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INSIDE THIS ISSUE

Early Experience with Intensive Research Has Long-Lasting Effects

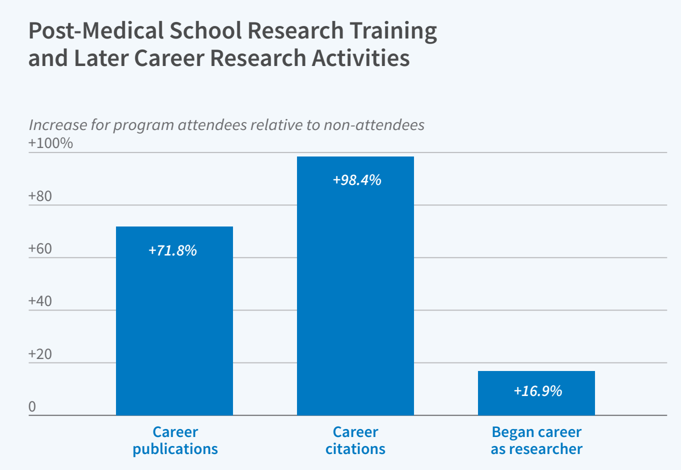
Introducing young doctors to intensive research programs early in their careers can have a large impact on their long-term professional development and lead them to pursue productive academic research careers more often than similar doctors who do not participate in such programs, according to a study by Pierre Azoulay, Wesley H. Greenblatt, and Misty L. Heggeness, **Long-Term Effects from Early Exposure to Research: Evidence from the NIH "Yellow Berets"** (NBER Working Paper No. 26069).

Seeking to understand what motivates talented people to enter — and stay in — innovative research and development roles, the researchers hypothesize that research careers can often be thwarted by small negative shocks or early-career decisions to embark on career paths that become difficult to redirect later in life. They suggest that early training interventions might influence the career trajectories of young talent.

The researchers sought data on a population which was "naïve to research" yet possessed the skills needed to pursue research careers, and which had been selectively exposed to an intense program of intellectual activity. The Associate Training Program (ATP) of the National Institutes of Health (NIH) met these criteria. The ATP received a surge of applications from highly regarded biomedical researchers. The dataset analyzed by the new study's authors includes 3,075 male physician applicants to

> Individuals who participated in the NIH's Associate Training Program entered research, published, and earned grant funding at higher rates.

1965 to 1975 during the Vietnam War from young physicians seeking to fulfill their military service through the program. The two- or three-year program trained young doctors to work at NIH under the supervision of its the program who, after passing a first screen based on their application dossier, also received an on-campus interview during the 10-year sample period. Rich oral histories from NIH officials and alumni of the program imply that, conditional on surviving to the final phase of the selection process, the ultimate acceptance decision reflected more the vagaries of the in-person interviewing process than unobserved markers of research aptitude. Of the total sample, 1,929 physicians entered the program while 1,146 did not.



The magnitudes represent the average treatment effect of attending the program, expressed as the percentage increase in the outcome variable for attendees relative to non-attendees, in regression specifications that flexibly account for the influence of observable factors at the time of selection.
Source: Researchers' calculations using U.S. National Archives data

The researchers tracked the two cohorts over the length of their careers, identifying three distinct phases of productive output for each physician: an education phase (pre-ATP application), a training phase (internships, residencies, fellowships), and an independent phase (after training through retirement or death). They tallied each applicant's publications, citations, patents, and NIH grants through 2017. In 2017, the youngest applicant from the sample was 65 years old with a career that spanned more than 30 years.

The researchers found that the ATP participants out-performed their non-participant peers in several indicators of research success: they published and earned grant funding at a higher rate, they had a higher citation impact, and they entered research positions at a higher rate and stayed for a longer time. The data show that ATP participants continued engagement in scholarly production throughout their careers. The researchers also documented a trend among the ATP participants of using the NIH's "bedside to bench" approach throughout their publications, suggesting that their NIH training had a long-lasting effect.

While the study does not examine the mechanisms that made the ATP successful, the researchers believe that the strong network among the cohort and their instructors as well as the unique skill-building opportunities provided at NIH likely played a part. They suggest, cautiously, that short, intensive programs similar to ATP could be a tool for propelling young innovators to join the "ideas sector" for the long term.

—Jennifer Roche

Borrowers Aware of FICO Scores Are Less Likely to Be Overdue

Failing to make minimum payments on credit accounts is a common and costly behavior for many borrowers. Recent research from the Consumer Financial Protection Bureau suggests that, every quarter, 20 percent of consumer credit accounts are assessed a late fee. The cost of the associated late payments can be high, and tardy payments can lower consumers' credit scores and increase interest rates on future loans.

In **Does Knowing Your FICO Score Change Financial Behaviors? Evidence from a Field Experiment with Student Loan Borrowers** (NBER Working Paper No. 26048), Tatiana Homonoff, Rourke O'Brien, and Abigail B. Sussman test the effect of an intervention designed to raise consumer awareness of the consequences of late payments.

Beginning in 2015, as part of the FICO Score Open Access initiative, the student loan institution Sallie Mae began providing its borrowers with unlimited access to their FICO scores. The researchers randomly assigned over 400,000 Sallie Mae clients into a control group and three treatment groups. Consumers in the treatment groups received various forms of quarterly email reminders that they could log on to the Sallie Mae website and view their FICO scores, along with instructions for accessing the information. In the first year of the experiment, 32 percent of treatment group consumers viewed their score at least once, 8 percentage points more than those in the control group.

> Quarterly emails about logging on to the Sallie Mae website to view FICO scores affected patterns of debt repayment.

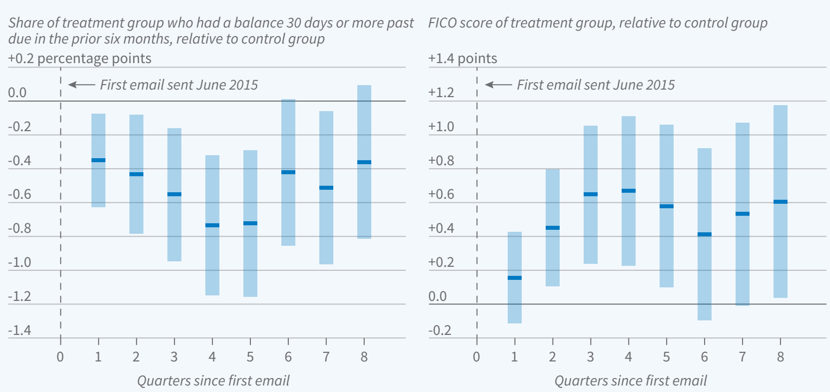
Using data on borrowers' credit scores and histories, the researchers found that treatment-group consumers were 4 percent, or 0.7 percentage points, less likely than control-group consumers to have an account more than 30 days past due. The intervention also improved borrowers' FICO scores by 0.7 points. The effects were similar across the three different treatment groups — a baseline group which received instructions on accessing scores, a second group which received instructions and information about the economic consequences of their scores, and a third group which received instructions and information about peers' behaviors. Treatment-group borrowers who viewed their scores as a result of the intervention were 9 percentage points less likely to have a past-due account, and enjoyed an 8.2 percentage point increase in their FICO scores.

The researchers also tested the effectiveness of the intervention on a smaller group of borrowers who only received the reminders for the first three quarters of the two-year intervention. They found no statistically significant differences in outcomes between members of this group and those who received the full two years' worth of reminders.

To shed further light on the mechanisms behind this change in payment patterns, the

FICO Score Awareness and Financial Health

Treatment group were recipients of quarterly emails about free FICO score availability.



Shaded bars represent 95% confidence intervals

Source: Researchers' calculations using data from TransUnion researchers analyzed a subset of borrowers' responses to a survey administered one year after the intervention began. They found that treatment-group borrowers were more likely to report their FICO scores accurately and were less prone to overestimation. The researchers note that this finding "suggests the intervention may lead to behavior change, in part by allowing people to properly calibrate their creditworthiness." They did not, however, find any effects of the intervention on more general financial knowledge. Treatment-group borrowers did not perform better on a financial literacy quiz, did not express higher levels of familiarity with FICO scores, and did not exhibit an improved ability to correctly identify any individual credit behavior as positive or negative.

"Our findings demonstrate the potential for targeted, low-cost, scalable interventions to positively impact financial decision making," the researchers conclude.

—Dwyer Gunn

R&D Tax Credits Boost New as Well as Existing Firms

Tax credits for research and development (R&D) spending were initially designed to encourage existing firms to increase their investments in R&D, and many studies suggest that these policies achieve this goal. There is little evidence, however, on whether R&D tax credits also affect the entry and growth of new businesses.

In **The Impact of State-Level R&D Tax Credits on the Quantity and Quality of Entrepreneurship** (NBER Working Paper No. 26099), Catherine Fazio, Jorge Guzman, and Scott Stern find that the introduction of a state-level R&D tax credit has a positive effect on entrepreneurial activity.

The researchers combine data from the Startup Cartography Project, which tracks the quality, quantity, and performance of entrepreneurship in the United States, with information from the Upjohn Institute's Panel Database on Incentives and Taxes, which records the availability and effective rates of state-level tax incentives. This combined dataset has entrepreneurship and tax credit measures for all counties in 25 states in the period 1990 to 2010.

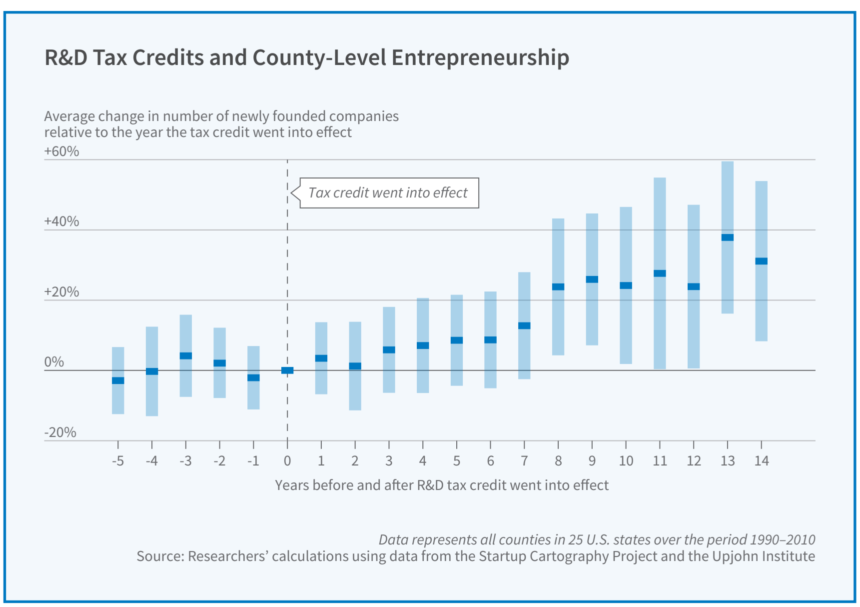
The researchers use this data to study how tax credits affect the number of new firms, which they define as "the quantity of entrepreneurship," as well as the quality of those firms. They measure quality by the extent to which start-up firms have characteristics at or around the time of registration that have been shown to predict a higher likelihood of achieving high-growth events. Such characteristics range from having a structure that invites equity financing, to seeking a patent or trademark, to having a short name.

State-level credits increase average entrepreneurial activity by around 7 percent; counties in states with R&D credits experience a rise in new firm formation of more than 20 percent over 10 years.

The researchers control for potentially confounding factors such as the rate of urbanization and business cycle effects, and they find a 7.5 percent average difference in the overall quantity of entrepreneurship in counties with R&D tax credits compared to those without. The difference is similar after adjusting for quality of new firms as well as other factors.

The researchers also investigate the R&D tax credit over a longer time horizon and find that its effect compounds over time. Counties with R&D tax credits experience a rise in the rate of new firm formation and the number of expected growth outcomes by 2 percent per year, even though state-level R&D tax credits have little to no effect on the rate or composition of new firm formation in the first few years following their introduction.

The researchers then contrast the effect of R&D tax credits with another common tax incentive, the state-level investment tax credit, which is intended to encourage existing businesses to make capital-intensive investments. They find that this credit does not boost entrepreneurship. Over the longer term, it is also associated with a decline in the quality-adjusted quantity of new firms founded.



The researchers suggest that by enhancing the competitiveness of established businesses, the investment tax credit may deter growth-oriented entrepreneurship over time. They conclude that tax policy can play an important role in stimulating regional entrepreneurship, particularly of the high-growth firms that have been shown to contribute to net job creation in the United States.

— Anna Louie Sussman

Is the Phillips Curve Still a Useful Guide for Policymakers?

The Phillips curve, named for the New Zealand economist A.W. Phillips, who reported in the late 1950s that wages rose more rapidly when the unemployment rate was low, posits a trade-off between inflation and unemployment. When unemployment is low, and the labor market is tight, there is greater upward pressure on wages and, through labor costs, on prices.

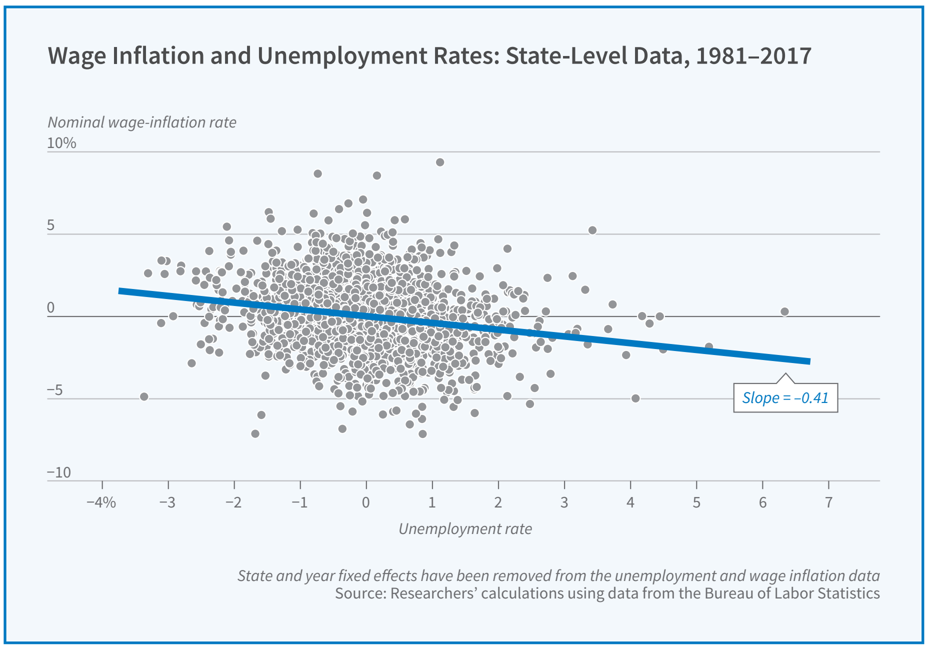
The conceptual foundations of this relationship have been a subject of active debate, but for many decades, the relationship seemed well-supported by U.S. data. In the last two decades, however, the U.S. inflation rate has not been particularly high, even during periods of low unemployment. The recent data have led many to wonder whether the Phillips curve has weakened or disappeared. In **Prospects for Inflation in a High Pressure Economy: Is the Phillips Curve Dead or Is It Just Hibernating?** (NBER Working Paper No. 25792) Peter Hooper, Frederic S. Mishkin, and Amir Sufi examine why the Phillips curve relationship has not been evident in recent aggregate data for the United States.

The researchers study both inflation in consumer prices and inflation in wages. They test for a "price" Phillips curve using data on annual costs of goods and services, and for a "wage" Phillips curve using hourly earnings data. They allow for different relationships between inflation and unemployment in tight and in slack labor markets. Using a simple model that assumes a linear relationship between inflation and unemployment, and data from 1961 to 2018, they estimate that a one percentage point drop in the unemployment rate increased inflation by a mere 0.14 percentage points. However, when they allow for different effects of unemployment changes in tight and slack labor markets, they find that the estimated effect of a one percentage point unemployment decline on the inflation rate is about -0.32 percentage points when the unemployment rate is 1 percentage point below the natural rate, and -0.12 when it is 1 percentage point above it.

Cross-state analysis of data on wages, prices, and the unemployment rate suggests that a tight labor market is associated with higher inflation.

When examining data only from 1988 to 2018, the researchers see less evidence for a robust price Phillips curve. The linear and non-linear slopes are both close to zero, consistent with the common view that the Phillips curve is flattening. However, the wage Phillips curve is much more resilient and is still quite evident in this time period.

The study points out that in the last three decades, the Great Recession notwithstanding, there has been less variability in the national economy than in prior decades, which makes it harder to detect the impact of unemployment on inflation. In addition, the Federal Reserve has tried to avoid labor market overheating as a way to stabilize inflation, thereby "anchoring" inflation expectations at a 2 percent inflation level and reducing the effect of unemployment fluctuations on price movements.



Wage Inflation and Unemployment Rates: State-Level Data, 1981–2017

State and year fixed effects have been removed from the unemployment and wage inflation data
Source: Researchers' calculations using data from the Bureau of Labor Statistics

The researchers observe that state- and city-level data provide more variability in unemployment rates and are less influenced by federal monetary policy than the national figures. Therefore, they explore the relationship between unemployment and inflation at this level. They find a strong negative relationship between the unemployment rate's deviation from the state average and the rate of wage inflation. They also find evidence of a nonlinear price Phillips curve in city-level data.

The researchers point out that the relationship between inflation and the unemployment rate is a key input to the design of monetary policy. They note that the unemployment rate in the U.S. economy is currently near record lows, and they caution that they cannot predict whether inflation will rise in the coming years. However, they conclude that "Evidence that the price Phillips curve has been dormant for the past several decades does not necessarily mean that it is dead... it could be hibernating, and there is a risk of the Phillips curve waking up, with inflationary pressures rising in the face of an overheating labor market."

—Morgan Foy

High Returns from Government Programs for Low-Income Children

Which government programs provide the most benefits per dollar spent? Nathaniel Hendren and Ben Sprung-Keyser examine 133 historical policy changes in the United States over the past half century to explore this question. In **A Unified Welfare Analysis of Government Policies** (NBER Working Paper No. 26144), they analyze policies spanning health and disability insurance, education and job training programs, taxes and cash transfers, and in-kind transfers such as housing vouchers and food stamps. Their analysis shows that direct investments in the health and education of low-income children yield particularly high returns.

The researchers draw upon a wide body of existing research to estimate the benefits each policy provides to its recipients and the net costs of the policy to the government. For the benefits, they sum a number of benefits, the largest of which is the present discounted value of the change in beneficiaries' future income as a result of program participation. For the costs, they measure the present discounted value of the program's current and future costs to the government, including any effects on tax revenues and government benefits. The ratio of a policy's benefits to its net governmental cost forms what they call the Marginal Value of Public Funds (MVPF). The MVPF measures the benefits per net dollar spent by the government.

The figure plots the MVPF ratio for a variety of policies, arrayed by the age of each policy's beneficiaries. The clustering of estimates in the upper left reveals that direct investments in children have historically had the highest ratio of benefits to net government cost. Expansions of health insurance to children, investments in preschool and K-12 education, and policies increasing college attainment all yield high returns.

The estimated MVPF is generally high for policies targeting children, regardless of their age. This finding challenges the notion that opportunities for high-return investments in children decline rapidly with age.

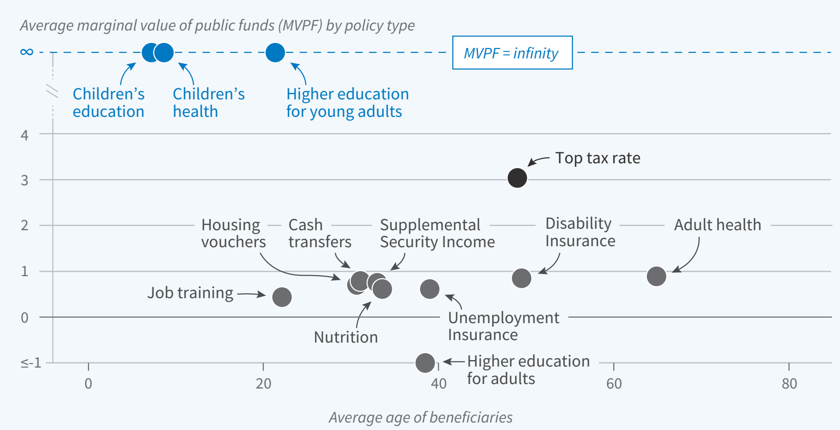
In some cases, the researchers found that the policies did not actually cost the government any money in the long run. This is the case for spending on early childhood health intervention, which reduced subsequent Medicaid-financed health care needs and raised future earnings and taxes. In present discounted value terms, spending money on this program improved long-run government finances. In the case of four major Medicaid expansions studied in previous literature, the researchers estimate that each dollar of initial spending was fully repaid and that the policy returned an additional 78 cents to the government. This means the policy has a higher return than other policies with positive costs. The researchers represent this as an infinite MVPF, shown at the top of the figure.

> Each dollar of initial spending on Medicaid expansion for children yielded $1.78 in future tax revenue and savings on government transfer programs.

Another example of a policy that did not cost the government money in the long run is government spending on public universities. Using evidence from Florida, estimates suggest that raising enrollment in public colleges pays for itself over the long run through increased tax revenue and reduced transfer payments.

For policies that target adult beneficiaries, the researchers generally find lower MVPF ratios than for programs targeting children, but often benefits are approximately equal to costs. For example, for health insurance expansions to adults the researchers find MVPF ratios of 0.8 to 1.6. This means that every dollar of net government spending delivers 80 cents to $1.60 of benefits. There is a wide range — from 0.1 to 1.2 — for tax credits and cash welfare programs for low-income adults. Many of these policies were associated with lower earnings for beneficiaries, and a thus a decline in government revenue. There is some heterogeneity across specific policies, and some policies targeting adults have higher MVPF ratios, particularly if they generate spill-over benefits for children. A complete summary of the estimated MVPF ratios by program may be found at www.policyinsights.org.

The Marginal Value of Public Funds by Policy Type and Beneficiary Age



Source: Researchers' calculations using data from 133 historical tax and expenditure policies implemented in the U.S.

As Southern Schools Desegregated, Share of Black Teachers Declined

In 1970, more than 90 percent of African American students in the 11 states of the former Confederacy attended integrated schools, compared with fewer than 5 percent in 1964. But as the student bodies became more diverse, the percentage of black faculty declined.

In **School Desegregation and Black Teacher Employment** (NBER Working Paper No. 25990), Owen Thompson estimates that the share of black teachers employed in Deep South schools fell by 31.8 percent between 1964 and 1972, compared with the likely trajectory of teacher employment in the absence of desegregation. The share of black teachers in the 781 sampled Southern districts fell from 30.6 percent in 1964 to 24.2 percent in 1972.

That decline was a significant blow to the black middle class in the South, where black schools traditionally had been staffed by black teachers. In 1960, 45 percent of Southern blacks with post-secondary educations reported teaching as their occupation.

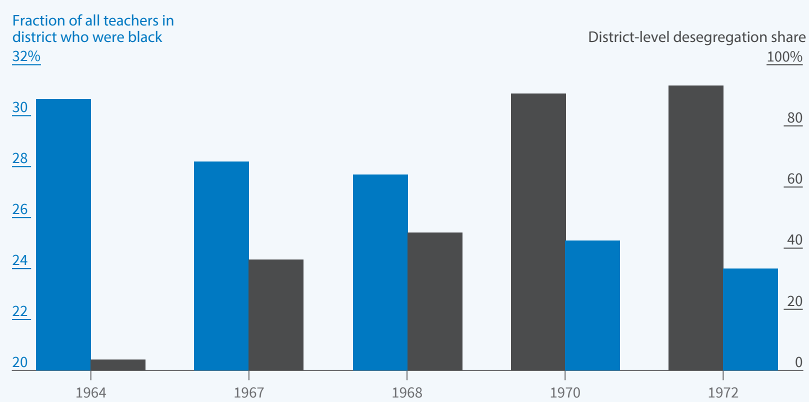
While the Supreme Court ruled school segregation unconstitutional in 1954 in *Brown v. Board of Education*, it wasn't until after the 1964 Civil Rights Act that federal enforcement of the court's ruling became widespread. Empowered to withhold federal aid from segregated districts, the U.S. Department of Health, Education, and Welfare provided much of the enforcement muscle for integration.

School boards' efforts to make sure white students had white teachers appear to explain a sharp decline in the share of black teachers in the Deep South.

Despite the Civil Rights and Voting Rights Acts, Southern school boards remained overwhelming white. Citing data from the census and educational archives, Thompson argues that these school leaders appeared intent on making sure white students had white teachers. The reduction in the number of black teachers was correlated with a district's composition of students: Districts with the lowest percentage of black students saw the highest percentage reduction in black teachers.

As districts consolidated schools, they disproportionately dismissed African American teachers. If white teachers had been dismissed at the same rate as black teachers, overall teacher employment would have fallen by 10 percent from 1964 to 1972; in fact, it fell by 4.7 percent.

U.S. School Desegregation and Black Teacher Employment, 1964–1972



District-level desegregation share is the district-level average of the fraction of black students attending a school where 5% or more of the students were white
Source: Researcher's calculations using data from the U.S. Department of Education

Some black teachers lost their jobs as districts stepped up recruitment of white teachers, who in many cases were less experienced than the people they replaced. The average Southern white teacher in 1970 was 2.7 years younger, 2.8 percentage points more likely to be male, and 5.8 percentage points more likely to have been born outside the South than that teacher's counterpart in 1960.

Thompson estimates that among the blacks who would have held teaching jobs in the absence of desegregation, half instead went into less-skilled fields and the remainder took jobs in schools outside the South.

— Steve Maas

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