential occupation— physical presence required
SOC 35-3031— Waiters and Waitresses	Non-essential occupation— human-to-human interaction

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