Hitting Where It Hurst Most:
COVID-19 and Low-Income Urban College Students

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Abstract

Using administrative data merged with a rich student survey collected during the summer of 2020, we document the immediate and short-term educational, financial, and personal burdens of New York city's low-income public university students during the COVID-19 pandemic, the closing of college campuses, and the city's shutdown. Low-income students are identified by whether they ever received the federal Pell Grant. We find that low-income college students were 8% more likely than general students at the same college to experience challenges while attending online classes during spring 2020 mostly due to higher childcare responsibilities, greater lack of internet, or greater probability of being sick or stressed. They were also 11% more likely to consider dropping a course because of concerns that their grade would jeopardize their financial assistance. Despite being 21% more likely to receive financial support from emergency relief grants and stimulus payments and unemployment benefits from the CARES Act, low-income college students have or are currently more at risk of experiencing financial distress including securing basic food needs (46% higher) and shelter (62% higher), facing job loss (15% higher), or losing their financial aid (12% higher). We identify potential mechanisms driving these results and correct for multiple hypothesis testing. Our findings underscore the need to target a variety of services and assistance towards low-income college students to secure their wellbeing and college continuity.

Keywords: COVID-19, low-income, college students, health, educational outcomes, financial support, employment, challenges.

JEL Codes: I24, I23, I22

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1. Introduction

Worldwide, the COVID-19 pandemic has disrupted the educational careers of students. Closing college campuses and moving learning online has burdened students, added technological difficulties to their learning, and raised significant concerns about those students who depend on college housing, meal plans, jobs, and other support to stay safe and secure. Moreover, the pandemic has suddenly changed the economic environment many students depend on in maintaining the financial support for their studies. Jobs and internships ensuring the financial well-being during their studies have vanished overnight. In addition, the grim labor-market prospects have halted graduates' career prospects and professional dreams.

As working-class neighborhoods in New York City's outer boroughs became the epicenter of the COVID-19 outbreak in mid-March 2020, many in those dense, lower-income areas have been struggling due to lack of resources or because of the emotional impacts of isolation. While the unsettling and difficult health and economic implications of this crisis appear to be disproportionately felt by the most vulnerable people in these communities, the empirical evidence up-to-date remains scarce. The objective of this paper is twofold. First, we document the immediate and short-term educational and financial burdens faced by New York city's public university students during the COVID-19 pandemic. Second, we document whether these burdens are greater for the most vulnerable students: low-income students.

For this purpose, we collected rich student survey data from Queens College (QC) between July 24th and August 17th 2020, merged it with academic administrative records, and analyzed whether low-income students were differentially impacted by the COVID-19 pandemic relative to the general student population. Low-income students are defined as those who ever received financial support from the federal Pell Grant Program, a need-based federal financial aid program targeted to eligible low-income students to help them pay for college costs. Located in the borough of Queens within three miles of the epicenter of New York city's COVID-19 outbreak, QC is one of the four-year colleges in the city's public university, City University of New York (CUNY).

It is also recognized as one of the most affordable public colleges in the country[1], and has been ranked in the top 1% of all colleges in moving students from the bottom fifth of the income distribution to the top fifth.[2]

The survey asked students about a variety of topics including: (1) COVID-19 infection, positive test and hospitalization; (2) online learning and course dropout during the spring semester when the pandemic hit; (3) financial support received since then; (4) changes in employment and income; (5) challenges as a result of the COVID-19 pandemic; and (6) plans to return to college during the fall 2020 semester. To document whether low-income students were more impacted by the COVID-19 pandemic than the general student population, we compare QC low-income students with similar students in the same college. Because of the rich survey data, we are able to control for socio-demographic characteristics, family background, class level and type of online teaching received after the college closure.

While we did not find a differential income effect in QC students' COVID-19 health outcomes, we did find significant differences in educational, financial and personal experiences related to the COVID-19 pandemic between low-income students and the general student population even after controlling for a rich set of students' characteristics. During the semester of the COVID-19 outbreak when the college closed down and moved to online teaching, we find that low-income students were 8% and 11% more likely to experience challenges with online teaching and consider dropping a course with respect to the general-population means of 71% and 42%, respectively. Relative to the general student population, low-income students were more likely to cite the following reasons behind the online-teaching challenges: childcare responsibilities (82% higher than the general student), lack of internet connection (49% higher), having been sick (26% higher), and being stressed or overwhelmed (12% higher). Consistent with the Pell Grant requiring students to maintain a GPA at or above 2.0 and have a good class attendance record, we find that 26% of low-income students reported concerns that

[1] The median undergraduate tuition at QC is $6,530, which is $14,203 less than the national average for Master Colleges and University ($20,733). In 2017, the undergraduate acceptance rate was 42.7%. https://datausa.io/profile/university/MAS

[2] Extracted by the CUNY from data files published by the Equality of Opportunity Project https://www.qc.cuny.edu/Documents/extract_from_mrc_table1.pdf

their grade would jeopardize their future financial assistance as the main reason for considering dropping a course during the spring semester. This share is 6 percentage points (or 30%) higher than the one observe in the general student population.

The employment situation of QC students changed drastically after the city's lockdown with half of them losing their jobs. Even though this employment shock impacted low-income and general students in a similar way, during the spring and summer 2020, low-income students were 21% more likely than the general student population to receive financial support from CUNY emergency relief grants, and stimulus payments and unemployment benefits from the CARES Act.

We also find that low-income students were hit harder by the COVID-19 pandemic than the general student population as, in addition to share with them serious concerns on their academic performance, college completion, and mental-health wellbeing, low-income students had greater burdens, including a higher risk of lacking basic needs such as food (46% higher) and shelter (62% higher), losing financial aid (35% higher), facing job loss (15% higher), and career assistance (10% higher).

Our population of interest is a socially-vulnerable and ethnically-diverse population in the epicenter of New York City's outbreak: over 2,500 students from an urban four-year college. Many of these students come from economically disadvantaged groups as 37% are first-generation college students, 27% are from families with household income below $40,000 per year, and 23% are transfer students, predominantly from Associate-degree granting institutions. They are an ethnically-diverse group with as many as 47% not being native English speakers, about half being minorities, and at least one third being under-represented minorities.[3] The high economic vulnerability and diversity of QC, while making it a specifically interesting setting to analyze, does not impair the external validity of lessons learned about student behavior, as extensively analyzed by Marx and Turner (2018) by comparing Pell-eligible students of CUNY with a representative sample from the National Postsecondary Student Aid Study.

[3] Under-represented minority group is defined as non-white and non-Asian (per Federal definition).

Our work connects to a well-developed literature that documents the effect of crises on student well-being, such as violent conflicts (Brück et al. 2019), natural disasters (Sacerdote 2012), or economic recessions (Oreopoulos et al. 2012; Fernández-Kranz and Rodríguez-Planas 2018). We add to this literature a timely perspective on the arguably most severe disruption of educational careers that has been observed in recent history. To the best of our knowledge, we are the first to document the immediate and short-term educational, financial and personal burdens faced by college students during the COVID-19 pandemic, the closing of college campuses, and the city's shutdown, and to explore whether these burdens are greater for the most vulnerable students in the college: the low-income students. This analysis will give us a better perspective on how COVID-19 has impacted low-income urban students and their educational perspective. To the extent that we find evidence that the pandemic is hurting the most economically vulnerable, our findings would suggest that the pandemic may be widening inequality and increasing poverty in the US. Our findings will be helpful in shaping future policies aiming at addressing pandemic challenges among the most underserved populations of students in the US.

The rest of the paper is structured in the following way. Sections 2 and 3 describe the institutional background and the data. Section 4 documents the health, educational, economic and personal wellbeing of the general QC student population during spring and summer 2020, as well as their plans to return to QC in the fall. Section 5 compares findings from the general population with those of low-income students. Section 6 concludes.

2. **Institutional Background**

During the past months, the already at-risk student population of QC experienced a sudden disruption in their education and life by happening to be in one of the epicenters of the COVID-19 outbreak. After a first case was confirmed on March 1st, New York rapidly became the most severely affected city in the whole US. At the end of March, infections already surpassed 30,000, with 675 dead, with the city alone surpassing confirmed cases of UK or China. Noteworthy, economically disadvantaged neighborhoods, such as Corona and Elmhurst, were disproportionately affected both in the number of

cases and in the case fatality rate. [4] At the end of April, it was estimated that more than a fifth of the city's population had contracted COVID-19.

The severity of the outbreak might have been affected by late government responses. Initially, both Mayor de Blasio and Governor Cuomo downplayed the scope and dangers of the outbreak. Only on March 12th, Mayor de Blasio declared the state of emergency in NY city, giving him a vast range of new authority such as cancelling parades and conferences and limiting restaurant capacity to 50%. By March 17th, he limited restaurants to only take-out and delivery and, by March 18th, he ordered schools to close. Governor Cuomo issued an executive order by March 20th (effective March 22nd) that placed the state on "pause", closing all non-essential retailers and services or ordering them to work from home, and ordering people to largely stay at home. CUNY (including QC) had closed on March 11th and the spring semester was moved to online teaching on March 19th.

As a result of the lockdown, by April, hundreds of thousands of New Yorkers were out of work, especially in low-income jobs in the retail, transportation and restaurant sectors. Among CUNY students, 38% reported having lost their job due to the COVID-19 pandemic, of which two thirds had worked at least 21 hours per week pre-COVID-19, and one fifth at least 35 hours per week. When asked about need for support or assistance since COVID-19, 90% of CUNY students indicated increased need in food, childcare, housing, and utilities. However, because of tidal explosion of unemployment claims (1.6 million in NY state in mid-March alone), NY state unemployment system was overwhelmed causing major delays in unemployment insurance payments.

3. Data

The data for this study come from an online survey merged with QC administrative records. To improve our understanding of the students' challenges linked to the COVID-19 pandemic, between Friday, July 24th and Monday, August 17th 2020, we conducted an online survey on the student population of QC, and asked them about a variety of topics including: (1) COVID-19 infection, positive test and

[4] Corona and Elmhurst in Queens borough were two of the three zip codes with the highest COVID-19 cases and deaths per count (4,546 cases and 400 deaths per 100,000 in Corona and 3,784 cases and 320 deaths per 100,000 in Elmhurst. https://www.nytimes.com/interactive/2020/nyregion/new-york-city-coronavirus-cases.html

hospitalization; (2) online learning and course dropout during the spring semester when the pandemic first hit New York city; (3) financial support received since then; (4) changes in employment and income; (5) challenges as a result of the COVID-19 pandemic; and (6) plans to return to college during the fall 2020 semester. In addition, we also asked students information on their socio-demographic characteristics and family background. The average duration of the survey was under 10 minutes and we used SurveyMonkey software to create the online survey.

We defined low-income students as those who ever received financial support from the federal Pell Grant Program. To be eligible for the Pell grant, students must demonstrate financial need—that is, their expected family contribution towards their education expenses has to be lower than $5,273. Other conditions for eligibility include: US citizenship or eligible non-citizenship (meaning holding a valid social security number); enrollment in a course for earning an undergraduate degree, a graduate degree or professional certification; and lack of criminal offenses related to drug possession and distribution. The minimum and maximum Pell Grant award for 2020-21 is $639 and $6,345.[5]

Information on students' Pell grant receipt was obtained from QC administrative records, which were merged with our survey data using students' CUNY ID. Other administrative-records information include students' sex and class level.[6] We obtained IRB approval (IRB file #2020-0475) to conduct the survey, collect the de-identify administrative records, and merge both data sources.[7]

The survey was administered via email, sent from an official email address of QC administration to the entire universe of QC students, about 17,000 graduate and undergraduate students. 2,561 students responded to the survey, of these 59 did not give consent to participate, leaving us with 2,502 valid respondents. An additional 12 students were lost because we lacked Pell-grant information from the administrative records. As of August 17th 2020, our final sample had 2,490 observations. Even though the survey was fielded for only three weeks, the response rate was 15%, which is above the usual response rate on CUNY online surveys of 13%. A response rate between 10% and 15% for external online surveys like the one we conducted is considered the target.[8] Furthermore, as the survey is still

[5] http://pell-grants.org/how-is-the-pell-grant-affected-by-academic-performance/
[6] Class-level indicate whether the student is a freshman, sophomore, junior, senior, or graduate student.
[7] IRB approval as well as the survey instrument are available from the author upon request.
[8] https://www.appjetty.com/blog/acceptable-response-rate-for-online-surveys/

open and will not close before mid-September, the final response rate could potentially approach 20%. The advantage of conducting the analysis with those who responded up until August 17th is that the fall semester has not yet begun. The fall semester began at QC on Wednesday August 26th 2020.[9] Importantly, we weighted our data to be representative of the QC student population in terms of sex, race, ethnicity and US citizenship, obtaining a sample that overall compares well with QC student population.[10]

Baseline Descriptive Statistics for the General Student Population

Panel A in Table 1 displays the means and differences in means for baseline characteristics by income status. Focusing first on QC general student population (shown in column 1, Table 1), women represent 53% of our sample. The college is very diverse with 10% Black students, 18% Hispanics, and 19% Asians. Close to half of the students (47%) were born outside of the USA and Puerto Rico, and 44% are not English-native speakers. QC students' economic fragility is signaled by 67% of them working prior to the COVID-19 pandemic, 18% working full time, and 19% being essential workers. Perhaps more revealing, 32% are first-generation college students, and another 20% are transfer students, predominantly from Associate-degree granting institutions. Over one fifth (22%) are from families with household income below $40,000 per year.

One fifth of our sample are graduate students. There is also a higher representation of upper level classes (juniors and seniors versus freshmen and sophomores). In Table 1, we also observe that once the college moved to online teaching, students tended to have a higher share of asynchronous than synchronous classes with as many as one fourth receiving at least three quarters of their classes asynchronously and 60% receiving a higher share of asynchronous than synchronous classes. In synchronous classes, the instructor and students meet at the same time via an online platform like Zoom,

[9] The author would consider adding respondents from after August 17th if the referees thought that the higher response rate would justify including responses collected during the beginning of the fall semester.

[10] Compared to the QC student population of fall 2019, our sample means are not too far from those of the population. For example, the share of females is 52% in our sample versus 57% in the population; the share of African Americans is 10% versus 9% in the population; the share of Hispanics or Asians is 21% versus 28% (in both cases); and the share of foreign born is 49% versus 32%. Source: https://www.qc.cuny.edu/about/research/Pages/CP-Enrolled%20Student%20Profile.aspx

Blackboard Collaborate, Google Meet, WebEx, etc., whereas asynchronous classes are conducted using pre-recorded lectures, discussion boards, via the exchange of documents and emails.

Column 2 in Panel A in Table 1 shows baseline characteristic means for low-income students, who represent one third of our sample. Column 3 in Table 1 displays the unconditional differences in baseline characteristics between QC general population and low-income students. Low-income students are 32% more likely to be Asians and 38% more likely to be Hispanics than the general student population. As expected, low-income students are 46% more likely to be first-generation college students, 33% more likely to be transfer students, 18% more likely to be ESL students, and 10% less likely to be US born than those from the general population.

4. COVID-19 and Queens College General Student Population

Panel B in Table 1 displays the means and differences in means for key outcomes by income status. In this section, we document the health, educational, economic and personal wellbeing of the general QC student population during spring and summer 2020 as well as their plans to return to QC in the fall—outcome means for the general student population are shown in column 1, Panel B, Table 1.

By the summer 2020, over one fifth of QC general student population had experienced COVID-19 symptoms and 6% had tested positive to COVID-19. Yet, less than 1% had been hospitalized because of COVID-19 or its complications. In comparison, CDC estimates that the percent of New York city's population with detectable antibodies to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) from March 23 to May 12, 2020 was 7% in New York city (Havers et al. 2020).

The COVID-19 pandemic immediately disrupted the educational careers of QC students with 71% of the general student population experiencing challenges attending classes online during the spring 2020 semesters and 42% considering dropping a course during that semester. We asked the students the reasons behind their online-teaching challenges, giving them ten possible choices. Students were instructed to check all that applied. The most cited reasons were being stressed or overwhelmed (39%), having technical difficulties with the software (20%), having to work (16%), caring for a sick family member (12%), having been sick (10%), lack of internet connection (7%), and childcare responsibilities (6%)—averages for the general population are shown in Table 3. In addition, we

observe that 21% of QC general student population considered dropping a course because of concerns that their grade would jeopardize their future financial assistance. At a much lower frequency, students claimed that they had to work or to take care of a family member (6% and 5%, respectively). Interestingly, only 3% of students considered dropping a course because they were themselves sick being sick (of COVID-19 or other diseases).[11]

At the same time, the employment situation of QC students changed drastically after the city's lockdown with less than one third of students continuing to work for pay or profit, down from over two thirds before the pandemic hit NY city. In addition, 65% of QC general student population received additional financial support due to COVID-19 pandemic, including emergency relief grants from CUNY's Chancellor[12] (22%) and the Petrie foundation (1%); the pandemic IRS stimulus payments from the CARES Act (21%); and the two new unemployment programs from the CARES Act: the pandemic unemployment compensation (15%) and the pandemic unemployment assistance (5%) as shown in Table 4. Nonetheless, despite this additional financial support, five months after the outbreak, as many as 63% of QC students expect their annual household income to decrease due to the COVID-19 pandemic.

Moving forward, the situation continues to be grim as reflected by over three fifths of QC students currently facing or being at risk of facing COVID-19 related challenges related to: career assistance (68%), mental health (65%), academic performance (63%), and job loss or other related financial stress (60%) as shown in Table 5. Just as concerning is that more than half of QC students report currently facing or being at risk of dropping out of college (52%) and as many as 17% and 12% lack or are at risk of lacking basic needs such as food or shelter, respectively.

In terms of students' plans for the fall 2020 semester, two thirds of them plan to return to QC. As retention rates for other years are only available for first-year students, we estimated the share of freshmen in our sample who plans to return to QC in the fall to have some perspective of how the COVID-19 pandemic may be affecting the retention rate. Based on our survey, the retention rate of

[11] Means available from the author upon request.
[12] Between April 6 and July 5 2020, a total of $3 million US dollar fund had been distributed via one-time individual grants of $500 each to 6,000 qualifying students.

first-time students who began their studies the previous fall is 56% compared to a full-time retention rate of 84% in 2017.[13]

5. Methodology and Income Results

To explore whether the educational and economic implications of this crisis have been disproportionately felt by low-income students, we estimate the following equation:

$$Y_i = \alpha + \beta_1 Low\ Income_i + \beta_2 X_{i0} + \delta_s + \varepsilon_{ist} \qquad (1)$$

where Y_i denotes an outcome variable for youth i , $Low\ Income_i$ is a dummy variable that takes value one if the youth ever received the Pell grant, X_{i0} is a vector of controls that varies in the different specifications as explained below, and ε_i is the error term. The coefficient of interest, β_1, measures the association between being low-income student and the outcome Y. Many of the outcome variables included in this study are binary. In such cases, we estimate a linear probability model.

For some survey questions, there are many possible responses. To address the concern that an increase in the number of tests increases the likelihood of rejecting the null hypothesis using traditional inferential techniques, we follow Kling, Liebman, and Katz (2007) and Rodríguez-Planas (2012 and 2017) and construct several summary indices (using the same families of outcomes). Each summary index variable, Y^*, is constructed as the unweighted average of all standardized outcomes within a family:

$$Y^* = \frac{\sum_k Y_k^*}{k} \qquad \text{where} \qquad Y_k^* = \frac{Y_k - \mu_k}{\sigma_k}$$

where Y_k is the k^{th} outcome of K variables within each family. Standardization is performed using mean (μ_k) and standard deviation (σ_k) for QC general student population.

Our main findings are displayed in Table 2, which presents results from estimating different versions of equation 1. The analysis is done separately for ten different outcomes namely students' (1) incidence of COVID-19 symptoms; (2) incidence of testing positive to COVID-19; (3) incidence of COVID-19 hospitalization; (4) incidence of online challenges during the spring semester; (5)

[13] https://datausa.io/profile/university/cuny-queens-college

consideration of dropping a course during the spring semester; (6) receipt of financial support during spring and summer 2020; (7) employment change due to the COVID-19 pandemic; (8) expected household income reduction due to the pandemic; (9) summary index for challenges faced or at-risk of facing as a result of the COVID-19 pandemic; and (10) plans to return to Queens College in the fall. Each row represents a different outcome variable.

Each column presents estimates of the coefficient on the low-income indicator from estimating a different regression in which additional micro-level covariates are sequentially included in the equation. Column 1 presents the unconditional means. Column 2 adds controls for sex, race and ethnicity.[14] Column 3 adds to the specification in column 2 controls for being born in the US or Puerto Rico, being a non-English (ESL) speaker, being a first-generation college student, and being a transfer student. Column 4 adds to the specification in column 3 class-level indicators and indicators for the share of classes that were asynchronous versus synchronous.[15] Each coefficient comes from a separate regression.

By summer 2020, one fourth of QC low-income students had had COVID-19 symptoms, 7% had tested positive to COVID-19 and less than 1% had been hospitalized because of COVID-19 or its complications (shown in rows 1 to 3, column 1, Table 2). While the symptoms unconditional mean is 5 percentage points higher for low-income students than for the general student population, this difference is not statistically significantly different from zero and converges to zero once we control for students' sex, race and ethnicity. At the same time, no differences are observed in positive-testing and hospitalization rates between low-income students and the general population, suggesting that, in terms of health outcomes, COVID-19 had no differential impact by students' income status.

Based on the unconditional means, the COVID-19 pandemic hit harder the educational career of low-income students by increasing their odds of online-teaching challenges by 10%, and considering dropping a course by 17% relative to the general student population (shown in rows 4 and 5, column 1,

[14] The race and ethnicity controls are an African-American indicator, and Asian indicator and a Hispanic indicator.

[15] There are five class-level indicators: freshman, sophomore, junior, senior, and graduate student. There are five indicators for the share of asynchronous classes during spring 2020: none, 0% to 25%, 26% to 50%, 51% to 75%, and over 75%.

Table 2). The size and statistical significance of both coefficients increase when we control for sex, race and ethnicity in column 2, but decrease after adding controls describing citizenship, language skills, parental human capital, and community college experience in column 3. To the extent that these latter controls are associated with low-income status, by including them we are measuring the direct association between our measure of low-income (having ever received a Pell grant) and educational challenges related to the COVID-19 pandemic beyond the indirect ways in which being low income could also be associated with such outcome through these other variables. Despite this, estimates in column 3 continue to indicate an 8% more challenging online experience and 11% higher consideration of dropping a course among low-income students than those from the general population—albeit the latter coefficient is only marginally significant at the 10% level. Adding controls for class-level and the share of asynchronous online classes received during the spring only changes a tad the size of the two coefficients.

Table 3 re-estimates different versions of equation 1 using as outcome the reasons behind students' online-teaching challenges. To address multiple hypothesis testing, the first row of the Table 3 presents results from using a summary index of the ten possible answers. The coefficient on the summary index is always statistically significant and, in our most complete specification in column 4, it indicates that the summary index is one sixteenth standard deviations higher for low-income students than those in the general student population.

Relative to the general student population, low-income students are more likely to cite the following reasons behind the online-teaching challenges: childcare responsibilities (82% higher than the general student), lack of internet connection (49% higher), having been sick (26% higher), and being stressed or overwhelmed (12% higher). All estimates are statistically significant at the 10% or lower. In the case of "being stressed", once we account for the students' class level and share of asynchronous classes, the coefficient is smaller and no longer statistically significant, suggesting that students' college experience as well as the type of online teaching are associated with some of that stress.

While the Pell Grant is not awarded based on academic performance, students are expected to maintain a GPA at or above 2.0 and have a good class attendance record that does not lead to an automatic withdrawal from a college course. Hence, it is not surprising that low-income students weary

of losing their Pell Grant, or of having to return a portion of the funding already received may have considered dropping a course prior to getting a grade that would hurt their GPA. According to the unconditional mean of 26%, low-income students were 29% more likely to consider dropping a course during the spring semester because of concerns that their grade would jeopardize their future financial assistance than the general student population. This effect is statistically significant at the 5% level. After accounting for socio-demographic characteristics, family background, class level and share of asynchronous teaching, low-income students are still 21% more likely to mention fears of losing their financial assistant as the reason for course dropping, albeit the effect is only marginally significant at the 10% level.

During the spring and summer 2020, 79% of low-income students received additional financial support due to COVID-19 pandemic (shown in panel B, Table 1). Column 1 in Table 2 shows that, relative to the general student population, low-income students were 21% more likely to receive such type of financial support. To explore the different sources of this differential financial support, Table 4 presents estimates of different versions of equation 1 using as outcome the receipt of different types of financial support. The first row presents estimates from a regression using as outcome the summary index of financial support receipt, and the next five rows display results using as outcome five different types of financial support available after the pandemic hit. The estimate of the summary index is always statistically significant at the 5% level or lower, and, in our most complete specification in column 4, it indicates that the financial-support summary index is one fourteenth standard deviations higher for low-income students than those in the general student population.

To assist students cope with the severe economic fallout of this extraordinary public health emergency, CUNY offered the Chancellor's Emergency Relief (CER) grant, a one-time $500 grant targeted to undocumented and low-income students. To be eligible students had to: (1) seek a degree at CUNY during school year 2019-20, and (2) belong to one of the following groups: undocumented or low-income students.[16] Not surprisingly given these eligibility rules, low-

[16] In the case of low-income students, eligibility is determined by being within 12 credits of earning an undergraduate degree, and having an Expected Family Contribution of zero on their federal financial aid application (FAFSA). Undocumented students could be seeking an undergraduate or graduate degree.

income students were 34% more likely to take advantage of the CER grant than the general student population, with close to one third of them receiving it. After accounting for our rich set of controls in column 4, being low-income is still associated with a 21% higher probability of CER grant receipt—albeit the coefficient is only marginally significant at the 10% level.

Table 4 also reveals that low-income students are also more likely to have benefitted from the emergency assistance from the CARES Act. As 28% and 19% of low-income students received the pandemic stimulus payments from the CARES Act and the pandemic unemployment compensation, respectively, they were 35% and 31% more likely to receive either assistance than the general student population. Both unconditional estimates are statistically significant at the 5% level or lower. After accounting for the different controls, only the low-income coefficient on the stimulus payments equation remain marginally significant, representing a 22% increase. The estimate on the pandemic-unemployment-compensation equation is half the size and no longer significant.

While we observe no differences in Table 2 between low-income and general students on maintaining employment (at the same or different employer) as a consequence of the COVID-19 pandemic, low-income students were 17% more likely to have lost a job or been furloughed, which would explain the higher receipt of pandemic unemployment compensation. However, this difference is not statistically significant.[17] Table 2 also reveals that low-income students are 13% more likely to expect a decline in household income resulting from the pandemic. However, this difference declines considerably and is no longer significant once we account for the battery of controls.

Table 5 presents estimates using as outcome the different COVID-19 related challenges students have faced or are at risk of facing. The first row presents estimates from a regression using a summary index (also shown in row 9 in Table 2). They are all statistically significant at the 10% level or higher. The coefficient in column 4 indicates that the challenge summary index is one seventeenth standard deviations higher for low-income students than those in the general student population.

Focusing on the unconditional means in column 1 in Table 5, we observe that low-income students report facing a higher risk of COVID-19 related challenges than the general student population

[17] Layoffs estimates available from the author upon request.

such as securing basic food needs (46% higher) and shelter (62% higher), losing financial aid (35% higher), facing job loss (15% higher), and career assistance (10% higher). Except for the latter, which is marginally significant, all the other differences are statistically significant at 5% or lower. However, most of these differences shrink and lose significance once we account for students socio-demographic characteristics, family background, or class level and share of asynchronous teaching. The two exceptions are challenges related to financial aid and to securing basic food needs. In our full specification, low-income students are 27% more likely to have faced or at risk of facing losing financial aid than the general student population (shown in row 7, column 4, Table 5). This effect is statistically significant at the 1% level. After controlling for sex, race, ethnicity and family background, low-income students are 25% more likely to have faced or be at risk of facing food insecurity than the general student population. This effect is statistically significant at the 10% level. Perhaps interestingly, we observe no income differential in academic-performance risk or risk of dropping-out-of-college. While this is worth underscoring, the high share of QC students concerned with both of these risks (63% for academic performance and 52% for dropping out of college) is sufficiently high to raise some concerns, even if no differential income pattern is observed.

In terms of students' plans for the fall 2020 semester, 61% of them plan to return to QC, 6% less than the general student population (shown in Table 2, row 10, column 4). Interestingly, this is partly explained by low-income students being 52% more likely to graduate. Both estimates are statistically significant at the 10% level.

5. Conclusion

This paper is the first to document the effect of the COVID-19 pandemic on the immediate and short-term educational, financial and personal burdens faced by urban public university student in the US. We find that the QC general student population was hard hit by the COVID-19 pandemic. In addition to be infected by the virus, students had their educational careers and employment situation severely and abruptly disrupted as soon as the city became the epicenter of the outbreak in March 2020. Five months later, QC students are still seriously concerned with the consequences of the pandemic on their academic performance and college completion, and continue to experience both financial and mental-

health stress. Half of those working prior to the pandemic have lost their jobs and, despite having received emergency relief assistance from CUNY and the CARES Act, close to two thirds of them expect their annual household income to decrease because of the pandemic.

The situation is grimmer for low-income students as they were 8% more likely than general students to experience challenges while attending online classes mostly due to childcare responsibilities, lack of internet, being sick, or stressed. They were also 11% more likely to consider dropping a course because of concerns that their grade would jeopardize their financial assistance. Despite being 21% more likely to receive financial support, low-income college students have or are currently more at risk of experiencing financial distress including securing basic food needs (46% higher) and shelter (62% higher), facing job loss (15% higher), or losing their financial aid (12% higher).

Understanding how the coronavirus pandemic has impacted the lives of QC's students is important because QC serves a socially-vulnerable and ethnically-diverse population in a location that has been the epicenter of New York City's coronavirus outbreak. To the extent that QC has been recognized as one of the most affordable public college in the country, that successfully moves students from poverty to prosperity, our findings underscore the need to target a variety of services and assistance to both QC general student population and its low-income students to prevent the current public health crisis from further affecting students' academic continuity and performance, widening inequality and increasing poverty in New York city.

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TABLE 1. Descriptive Statistics

	General student population mean	*Low-income students mean*	*Difference (low-income minus general student)*
	(1)	*(2)*	*(3)*
Panel A — Baseline Characteristics			
Female	0.528	0.504	-0.025 (0.02)
Black	0.099	0.096	-0.003 (0.01)
Asian	0.193	0.254	0.061** (0.02)
Hispanic	0.184	0.254	0.070*** (0.02)
US born	0.531	0.477	-0.054* (0.03)
ESL	0.442	0.523	0.082*** (0.02)
First-generation college student	0.319	0.465	0.147*** (0.02)
Transfer student	0.198	0.294	0.096*** (0.02)
Employed	0.673	0.687	0.014 (0.02)
Freshman	0.116	0.004	-0.112*** (0.01)
Sophomore	0.197	0.086	-0.110*** (0.02)
Junior	0.217	0.241	0.024 (0.02)
Senior	0.254	0.541	0.287*** (0.02)
Graduate	0.214	0.123	-0.091*** (0.02)
No asynchronous courses	0.115	0.112	-0.003 (0.01)
1% to 25% async. courses	0.152	0.162	0.010 (0.02)
26% to 50% async. courses	0.138	0.126	-0.012 (0.01)
51% to 75% async. courses	0.157	0.167	0.010 (0.02)
75% to 100% async. courses	0.249	0.249	0.000 (0.02)
Panel B — Outcome Variables			
COVID-19 symptoms	0.209	0.254	0.046 (0.03)
Tested positive of COVID-19	0.059	0.068	0.009 (0.01)
Hospitalized due to COVID-19	0.008	0.008	-0.000 (0.00)
Teaching-online challenges	0.709	0.779	0.069** (0.02)
Considered dropping a course	0.420	0.493	0.073** (0.02)
Continues to work (same or other job)	0.326	0.318	-0.007 (0.02)
Received COVID-19 financial support	0.651	0.789	0.138*** (0.02)
Lower household income	0.632	0.716	0.084** (0.03)
Challenges summary index	0.000	0.131	0.131*** (0.03)
Plans to return to QC in the fall	0.656	0.526	-0.046 (0.02)
Sample size	1,744	803	2,547

Note: Standard errors are reported in parentheses in column 3. Column 3 presents the coefficient on the low-income dummy from a regression model with no other controls.
Significant at the: ***1 percent level, ** 5 percent level, *10 percent level.

TABLE 2. Low-Income Students and COVID-19

	No controls	Demographic controls	Family background	Class level & online teaching
OUTCOMES	(1)	(2)	(3)	(4)
Health outcomes				
COVID-19 symptoms	0.046	0.008	0.021	0.017
	(0.03)	(0.03)	(0.02)	(0.03)
Tested positive of COVID-19	0.009	0.001	0.002	0.006
	(0.01)	(0.01)	(0.01)	(0.01)
Hospitalized due to COVID-19	-0.000	-0.002	-0.001	0.000
	(0.00)	(0.00)	(0.00)	(0.00)
Educational outcomes during spring semester 2020				
Had teaching-online challenges	0.069**	0.086***	0.056**	0.045*
	(0.02)	(0.02)	(0.02)	(0.02)
Considered dropping a course	0.073**	0.108***	0.046*	0.050*
	(0.02)	(0.02)	(0.02)	(0.02)
Economic outcomes since spring semester 2020				
Continues to work (same or other job)	-0.007	-0.025	0.020	0.007
	(0.02)	(0.02)	(0.02)	(0.02)
Has received COVID-19 financial support	0.138***	0.15***	0.118***	0.115***
	(0.02)	(0.02)	(0.02)	(0.02)
Expects lower annual household income	0.084**	0.053	0.039	0.024
	(0.03)	(0.03)	(0.03)	(0.03)
Challenges and fall return plans				
Challenges summary index	0.131***	0.085**	0.067*	0.059*
	(0.03)	(0.03)	(0.03)	(0.03)
Plans to return to QC in the fall	-0.046	-0.095***	-0.027	-0.041*
	(0.02)	(0.02)	(0.02)	(0.02)
COVARIATES				
Sex, race and ethnicity controls		X	X	X
US born, ESL, first-generation, transfer			X	X
Class level and share of async. courses				X

Notes: The table reports estimates associated with low-income students on the dependent variables indicated in row headings. Standard errors are reported in parentheses.
*, **,*** Estimate significantly different from zero at the 0.1 or 0.05 level or 0.01 level.

TABLE 3. Low-Income Students and Reasons Behind Online-Teaching Challenges

		No controls	Demographic controls	Family background	Class level & online teaching
OUTCOMES	*General population means*	*(1)*	*(2)*	*(3)*	*(4)*
Summary Index	0.000	0.084***	0.052*	0.060**	0.062**
		(0.02)	(0.02)	(0.02)	(0.02)
I was sick	0.102	0.047**	0.031*	0.032*	0.035*
		(0.02)	(0.02)	(0.02)	(0.02)
I was caring for a sick family member	0.118	0.033*	0.016	0.016	0.013
		(0.02)	(0.02)	(0.02)	(0.02)
I was caring for a child	0.058	0.053***	0.050***	0.046***	0.045***
		(0.01)	(0.01)	(0.01)	(0.01)
I was too stressed, anxious or overwhelmed	0.392	0.059*	0.023	0.047*	0.037
		(0.02)	(0.02)	(0.02)	(0.02)
I lacked a computer or laptop or phone	0.025	-0.008	-0.010	-0.014*	-0.014
		(0.01)	(0.01)	(0.01)	(0.01)
I had a phone to connect, but needed a computer or laptop	0.031	-0.005	-0.007	-0.009	-0.014
		(0.01)	(0.01)	(0.01)	(0.01)
I lacked internet connection	0.065	0.032**	0.024	0.025*	0.032*
		(0.01)	(0.01)	(0.01)	(0.01)
I experienced technical difficulties with the software	0.200	0.016	-0.003	0.016	0.020
		(0.02)	(0.02)	(0.02)	(0.02)
I lacked basic needs such as food insecurity or shelter	0.014	0.016*	0.013	0.014*	0.013
		(0.01)	(0.01)	(0.01)	(0.01)
I had to work	0.161	0.038*	0.026	0.035*	0.030
		(0.02)	(0.02)	(0.02)	(0.02)
COVARIATES					
Sex, race and ethnicity controls			X	X	X
US born, ESL, first-generation, transfer				X	X
Class level and share of async. courses					X

Notes: The table reports estimates associated with low-income students on the dependent variables indicated in row headings. Standard errors are reported in parentheses.
*, **,*** Estimate significantly different from zero at the 0.1 or 0.05 level or 0.01 level.

TABLE 4. Low-Income Students and Receipt of Different Types of Financial Support

		No controls	Demographic controls	Family background	Class level & online teaching
OUTCOMES	*General population means*	*(1)*	*(2)*	*(3)*	*(4)*
Summary Index	0.000	0.119***	0.087***	0.103***	0.072**
		(0.02)	(0.02)	(0.02)	(0.02)
Chancellor's Emergency Relief grant	0.218	0.074***	0.051**	0.063***	0.046*
		(0.02)	(0.02)	(0.02)	(0.02)
Petrie foundation grant	0.007	0.006	0.005	0.005	0.004
		(0.00)	(0.00)	(0.00)	(0.00)
Pandemic IRS stimulus payments	0.208	0.073***	0.055**	0.063***	0.050*
		(0.02)	(0.02)	(0.02)	(0.02)
Pandemic unemployment compensation	0.145	0.047**	0.034*	0.042*	0.023
		(0.02)	(0.02)	(0.02)	(0.02)
Pandemic unemployment assistance	0.053	0.016	0.009	0.014	0.011
		(0.01)	(0.01)	(0.01)	(0.01)
COVARIATES					
Sex, race and ethnicity controls			X	X	X
US born, ESL, first-generation, transfer				X	X
Class level and share of async. courses					X

Notes: The table reports estimates associated with low-income students on the dependent variables indicated in row headings. Standard errors are reported in parentheses.
*, **,*** Estimate significantly different from zero at the 0.1 or 0.05 level or 0.01 level.

TABLE 5. Low-Income Students and Challenges Facing or at Risk of Facing

		No controls	Demographic controls	Family background	Class level & online teaching
OUTCOMES	*General population means*	*(1)*	*(2)*	*(3)*	*(4)*
Summary Index	0.000	0.131***	0.085**	0.067*	0.059*
		(0.03)	(0.03)	(0.03)	(0.03)
Replacing a job loss or other financial stress issues	0.602	0.088**	0.061*	0.044	0.024
		(0.03)	(0.03)	(0.03)	(0.03)
Finding career assistance (internship and job opportunities)	0.676	0.066*	0.037	0.045	0.017
		(0.03)	(0.03)	(0.03)	(0.03)
Maintaining mental health	0.645	-0.008	-0.034	-0.014	-0.023
		(0.03)	(0.03)	(0.03)	(0.03)
Securing basic food needs	0.173	0.080***	0.068***	0.043*	0.039
		(0.02)	(0.02)	(0.02)	(0.02)
Securing shelter	0.117	0.073***	0.052**	0.030	0.028
		(0.02)	(0.02)	(0.02)	(0.02)
Maintaining financial aid	0.423	0.149***	0.113***	0.095***	0.114***
		(0.03)	(0.03)	(0.03)	(0.03)
Maintaining aspired level of academic performance	0.630	0.014	-0.015	-0.005	0.010*
		(0.03)	(0.03)	(0.03)	(0.03)
Continuing college education and completing my degree	0.518	0.050	0.023	0.011	0.006
		(0.03)	(0.03)	(0.03)	(0.03)
COVARIATES					
Sex, race and ethnicity controls			X	X	X
US born, ESL, first-generation, transfer				X	X
Class level and share of async. courses					X

Notes: The table reports estimates associated with low-income students on the dependent variables indicated in row headings. Standard errors are reported in parentheses.
*, **,*** Estimate significantly different from zero at the 0.1 or 0.05 level or 0.01 level.