Economic inequality and educational attainment across a generation

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Economic inequality in the United States has grown substantially over the past three decades. In 1973, the top 5 percent of families had about 15 percent of income; they now have about 21 percent of the even larger pie (Figure 1). Among families, income inequality has increased by about 20 percent, when the standard Gini coefficient is used to gauge this disparity.[1] This growth in inequality has affected many aspects of life in America, and is reflected, for example, in greater segregation of neighborhoods by income, and in the consequent decline of urban neighborhoods in which many poor and minority children live.[2] However, little is known about the effects of the increasing inequality on the prospects for the next generation of Americans, the children who are growing up in this more unequal economic environment.

It is now clear that the century-long improvement in educational attainment in the United States slowed or declined over the same period during which economic inequality increased.[3] Our research posed questions about the possible relationships between these trends. We asked: Does the increase in economic inequality among families and neighborhoods impede or enhance the overall level of schooling attainment among those children who experience it? Is the disparity in levels of schooling among children growing up in a more unequal environment likely to be greater or less than that among children reared in a less unequal environment?[4]

We examined the effect of increased inequality on three educational outcomes of a cohort of children who grew up during the 1970s and 1980s. These outcomes are the number of years of schooling completed, the probability of graduating from high school, and the probability of

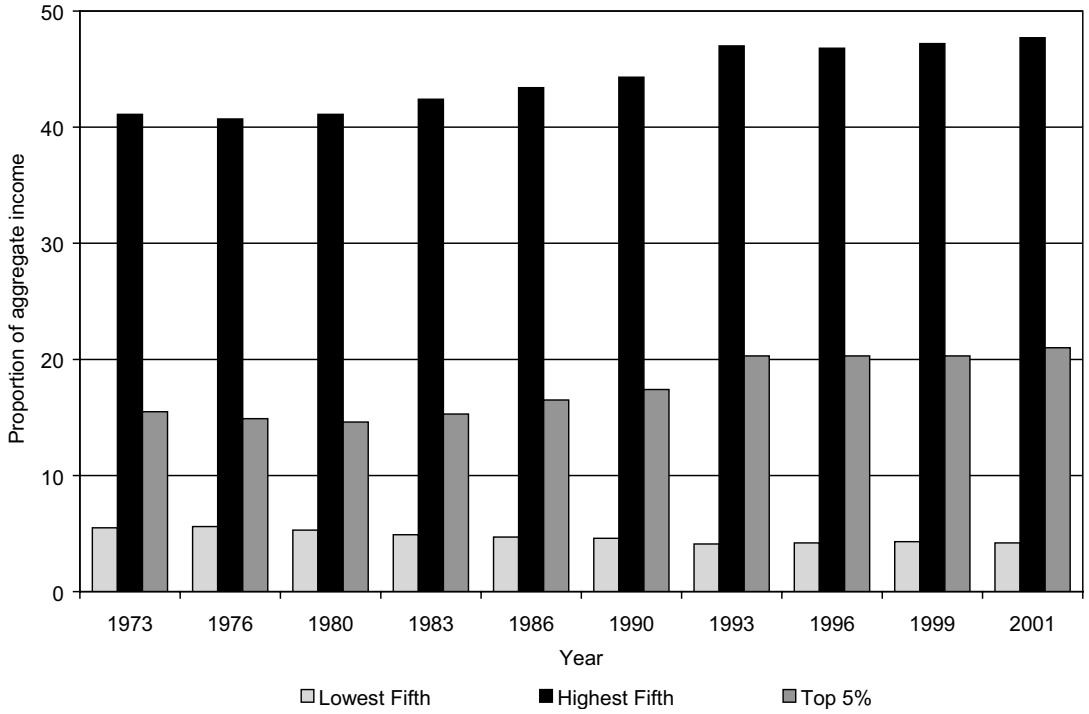

Figure 1. Trends in the shares of aggregate income in the United States, 1973–2001.

Source: U.S. Census, Historical Income Tables—Families, Table F-2, on the Census Web site at http://www.census.gov/hhes/income/histinc/f02.html.

attending college. In this summary article, we discuss only years of schooling completed.

Our procedure was straightforward. We first statistically estimated a model over this cohort of children in which we measured the effect of a number of important determinants on the level of educational outcomes. We drew from the existing literature for guidance regarding the family and economic variables found to be significantly related to schooling outcomes.[5] Our main concern was to establish the effects of family income and wealth and of state income inequality on the schooling attainments of young people, though our model incorporated other important determinants of educational achievement, as we note below.

With the estimates from this model in hand, we directly increased the variation (that is, the inequality) in these centrally important economic variables—call them the "inequality-increasing variables"—to "simulate" the effect of growing economic inequality. In our model of attainment these variables were quantified as (1) the ratio of family income to the poverty line, (2) family net worth, (3) the Gini coefficient of family income in the state of residence, and (4) state public tuition or fees for postsecondary education. We sought to estimate the effect of simulated changes in these four variables while the children were growing up on both the average level of their schooling attainment and the disparities in attainment among the children; we emphasize in this article the effects of simultaneous changes in all four variables.

These simulations suggested how today's young adults would fare, in terms of their educational attainment, if the extent of inequality that they faced while growing up were in fact greater than it was.

The data that we used in our estimates consist of a sample of just over 1,200 children from the Panel Study of Income Dynamics (PSID).[6] We merged census tract data on schooling and income from the 1970 and 1980 censuses, and we included a measure of income inequality in the children's states of residence when they were ages 12–15. The PSID data contain extensive longitudinal information on family members and their basic demographic characteristics, family income, living arrangements, and neighborhoods. We considered the characteristics of these children over an extended period, from the time they were age 2 until they were 15. These data also provide the total number of years of their schooling as of age 25 (an average of 12.25 years for young adults in our sample.)

Table 1
Years of Completed Schooling: Regression Results for the Core "Inequality-Changing" Variables

Family income/poverty line	
at children's ages 2–5[a]	0.384***
at children's ages 6–11[a]	-0.168
at children's ages 12–15[a]	0.336***
State gini at children's ages 12–15 (avg)	0.682
Log of positive wealth, 1984	0.050***
Public tuition & fees per full-time equivalent student in 1987	-0.036
Tuition & fees (youngest cohort), measured in later high school years	-0.154**

[a]Logged values.
** Significant at the 5% level; *** significant at the 1% level

Our estimates of the relationship between the inequality-increasing variables and years of schooling (summarized in Table 1) provided no particular surprises, in light of earlier research. First, we found that family income and wealth have positive and statistically significant links to attainment: children who grow up in families with higher income and greater wealth receive more schooling. Second, reviewing the geographic economic variables, we found that income inequality within the state (as measured by the Gini coefficient) has no significant ties to attainment. But higher state college tuition costs when children are in high school appear to deter schooling.

Our full estimation included other variables that have been shown to have a persistent and significant relationship with educational attainment.[7] Here, too, our findings are in line with previous research. Parents' schooling is positively and significantly associated with their children's high school graduation and years of schooling. Blacks, women, and children from families with a foreign-born head have higher educational attainment than those in other groups, when background characteristics such as parents' education are taken into account. Children whose families move more and who live in counties with higher unemployment are less likely to graduate from high school. The percentage of neighborhood residents who did not complete high school strongly and negatively affects educational attainment among young people in the neighborhood. But having a single parent does not appear to influence any of our three measures, once other family characteristics are accounted for.

Estimating the effect of increased economic inequality

Because these estimates were so congruent with the findings of other research, we took them to represent real links of cause and effect. Starting from this point, we systematically increased the level of inequality in our family and geographic variables, in line with the actual increase in each of these variables over the two decades from 1970 to 1990.[8] Thus, we increased wealth inequality by 25 percent, the inequality in family income/needs by 10 percent, and the disparities in state tuition and fees by 10 percent. Second, we used the adjusted values of the

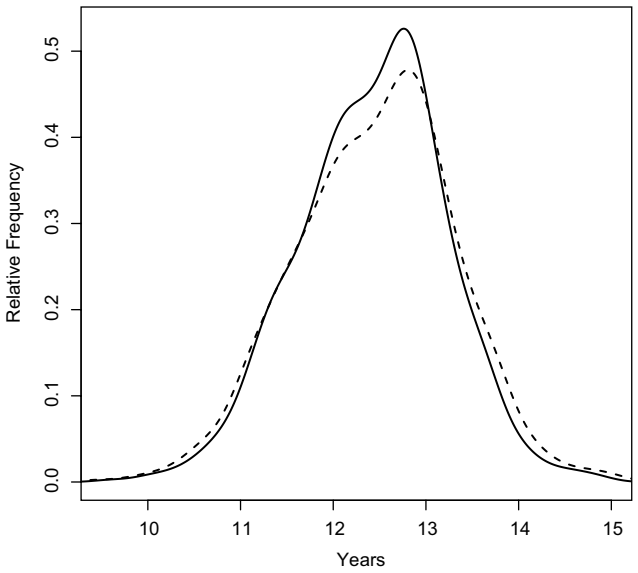

Figure 2. Actual years of completed schooling (solid line) compared with years of schooling if economic inequality were to increase (dotted line).

variables, together with the estimated coefficients from our model and the actual values of other variables, to predict how much our years of schooling attainment would change if inequality in these dimensions increased.

These results for years of schooling appear in Figure 2. There are two distributions: the predicted actual distribution of years of schooling among those in the sample (the solid line), and a predicted distribution of schooling that is based on greater inequality in our family and geographic variables (the dotted line). The difference between the two distributions reflects the effect of increased economic inequality on schooling.

In Table 2, we report in greater detail our findings for both the average level and the inequality of schooling among children in our sample, both under actual circumstances and as economic inequality increases. We first assessed the effect of each economic inequality factor singly. Of the four factors, family wealth appears to have the greatest effect. But because the real changes in the distribution of each of these measures of economic inequality reflect essentially the same underlying social forces and economic arrangements, it would be misleading only to consider each in isolation. Thus the results in the last line, reflecting the joint change in all four measures, summarize the general effect of increases in economic inequality on the distribution of economic attainment.

From estimates such as those in Table 2, we can begin to answer the questions posed at the beginning of this article.

Does the increase in economic inequality among families and neighborhoods have implications for the educational attainment of the children in these families and neighborhoods?

The answer is yes, in two ways. Average achievement goes up slightly, but so does the variability of achievement. Average years of schooling increase by less than 1 percent. Inequality, in contrast, increases substantially, by over 8 percent when all four measures of inequality are considered together. Moreover, a higher proportion of students do not complete high school or 11th grade (Table 2).

Is the schooling of children growing up in a more unequal economic environment likely to be more unequal?

Again the answer is yes, especially if they are already disadvantaged (Table 3). For example, increased economic inequality increases average schooling for whites, but barely changes it for blacks. It does, however, increase the number of black students dropping out before year 11, by around 13 percent. [9]

Conclusions

Our estimates suggest that increases in economic inequality of the magnitude experienced in the United States over

Table 2
Predicted Actual Years of Education versus Years of Education if Inequality Increases

Years of Education	Mean Years	Median Years	SD	%< 12 Years	%< 11 Years
Predicted Actual Years	**12.597**	**12.643**	**0.816**	**19.1**	**1.9**
Changes in Inequality-Increasing Factors					
SD of family income/needs[a] +10%	12.612	12.670	0.848	19.9	2.1
SD of family wealth[a] +25%	12.636	12.696	0.852	19.6	2.5
Gini + state change in Gini	12.615	12.668	0.817	19.0	1.9
SD of tuition +10%	12.593	12.639	0.817	19.5	1.9
Four factors changed	**12.665**	**12.727**	**0.885**	**19.1**	**2.5**
%Change	**+0.5**		**+8.4**	**+0.9**	**+32.0**

Note: Based on the weighted, preferred model. Percentages have been rounded.
[a]Logged values.

Table 3
The Effect of Greater Inequality on Years of Education: White versus Black Children

	Mean Years	Median Years	SD	% <12 Years	% <11 Years
White Children					
Predicted actual years	12.686	12.75	0.849	17.3	2.8
All four factors changed	12.781	12.84	0.908	17.3	2.9
Difference (%)	+0.7	+0.7	+6.9	0	+3.6
Black Children					
Predicted actual years	12.141	12.08	0.654	36.9	3.9
All four factors changed	12.146	12.11	0.708	38.7	4.4
Difference (%)	+0.4	+0.2	+11.9	+4.9	+12.8

the past few decades have intergenerational effects with broad social implications. In particular, the increase in family income and wealth inequality leads to greater dispersion of educational attainment, primarily because those at the bottom of the educational distribution have fallen further below the average level of education.[10] Thus those who had the least human capital to begin with are placed at an even greater relative disadvantage. When this relative economic disadvantage is compounded by racial disadvantage, the effect is even greater, and the racial gap in education becomes larger.

Because labor market success is linked to schooling achievement, the consequence of widening disparities in schooling is likely to be further increases in earnings inequality. Thus the cycle of disadvantage we have already observed is likely to be further magnified unless policies are adopted to counter or at least to mitigate the effects of the growing economic disparity. One potentially productive route would be to provide greater resources for preschool opportunities for 3- and 4-year-olds, improving school readiness and perhaps levels of schooling. Tuition subsidies to encourage postsecondary schooling may be another route. But the finding that tuition costs are significantly, and negatively, associated with high school completion suggests that tuition subsidies are likely to be more effective if young people and their parents know about them during the high school years, well before they reach the point of deciding whether to apply for college. ■

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[1]The Gini coefficient is a measure of inequality that consists of a number between zero and one. Zero = perfect equality, 1 = perfect inequality. In discussing family income, the higher the Gini coefficient, the greater the level of income inequality. From 1970 to 2001 the Gini coefficient of household income in the United States rose from 0.394 to 0.456.

[2]In partnership with the Carnegie Corporation, the Russell Sage Foundation launched a research initiative to examine social inequality on a number of dimensions, including family well-being, educational opportunity, health care and coverage, legal services and criminal justice, political participation and representation, banking and credit, housing, pension provision, environmental quality, and even access to computers and the Internet. Literature reviews and working papers from this project are posted on the foundation's Web site, http://www.russellsage.org/programs/proj_reviews/si/index.htm. One IRP contribution to the project is R. Haveman, G. Sandefur, B. Wolfe, and A. Voyer, "Trends in Children's Attainments and Their Determinants as Family Income Inequality Has Increased," in *Social Inequality*, ed. Katherine Neckerman (New York: Russell Sage Foundation, 2004). On the issue of inequality, see also P. Jargowsky, *Poverty and Place: Ghettos, Barrios, and the American City* (New York: Russell Sage Foundation, 1997); D. Massey, "The Age of Extremes: Concentrated Affluence and Poverty in the Twenty-First Century," *Demography* 33, no. 4 (1996): 395–412.

[3]See "Inequality in America: What Role for Human Capital Policies?" in this *Focus*, p. 1.

[4]The research report here is discussed in greater detail in M. Campbell, R. Haveman, G. Sandefur, and B. Wolfe, "What Does Increased Economic Inequality Imply about the Future Level and Dispersion of Human Capital?" working paper for the Russell Sage Foundation Project on Social Inequality, January 2005. On the Foundation's Web site at http://www.russellsage.org/programs/proj_reviews/si/wphaveman01.pdf.

[5]See Haveman and colleagues, "Inequality of Family and Community Characteristics in Relation to Children's Attainments."

[6]We began with 29 years of data on over 2,600 children born between 1966 and 1970, and followed them from 1968 to 1999. We retained only individuals who remained in the survey until age 21 and for whom we had all information on core variables.

[7]Among them are race and gender, parental schooling and family structure (including the number of siblings), having a foreign-born parent, how often the family moved, and the high school dropout rate in the neighborhood. Full regressions for the demographic and other variables discussed in this article are available from the authors.

[8]To do so, we used several public sources. From Current Population Survey (CPS) data, we estimated that from 1970 to 1990 the standard deviation of family income increased by 9 percent and the standard deviation of wealth increased by 25 percent. We also based our increases in the Gini coefficient on CPS data on changes in the coefficient for each state from 1970 to 1990. Although the average level of public tuition increased fourfold over this period, inequality among levels is difficult to determine; we used a 10 percent increase, which is approximately the increase in tuition inequality between public four-year universities and two-year colleges, according to the National Center for Education Statistics. In the simulation, we adjusted each simulated outcome value by a constant, so as to preserve the mean value for each variable.

[9]To determine where these increases in inequality are most concentrated, we calculated two standard ratios for the measures of attainment: first, the ratio of those at the 90th percentile of the distribution of schooling to those at the median (the 50th percentile), and second, the ratio of those at the median to those at the bottom of the distribution of schooling, the 10th percentile. The effect of increases in family and geographic economic inequality was concentrated among those with the lowest levels of schooling—in every case we calculated, the 50/10 ratio increased substantially more than the 90/50 ratio.

To test the validity of our estimates, we calculated three indexes of inequality, the Gini coefficient, the Theil inequality coefficient, and the Theil entropy index, which differentially weight changes in different parts of the distribution. These estimates are discussed in the full report on which this summary is based (see note 4).

[10]The results from our simulations appear to be reflected in actual patterns of change in attainment during past decades. Using data from the Current Population Survey, we found that from 1979 to 1991, mean years of schooling among young adults aged 22–25 increased by just over a third of a year, and the standard deviation of years of schooling increased by 0.08 years, a value very like our simulated increase of 0.07 years.