How the Deck is Stacked: Racial and Ethnic Disparities in Earnings Following High School Graduation in Minnesota

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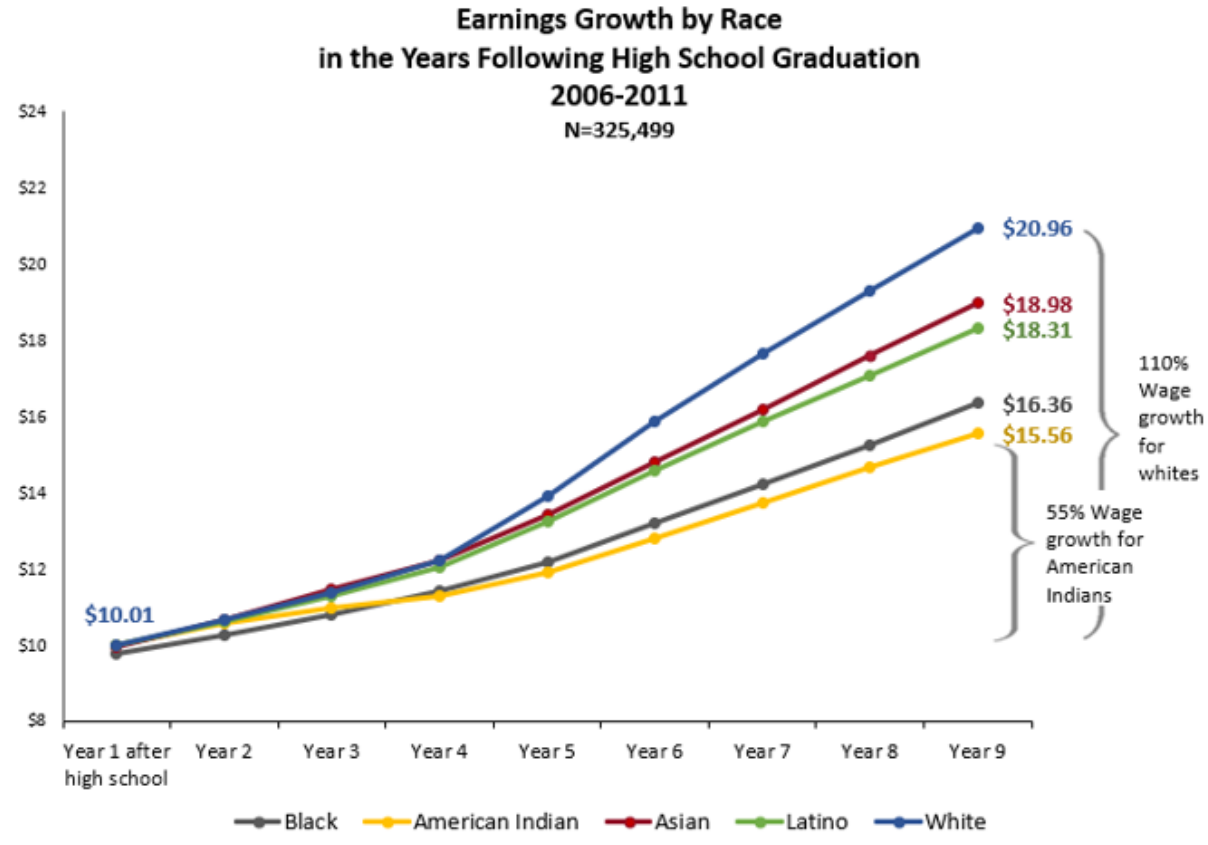
Minnesota has some of the worst racial disparities in the nation, due to consistent and compounding systemic barriers for Black, Indigenous and People of Color (BIPOC). Few disparities are more consequential than the low earnings potential of youth of color relative to their white peers. The racial wage gap emerges so early in life that it is evident shortly after graduating from high school.

As shown in Figure 1, in the first year after high school, wages are approximately the same regardless of race (around $10 an hour), but after only three years the earnings of white Minnesotans start growing at a much faster pace than others. Over the course of nine years following high school graduation, the wages of white Minnesotans grew exactly twice as much as those of Indigenous Minnesotans (110% versus 55%).

Figure 1



Throughout this study, wages are expressed in constant 2020 U.S. dollars.
Only students who graduated by 2011 were tracked for nine years.
Source: *Statewide Longitudinal Education Data System (SLEDS)*

Wage gaps accumulate over time and perpetuate racial inequalities in all aspects of life, such as home ownership, access to financial credit and quality health care, as well as employment stability that protects from job losses. The COVID-19 pandemic has fully exposed and exacerbated these disparities, making it particularly urgent to identify the early factors and mechanisms that produce them.

This study examines racial wage gaps among 604,485 students who graduated from a Minnesota high school from 2006 to 2016. Since we know their high school experiences and full labor market histories, we can identify the earliest points in life when wage gaps emerge and formulate hypotheses on which factors contribute the most to their formation. This evidence can eventually help craft policy responses to mitigate and prevent the problem.

ABOUT THE DATA

This research uses data on students who graduated from a Minnesota public high school (including charters, which are private non-profits) merged with postsecondary student records and Minnesota Unemployment Insurance wage records from the Statewide Longitudinal Education Data System (SLEDS). All students who graduated from high school between 2006 and 2016 are included regardless of what year they started high school. Since the study's main goal is to measure employment and earnings outcomes, the dataset is restricted to individuals who had at least one employment record in Minnesota, representing 94% of public high school graduates between 2006 and 2016.

Main Mechanisms Driving Wages and Wage Gaps

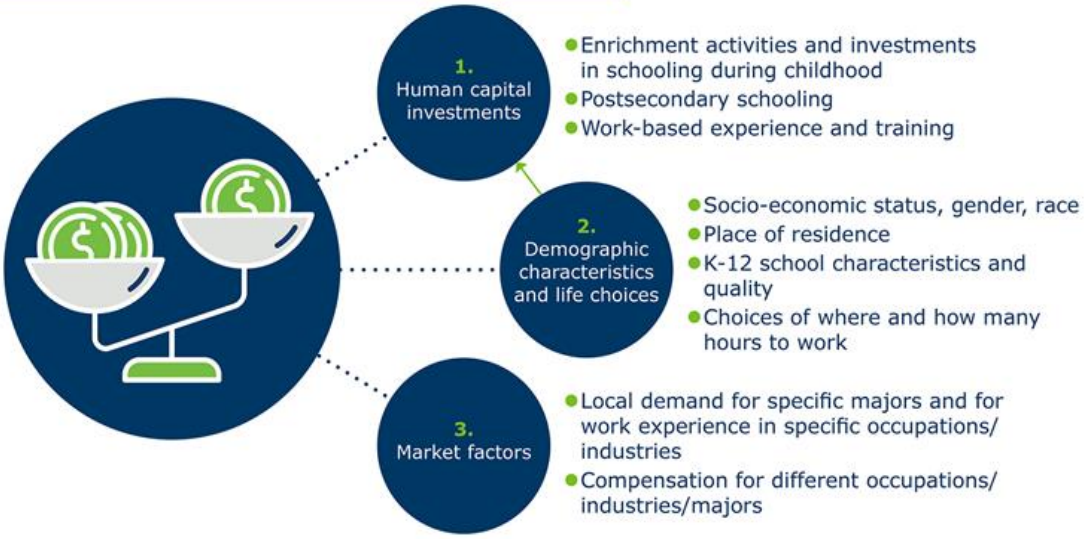
Wages can be viewed as the end result of three mechanisms, illustrated in Figure 2:

1. The ability to invest in human capital [1] is a key determinant of wages. Postsecondary education is the best documented but not the only form of human capital investment. Others are apprenticeships, on-the-job training, and all contributions of time and money that individuals, their parents, and their employers make to enhance the individual's skills;

2. Individual characteristics [2] impact wages either directly by driving the acquisition of skills and knowledge or indirectly by influencing the ability to invest in human capital (see the green arrow in Figure 2). These characteristics include gender, race, socio-economic status, and county of residence (which in turn influences K-12 school choice) as well as life choices made by an individual such as relocating for work, interrupting work to care for family members, etc. All of these factors can produce differences in the level of college and work readiness from one individual to another;

3. Market conditions drive wages by dictating which educational paths and work experiences are most valued by employers at a given time and place. Economic shocks like the Great Recession and the pandemic recession can provoke rapid shifts in market demand conditions, making certain skills obsolete and lowering the earnings potential of individuals who specialized in these skills.

Figure 2. WHAT FACTORS DETERMINE WAGES?



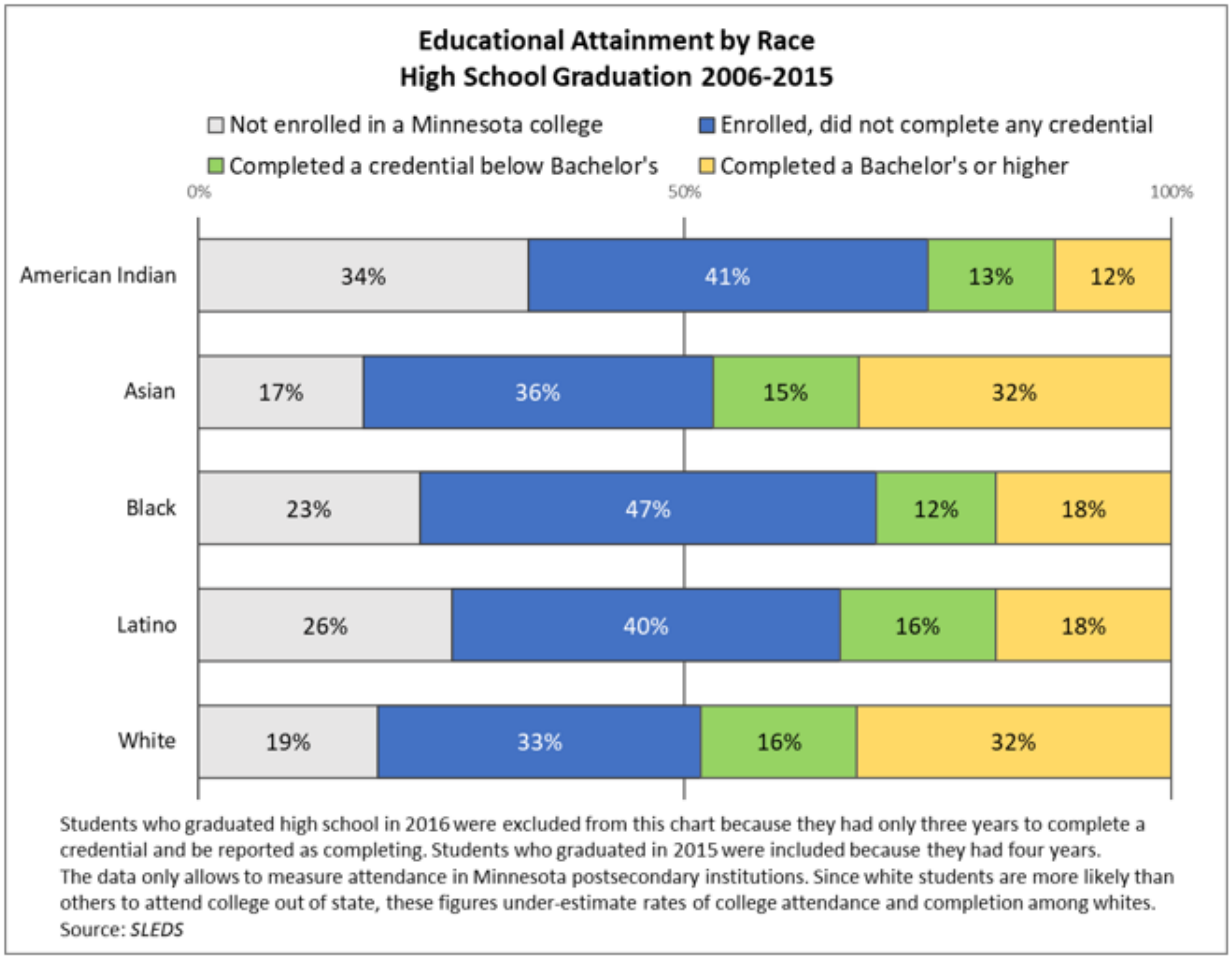
Racial wage gaps emerge when one or more of the three sets of factors driving wages are highly correlated with race, so that individuals from certain race groups have fewer opportunities to build marketable workforce skills.

There is also a fourth mechanism representing employers' preferences, which can mediate the influence of the other three factors. Employer perceptions can influence which individual characteristics are viewed as more valuable, and thus determine which applicants are more likely to get jobs with higher earning potential. Such preferences, especially biases, lead to structural discriminatory practices based on race, gender, age, look, etc. These aspects cannot be revealed through simple descriptive methods but will be discussed later in the article.

Racial Gaps in Postsecondary Educational Attainment

The first factor driving the wage gaps shown in Figure 1 is postsecondary educational attainment. Minnesota has one of the highest college participation rates, ranking 4th nationally, but racial and ethnic disparities (henceforth referred to as racial disparities) in outcomes are also sadly top-ranked. As shown in Figure 3, from 2006 to 2015 white and Asian high school students were the most likely (81% and 83% respectively) to enroll in college, while Indigenous students were the least likely (at 66%). Even more alarming is the fact that nearly half (47%) of Black and 41% of Indigenous students enrolled but did not complete any credential. Finally, only 18% of Latinx and Black students and 12% of Indigenous students completed a bachelor's degree or higher credential versus 32% of white and Asian students.

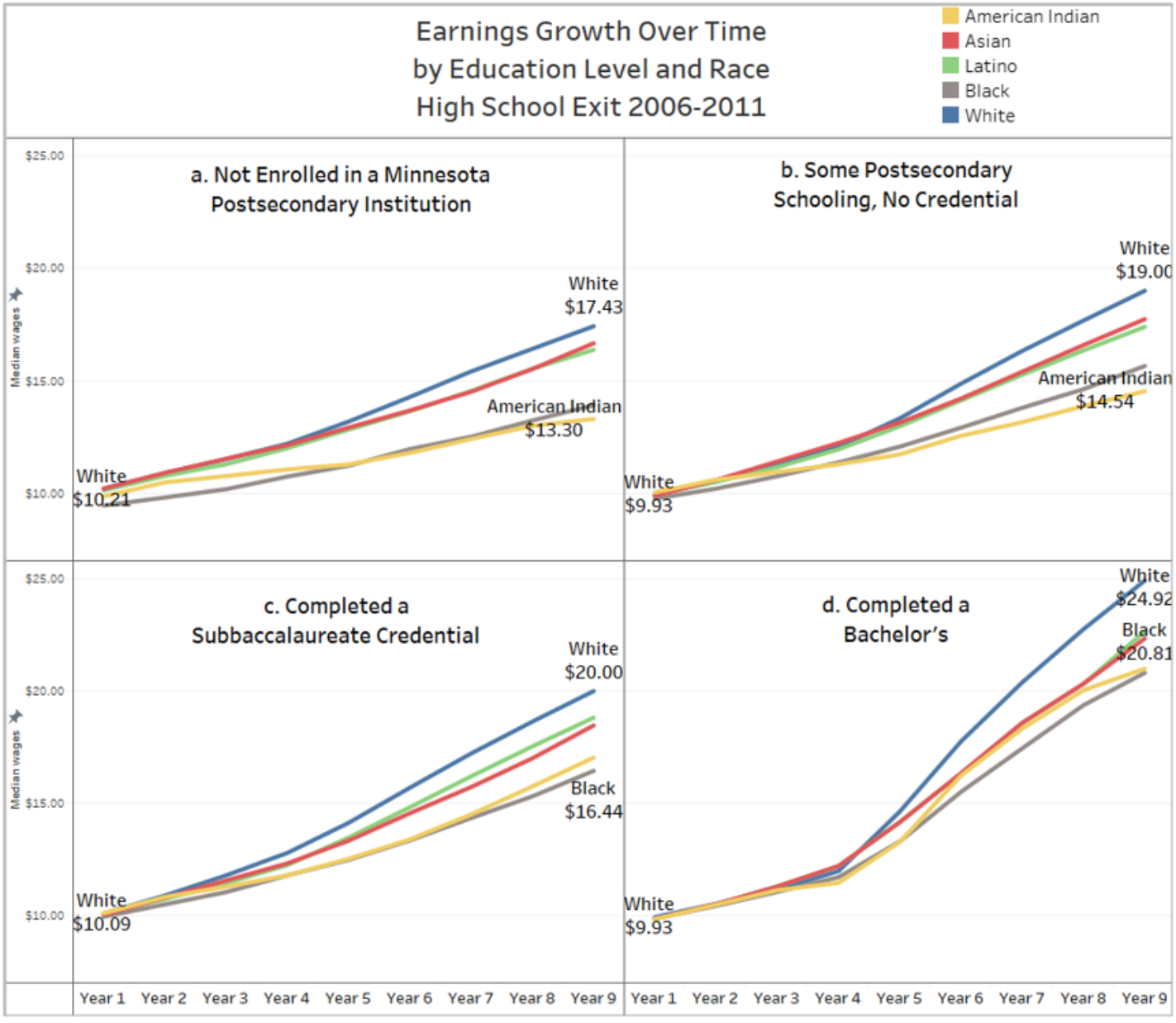
Figure 3



Students who graduated high school in 2016 were excluded from this chart because they had only three years to complete a credential and be reported as completing. Students who graduated in 2015 were included because they had four years.
The data only allows to measure attendance in Minnesota postsecondary institutions. Since white students are more likely than others to attend college out of state, these figures under-estimate rates of college attendance and completion among whites.
Source: *SLEDS*

The impact of postsecondary education gaps on wages and wage disparities is profound, as we can see by breaking down the data in Figure 1 by education level. At the low end of the education spectrum, corresponding to individuals who did not enroll in college (identified in panel a of Figure 4), white students had the fastest earnings growth, Asian and Latinx students closely trailed the earnings of whites, while Black and Indigenous students lag much further behind. The earnings trajectories start to diverge very early, from the second year out of high school.

Figure 4



One possible explanation is that white students may have had the opportunity to prepare for the workforce while still in high school or had access to other resources like career and technical education in high school. In this group of students, 26% of white students took at least one career and technical education course focused on careers in construction, vehicle repair, HVAC repair, and manufacturing (blueprint reading, welding, robotics, mechatronics) versus 22% of Latinx students and 17% of Black students. Furthermore, among whites the average number of courses taken was 2 versus 1.8 among Latinx students and 1.5 among Black students. This slightly more intense early exposure to in-demand careers is one factor that has enabled white students to transition more successfully to the labor market and access the few well-paying jobs that do not require formal postsecondary credentials.

Panel b of Figure 4 represents individuals with some college but no credentials. This group, which is numerically the largest of the four, has a clear advantage in the labor market over those who never entered college. In this group, BIPOC Minnesotans gained something from their postsecondary experiences, but were still surpassed by white students in their hourly wage.

Panel c of Figure 4 represents individuals who completed a sub-baccalaureate credential. This group fares better than the previous two, but racial differences are evident. By the 9th year, the earnings of Black and Indigenous Minnesotans ($16.44 and $17.04 respectively) fell below those of white Minnesotans who stopped at a high school diploma ($17.43). This means that Black and Indigenous students who invested in postsecondary schooling had the same wage outcomes as white students who did not make these investments.

The equity implications of this finding are deeply impactful: if these students had to take on loans to complete a sub-baccalaureate credential and after nine years still cannot match the earnings power of their white peers who did not attend college and thus did not take any student loan debt, their financial position will be significantly less favorable than their white peers.

Finally, panel d represents individuals who completed a bachelor's degree. Over nine years, white students experienced 143% wage growth, the highest of all groups.

What is the effect of postsecondary education on the racial wage gap? Table 1 summarizes the results from Figures 1 and 4. Wage gaps are measured by dividing the wages by those of white students.

Table 1- Racial Wage Gaps by Education Level, High School Graduation Years 2006-2011

Education Level and Chart of Reference	Median Wages in Year 9, People of Color	Median Wages in Year 9, Whites	Earnings Ratio Between People of color and Whites
Not enrolled in a Minnesota postsecondary institution (Figure 4, panel a)	$ 15.26	$ 17.43	87.5%
Some postsecondary schooling, no credential (Figure 4, panel b)	$ 16.56	$ 19.00	87.1%
Completed a sub-baccalaureate credential (Figure 4, panel c)	$ 17.82	$ 20.00	89.1%
Completed a Bachelor's (Figure 4, panel d)	$ 21.81	$ 24.92	87.5%
Total, not accounting for education level (Figure 1)	**$ 17.66**	**$ 20.96**	**84.3%**

Source: SLEDS

Accounting for education level improves the initial earnings ratio of 84%. Among completers of a sub-baccalaureate credential, BIPOC students earned 89% as much as whites versus 87% among non-completers. Completing a Bachelor's apparently did not narrow the gap, which remained stubborn at 87.5%. These results are disappointing: We would have expected racial wage gaps to shrink consistently as education level increases.

Racial/Ethnic Gaps in Individual Characteristics and High School Background

The second, and most important mechanisms influencing wages are individual characteristics, including race, and K-12 schooling experiences. Table 2 shows a series of variables that correlate significantly with wages after high school exit [3], including income and language. All are strongly associated with race.

It is important to remember that these data represent students at public schools, which include public-owned schools and private-owned schools like charters [4]. Larger shares of students of color (10% of Blacks, 7% of American Indians, 6% Asians, 4% Latinos versus 2% of whites) attended charter schools. It's been proven that the differences in educational outcomes within district type (traditional public schools and charters) can be as stark as the differences between them. However, the data below does not compare the two, so it should not be generalized to any specific type of district.

Table 2 - Gaps in High School Experiences and Outcomes by Race

	Individual Characteristics					High School Characteristics				
Race	**Number 2006-16**	**Low Income (1)**	**English Lang. Learner**	**Did Not Graduate on Time (2)**	**Took PSEO or CE courses (3)**	**Alternative School (4)**	**25% (or more) Low Experienced Teachers (5)**	**50% (or more) Racial Minorities**	**50% (or more) ACT Test Takers Proficient in Math (6)**	**75% (or more) Seniors Enrolled in College (7)**
Black	41,625	81%	17%	13%	15%	28%	28%	47%	30%	43%
American Indian	8,612	69%	1%	9%	21%	24%	25%	28%	23%	24%
Asian	35,677	65%	43%	7%	25%	21%	18%	43%	37%	49%
Latino	27,180	68%	28%	8%	20%	24%	22%	26%	36%	42%
White	491,391	24%	0%	2%	33%	8%	16%	4%	47%	54%
Total	**604,485**	**33%**	**5%**	**4%**	**30%**	**11%**	**17%**	**11%**	**44%**	**52%**

(1) Low income is measured by whether a student qualifies for free or reduced-price meals under the National School Lunch Program.
(2) Attended an Adult Basic Education diploma program, dropped out and repeated years, or graduated after the age of 19.
(3) Postsecondary Enrollment Options (PSEO) is a program that allows students in 10th, 11th and 12th grade to earn college credit while still in high school by enrolling in a college course. Concurrent Enrollment (CE), commonly known as College in the Schools, allows juniors and seniors to take free college-level courses at their high school through partnerships between high schools and local postsecondary institutions. PSEO and CE courses might include Career and Technical Education courses.
(4) Attended an Area Learning Center, an Alternative Learning Program, or an online high school at any time 9th -12th grade.
(5) Share of students who attended schools where one out of four (25%) or more teachers taught for 5 years or less. This is a measure of teacher quality and/or teacher retention.
(6) The ACT is one of the most widely administered college entrance exams in the U.S. Math proficiency corresponds to a 50% chance of obtaining a B or higher score in College Algebra. Data not available for 2006 and for schools with no ACT test takers.
(7) Enrollment in any postsecondary institution, and including out-of-state schools, within one year of high school graduation.
Sources: SLEDS, MN Department of Education (MDE), ACT, and National Center for Education Statistics (NCES)

Black students are the most disadvantaged by nearly all indicators. A staggering 81% were eligible for free or reduced-price lunch, which is the best available indicator of low family income; 17% were English language learners, suggesting that some students recently immigrated from abroad; 13% did not graduate from high school on time; 28% attended alternative schools, which typically serve students who fall behind academically; only 15% participated in programs such as Postsecondary Enrollment Options (PSEO) and Concurrent Enrollment (CE) programs that allow students to take college courses while in high school; 47% attended a school serving predominantly BIPOC students, especially charters [5] and schools in the Twin Cities. Unfortunately, high levels of segregation also correspond with low school achievement levels. Furthermore, 28% attended a high school where one out of four (or more) teachers were in their first five years of teaching experience, indicating that these students were more likely to be taught by the least experienced teachers. Finally, only 30% attended a school where 50% or more ACT test-takers were proficient in math. ACT math scores are an important indicator not only because racial gaps in math are larger than in reading, but also because poor preparation in math prevents students of color from pursuing STEM majors leading to employment in fields projected to have better job growth prospects in the future.

Indigenous students have high levels of eligibility for free and reduced-price lunch (69%), were more likely to attend an alternative high school (24%) and had a relatively high percentage of students who did not graduate on time (9%). Also pointing to skills gaps is that only 23% of Indigenous students, the lowest of all racial groups, attended schools where 50% or more ACT test-takers were proficient in math. This measure of school performance is twice as low as white students. Finally, another concerning result is the extremely low percentage of students in a high school where 75% or more seniors enrolled in college. The fact that only 24% of Indigenous students, the lowest percentage of all race groups, attended a school with a strong college-going culture helps explain why they have the lowest rates of college enrollment in the state. The rural residence of many Indigenous students, further away from the biggest postsecondary institutions, might also have contributed to this phenomenon.

Asian students have a mix of advantages and disadvantages. On the one hand, Asians have the highest concentration of English language learners (43%) and an identical share (43%) of students in schools serving BIPOC students. These indicators suggest that language barriers could be a challenge for Asian students more than for other groups. Despite the linguistic barriers, Asian students were able to access higher quality schools than other race groups. For example, only 18% of Asian students attended schools where one out of four teachers (or more) are low experienced. This implies that Asians had greater access to experienced teachers than other BIPOC students. They were also more likely to attend schools with better ACT math achievement levels and higher college enrollment rates immediately after graduation than other BIPOC students.

Hispanic/Latinx students [6] face similar challenges as Black students, but with lower rates of eligibility for free/reduced price lunch and higher concentrations of English language learners (28%), indicating more linguistic barriers. Their rates of participation in programs for academically struggling students were also very high at 24%.

White students are favored on all indicators displayed in Table 2. Besides the characteristics already mentioned, they were also significantly more likely (33%) than other racial groups to take college courses offered through PSEO/CE programs. Differential rates of participation in these programs by race can be explained in two ways. First, better academic preparation allowed white students to free up some of their junior and senior year schedules to attend college-level courses [7]. Participation in these advanced courses depends in great part on having taken a strong core curriculum from middle school. Second, more white students might have sought to participate in these programs because of family expectation to attend college or family financial resources that would allow them to plan to attend college. These factors (abilities, prior coursework and socio-economic background) can determine from an early age which students are college-bound and which aren't. School environment also seems to influence the decision to attend postsecondary school and specifically a four-year school. We find that 54% of white students attended a school with a strong college-going culture. This might have further contributed to shaping expectations about one's ability to succeed in college and allowed white students to benefit from collaborative relationships between their high school and postsecondary institutions that can be valuable in navigating the college admission and financial aid process.

The disparities in access to experienced teachers shown in Table 2 deserve a few additional words. Black and Indigenous students are substantially more likely than white students to attend a school with 25% or more low-experienced teachers. Since gains in teaching effectiveness are strongest in the first years of teaching, our indicator points to racial inequities in access to effective teachers, which is key to student achievement. Only when we account for the income level of the school, measured by the share of students qualifying for free or reduced-price lunch, do we achieve near parity in the teachers' experience indicator by race. This finding reflects the difficulties faced by schools with a high number of economically disadvantaged students in recruiting experienced teachers and retaining teachers beyond the first five years of tenure. [8]

Disparities in high school inevitably produce severe racial disparities in college readiness levels. One of the key measures of college readiness is the need for remediation upon enrollment in postsecondary school, displayed in Table 3. Students are placed in supplemental instruction in core subjects like math and reading when they are unprepared to take college-level courses. Black students had the highest rates of remediation (46.2%), followed by Latinx, Indigenous, Asian, and lastly white students.

Table 3 – Gaps in Postsecondary School Experiences and Outcomes by Race					
Race	**Number of Students Enrolled in MN 2006-2016**	**Placed in Remedial Instruction (1)**	**Completed Any Post-Secondary Credential**	**Incidence of Part-time Enrollment (2)**	**First Enrolled in a Two-Year Community College**
Black	31,862	46.2%	37.1%	29.3%	59.7%
American Indian	5,641	34.0%	36.5%	20.3%	54.7%
Asian	29,425	33.5%	53.9%	20.1%	43.3%
Latino	19,872	37.9%	43.8%	25.9%	61.6%
White	394,594	19.7%	57.2%	16.7%	41.9%
Total	481,394	23.1%	54.9%	18.3%	41.9%
(1) This measure is assessed within 3 years from high school exit with the aim of excluding non-traditional students who might be placed in remedial education because they need a refresher, not because they carried over skills gaps from high school. (2) This measure is assessed only at the undergraduate level using a cutoff of 15 quarter credits.					

It is important to note that the rate of remediation was also high (42%) among Black Minnesotans who were already U.S. citizens and did not need to take English language services in high school. This suggests that U.S.-born Black students did not enter higher education much more prepared than Black Minnesotans from immigrant families.

Remediation, which results in more BIPOC Minnesotans paying for high school education at the college level, is a risk indicator for dropping out of college, as shown by the fact that the greater the incidence of remediation the lower the likelihood of completing a credential. The only exception is Indigenous students, who had lower rates of remediation than Black students (34.0%) not necessarily because they were better prepared academically but because relatively more of them chose to enroll in open-access private career schools that do not require being assessed college ready and thus do not provide remedial education.

Another important difference between white students and BIPOC students is the incidence of part-time enrollment, or the amount of their schooling spent attending part-time. White students were the least likely to attend part-time (16.7%) while Black and Latinx students were the most likely (29.3% and 25.9%) because they had to work more during college. Black and Latinx students worked more hours on average per year than whites during the first two years of postsecondary school, in most cases to pay for the cost of their higher education, which also might cost more than white Minnesotans due to the increased need for remedial classes. The need to juggle school and work can have a negative impact on academic performance and increases the risk of dropping out of college if students lose their job.

The table also shows that public two-year schools are on the frontlines of the effort to tackle racial disparities. More resources should be channeled to community colleges to help them lower the cost, so that college is affordable, improve the effectiveness of remedial coursework as well as strengthen other tools to provide BIPOC students with the academic, motivational, and financial supports needed to persist to the second term and complete a credential.

Finally, we cannot ignore the fact that the racial gaps displayed in Table 2 and 3 are, at least in part, income gaps. Table 4 summarizes the same indicators by income level. Low-income students are significantly more at risk of not graduating from high school on time, not taking college-level courses during high school, attending a school with a higher proportion of BIPOC students and with lower math scores, not enrolling in postsecondary school, needing remediation when enrolled, attending college part-time, and not completing any credential. We can also see that low-income students attend schools with disproportionately high rates of teachers who are in their first five years of teaching experience (23% versus 15%). Furthermore, the fact that 22% of lower income students (more than three times the rate of their non-free and reduced-price lunch peers) attended alternative schools, which typically serve academically struggling students, shows how income and racial disparities combine to the disadvantage of BIPOC students.

Table 4 – Gaps in Educational Experiences and Outcomes by Income Status										
Free or Reduced-Price Lunch Status	**Number**	**Did Not Graduate on Time**	**Attended an Alternative School**	**Attended a School with >25% Low Experienced Teachers**	**Attended a School with >50% Racial Minorities**	**Attended a School with >= 50% ACT Test Takers Proficient in Math**	**Enrolled in Higher Ed**	**Enrolled Part-time in Higher Ed**	**Placed in Remedial Instruction**	**Completed any Credential**
Eligible	197,189	11%	22%	23%	23%	31%	70%	24%	36%	32%
Not Eligible	407,296	3%	6%	15%	4%	51%	84%	16%	18%	50%
Total	**604,485**	**5%**	**11%**	**17%**	**11%**	**44%**	**80%**	**18%**	**23%**	**44%**

* Students from a household with an income at or below 185% of the federal poverty level ($47,638 for a family of four) qualify for Free/Reduced Price Lunch.
Source: SLEDS

In conclusion, these results shed light on the difficulties many BIPOC students have to overcome to prepare for and access college. They also provide a glimpse of the likely reasons why many did not complete a credential.

The Effect of Market Conditions on Racial Wage Gaps: Choice of Major Matters

We've seen that the racial wage gap is a result of systemic disparities in family income and in learning opportunities during K-12, and of difficulties navigating the first year in college. But there is also a third set of factors determining the formation of racial wage gaps: the fact that BIPOC high school students oftentimes do not have the skills to take advantage of the job opportunities in local labor markets. This is "market factors" in Figure 2.

BIPOC students are particularly affected by local demand conditions because they are generally less geographically mobile than white students after high school. [9] Therefore, it is imperative that they enroll in postsecondary programs well aligned with the needs of local employers. Unfortunately, this is often not the case. Table 5 displays the breakdown of sub-baccalaureate program completers by major and race, including median wages during the seventh year after high school exit by gender. Earnings ratios higher than 100 indicate cases in which BIPOC Minnesotans earned a higher wage than whites.

Across majors, seven years after high school exit white men received the most favorable wage ($20.12), followed by Latino men ($18). Asian women were almost at parity with Asian men ($16.61 versus $16.72). Across genders, the median earnings of Black ($15.43) and Asian workers ($16.62) were 84% and 91% percent, respectively, of the earnings of white workers ($18.36).

(see Table 5 – next page)

Table 5 - Earnings Seven Years After High School Exit by Race, Awards from One to Three Years in Length, by Selected Fields of Study						
Majors	**Race**	**Share of Completers in Major Within Race**	**Median Wage, Female**	**Median Wage, Male**	**Median Wage, Total***	**Earnings Ratio to Whites**
Registered Nursing (RN) N=3,059	Black	3.1%	$ 30.08	Suppressed**	$ 30.09	98%
	Asian	2.0%	$ 31.52	$ 35.82	$ 31.88	104%
	Latino	2.6%	$ 31.01	$ 33.15	$ 32.06	104%
	White	4.4%	$ 30.57	$ 31.43	$ 30.70	100%
Medical Assisting Services, Medical Administrative Services, and Licensed Practical Nursing (LPN) N=7,423	Black	13.7%	$ 16.17	$ 13.77	$ 16.08	94%
	Asian	14.7%	$ 17.16	$ 16.41	$ 17.12	101%
	Latino	10.5%	$ 18.01	$ 19.67	$ 18.22	107%
	White	9.5%	$ 17.00	$ 17.90	$ 17.02	100%
Other Health Care programs* N=5,222**	Black	6.6%	$ 18.11	$ 17.05	$ 17.99	84%
	Asian	7.4%	$ 20.03	$ 18.50	$ 19.50	91%
	Latino	6.0%	$ 19.64	$ 17.86	$ 19.58	92%
	White	7.1%	$ 21.21	$ 22.30	$ 21.32	100%
Liberal Arts N=16,812	Black	29.3%	$ 15.22	$ 14.86	$ 15.01	92%
	Asian	26.7%	$ 15.71	$ 15.18	$ 15.49	95%
	Latino	26.5%	$ 16.08	$ 16.26	$ 16.21	99%
	White	21.9%	$ 16.17	$ 16.55	$ 16.33	100%
Cosmetology and Culinary Arts N=6,010	Black	14.9%	$ 13.94	$ 13.86	$ 13.90	89%
	Asian	7.5%	$ 14.37	$ 15.60	$ 14.55	93%
	Latino	10.5%	$ 16.85	$ 18.00	$ 15.33	98%
	White	7.7%	$ 15.66	$ 15.23	$ 15.58	100%
Construction and Repair Technologies N=9,955	Black	3.7%	suppressed	$ 17.90	$ 17.87	81%
	Asian	7.3%	suppressed	$ 17.88	$ 17.79	81%
	Latino	10.5%	$ 15.22	$ 19.72	$ 19.58	89%
	White	14.4%	$ 19.53	$ 22.13	$ 22.09	100%
Engineering Technologies N=2,905	Black	1.4%	suppressed	$ 19.02	$ 19.02	85%
	Asian	2.7%	$ 16.68	$ 18.94	$ 18.59	83%
	Latino	2.8%	$ 15.46	$ 20.87	$ 20.53	92%
	White	4.2%	$ 19.82	$ 22.59	$ 22.32	100%
Business N=5,470	Black	7.5%	$ 15.58	$ 16.63	$ 16.12	93%
	Asian	9.0%	$ 17.06	$ 15.58	$ 16.60	96%
	Latino	8.8%	$ 15.22	$ 19.72	$ 18.14	105%
	White	7.2%	$ 16.73	$ 18.52	$ 17.26	100%
IT N=2,280	Black	2.6%	suppressed	$ 20.08	$ 20.52	107%
	Asian	7.3%	$ 15.55	$ 16.87	$ 16.58	86%
	Latino	2.4%	suppressed	$ 19.70	$ 19.85	103%
	White	2.9%	$ 17.37	$ 19.43	$ 19.20	100%
Total, All Majors N=74,091	**Black**	**100.0%**	**$ 15.31**	**$ 15.90**	**$ 15.43**	**84%**
	Asian	**100.0%**	**$ 16.61**	**$ 16.72**	**$ 16.62**	**91%**
	Latino	**100.0%**	**$ 16.85**	**$ 18.00**	**$ 17.33**	**94%**
	White	**100.0%**	**$ 17.08**	**$ 20.12**	**$ 18.36**	**100%**

*Wage figures represent 47,092 individuals who were employed in Minnesota 7 years after high school exit.
** Suppressed due to small sample sizes (10 individuals or less).
*** This category includes programs that prepare for very high demand careers often requiring a license, such as radiologic technician, radiation therapist, surgical technologist, cardiovascular technologist, and ultrasound technician.

Does accounting for major have an effect on racial wage gaps? The answer is definitively yes.

The earnings ratio between Black and white workers rises to the 89%-94% range in most fields, reaching 98% in Registered Nursing. Also remarkable are the competitive wages earned by Black Minnesotans with sub-baccalaureate credentials in IT. Their median hourly wage of $20.52 is more than one dollar higher than white Minnesotans, corresponding to an earnings ratio of 107%.

Wage disparities within the same major persist especially among men and in fields related to Construction and Repair and Engineering Technologies, where the ratios between the earnings of Black workers and those of white workers are only 81% and 85% respectively. [10] The only female-dominated field where accounting for major appears to have no effect on the earnings ratio – 84% for Black workers, 91% for Asian workers, and 94% for Latinx workers – is Other Health Care programs. This result masks large racial differences in occupational specializations within this diverse major. Wage gaps do indeed get smaller if we also control for the fact that BIPOC Minnesotans are underrepresented in the most remunerative programs such as Radiographer and Cardiovascular/Ultrasound Technicians.

The same trends we observe among sub-baccalaureate program completers are found among bachelor's completers. Racial imbalances are particularly stark in STEM disciplines, possibly because the high schools attended by BIPOC students have lower math proficiency overall than those attended by whites (see Table 2).

This analysis strongly supports the conclusion that if graduates were more equally represented across majors, there would be fewer differences by race in the career paths pursued after graduation and thus less wage disparity. We are far from equal representation, as shown by the "Share of Completers in Major" figures. White students are under-represented in Cosmetology and Culinary Arts, Liberal Arts, and health care majors in lower demand such as Medical Assisting and Medical Administrative Services. In contrast, whites are over-represented in Registered Nursing and skilled trades majors such as Construction and Repair and Engineering Technologies, which lead to jobs in higher-paying careers. Black Minnesotans are extremely highly concentrated (14%) in Cosmetology and Culinary Arts programs, which lead to careers that have been hit the hardest by the COVID-19 pandemic. These career paths put these students at higher risk of layoffs when market conditions shifted in 2020.

It is also important to note that Cosmetology and Culinary arts programs were low-performing even before COVID-19 hit. Some schools have voluntarily shut down programs in these fields. For example, Minneapolis Community and Technical College closed their culinary program in 2014 because it had a 42% student loan default rate. [11] Others were forced to close in 2016. [12] This evidence shows that uneven quality of schooling is an issue not only at the K-12 level but also at the postsecondary level. Students of color, especially Black and Indigenous, are sometimes paying a price for their over-reliance on programs that have no admission requirements and therefore do not require remedial coursework.

This evidence demonstrates the importance of helping BIPOC students choose a major with an eye towards viable career paths and labor market trends in Minnesota. For example, BIPOC students should be made more aware of the fact that a two-year degree in Liberal Arts pays off if used to transfer to a four-year degree, [13] but has less stand-alone market value than other 2-year degrees.

In 2015, a law mandated Minnesota State to use labor market data to inform the academic program approval processes and program review. [14] When funds are channeled towards popular but low performing programs, and students are not adequately informed about the consequences of their choices, there is the risk for some high-performing but less popular programs to remain under-funded and under-promoted by the schools.
When we tie these findings back to the conceptual model presented at the beginning of the article, we can conclude that holding constant some key factors such as human capital investments in postsecondary education, individual characteristics like race, gender and age, and market factors such as occupational demand (to the extent in which major reflects occupational goals) substantially reduces wage gaps, but not in all fields.

Why is it so difficult to equalize educational choices by race? Some factors that impact choice of major are preparation, prior exposure, interests, availability of role models and perception of workplace acceptance within the sector. Some high demand programs, such as RN, require passing a college readiness test which often weeds out students of color. Furthermore, traditionally low representation in some sectors can discourage BIPOC students from pursuing degrees in fields where they see little chance of being hired, like Construction [15] or Utilities.

Industry Segregation Based on Race Leads to Opportunity Gaps

What other market mechanisms besides occupational demand can affect the relative value of educational credentials? Industry demand can be just as important. Unfortunately, sorting into industries is even less an individual choice than picking a major. Previous analysis [16] has found evidence of job sorting mechanisms – reflecting employers' hiring preferences – that keep people of color and women segregated in industry sectors where they get stuck in low wage jobs. Particularly strong job sorting occurs in the skilled trades, especially Construction, Repair and Maintenance and Engineering Technologies. Table 6 reveals striking differences in industry of employment already in the first and second year after high school among students who majored in these fields.

Table 6 – Shares of Graduates Employed in Industries Related to Their Major, by Race

Race	Industries Highly Related to Programs in Construction, Repair and Maintenance, and Engineering Technologies	Share Working in Industry Year 1 After High School	Share Working in Industry Year 2 After High School
Black (N=155)	Construction and Utilities	2.1%	4.2%
	Manufacturing	6.9%	7.7%
	Wholesale, Professional and Technical Services, Repair and Maintenance Services	6.9%	8.4%
	Total employed in highly related industries	**16%**	**20%**
Asian (N=381)	Construction and Utilities	3%	3%
	Manufacturing	1%	4%
	Wholesale, Professional and Technical Services, Repair and Maintenance Services	5%	12%
	Total employed in highly related industries	**9%**	**19%**
Latino (N=411)	Construction and Utilities	6%	9%
	Manufacturing	9%	10%
	Wholesale, Professional and Technical Services, Repair and Maintenance Services	8%	9%
	Total employed in highly related industries	**23%**	**28%**
White (N=12,053)	Construction and Utilities	13%	18%
	Manufacturing	8%	9%
	Wholesale, Professional and Technical Services, Repair and Maintenance Services	11%	13%
	Total employed in highly related industries	**32%**	**40%**

Source: SLEDS

We can observe that the transition toward jobs that better match one's career goals is advantageous to white Minnesotans and disadvantageous to BIPOC Minnesotans. White students were significantly more likely to be working in related industries immediately out of high school (32%). Within two years from high school, 40% were employed in related industries versus only 20% of Black, 19% of Asian, and 28% of Latinx students. These differences matter because industries like Construction, Utilities, Manufacturing, and Professional and Technical Services offer union wages, more full-time work and more job stability. [17] They also provide on-the-job training. The early advantage white students gain in terms of work experience inevitably leads to the large racial wage gaps seven years after high school exit shown in Table 5.

What could explain this early advantage? If whites finished postsecondary school more quickly than others, which is the case, one could in part explain their higher participation rates in related industries in the second year, but not in the first year when most students had not yet completed a program. Were white students more successful in career planning and job search? Were they more career-ready than others upon high school exit, perhaps through taking Career and Technical Education courses during high school? Or is something else also at play, such as privileged access to jobs or employer-sponsored training – such as apprenticeships – through family contacts or other information networks? Or were employers' hiring practices in these industries racially biased?

Privileged access to jobs, increased opportunities for training and racial biases lead to white Minnesotans being able to acquire valuable workforce skills at a faster rate than BIPOC workers. Being subject to unequal treatment at the onset of one's career can make one more vulnerable to market forces in the future. Job seekers of color, or women, who are subject to occupational and industry segregation, fall more easily under the ax of market forces because they lack the work experience and on-the-job training needed to transfer to other jobs when demand for labor in their field declines. The COVID-19 recession is indeed a perfect example of how economic downturns affect workers of color disproportionately. [18] This greater vulnerability is not only a function of lower educational achievement (skills gaps) but also of the higher concentration of BIPOC workers in industries like Temp Help, Food Services, Social Assistance and Nursing and Residential Care Facilities where work is less stable and opportunities for professional development and career mobility are lower (opportunity gaps).

Did Racial Wage Gaps and the Factors Driving Them Improve Over Time?

Figure 5 compares earnings growth trends in the earliest high school exit cohorts in our study (corresponding to 2006 and 2007) to the most recent cohorts for which we have eight years of wage data (2012) to see if there has been an improvement in racial wage gaps over time. Since the 2006/07 cohort entered the labor market right before the Great Recession while the 2012 cohort entered during a period of strong economic recovery, comparing the two cohorts allows us to gauge the effect of changes in market demand conditions on the gap.

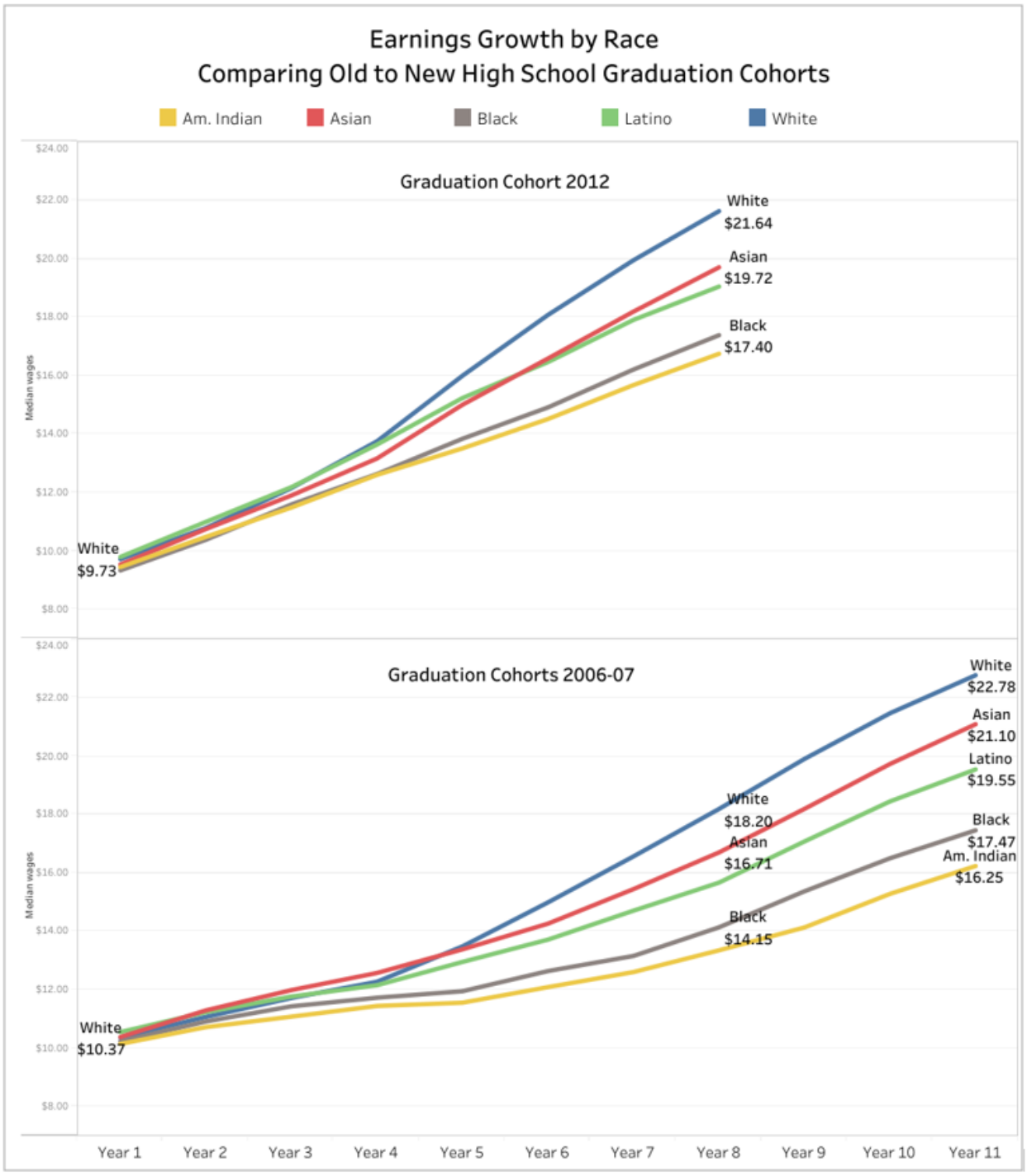
By the eighth year, inflation-adjusted wages were much higher in the newer than in the older cohorts regardless of race. What is striking is the difference in the steepness of the curves, indicating a complete change in economic conditions. The trajectories of the 2006/07 cohorts stay flat for a longer time, especially those of Blacks and American Indians, a consequence of the Great Recession. During eleven years the earnings of Blacks grew only by 70% versus 120% among whites. In both time periods, whites' earnings far outpaced those of other race groups.

Earnings curves are as important as the wage gap because they represent earnings growth potential. Steeper trajectories like those seen in the 2012 cohort suggest that students who enrolled in college might take less time to recoup their educational investments.

The second most important takeaway from Figure 5 is the improvement in the magnitude of racial wage gaps among Blacks in the cohorts that exited in 2012. Eight years after high school Blacks earned $17.40 per hour, representing 81% of the wages earned by whites, up from 78% in the 2006/07 cohorts. BIPOC students as a whole earned 86% as much as whites eight years after high school exit, up from 84% in the older cohorts. Improved market conditions are likely to have contributed to this modest narrowing of the racial wage gap.

Besides being impacted by a major recession and an equally impressive recovery, the period of focus in this study (2006 to 2015) was impacted by historically low investments in public K-12 schools. From 2003 to 2011, education funding fell from $9,700 to $8,400 per student. After 2011, funding levels increased until in 2015 Minnesota' percentage expenditure per pupil surpassed the national average . Some of the indicators presented in Tables 2 and 3 have improved since 2006. For example, school racial segregation has declined over the years among Black students, a very encouraging trend. Participation in programs that allow high school students to take college-level courses has increased three-fold from 2006 to 2016 and slightly more among BIPOC students, signaling better opportunities for students of color to be exposed to rigorous coursework. Finally, the need for remedial services has declined by at least 6 percentage points from 2011 to 2016 in all race groups, though racial gaps remain.

Figure 5



In conclusion, while there have been some improvements in K-12 school quality and college readiness since 2011 and the racial wage gap appears to have narrowed very slightly since the end of the Great Recession, BIPOC students are still significantly behind white students.

Addressing the problem of racial wage gaps requires fixing existing inequities in each of the parts of the conceptual model presented at the beginning of the article:

- first, by removing gaps in postsecondary educational achievement by increasing postsecondary attainment among BIPOC students;
- second, by removing gaps in K-12 schooling which drive both postsecondary educational achievement and work-readiness; and
- third, by removing hiring bias and information gaps in the decision-making process of individuals and employers that deprive BIPOC workers of the opportunity to acquire valuable workforce skills as fast as whites.

Conclusions and Policy Implications

This study examined a series of systemic barriers that contribute to racial/ethnic wage inequality among individuals who attended a public high school in Minnesota from 2006 to 2016. Here is a summary of findings:

- Racial wage gaps start emerging around age 21. Nine years after high school exit, students of color earned only 84% as much as whites. The earnings of Black and Indigenous Minnesotans, in particular, lag further behind those of other race groups.

- Gaps in postsecondary educational attainment contribute to racial wage gaps but do not fully explain them. Even among Bachelor's degree completers, students of color earned 87% as much as whites.

- The postsecondary completion gap between white Minnesotans and BIPOC Minnesotans is startling. Nearly half (47%) of Black and 41% of Indigenous Minnesotans enrolled in postsecondary education but did not complete any credential, which is even more startling when disparities in on-time high school graduation are examined.

- This completion crisis stems in part from systemic disadvantages faced by students of color long before reaching college age. During the time period of this study, many students of color attended high schools that were racially segregated or low achieving, were taught by the least experienced teachers, reached college academically unprepared and left before finishing a degree. Furthermore, lower shares of students of color were able to take college-level courses in high school. Insofar as the disparities at the K-12 level are of a structural nature – driven, for example, by home prices in school districts – skills gaps will inevitably emerge among youth of color.

- Racial gaps in educational attainment go hand in hand with income gaps but are not entirely explained by income differences.

- Minnesotans of color are not represented in high demand/high wage majors at the same rate as whites. When differences in major are accounted for, racial wage gaps are significantly (though not entirely) reduced for those who have attained a postsecondary credential. This finding suggests that college counseling services and exposure to careers during high school are critical to steer students of color to educational tracks and occupations well aligned with employer needs.

- Uneven quality of schooling is an issue not only at the K-12 level but also at the postsecondary level, with the added problem that postsecondary school requires financial investment, often in the form of loans. Students of color, especially Black and Indigenous Minnesotans, tend to be over-represented in programs with low market value, making college less valuable and less affordable. This finding suggests that college program offerings should not be driven exclusively by the popularity of a program (reflected in its enrollment size) but primarily by employer demand and post-graduation earnings prospects.

- Racial wage gaps are much more pronounced among men than among women.

- Students of color are less likely to work in industries related to their field of study than whites with similar credentials primarily because of job segregation by race. Within two years from high school, 40% of white students who earned credentials in the skilled trades were already employed in industries strongly related to their major versus only 20% of Black and 18.5% of Asian students. Job sorting in the form of industry allocation appears to give white students – especially males – an early advantage in the form of better opportunities for skills acquisition, ultimately leading to racial wage gaps seven years after high school. Industry segregation also makes Minnesotans of color more vulnerable to changes in market conditions because they lack the work experience and on-the-job training needed to transfer to other jobs when demand for labor in their field declines.

- Minnesotans of color are more vulnerable to shifts in local market demand conditions during economic downturns. This is demonstrated, among other things, by the fact that younger cohorts of Black students – the largest group of students of color – had better earnings growth and slightly smaller racial wage gaps seven years after high school compared to Black students who exited high school at the start of the Great Recession.

- There are some bright spots, including the fact that some K-12 educational disparities have improved, but these recent gains could quickly erode as a result of the COVID-19 recession.

These findings point to the self-perpetuating and inter-generational nature of racial inequalities and the inextricable relationship between opportunity gaps and skills gaps.

In light of this body of evidence, four recommendations are critically important to reduce wage inequalities among youth of color.

First, college readiness ought to be strengthened at every level of the educational pipeline. This is particularly crucial in elementary and middle school, when large racial disparities build up, preventing students of color from participating in the high school courses that prepare both for college and for workforce entry. Furthermore, in light of the evidence of disparities in access to experienced teachers by race and income level, it is critically important to support new teachers in schools serving predominantly low-income and racially diverse students through higher salaries and student debt relief to improve retention and quality of instruction.

Second, more advising and streamlined remedial instruction should be provided for BIPOC students, helping to ensure they can complete their degree on time.

Third, Career and Technical Education courses should be widely available to BIPOC students and aligned to local employer demands. Employers also have a role to play by strengthening connections with local high schools and vocational schools to identify interested students with an eye towards underrepresented populations. This would give employers a chance to diversify their labor force and expand their labor pool.

Fourth, debt relief should be provided for low income students, especially BIPOC students. If Minnesotans of color continue to disproportionately miss out on educational opportunities, gaps at all levels will widen. These interventions would help address the workforce shortages that employers are experiencing in the skilled trades and other in-demand sectors, prevent communities of color from bearing the brunt of unemployment and learning losses during economic downturns, and contribute to raising the overall competitiveness of Minnesota's labor force.

[1] Jacob Mincer, Schooling, Experience, and Earnings. 1974, National Bureau of Economic Research (NBER).
[2] Gary Becker, Human Capital. 2002, Paper given at the University of Montevideo. According to Becker, families and choice of schools are the most important factors affecting human capital formation.
[3] When tested through a series of regression models, all variables in Table 2 are significantly associated (either positively or negatively) with wages earned 4, 5, 6, and 7 years after high school exit. These relationships persisted even when the model controlled for gender, disability status, year of high school exit, and region of employment. The only variable that loses statistical significance or changes direction when all other variables are included is the English learner indicator.
[4] The Bureau of Labor Statistics classifies the ownership of charter schools as private non-profit. Charter school districts are publicly funded but privately managed and semi-autonomous.
[5] In our dataset, charters are vastly over-represented among schools having more than 50% BIPOC students.
[6] The race definitions used in this study are based on self-reporting, and the data collection instrument does not distinguish between Latinx as a race and Hispanic as a cultural/linguistic/ethnic identification.
[7] Being on track to graduate is a pre-requisite for being eligible for traditional PSEO. Also, some colleges implement a GPA cutoff, making these programs fairly selective.
[8] An extensive discussion of the teacher shortage in Minnesota and the difficulties faced by charters and schools serving low income students in attracting and retaining teachers can be found in the 2017 Report of Teacher Supply and Demand in Minnesota's Public Schools, https://mn.gov/pelsb/assets/2017%20Teacher%20Supply%20and%20Demand%20Corrected_tcm1113-322217.pdf.
[9] In 2016, only 17% of Minnesota public high school graduates of color enrolled in a postsecondary institution outside the state. The share among white students was twice as high, at 32%. Similar differences are observed before 2016: in the 2009 graduation class, 8% of students of color enrolled out of state versus 19% of whites. (Source: SLEDS)
[10] These results are robust to changes in cohorts selected (older versus newer), geography of employment (metro and outside the metro), and detailed major within these disciplines.
[11] Rayno, Amelia. Why are Twin Cities culinary schools closing amid restaurant boom? Star Tribune, Sept 17, 2016 https://www.startribune.com/why-are-twin-cities-culinary-schools-closing-amid-restaurant-boom/393614391/.
[12] Eyewitness News. 79 Minnesota-Based Regency Beauty Institutes to Close, 2016 https://kstp.com/news/regency-beauty-institute-closes-its-79-campuses-5-minnesota-institutes-/4277460/.
[13] Leibert, Alessia. Stackable Credentials: Myth and Reality. March 2017, Economic Trends magazine https://mn.gov/deed/newscenter/publications/trends/march-2017/stackable-credentials.jsp.
[14] With the purpose of promoting postsecondary school accountability, Statute 136F.37 was put in place requiring Minnesota State to provide labor market information to students, including career placement rates for graduates of occupational programs, and to assess labor market data when conducting college program reviews (source: https://www.revisor.mn.gov/statutes/cite/136F.37). In the same year, the MN Department of Employment and Economic Development launched the Graduate Employment Outcomes tool, displaying post-graduation employment and wage outcomes broken down by school. The main goals of the tool are to help prospective students choose programs that lead to economic self-sufficiency and help schools decide upon course and program offerings that meet employer needs and lead to self-sufficiency after completion.
[15] Casale, Oriane. The Case for Diversifying Construction. Economic Trends magazine https://mn.gov/deed/newscenter/publications/trends/december-2016/diversifying-construction.jsp.
[16] Leibert, Alessia. A Good Job after College, July 2016, MN Employment Review https://mn.gov/deed/newscenter/publications/review/july-2016/good-job-after-college.jsp.
[17] For data on racial disparities in wages by industry see also GEO by Race Dashboard https://mn.gov/deed/data/data-tools/graduate-employment-outcomes/race-geo.jsp.
[18] Black workers who filed for Unemployment Insurance in Minnesota since March 2020 were almost twice as likely as whites to lose their job permanently and to stay out of work for longer periods of time. See DEED's Profile of Risk for Prolonged Unemployment dashboard https://mn.gov/deed/data/data-tools/profile-unemployment/.