Promoting Sustainable Development Goals in the U.S. to reduce Poverty and Inequality

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1. Introduction

The U.N. Sustainable Development Goals (SDGs) aim to transform our world by 2030. Two of the most pressing goals are to end poverty (Goal 1) and reduce inequality (Goal 10). This research investigates the status of poverty and income inequality in the U.S. and discusses education's role in addressing these interconnected challenges, using the data from the U.S. Current Population Survey (CPS). The use of CPS from 2000 to 2023 can provide empirical evidence of the role of education in reducing inequality and alleviating poverty.

Poverty, gender, and racial/ethnic income inequality should be understood as a multidimensional and subjective concept that extends beyond a narrow focus on income and consumption. This paper intends to investigate the role of education in promoting gender equality, reducing inequality, and alleviating poverty in the U.S.

The United Nations 2030 Agenda for Sustainable Development presents gender equality and the empowerment of women as one of the major goals. Ideally, achieving gender equality requires moral obligation and intrinsic value. Alleviating gender inequalities also increases productivity, competitiveness, sustainability, and economic growth rates. According to an OECD report (2023), closing gender disparities in working hours and labor force participation may add an average of 9.2% to GDP across OECD countries by 2060, approximately a quarter percentage points to average yearly growth. Therefore, if we do not narrow the gender gap, we risk losing out on future prosperity as a society.

Goldin (2022) reports that the COVID-19 recession impacted women's labor force participation and employment more relative to men. But, contrary to popular belief, women did not leave the labor market in large numbers or drastically cut back on their work hours. The capacity to manage jobs and care varies significantly according to race, occupation, and level of education. For example, individuals with higher levels of

schooling had more flexibility in managing jobs and caregiving duties. Those employed in in-person service occupations and establishments experienced significant job losses during the initial stage of the pandemic. Black women were particularly affected, possibly due to the health effects of COVID-19.

2. Poverty

Despite the economic affluence of the U.S., poverty has been stubbornly persistent. The U.S. Census Bureau (2023) reported that the 2022 real median household income decreased compared to 2021. There was no statistically significant difference in the official poverty rate of 11.5% between 2021 and 2022, and the official poverty rate for Blacks dropped between 2021 and 2022 to the lowest level on record. However, in comparison to 2021, the rate of the Supplemental Poverty Measure (SPM)[1] increased by 4.6 percentage points to 12.4% in 2022 (United States Census Bureau, 2023).

The U.S. official poverty measure defines poverty by comparing pretax cash income to a poverty threshold set at three times the cost of a minimum food diet in 1963 and adjusted by family composition. The U.S. Census Bureau determines who is in poverty using a set of money income thresholds that vary by family size and composition per the Office of Management of Budget (OMB) policy directives. Every family member is regarded as living in poverty if the family's total income is less than the threshold. The official poverty line is adjusted for inflation using the Consumer Price Index (CPI-U), although it does not change geographically. The official definition of poverty is based on pretax money income and excludes capital gains and non-cash benefits, such as public housing, Medicaid, food stamps, etc. (United States Census Bureau, 2024).

[1] In 2011, the U.S. Bureau of Labor Statistics released the SPM which extends the conventional poverty measure by including many government programs intended to help low-income families but were not included in the official poverty measure. The SPM also accounts for state and federal taxes and medical expenses. Also, the SPM accounts for geographic variation in poverty threshold while the official poverty measure does not.

This paper examines the education level and income for four major race and ethnic categories: Non-Hispanic White, Black or African American, Hispanic/Latino, and Asian. How does education affect poverty? Education can help individuals build human capital and skills, which leads to better employment and earnings. Education has played the role of a great equalizer that can improve individuals' economic conditions and mobility and reduce other adverse social problems such as crime and deteriorating health. Education also contributes to macroeconomic growth (Bernardi and Plavgo, 2019).

Frequently referred to as the great equalizer, education helps individuals accumulate skills and find jobs to survive and prosper. Providing access to high-quality elementary education and promoting the well-being of children is globally acknowledged as a means of breaking the cycle of poverty. This is partly because it deals with many other problems that make communities susceptible. Education also promotes economic growth. If economic growth outcomes are equitably distributed, education can reduce inequality and help economically marginalized individuals from falling into the poverty trap.

For global evidence, UNESCO (2014) reports that basic reading proficiency among students in low-income countries can lift approximately 171 million people out of extreme poverty. This number would be equivalent to a 12% reduction in global poverty. The study also reported that secondary education completion underscores the power of education in significantly mitigating poverty incidence on a global scale.

Education has helped individuals accumulate human capital, which is essential for better work opportunities. Education has also contributed to socioeconomic leveling. Therefore, policies making primary and secondary education of decent quality available can help many families and individuals to enhance their income above the poverty threshold. In low-income countries, completing primary education is associated with higher earnings and consumption among workers in rural and informal sectors.

An important way education reduces poverty is by increasing people's income. Globally, one year of school increases earnings by 10%, on average. Also, UNESCO (2017, p11) reports that "world poverty could be cut in more than half (55 percent) if all adults completed primary and secondary education" and "the effects would be

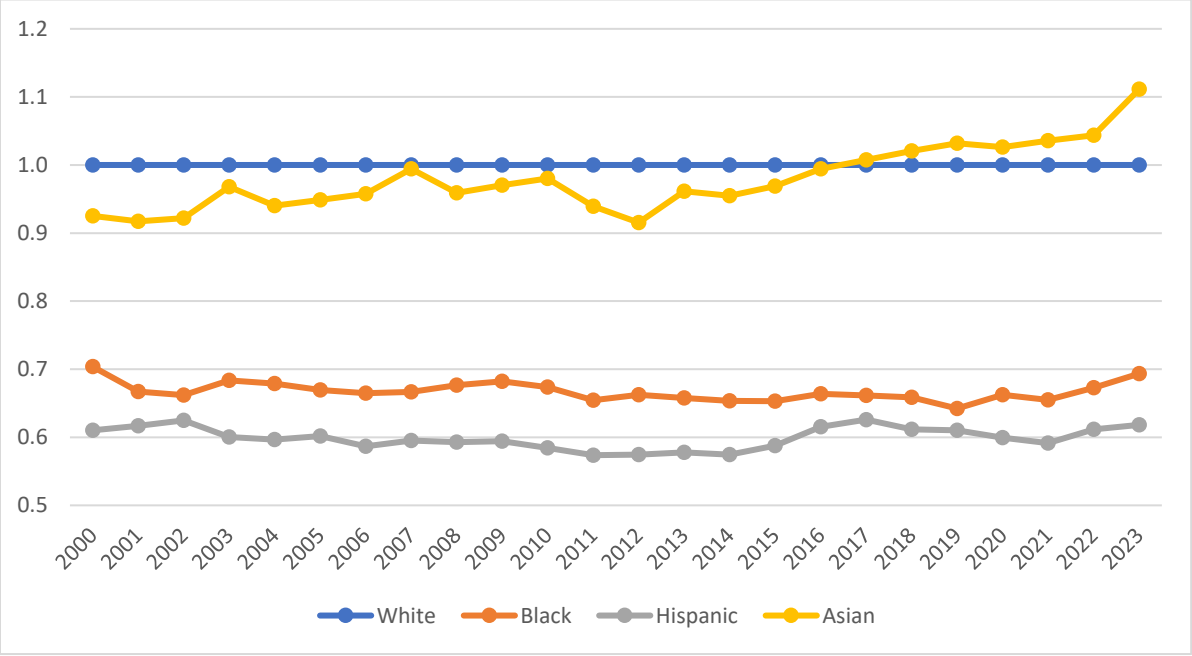
substantial at approximately two-thirds of the poverty reduction in sub-Saharan Africa and Southern Asia.

The U.N. defines its fourth SDG as "to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all." In addition to promoting academics-related learning, a quality education benefits individuals, especially children, by helping them gain emotional, cognitive, communication, and social skills essential to secure jobs and earn higher incomes. The accumulation of human capital is not the education's only virtue. Education is also associated with better public health outcomes, such as lower maternal and infant mortality rates and vulnerability to HIV and AIDS, which is linked to better quality of life.

3. Income inequality

Figure 1 shows the relative mean total personal income ratio pattern for full-time workers aged 16 or over in major race and ethnic groups, findings from the U.S. CPS data. Black and Hispanic workers have consistently earned significantly less than White workers, approximately between 60 and 70 percent of White workers' income.

Figure 1. Mean total personal income ratio by race and ethnic groups, compared to White income



Source: The U.S. Census Current Population Survey, Base Year = 2023. Author's compliation

Since workers in different racial and ethnic groups may have different socioeconomic and other characteristics that affect income, such as level of education or place of residence, it is necessary to control those characteristics to see more precise pictures of income inequality. To do this, we estimated specification (1) using the U.S. CPS data from 2000 to 2023 for full-time workers aged 16 or over.

$$(1)\ Income=\beta_0+\beta_1 Age+\beta_2 Age^2+\beta_3 Education+\beta_4 Married+\beta_5 Metropolitan+\beta_6 South+\beta_7 Foreign\ born+\beta_8 Female+\beta_9 Race\ group+\beta_{10} Race\ groups*Education+\varepsilon$$

The dependent variable is the real total income adjusted for inflation (base year = 2023). Explanatory variables include major socioeconomic, demographic, and location variables. To see if education affects income differently across race and ethnic groups, we also include interaction terms between race and ethnic groups and education. ε is a classical random error term. We used robust standard errors to estimate the specification (1) to address potential heteroscedasticity. Table 1 lists the empirical analysis estimates with four models with different sets of explanatory variables.

Table 1. Income regression estimated coefficients (Dependent variable: total income)

	Model 1	Model 2	Model 3	Model 4
Age	3518.8	3680.5	3721.4	3626
	[33.85]***	[33.52]***	[33.54]***	[33.35]***
Age squared	-30.9	-32.56	-33.06	-32.3
	[0.430]***	[0.425]***	[0.425]***	[0.423]***
Education (years)	8950.9	9270.8	9115.2	12474.9
	[28.35]***	[28.44]***	[29.26]***	[54.41]***
Married (1 for married)	14596.1	11396.9	10343.7	9698.7
	[122.4]***	[120.3]***	[121.0]***	[120.5]***
Metropolitan (1 for Metropolitan residence)	3740.7	3938.5	5570.5	4543.2
	[152.1]***	[150.4]***	[155.5]***	[154.1]***
South (1 for Southern residence)	-3420.9	-2947.2	-1429.2	-1173.3
	[129.0]***	[127.0]***	[131.3]***	[130.4]***

Foreign-born (1 for foreign born)	-1644.8	-2668	-155.6	-4392
	[167.9]***	[166.2]***	[206.0]	[210.0]***
Female (1 for female)		-28467.7	-28097.4	21525.4
		[119.0]***	[118.7]***	[669.7]***
Black (1 for Black)			-12115.7	22767.1
			[177.2]***	[1295.4]***
Hispanic (1 for Hispanic)			-5986.7	74898.3
			[178.5]***	[769.1]***
Asian (1 for Asian)			-3742.7	12698.2
			[335.1]***	[1508.5]***
Female * Education				-3544.5
				[52.41]***
Black * Education				-2451.5
				[99.13]***
Hispanic * Education				-6167
				[60.14]***
Asian * Education				-1003.2
				[109.4]***
Constant			-136938	-180985.7
				[892.6]***
N	1672717	1672717	1672717	1672717
adj. R-sq	0.146	0.172	0.174	0.184

Standard errors in brackets. For a discrete change of categorical variable from 0 to 1.
* p<0.05, ** p<0.01, *** p<0.001

Model 1 includes a basic set of socioeconomic variables and a variable controlling for years of schooling. All statistically significant estimates in Model 1 conform to theoretical expectations. The positive and negative signs of the Age and Age-squared variables confirm that workers earn more as they age, but increasing pattern loses momentum. The combinations of these two age terms capture a concave relationship between age and total income. This pattern is consistent with all four models.

The statistically significant positive estimates of the education variable controlling for years of schooling show that a year of education will increase the total income by at least 8,950 dollars. Variables controlling for locations also conform to expections. Other findings reported in Table 1 are as follows. Married workers earn more than unmarried workers. Workers with metropolitan residence earn more than those with non-metropolitan residence. And foreign-born workers earn less than native-born workers.

The estimated coefficients of gender and three categorical variables controlling for non-white workers (Black, Hispanic, and Asian) show the income disadvantages of female and non-white workers compared to male workers and white workers. Model 3 shows that the income disadvantage of non-white workers is highest for black workers and lowest for Asian workers. To investigate the mediating effects of education on total income across gender and race/ethnic groups, Model 4 includes interaction terms between gender and education and between racial/ethnic groups and education.

The estimated coefficients of these four interaction terms are all negative and statistically significant. This result merits a careful interpretation. Despite the positive impact of education on income, which was shown by the positive estimates of the Education variable in all models, the pattern of education impact varies across race/ethnic groups. White workers being the omitted baseline group, the negative estimates of all interaction terms in Model 4 imply that 1) the impact of education on income is lower for female workers than male workers and, 2) the impact of education on income is lower for non-white workers than white workers. In other words, the returns to education for female workers and non-white workers are lower than that of male workers and white workers, respectively. For non-white workers, the return to education is lowest for Hispanic workers.

The empirical results indicate a nuanced relationship among race, gender, education, and income. The negative estimates for female and non-white group variables in Model (3), which does not include interaction terms, mean that, on average, female and non-white workers earn less than male workers and white workers, respectively, controlling for other factors. After adding the interaction terms with the education variable, the positive estimated coefficients for the Education variable for female workers and non-white workers now mean that, on average, female workers and

non-white workers (without considering education) earn more than male workers and white workers, respectively.

However, this does not tell the whole story because the interaction term must be considered. The negative estimated coefficients for the interaction terms in Model 4 suggest that as education increases, the income advantage of female workers and non-white workers compared to male workers and white workers decreases. In other words, the returns to education are lower for female workers and non-white workers compared to male workers and white workers, respectively.

The results in Model 4 might suggest that female and non-white workers with lower levels of education (e.g., no high school or high school diploma) may earn more than similarly educated male workers or white workers. It is also possible that other omitted variables positively affect the income of less-educated female workers and non-white workers. Essentially, education increases income for all workers but at a slower rate for women workers and non-white workers. This finding might indicate structural inequalities where female workers and non-white workers, despite their educational attainment, may face discrimination or other barriers in accessing higher-paying jobs, resulting in smaller income gains compared to male and white counterparts as the level of education rises.

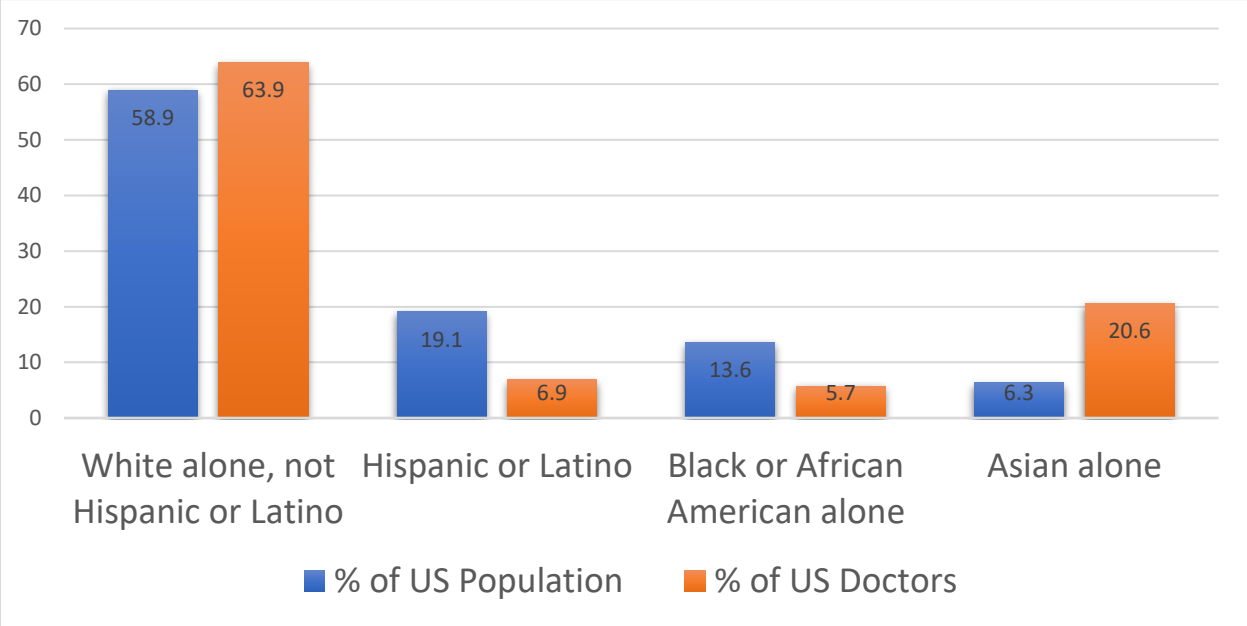
4. Case of high-paying occupation

As a case study, this section investigates the medical doctor's occupation. Medical doctors are among the most prestigious professionals in many societies, including the United States. Admission to medical schools is highly competitive and requires rigorous academic preparation and high academic records. Figure 2 shows that although the share of Black or African Americans and Hispanic or Latino are 13.6% and 19.1% of the U.S. population, they represent only 5.7% and 6.9% of medical doctors in the U.S. The figure shows that the percentage of medical doctors for the Black or African American group and Hispanic or Latino group is less than proportional to their population share, much less than one-half for both groups.

The share of Asians in the U.S. population is 6.3%, but they represent 20.6% of medical doctors, proportionally more than three times. While there are other

occupations deemed prestigious with financial stability, the underrepresentation of Blacks and Hispanics in medicine is an example of their weaker status in the U.S. labor market.

Figure 2. Share of Race and ethnic groups in the U.S. population and medical doctors.

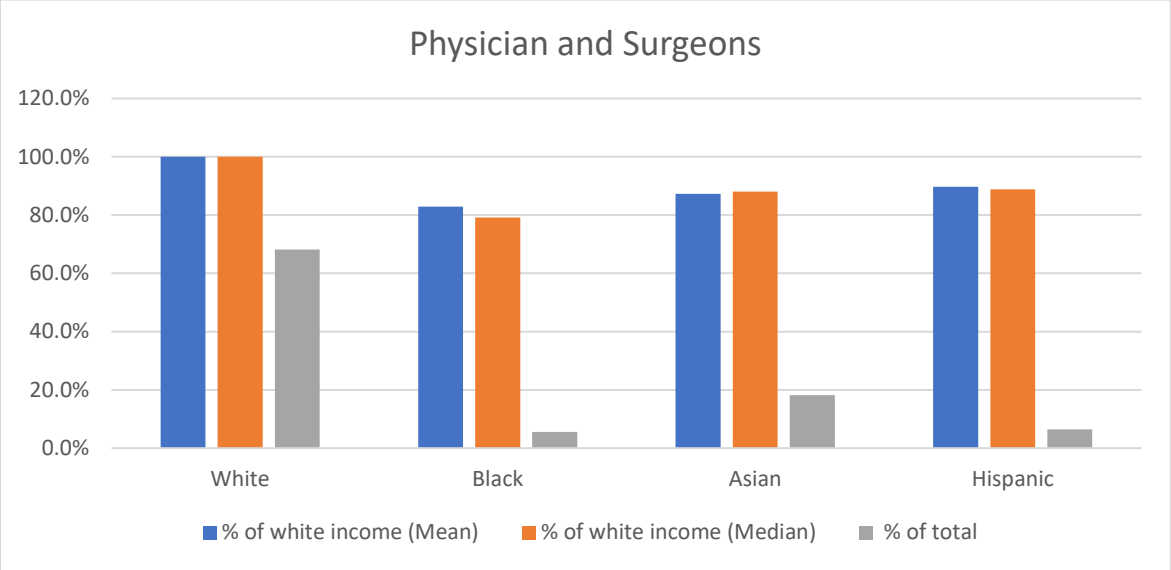


Source: https://www.census.gov/quickfacts/fact/table/US/PST045223 (U.S. Population estimates, July 1, 2023), Association of American Medical Colleges. Author's compilation

Practicing medicine is a prestigious occupation that commands professional respect and offers high economic rewards. However, even among medical doctors, income gaps exist across racial/ethnic groups, as seen in Figure 3. It shows that the mean and median income of non-white medical doctors are lower than that of White. The Black group's relative income, both mean and median is the lowest at approximately 80% of the White group's.

One reason for this noticeable income inequality is the different patterns of medical specialties among medical doctors. Within the medical doctor profession, the specialties with a significant presence of Black and African Americans and Hispanics are those with relatively lower compensation.

Figure 3. Relative mean and median income of medical doctors by race and ethnic groups, compared with white group



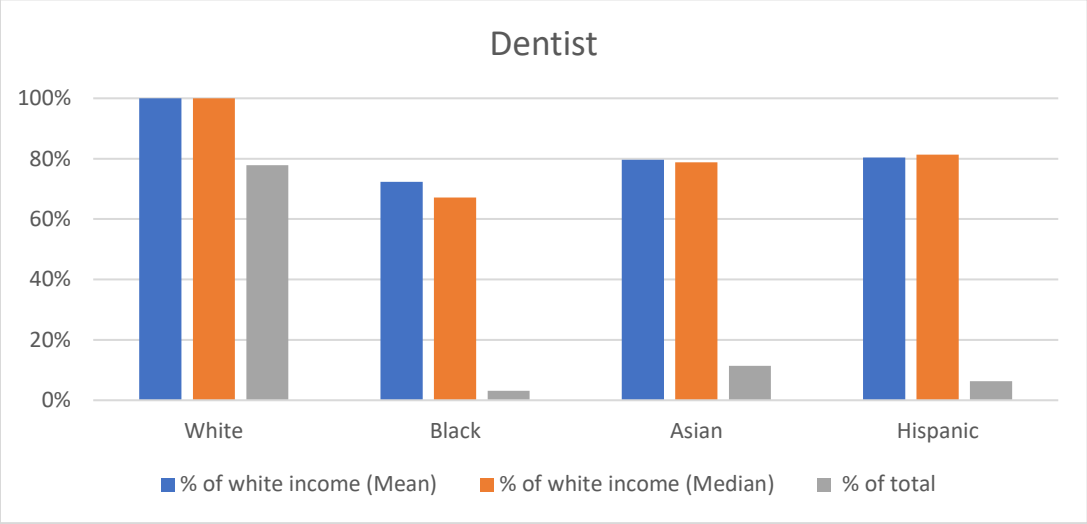
Source: The U.S. Census Current Population Survey. Author's compilation

For example, the medical specialties with a large presence of White medical doctors are orthopedic surgery, sports medicine (orthopedic surgery included), and otolaryngology. In contrast, those of Black or African American medical doctors are Child and adolescent psychiatry, obstetrics and gynecology (OB/GYN), and preventive medicine. In 2022, the average salary of an orthopedic surgeon is 70 percent higher than that of OB/GYN doctors and 89% higher than that of psychiatrists. Similarly, the medical specialties with a large presence of Asian medical doctors offer higher compensation than those of Black or African American and Hispanic medical doctors.[2]

A similar pattern is observed for dentists, another prestigious occupation requiring rigorous training and education. Figure 4 reports that the representation of dentists in the Black and Hispanic groups is much less than proportional in terms of population share. The relative income of Black dentists is the lowest at approximately 70% of those of White group.

[2] https://www.amnhealthcare.com/blog/physician/perm/physician-starting-salaries-by-specialty-2022-vs-2021/ Average Physician Salaries: The Top 20 Recruited Specialties (starting salary offer), https://www.aamc.org/news/what-s-your-specialty-new-data-show-choices-america-s-doctors-gender-race-and-age

Figure 3. Relative mean and median income of dentists by race and ethnic groups, compared with white group



Source: The U.S. Census Current Population Survey, Author's compilation

5. Discussion and conclusions

The COVID-19 pandemic may have compounded income gaps since economic hardship and health problems affected individuals from lower-income households and communities of color disproportionately. For example, lower-income Black and Hispanic students were also less likely to have the resources required to participate in virtual classrooms during the pandemic. In addition to the lack of resources, such as computers and tablets, in the students' households, the underfunded and under-resourced public schools to which they were attending exacerbated the difficulties.

The COVID-19 experience of Black and Hispanic students demonstrates how interconnected educational inequality is with public policies. Public policies have not paid enough attention to the public schools in impoverished areas, and local school practices shaped by these policies have affected students' academic performance. The U.S. educational system has been increasingly deregulated, commercialized, and based on free market principles. Moreover, it has been reported that Black and Hispanic students frequently encounter within-school segregation, wherein they are disproportionately assigned to less rigorous academic tracks or programs than their white counterparts. This reality also has a significant impact on the educational outcomes of Black and Hispanic students. Additionally, Black and Hispanic populations

are more likely to live in impoverished areas that offer insufficient opportunities for work, housing, and healthcare.

School choice policies were introduced to alleviate the negative consequences of school segregation. The school choice policies aim to provide better educational opportunities, especially to lower-income minority students, by allowing them to select schools, including charter schools, sometimes outside their designated school district. Unfortunately, despite the building-level desegregation under the school choice system, Black and Hispanic students with comparable achievements to their White peers are often placed on less rigorous academic tracks. This type of academic tracking and curriculum assignment practice may perpetuate socioeconomic disparities within schools, negatively impacting minority students' academic success, self-esteem, and performance in the labor market.

Despite decades of school reforms aimed at reducing racial disparities in the educational system, Black and Hispanic students continue to face poorer academic and social outcomes (such as the average amount owed as a percentage of the amount borrowed in four years after a bachelor's degree completion) compared to White students. Not only do they have lower graduation rates for high school (81 for Black, 83 for Hispanic, 90 for White and 93 for Asian/Pacific Islanders, 87 for U.S. average or college), they also tend to attend schools where a higher percentage of students are impoverished and have limited financial resources (U.S. Department of Education, 2023).

Therefore, improving the quality of education and training is more crucial than simply staying in schools longer, especially for economically disadvantaged students. Redistributing public spending from defense to social protection, infrastructure, and education when the political and security environment permits may be effective in reducing income inequality. A growing body of literature suggests that public transfer can mitigate inequality (Doumbia and Kinda, 2019; Aaberge et al., 2019; Sidek, 2021). Appropriate financial knowledge has also been found to reduce economic disparities across countries over time (Lo Prete, 2018).

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