Economic Brief

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Slowing Growth in Educational Attainment

By Urvi Neelakantan and Jessie Romero

Research suggests the economy's demand for college-educated workers exceeds the supply, which might be contributing to slower economic growth. Improving students' preparation at the K-12 level could both increase the college completion rate and help those who are not college-bound choose the best paths for themselves.

Why isn't the United States producing more college graduates? It might seem like a surprising question, given that the share of the adult population with a college degree is at an all-time high. There is reason to believe, however, that the demand for college-educated workers is outpacing the supply and has been for some time. One piece of evidence is the growth and persistence over the past several decades of the "college wage gap" — the difference in earnings between workers with and without a four-year college degree. Research has shown that for much of U.S. history, workers have obtained more education in response to higher wages and that the resulting increase in the supply of workers eventually led the wage gap to shrink. A persistent college wage gap thus suggests that the demand for college-educated workers still exceeds the supply.[1]

Two key — and related — factors appear to play a role in college enrollment and completion: socioeconomic status and preparedness, broadly defined to include both academic preparation and the knowledge needed to make informed choices about college. The K-12 system plays a central role in preparedness, which means that children's ability to make informed choices about their paths after high school and to succeed along those paths can vary with the quality of their schools. A challenge for policymakers, however, is that the evidence on what makes a school high quality is somewhat mixed and difficult to generalize from one school to another.

Why Does the Fed Care about Education?

Policymakers, including those at the Federal Reserve, are ultimately concerned about people's standards of living. Improvements in standards of living are driven by economic growth, which depends on productivity. Productivity, in turn, depends at least in part on human capital — the skills, knowledge, and other intangible qualities that individuals possess. And formal education is a key component of human capital. Economists have identified a slowdown in productivity growth in the United States (and other developed countries) beginning in the early 2000s, which could be contributing to slower economic growth.[2] One factor contributing to slower productivity growth might be slower growth in the United States' stock of human capital.

The Fed also cares about education because its monetary policy mandate includes a charge to promote maximum employment. Aggregate

employment (or unemployment) is determined by the rates at which individual workers flow through the labor market, and these flows are influenced by a variety of factors outside the purview of monetary policy. Understanding these factors, however, gives policymakers the necessary context for taking monetary policy actions. Education is one such factor: during economic downturns and expansions alike, college graduates on average have much lower unemployment rates than workers with less formal education. And during recessions, the unemployment rate for college graduates tends to rise less than the rate for less-educated workers.

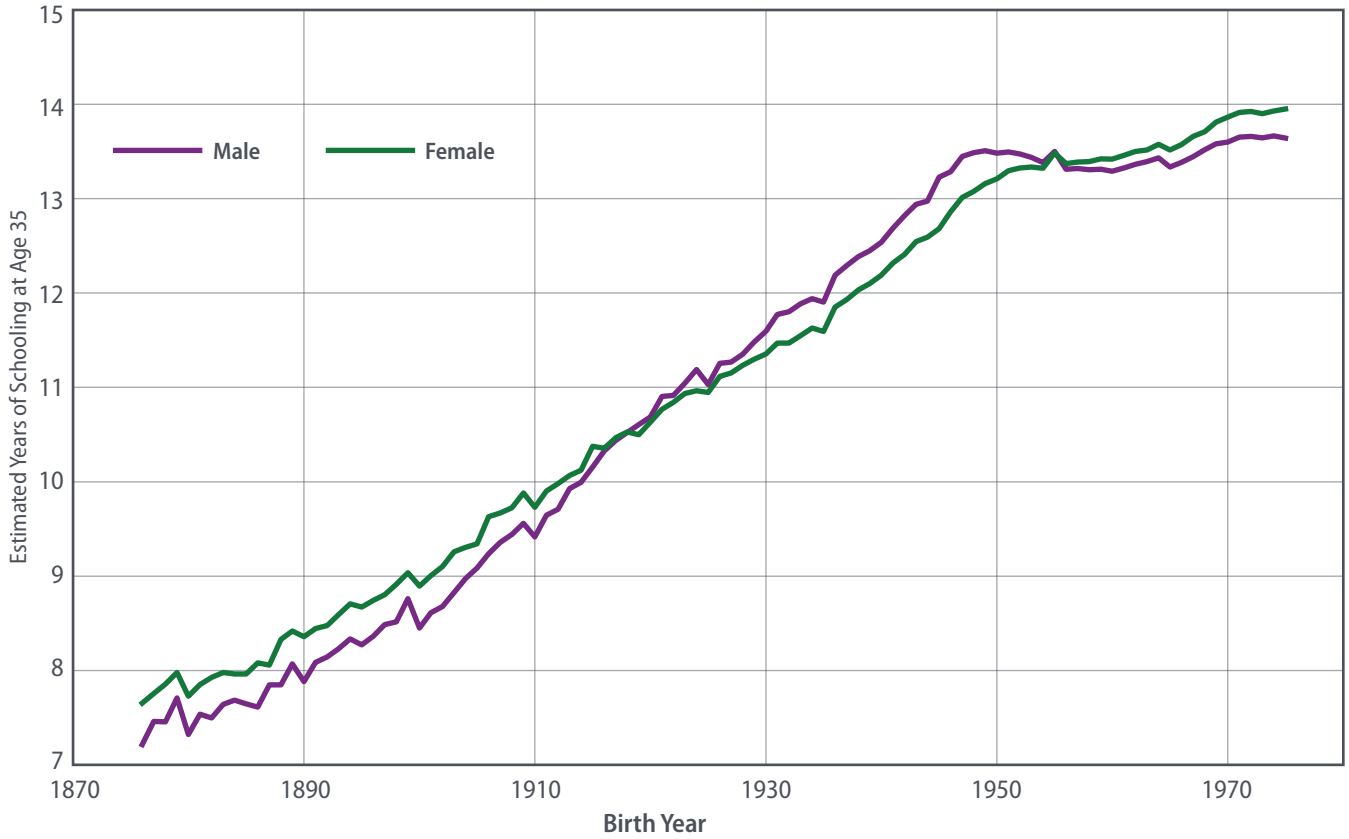
Supply and Demand for High-Skill Workers

In the first half of the twentieth century, schooling increased steadily for successive cohorts of Americans. However, educational attainment decelerated sharply for those born during the next twenty years, with the result that Americans, particularly men, born in 1970 barely completed more years of school than those born in 1950.[3] (See Figure 1.) This slowdown in skill acquisition, combined with growing demand for high-skill workers, contributed to a large increase in the "college premium" — the higher wages and earnings of college graduates relative to workers with only high school degrees. (See Figure 2.)

In previous periods in the United States, an increase in the demand for highly educated workers has been met with a supply response: workers, observing that a skill premium existed, increased their level of education to take advantage of it. Over time, this had the effect of reducing the wage gap.[4]

Recent data do point to an increase in educational attainment for cohorts born after the 1970s. Still, the persistence of the college premium suggests that the

Figure 1: Years of Schooling by Birth Year



Sources: Authors' calculations using the 1940–2000 data from the Integrated Public Use Microdata Series: Version 7.0. Minneapolis: University of Minnesota, 2017. The authors follow a procedure similar to Goldin and Katz (2010).

Note: Estimates are for average years of schooling.

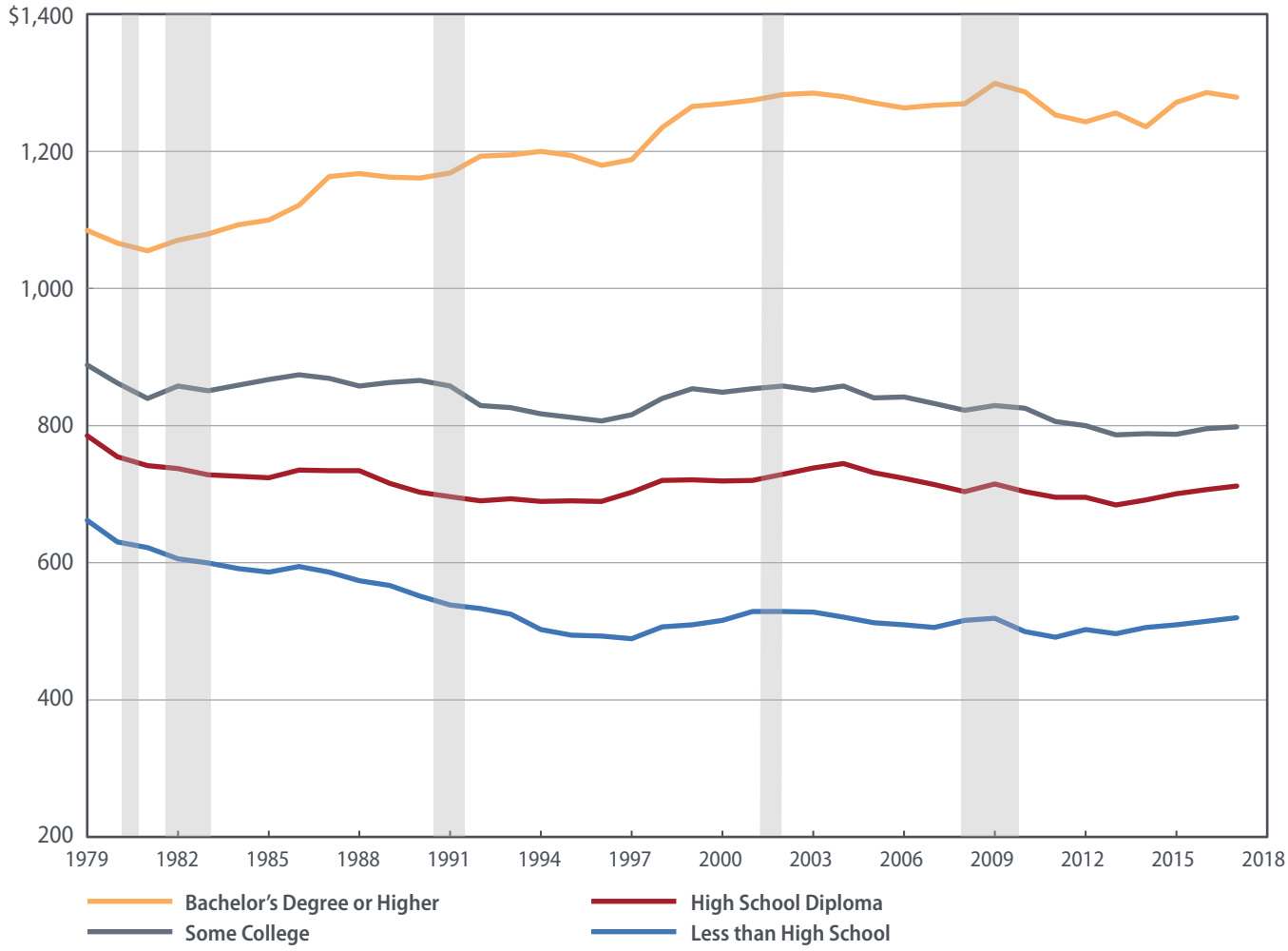
economy's demand for high-skill workers exceeds the supply. Moreover, to the extent attainment has increased, it has increased unequally.[5]

Trends in College Enrollment and Completion

College enrollment varies significantly by measures of socioeconomic status (SES). Following the 2010–11 school year, 51 percent of graduates from public high schools where less than a quarter of the students were approved for free or reduced-price lunch programs enrolled in a four-year college. In contrast, during the same time period, only 29 percent of high school students graduating from a school where more than three-fourths of the students were approved for free or reduced-price lunch enrolled in a four-year college. There is also variation by geography; students from rural areas are slightly less likely to attend college than students from urban and suburban areas, and they are more likely to attend a two-year college. Students who obtain a two-year degree do earn more on average than those with only a high school diploma, but the premium is much smaller than for those with a four-year degree. (See Figure 2.)

Currently, a large share of students who enroll in college fail to earn a degree: among students who started attending a four-year institution in 2009, only

Figure 2: Median Weekly Earnings by Educational Attainment



Sources: U.S. Bureau of Labor Statistics (BLS), "Highlights of Women's Earnings in 2016," Table 19, August 2017. Data for 2017 are from BLS, "Usual Weekly Earnings of Wage and Salary Workers," Table 9.

Notes: "Some College" includes people who earned two-year degrees. Earnings are in constant 2017 dollars for full-time, wage and salary workers age twenty-five and older. Shaded areas indicate recessions.

59 percent had earned a bachelor's degree within six years, according to the National Center for Education Statistics (NCES). That's a modest improvement since the 1996 cohort, the first year for which the NCES has published data, when 55 percent earned a degree within six years. (Completion rates vary greatly by type of institution: 59 percent at public colleges, 66 percent at private nonprofit colleges, and 23 percent at private for-profit colleges.)

Like college enrollment, college completion varies by socioeconomic factors. In 2002, the NCES began surveying a cohort of about 15,000 high school sophomores. Students were assigned a composite score for SES based on their parents' education levels, occupations, and incomes. By 2012, 77 percent of the high-SES students who were enrolled in a four-year college in 2006 had earned a bachelor's degree or higher. But only 50 percent of the low-SES students who enrolled in college had completed their degrees by 2012. Even among students with similar prematriculation academic achievement, low-SES students were less likely to complete college than high-SES students.[6]

Preparing Students for College

A large body of research suggests that college preparation is a key factor in college completion. Preparation includes two components, both of which tend to vary with socioeconomic factors. One component is information or "knowledge about college." Numerous studies have shown that low-income students don't know as much about the application process and tend to receive less help navigating it. In part, this could be because they know fewer adults who have completed college. It also could be because they attend high schools with fewer resources for college guidance.[7]

The schools children attend also affect the second major component, academic preparation. In the United States, most students are assigned to schools based on where they live. The value of a neighborhood's schools in turn affects its housing prices. This gives wealthier parents more options because they can afford to move to neighborhoods with higher housing prices and better quality schools or opt to send their children to private schools.

While research suggests that school quality improves academic outcomes, defining "quality" is no simple task. And because there is significant variation across school districts, schools, and students themselves, it is difficult to generalize the outcomes of any specific intervention to other settings. In addition, it is very challenging to disentangle the various factors that contribute to school quality and student outcomes.

Despite these caveats, two factors consistently emerge from the research as important inputs into school quality: teacher quality and class size.[8] But what makes a teacher effective? One determinant is experience — teachers who have been in the classroom at least three years tend to do better than those with less experience.[9] But beyond this fact, the answer remains somewhat elusive. This is an open area of research, and the findings will be important for designing policies that effectively incentivize better teaching.[10] Switching to a small class can raise a student's test scores, according to studies of Project STAR, a class-size reduction initiative in Tennessee. The gains were the largest for lower-income and minority students. But while reducing class size, particularly for kindergarten through third grade, may have significant effects on students' academic performance, smaller classes are costly. Moreover, to the extent class-size reduction requires schools to hire inexperienced or less-effective teachers, the benefits could be muted.

School Choice

School choice programs — such as private school vouchers, charter schools, and open enrollment — attempt to break the link between families' SES and their access to quality schools. Proponents of expanding school choice also argue that offering more alternatives to traditional public schools would introduce competition in an otherwise noncompetitive public school sector and make public schools more productive. A potential downside of such programs is that they reduce academic diversity in the classroom, which may be particularly detrimental for lower-achieving students.[11] In addition, low-performing schools (and the students who remain in them) may be left even worse off because school funding is typically tied to school size.

Currently, twelve states and Washington, D.C., offer voucher programs, including Maryland and North Carolina.[12] (Some states also offer education savings plans or scholarship tax credits to help children attend private schools.) Some studies have found positive effects for certain groups of students in certain subjects, but the results are inconsistent. There seems to be more evidence in favor of charter schools, which receive public funding but are independently operated under a charter with the school district. Numerous studies have shown improvements in standardized test scores for students attending charter schools, with the largest gains accruing to students from disadvantaged backgrounds. Some research also has found that students attending charter schools are more likely to graduate from high school and attend college.[13] Because charter schools vary widely in their instructional approaches, however, any positive results might only be applicable to the particular schools studied.[14]

Another mechanism for increasing school choice is open enrollment, where students have the option to transfer to another school within their district or even to a school outside their district. Most states allow open enrollment in some form, albeit with a number of restrictions based on schools' capacities and which students receive priority.[15] Research on an open-enrollment program in North Carolina's Charlotte-Mecklenburg school district for the 2002–03 school year found that students who used the choice program to attend a school with higher test scores had significant gains in academic achievement.[16] Another study found that girls who attended a higher-quality school were much more likely to graduate from high school and attend college, although for boys on average there was little effect.[17]

A universal difficulty in assessing school-choice programs is controlling for selection effects. For example, the gains in academic achievement observed in Charlotte might have occurred because more academically focused or motivated students (or those with more academically focused parents) chose to take advantage of the opportunity to attend a different school.

Beyond College

It is possible that improvements in K-12 preparation could lead to higher college completion rates without increasing the number of graduates: to the extent that better "knowledge about college" is part of being prepared, students likely to be on the margin of dropping out of college might decide not to enroll in the first place.

In fact, a high school that focuses predominantly on college preparation might not be a good match for everyone. If the only reason to graduate from high school is to enroll in college, then students who do not wish to attend college or who perceive large barriers to doing so might not see much value in graduating from high school. For those students, information about and access to vocational training or apprenticeship programs, for example, could help them understand the value of finishing high school and improve their labor market outcomes relative to dropping out.[18]

In addition, while most studies of school quality focus on academic gains, these are not the only reason to try to improve schools. Efforts to improve school quality also may improve students' noncognitive skills and thus lead to improved labor market outcomes long after their effects on test scores have dissipated.[19] ■

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Endnotes

1 This *Economic Brief* is adapted from Urvi Neelakantan and Jessie Romero, "Falling Short: Why Isn't the U.S. Producing More College Graduates?" Federal Reserve Bank of Richmond *2017 Annual Report*, pp. 4–16.

2 Gilbert Cette, John Fernald, and Benoît Mojon, "The Pre-Great Recession Slowdown in Productivity," *European Economic Review*, September 2016, vol. 88, pp. 3–20.

3 Claudia Goldin and Lawrence F. Katz, *The Race between Education and Technology*, Cambridge, Mass.: Harvard University Press, 2010. See also Rui Castro and Daniele Coen-Pirani, "Explaining the Evolution of Educational Attainment in the

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[4] For more on changing wage structures, see Goldin and Katz (2010).

[5] Adam Blandin, Christopher Herrington, and Aaron Steelman, "How Does Family Structure during Childhood Affect College Preparedness and Completion?" Federal Reserve Bank of Richmond *Economic Brief* No. 18-02, February 2018.

[6] National Center for Education Statistics, "Education Longitudinal Study of 2002." For more on socioeconomic and regional disparities see Emily E. Cook, Jessie Romero, and Sarah Turner, "Transitioning from High School to College: Differences across Virginia," Federal Reserve Bank of Richmond *Economic Brief* No. 17-12, December 2017.

[7] Caroline M. Hoxby and Christopher Avery, "The Missing 'One-Offs': The Hidden Supply of High-Achieving, Low-Income Students," *Brookings Papers on Economic Activity*, Spring 2013.

[8] Steven G. Rivkin, Eric A. Hanushek, and John F. Kain, "Teachers, Schools, and Academic Achievement," *Econometrica*, March 2005, vol. 73, no. 2, pp. 417–458; Diane Whitmore Schanzenbach, "What Have Researchers Learned from Project STAR?" *Brookings Papers on Education Policy*, May 2006, vol. 9, pp. 205–228; and Roland G. Fryer, "Teacher Incentives and Student Achievement: Evidence from New York City Public Schools," *Journal of Labor Economics*, April 2013, vol. 31, no. 2, pp. 373–407.

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[12] Vermont and Maine also have voucher programs, but these are longstanding policies for students who live in towns without a public school.

[13] Caroline M. Hoxby and Jonah E. Rockoff, "The Impact of Charter Schools on Student Achievement," Manuscript, March 2005; Timothy J. Gronberg and Dennis W. Jansen, Navigating Newly Chartered Waters: An Analysis of Texas Charter School Performance, Austin, Texas: Texas Public Policy Foundation, April 2001; Atila Abdulkadiroğlu, Joshua D. Angrist, Susan M. Dynarski, Thomas J. Kane, and Parag A. Pathak, "Accountability and Flexibility in Public Schools: Evidence from Boston's Charters and Pilots," *Quarterly Journal of Economics*, May 2011, vol. 126, no. 2, pp. 699–748; and Kevin Booker, Tim R. Sass, Brian Gill, and Ron Zimmer, "The Effects of Charter High Schools on Educational Attainment," *Journal of Labor Economics*, April 2011, vol. 29, no. 2, pp. 377–415.

[14] Robert Bifulco and Helen F. Ladd, "The Impacts of Charter Schools on Student Achievement: Evidence from North Carolina," *Education Finance and Policy*, Winter 2006, vol. 1, no. 1, pp. 50–90.

[15] The No Child Left Behind Act of 2001 mandated that students can transfer out of schools that fail to make "adequate yearly progress" two years in a row. For an overview of open-enrollment policies, see Micah Ann Wixom, "Open Enrollment: Overview and 2016 Legislative Update," Education Commission of the States, January 2017.

[16] Justine S. Hastings and Jeffrey M. Weinstein, "Information, School Choice, and Academic Achievement: Evidence from Two Experiments," *Quarterly Journal of Economics*, November 2008, vol. 123, no. 4, pp. 1373–1414.

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