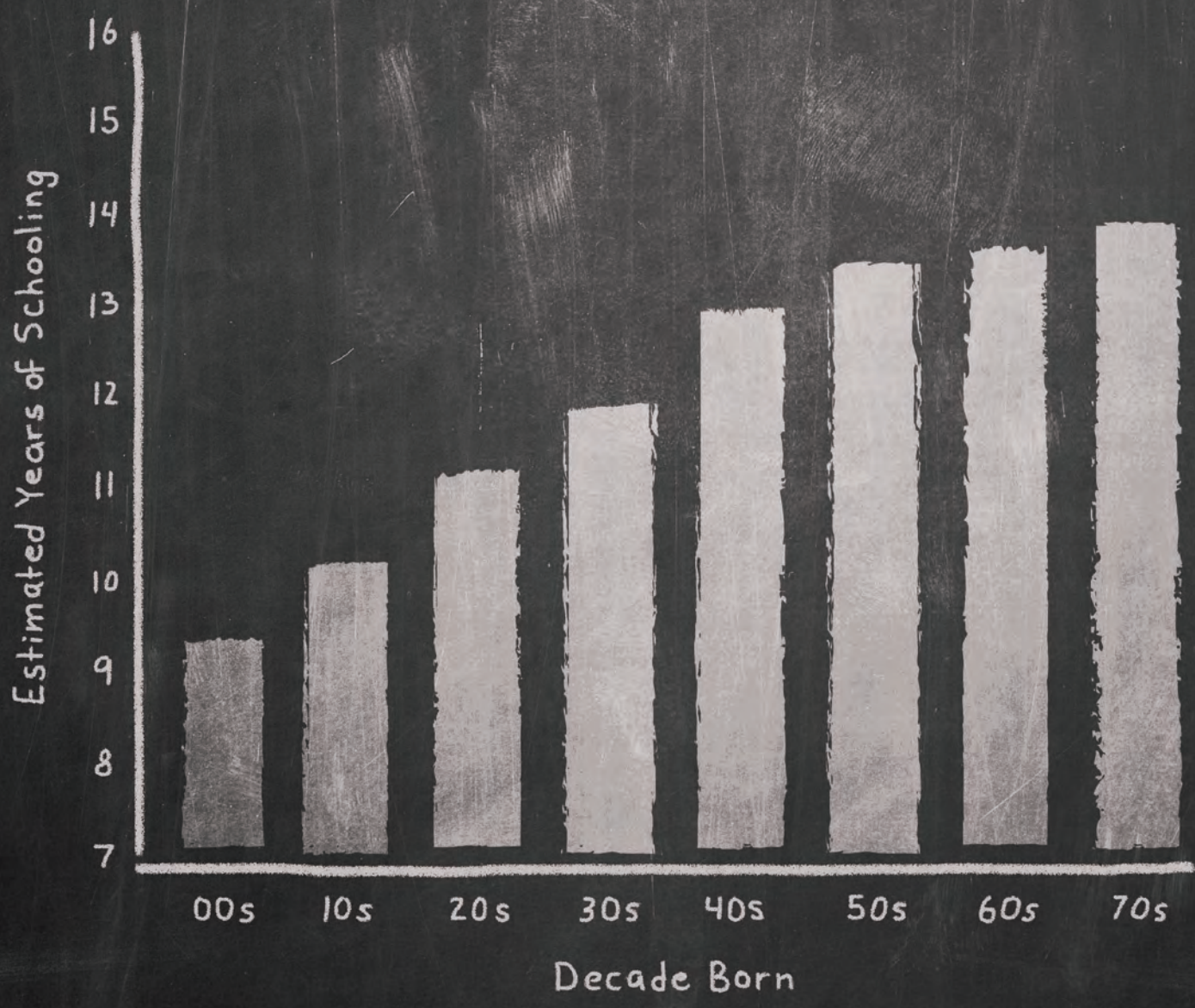


Falling Short

Why Isn't the U.S. Producing
More College Graduates?





About the Cover: Blackboards were state-of-the-art teaching aids in 1902, when this two-room schoolhouse opened in Henrico County, Virginia. Deep Run School offered seven grades of instruction, which would have completed the formal education of many of its students. The chart on the cover shows that the average person born in the first decade of the twentieth century in the United States obtained about nine years of schooling by age thirty-five. Educational achievement increased steadily for the next four decades before leveling off between thirteen years and fourteen years of schooling for Americans born after World War II. See the essay that begins on page 4.

About the Richmond Fed

MISSION: As a regional Reserve Bank, we serve the public by fostering the stability, integrity, and efficiency of our nation's monetary, financial, and payments systems.

VISION: To be an innovative policy and services leader for America's economy.

KEY FUNCTIONS: We contribute to the formulation of monetary policy. We supervise and regulate banks as well as bank and savings and loan holding companies that are headquartered in the Fifth Federal Reserve District. We process currency and electronic payments for banks and provide financial services to the U.S. Treasury. We also work with a wide variety of partners to strengthen communities in the Fifth District.

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Message from the Board of Directors

Choosing a New President to Lead the Richmond Fed



*Margaret G. Lewis (left) and
Kathy J. Warden*

The board of directors of a Federal Reserve Bank serves many roles. Directors provide information to Bank leaders about economic conditions around the Fifth District, set the discount rate on loans to commercial banks and other depository institutions every two weeks with the approval of the Board of Governors, and oversee the operations and longer-term direction of the Bank. In 2017, the Richmond Board was encouraged by the progress made on critical initiatives, such as the National IT strategic plan, cybersecurity, and spending stewardship, among others. The District leadership team met the highest standards for policy, research, and operational effectiveness. The team also continuously demonstrated its commitment to Federal Reserve System partnerships.

Last year, the directors were responsible for choosing a new Bank president who will lead the institution, be an important voice in the Fifth District (and have a keen ear for input provided by others in the region), represent the Bank at Federal Open Market Committee (FOMC) meetings, and continue the Bank's commitment to developing and maintaining a diverse and inclusive workplace.

The Board engaged a search firm to help identify a diverse and qualified candidate pool. In December, we chose Tom Barkin to become the Bank's eighth president and chief executive officer. Tom joined the Bank on January 1, 2018, and has moved quickly forward. Among his immediate orders of business was to prepare to vote at his first FOMC meeting at the end of January. He has spent considerable time learning from people around the Bank—getting to know them personally, understanding their roles, and listening to what they have to say about our strengths and our opportunities for improvement. He has been out in our District as well, engaging with business and community leaders.

Tom joined the Bank after working for McKinsey & Company, a worldwide management consulting firm. Immediately prior, he was a senior partner and the chief risk officer at McKinsey. He previously served as its chief financial officer and oversaw its offices in the southern United States. Tom also served on the Board of Directors of the Federal Reserve Bank of Atlanta from 2009 through 2014, chairing the Board during 2013–14. Tom's wealth of experience made him an excellent candidate, and we are excited about the leadership he brings to the Bank.

We would like to recognize and thank Mark Mullinix for his outstanding service as interim president. We congratulate him and wish him all the best as he retires from his role as first vice president in June 2018.

Mark and others throughout the Bank worked hard to keep things running smoothly during a year of significant change. The Bank is in a strong position going forward, and we welcome the opportunity to continue to serve the people of the Fifth District and the nation.

Margaret G. Lewis
Chair of the Board

Kathy J. Warden
Deputy Chair of the Board

Message from the Interim President

Why Education Matters to the Richmond Fed

Why isn't the United States producing more college graduates? That's the question asked by Urvi Neelakantan and Jessie Romero in this year's *Annual Report* essay. It might seem like a surprising question—after all, the share of the adult population with a college degree is at its highest point ever. But there is reason to believe the supply of college graduates isn't keeping up with our economy's demand for them.

One piece of evidence is the growth and persistence over the past several decades of the “wage gap”—the difference in earnings between workers with and without a four-year college degree. Economists have found that for much of U.S. history, differences in earnings can be explained by the basics of supply and demand. A consistently higher “price” for the labor of more-educated workers thus suggests that the demand for educated workers is outstripping the supply.

Why does that matter? Education has important implications for economic growth and continued improvements in our standards of living. In large part, growth is driven by increases in productivity, which in turn depend on the skills and knowledge we possess—what economists call “human capital.” Human capital can be acquired in many ways, but education is a key component. Data suggest that productivity growth has been slowing since the early 2000s, and one factor might be slower growth in the United States' stock of human capital. In short, failing to meet our economy's demand for skilled workers might be hindering economic growth.

Of course, education also has important implications for the lives of individuals. On average, college graduates earn more money than nongraduates, and they are more likely to be employed. College isn't necessarily the right path for everyone, but it's essential to identify any barriers that might prevent some students from achieving their full potential.

An additional concern is the high proportion of students who enroll in college but do not graduate. A variety of factors contribute to students leaving college, but, as Urvi and Jessie discuss, a key factor seems to be inadequate preparation during students' K-12 years. The authors also discuss how K-12 preparation varies with socioeconomic status and how “school-choice” initiatives are intended to provide more children with access to high-quality schools.

Education is incredibly complex—no single solution will be right for all students, and no single essay can hope to cover all possible solutions. Continued research is vital to our society's well-being, and we hope you find this year's essay an interesting and informative introduction to the topic.

Additionally, new to this year's *Annual Report* is “Bank at Work,” which highlights the Richmond Fed's three primary functions as well as its community outreach work and support services. The article may introduce you to our roles and responsibilities or simply serve as a reminder of the services performed by our Reserve Bank and the Federal Reserve System.



Mark L. Mullinix

Interim President and Chief Operating Officer





Falling Short

Why Isn't the U.S. Producing More College Graduates?

By Urvi Neelakantan and Jessie Romero

For roughly four decades, the gap in earnings between workers with and without a college degree has been large. This persistent earnings gap is unusual from a historical perspective—in previous instances, workers have responded by increasing their level of education, and the resulting increase in the supply of more-educated workers has narrowed the gap over time. Over the past four decades, students have indeed enrolled in college at increasing rates; however, a large proportion of them have failed to earn degrees. Partly as a result of this bottleneck, the earnings gap has endured.

Why isn't the U.S. producing more college graduates? 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. For example, a large literature has documented the contribution of early childhood education to later academic (and labor market) success; children from lower-income families are less likely to have access to such education.¹

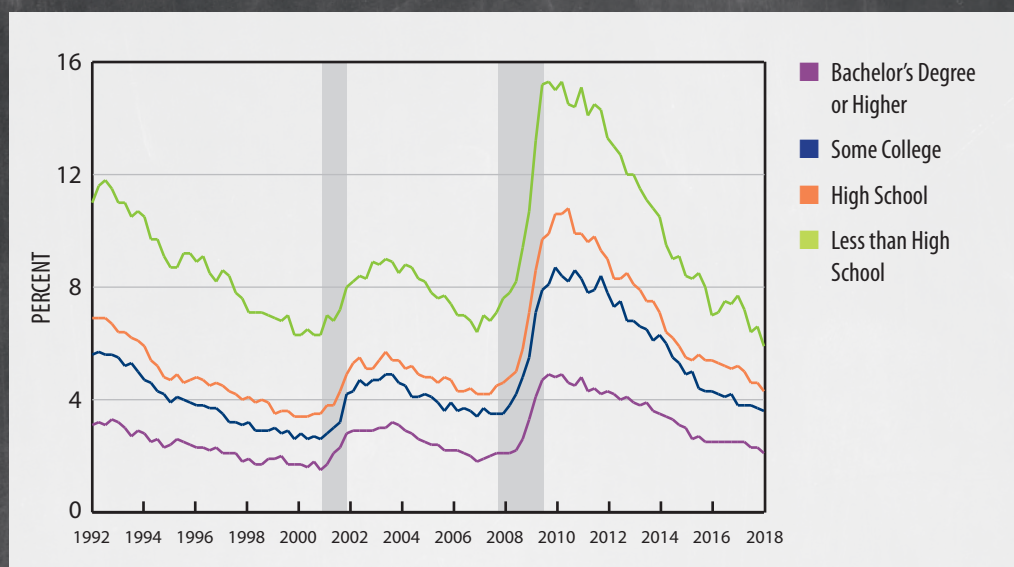
Children from lower-income families also are less likely to have the opportunity to attend high-quality elementary and secondary schools that enable them to make informed choices about their path after high school and succeed along that path. A challenge for policymakers, however, is that the evidence on what makes a school high quality is somewhat mixed and difficult to generalize from one school to another. This remains an important area of economic research, of interest not only to education and fiscal policymakers, but also to the Fed.

Why Does the Fed Care about Education?

All policymakers, including those at the Fed, are ultimately concerned about people's standards of living. Improvements in standards of living are driven by economic growth, which in turn depends on productivity. Productivity depends at least in part on human capital—the skills, knowledge, and other intangible qualities that individuals possess. Formal education is a key component of human capital.

Productivity growth is of particular interest to monetary policymakers because of its relationship to the appropriate policy rate. In conventional monetary policy thinking, the central bank's target interest rate should track an underlying interest rate known as the "natural rate of interest." In general, the natural rate and overall economic growth move together: slower growth tends to be associated with a lower natural interest rate, and faster growth with a higher natural rate.²

**Figure 1:
Unemployment
Rate by Educational
Attainment**



SOURCE: U.S. Bureau of Labor Statistics Current Population Survey and Haver Analytics
 NOTES: "Some College" includes people who earned two-year degrees. Data are for workers age twenty-five and older through the fourth quarter of 2017. Shaded areas indicate recessions.

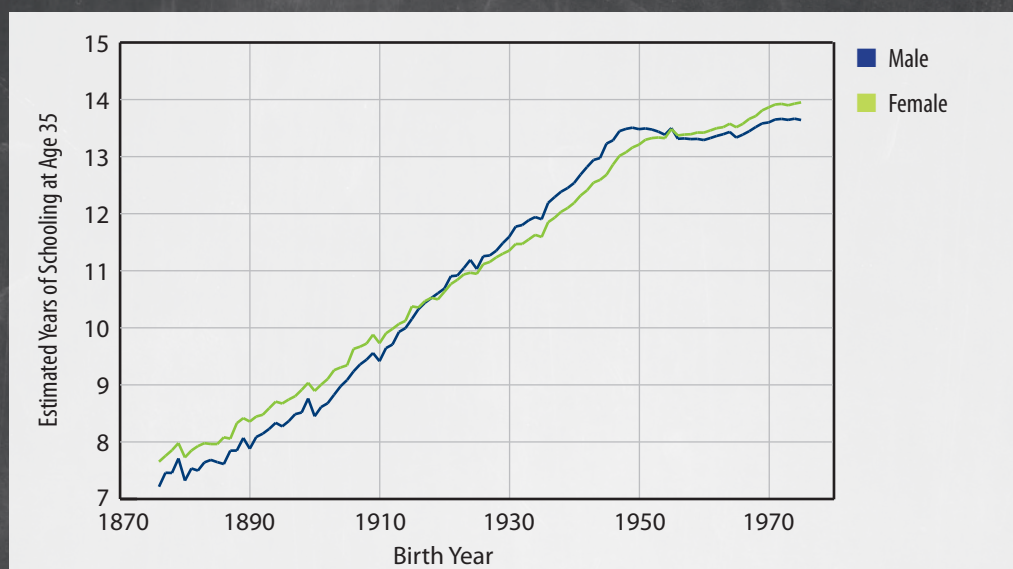
Economists have identified a slowdown in productivity growth in the United States (and other developed countries) beginning in the early 2000s, which could be contributing to slower economic growth.³ One factor contributing to slower productivity growth might be slower growth in the United States' stock of human capital, which could be dampening the nation's ability to absorb technological and scientific advances. In short, low growth in college attainment may be contributing to a low natural rate of interest. The low average policy rates that would be appropriate in this situation potentially make monetary policymakers' task more difficult by limiting the central bank's ability to respond to recessions.

The Fed also cares about education because its mandate includes a charge to promote "maximum sustainable 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.⁴ Understanding these factors gives policymakers the necessary context for taking monetary policy actions, including cognizance of those actions' potential limitations. 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. (Note the large difference in the recession of 2007–09 in Figure 1.) Thus, a well-educated workforce may offer the promise of an economy with a low and stable unemployment rate.

Supply and Demand for High-Skill Workers

In the first half of the twentieth century, schooling increased steadily for successive cohorts of Americans, according to research by Claudia Goldin and Lawrence Katz of Harvard University. While those born in 1920 had completed less than eleven years of schooling on average by age thirty-five, those born in 1950 completed about thirteen and a half years. However, educational attainment decelerated sharply for those born during the next twenty years, with the result

Figure 2:
Years of Schooling
by Birth Year



SOURCE: Authors' calculations using 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.

that Americans, particularly men, born in 1970 barely completed more years of school than those born in 1950. (See Figure 2.)⁵ Rui Castro of the University of Western Ontario and Daniele Coen-Pirani of the University of Pittsburgh have found similar results. In a 2016 article, they concluded that the college graduation rate for white men actually decreased between the 1948 and 1960 birth cohorts; despite some recovery, the graduation rate for the 1972 cohort was still 3 percentage points lower than the rate for the 1948 cohort.⁶

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 a high school degree.⁷ In 1980, workers with a bachelor’s degree or higher earned about 29 percent more than workers with only a high school degree. By 2009, college graduates earned nearly 45 percent more, a gap that has persisted since then. (See Figure 3.)⁸

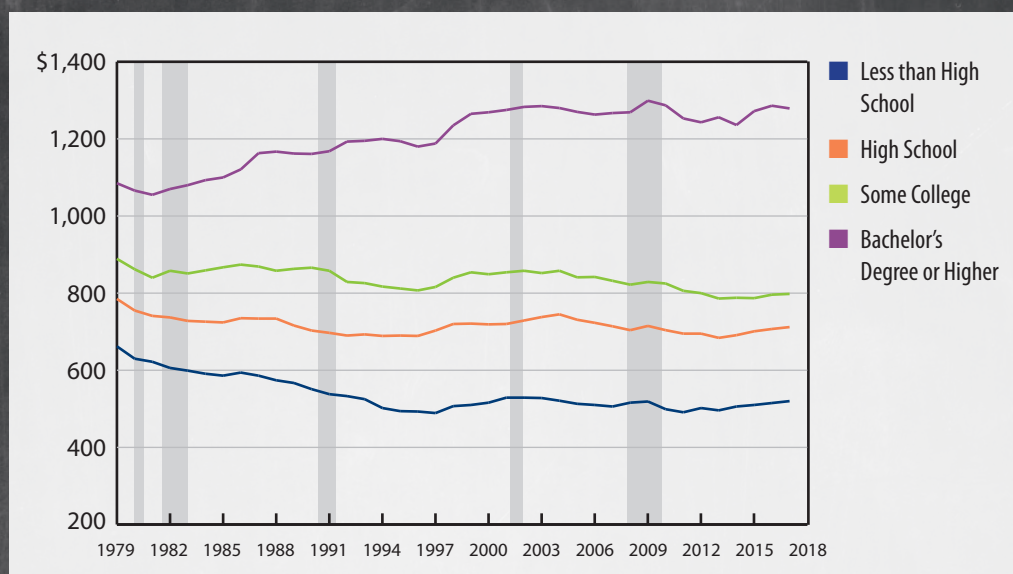
In previous periods in the United States, an increase in the demand for highly educated workers has been met with a supply response: workers, observing that a skill premium existed, increased their level of education to take advantage of it. Over time, this had the effect of reducing the wage gap. For example, the high school graduate premium plummeted by more than half between 1910 and 1950, a period during which the fraction of seventeen-year-olds who were high school graduates rose from less than 9 percent to nearly 60 percent.⁹

Recent data do point to an increase in educational attainment for cohorts born after the 1970s.¹⁰ Still, the persistence of the college premium suggests that the supply of high-skill workers remains insufficient to meet the economy’s demand. Moreover, to the extent attainment has increased, it has increased unequally.¹¹

Trends in College Enrollment and Completion

College enrollment in the United States has grown substantially since the 1970s. Between 1975 and 2015, the share of eighteen- to twenty-four-year olds enrolled in a four-year institution increased from 17.3 percent to 29.9 percent, with the majority of the increase occurring

**Figure 3:
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. NOTE: "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.

between 1975 and 1995, according to the National Center for Education Statistics (NCES). The share peaked at 30 percent in 2011 and then declined—likely as a result of declining enrollment in for-profit schools—before starting to rise again in 2014.

College enrollment varies significantly by measures of socioeconomic status. In 2010–11, 50.7 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 the following year. In contrast, during the same time period, only 29.1 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 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 degree, but the premium is much smaller than for those with a four-year degree. (See Figure 3.)

Currently, a large share of students who enroll in college fail to graduate: among students who started attending a four-year institution in 2009, only 59 percent had earned a bachelor's degree within six years, according to the 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 socioeconomic status (SES) based on their parents' education levels, occupations, and income. Then they were grouped into low, middle, and high SES. 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.¹²

Recent research by Sarah Turner and Emily Cook of the University of Virginia (UVa) illustrates how these differences play out at the state level. Overall, Virginia is one of the most highly educated states in the nation. But within the state, college attendance ranges from less than 50 percent of high school graduates in some low-income, predominantly rural school districts to more than 80 percent in some high-income, suburban school districts, based on data from the 2013–14 school year.¹³ There also are systematic differences in the schools to which students apply and eventually enroll; in general, students from less affluent, more rural districts are less likely to apply to and to enroll in high-resource institutions, such as UVa or the College of William & Mary, than students from more affluent, suburban areas. Universities with more resources, as measured by instructional expenditures per student, tend to have higher graduation rates, and their graduates tend to have higher earnings. In part, these outcomes reflect the characteristics of the students most likely to attend high-resource schools, but they also reflect the benefits of greater resources.

Is the Problem Paying for College?

Given the correlations between family income, college enrollment, and college completion, not to mention widely publicized tuition increases in recent decades, one approach to reducing disparity has been to increase the availability of need-based financial aid.¹⁴ Thus, at most schools, there is a large difference between sticker price and net price, especially for students from lower-income families. And at some of the most selective (and expensive) schools, the availability of considerable need-based financial aid produces realized net costs for low- and moderate-income families that actually are lower than net costs at less selective schools. The posted price to attend UVa, for example, is nearly \$27,000 per year. But for a student with a family income between \$30,000 and \$39,999, the average net price is about \$11,000 per year. In contrast, the sticker price to attend Old Dominion University, in Norfolk, Virginia, is \$21,523, while the net price for a low-income student is \$15,170.¹⁵

Many students do not seem to have full information about college costs. In a 2015 survey, Zachary Bleemer of the University of California, Berkeley and Basit Zafar of Arizona State University found that students and their families believed the annual net cost of attending a four-year college was about \$10,000 higher than the actual net cost. Lower-income families and families where the parents had not attended college were more likely to overestimate costs.¹⁶

While posted prices can make a college seem less attainable than it actually is, paying for any college may remain a burden for many families.¹⁷ Research by John Bailey Jones of the Richmond Fed and Fang Yang of Louisiana State University suggests that if college costs had stopped increasing after 1961, enrollment would have been 3 percent to 6 percent higher in 2010.¹⁸

Need-based financial aid makes many high-resource institutions, such as the University of Virginia, more affordable than their sticker prices may indicate.



UVa PHOTO



Many students drop out of college after they discover that their grade performances are insufficient to earn degrees.

In addition, the returns to college are uncertain, both because of the likelihood of noncompletion and because of earnings variation even among those who do graduate. This uncertainty, combined with the costs of college, makes college a risky investment. Some students who choose not to enroll, particularly those from low-wealth households, appear to be making rational decisions because the risks to them are large enough to exceed the expected gains.¹⁹

Why do some students fail to complete college? Research suggests that the decision to drop out reflects a process of learning about one's own ability; many students seem to lack sufficient knowledge about their academic ability when they enter college, and they drop out based on what they learn about their ability after they enroll.²⁰

This process of self-discovery may work differently for students from different socioeconomic backgrounds, according to research by Ali Ozdagli of the Boston Fed and Nicholas Trachter of the Richmond Fed.²¹ In a 2015 paper, they developed a model in which students enroll in college and are endowed with a particular wealth level. Students learn about their ability to accumulate skills by taking exams; each time they take an exam, they update their beliefs about their abil-

ities and weigh the expected gains from completing college against the costs of remaining in college. Ozdagli and Trachter demonstrate that students' initial wealth levels affect their belief threshold for dropping out. Wealthier students are less risk-averse and thus more likely to continue investing in the risky asset, that is, to continue attending college. Poorer students are about 27 percent more likely to drop out. They also drop out about one year earlier.²²

It might also be the case that children from families with fewer resources are less prepared for college in the first place. Virginia Commonwealth University economists Adam Blandin and Christopher Herrington have studied how college attainment varies among students from different family backgrounds and whose parents have different education levels. In general, they found that college completion rates have increased more for students who grew up in a two-parent household where at least one parent had a bachelor's degree or higher. The authors attribute this difference to the fact that these "high-resource" families are able to invest more in preparing their children for college.²³

Preparing Students for College

This research raises the question: Why are some students better prepared than others? Preparation includes two key 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.²⁴

The schools children attend also affect the second major component, academic preparation. In the United States, residential neighborhoods are the predominant mechanism of assigning students to schools. The value of a neighborhood's schools in turn affects its housing prices. This gives wealthier parents more options, as they can afford to move to neighborhoods with higher housing prices and better quality schools or opt to send their children to private schools. Recent research by Sean Reardon of Stanford University found that students in the most and least socioeconomically advantaged school districts performed an average of four grade levels apart.²⁵

While research suggests school quality improves academic outcomes, defining "quality" is no simple task. Researchers have been attempting to do so since at least the 1960s, when Johns Hopkins University sociologist James Coleman conducted the first comprehensive survey of the U.S. educational system.²⁶ (Coleman concluded that a school's physical amenities were less of a factor in achievement than a student's peers and socioeconomic background and that disadvantaged students in particular would benefit from greater diversity.)

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 difficult 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.²⁷ For example, a one standard deviation increase in teacher quality has been shown to raise math achievement by 0.15 to 0.24 standard deviations per year and reading achievement by 0.15 to 0.20 standard deviations per year.²⁸ 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.²⁹ 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.³⁰

Switching to a small class can raise a student's test scores by about 0.15 standard deviations, 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. In addition, 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' socioeconomic status and their access to quality schools. Proponents of

Switching to a small class can raise a student's test scores by about 0.15 standard deviations, according to studies of Project STAR.



expanding school choice also argue that offering more alternatives to traditional public schools will 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.³¹ 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.³² (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. Several recent studies actually found that test scores declined for children using vouchers to attend private schools.³³ This might reflect the fact that private schools with declining enrollment, perhaps because of lesser academic quality, are more likely to participate in voucher programs.

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. Charter schools have become widespread since the early 2000s. Currently, at least forty-two states and D.C. have passed legislation allowing charter schools, including every state in the Fifth District. From the 2004–05 school year through the 2014–15 school year, the percentage of all public schools that were public charter schools increased from 4 percent to 7 percent, and the number of students enrolled in public charter schools increased from about 900,000 to 2.7 million, according to the NCES.

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.³⁴ Because charter schools vary widely in their instructional approaches, however, any positive results might only be applicable to the particular schools studied.³⁵

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 a school's capacity and which students receive priority.³⁶

In the Fifth District, the Charlotte-Mecklenburg school district offered open enrollment for the 2002–03 school year after a court ruling ended a decades-old busing program.³⁷ One study found that students who used the choice program to attend a school with higher test scores had significant gains in academic achievement.³⁸ 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.³⁹

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.



It is possible that better preparation could lead to higher college completion rates without increasing the number of college graduates.

Beyond College

This essay has focused on college completion rates as a factor restricting the supply of college graduates in the United States, including how students' preparation during K-12 affects their chances of earning a degree. It is possible, however, that improvements in preparation could lead to higher college completion rates without increasing the number of graduates: to the extent "knowledge about college" is part of being prepared, students 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. For those students, information about and access to vocational training or apprenticeship programs, for example, could increase the value of finishing high school and improve their labor market outcomes relative to dropping out.⁴⁰

In addition, while most studies of school quality focus on academic gains, these are not the only reasons to try to improve schools. Efforts to improve school quality also may improve students' noncognitive skills and thus affect labor market outcomes through those channels. For example, one study of Project STAR found that class quality (as measured by students' end-of-year test scores) in kindergarten through third grade had significant effects on skills such as effort, initiative, and lack of disruptive behavior in later grades.⁴¹ These skills, in turn, are highly correlated with earnings later in life even after conditioning on test scores. These results suggest that high-quality classrooms may lead to improved labor market outcomes long after their effects on test scores have dissipated. ■

Urvi Neelakantan is a senior policy economist and Jessie Romero is a senior economics writer in the Research Department at the Federal Reserve Bank of Richmond. The authors are grateful to John Bailey Jones, Karl Rhodes, Nicholas Trachter, and John A. Weinberg for many helpful comments.

The views expressed are those of the authors and not necessarily those of the Federal Reserve Bank of Richmond or the Federal Reserve System.

Endnotes

- ¹ For an overview, see Duncan and Magnuson (2013).
- ² For more on the natural rate, see Lubik and Matthes (2015).
- ³ Cette, Fernald, and Mojon (2016).
- ⁴ Hornstein, Krusell, and Violante (2007).
- ⁵ Goldin and Katz (2010), p. 20.
- ⁶ Castro and Coen-Pirani (2016).
- ⁷ Increasing demand and higher wages for high-skill workers is generally attributed to “skill-biased technical change,” or changes in technology that increase the productivity of workers with the education to use the new technologies. For more, see Goldin and Katz (2010) and Jones and Yang (2016). There is some debate, however, about whether the value of a college degree stems from the knowledge gained during college or from the “signal” sent by obtaining a degree (Caplan 2018). Also, Schwartzman (forthcoming) illustrates how spillovers among skilled workers may contribute to higher wages for those workers.
- ⁸ Some economists are now asking why the premium has not continued to increase. Some research suggests the demand for high-cognitive workers has actually decreased since 2000, leading college-educated workers to move down the occupational ladder and perform jobs typically held by less-skilled workers (Beaudry, Green, and Sand 2016). Other research finds that technological change has polarized the labor market and led to a decline in middle-skill jobs (Acemoglu and Autor 2011; Autor and Dorn 2013). Valletta (2017) finds evidence of both “de-skilling” and polarization.
- ⁹ For more on changing wage structures, see Goldin and Katz (2010) and Goldin and Margo (1992).
- ¹⁰ Blandin, Herrington, and Steelman (2018).
- ¹¹ Blandin, Herrington, and Steelman (2018).
- ¹² National Center for Education Statistics, “Education Longitudinal Study of 2002.”
- ¹³ Cook, Romero, and Turner (2017).
- ¹⁴ It’s also possible that the greater availability of financial aid has enabled colleges to raise tuition more than they otherwise would have.
- ¹⁵ Cook, Romero, and Turner (2017).
- ¹⁶ Bleemer and Zafar (2018).
- ¹⁷ The evidence on whether financial factors restrict college attendance is mixed. See Lochner and Monge-Naranjo (2012).
- ¹⁸ Jones and Yang (2016).
- ¹⁹ Athreya and Eberly (2016); Hendricks and Leukhina (forthcoming).
- ²⁰ Stinebrickner and Stinebrickner (2008) and (2012).
- ²¹ Ozdagli and Trachter (2015).
- ²² In related research, Trachter (2015) finds that community colleges are a relatively inexpensive way for students to learn about their ability before potentially transferring to a four-year college.
- ²³ Blandin, Herrington, and Steelman (2018).
- ²⁴ Hoxby and Avery (2013).
- ²⁵ Reardon (2016).
- ²⁶ Coleman (1966).
- ²⁷ Rivkin, Hanushek, and Kain (2005); Schanzenbach (2006).
- ²⁸ See Fryer (2013).
- ²⁹ Rivkin, Hanushek, and Kain (2005).
- ³⁰ See Neal (2011) for a discussion of teacher incentives.
- ³¹ For an overview of the literature on peer effects, see Sacerdote (2011).
- ³² Vermont and Maine also have voucher programs, but these are long-standing policies for students who live in towns without a public school.
- ³³ For example, see Figlio and Karbownik (2016).
- ³⁴ See Hoxby and Rockoff (2005); Gronberg and Jansen (2001); Abdulkadiroğlu et al. (2011); and Booker et al. (2011).
- ³⁵ Bifulco and Ladd (2006).
- ³⁶ 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, visit the Education Commission of the States at www.ecs.org/open-enrollment-policies.
- ³⁷ CMS serves roughly 150,000 students in North Carolina and is the eighteenth-largest school district in the country.
- ³⁸ Hastings and Weinstein (2008).
- ³⁹ Deming et al. (2014).
- ⁴⁰ Cullen, Levitt, Robertson, and Sadoff (2013).
- ⁴¹ Chetty et al. (2011).

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Fifth District Economy Gains Strength in 2017

Economic activity in the Fifth Federal Reserve District expanded moderately in 2017, according to anecdotal reports and economic data compiled by the Richmond Fed. Labor markets strengthened as payrolls expanded and wage growth picked up. In fact, compared with 2016, more firms reported raising starting wages, offering sign-on bonuses, or expanding benefits packages to attract qualified workers. Fifth District manufacturers and services firms generally reported solid growth in 2017. Hurricanes Harvey and Irma hurt some businesses, but the effects were largely temporary. Real estate markets continued to improve as home prices rose and residential and commercial construction activity expanded, although builders struggled to find enough buildable lots and construction labor to meet growing demand, so inventories of homes for sale declined in many markets.

Labor Markets

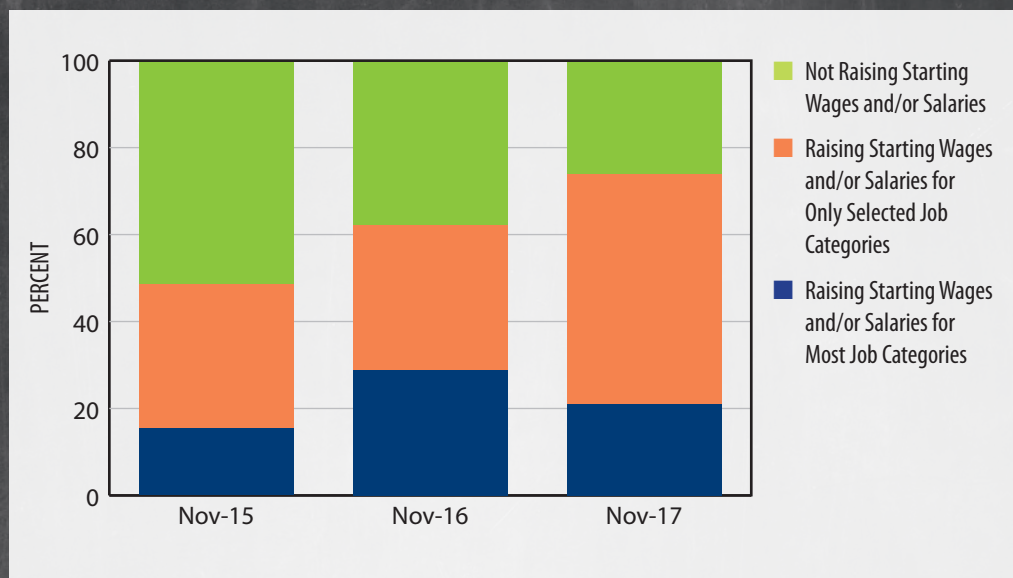
Labor market conditions generally improved during the year. By December 2017, payroll employment in the Fifth District had grown 0.9 percent since the end of 2016, somewhat less than the national rate of 1.5 percent. The only two Fifth District jurisdictions to outpace national growth were South Carolina and North Carolina, where employment expanded 1.6 percent in each state. Maryland reported the slowest year-over-year growth in the District at just 0.1 percent, while employment growth in the District of Columbia (D.C.), Virginia, and West Virginia ranged from 0.5 percent to 1 percent.

In the Fifth District as a whole, the professional and business services industry led employment growth in absolute terms (37,900 jobs), while the natural resources, mining, and construction industry reported the largest percentage growth of 2.4 percent by adding 17,900 jobs. Overall job growth was constrained, however, by slow growth in the District's two largest sectors—government and trade, transportation, and utilities—which grew 0.1 percent and 0.4 percent, respectively, and by a 0.2 percent decline in the District's smallest sector, information.

Meanwhile, the unemployment rate in the Fifth District ended the year at 4.2 percent, which was just slightly above the national rate of 4.1 percent. In 2017, the District unemployment rate reached its lowest mark since October 2007. Since last December, jobless rates declined in every jurisdiction, with the largest improvements occurring in North Carolina and Virginia, where each rate declined 0.5 percentage points. Virginia continued to report the lowest unemployment rate in the District at just 3.6 percent in December 2017.

Anecdotes from across the Fifth District also indicated a tightening labor market in 2017 as many employers reported difficulty filling open positions. Some of the most often cited shortages were for engineers, accountants, information technology specialists, construction workers,

Figure 1:
Changes in Starting
Wages and/or Salaries
to Attract New Hires



SOURCE: Richmond Fed surveys of Fifth District employers, November 2015, 2016, and 2017
 NOTE: Respondents were asked which of these three approaches best describes any changes in their starting wages and/or salaries to attract new hires.

and truck drivers. In a survey conducted by the Richmond Fed in November 2017, employers were asked which approaches they took to find workers. The most selected answer was retaining and promoting existing employees to reduce the need for new hires, followed by increasing the wages, signing bonuses, or benefits offered to new hires. Other popular approaches were to hire less-qualified applicants and train them or to use a temporary staffing agency.

Moreover, when asked about the use of starting wages to attract new hires, nearly 74 percent of responding firms in November said they had raised starting wages for some or most job categories. By comparison, when the same survey was conducted two years ago, less than 50 percent of respondents reported raising starting wages. Existing employees were also more likely to see wages increase more than in previous years, according to the survey results.

The most recent data from the Bureau of Labor Statistics' Quarterly Census of Employment and Wages reinforced the anecdotal evidence. The average wage across industries in the District during the four quarters ending in September 2017 was up 2.2 percent from the same period in 2016. Employees in the construction industry saw the largest average wage growth of 4.1 percent, followed by those engaged in financial services, where the average wage rose 3.5 percent. The average wage in the professional and business services industry grew 2.5 percent from the fall of 2016 to the fall of 2017.

Business Conditions

Manufacturing activity strengthened in 2017 and had its strongest year since 2010 by some metrics. The Richmond Fed maintains a composite manufacturing index based on its Fifth District Survey of Manufacturing Activity. It is a diffusion index, meaning that a positive reading indicates that the share of firms reporting expansion exceeds the share of firms reporting contraction. The composite index spent all of 2017 above zero, ranging from three to thirty. The reading of thirty was the highest on record, and the last time the index reached a value greater than twenty-five was in April 2010.

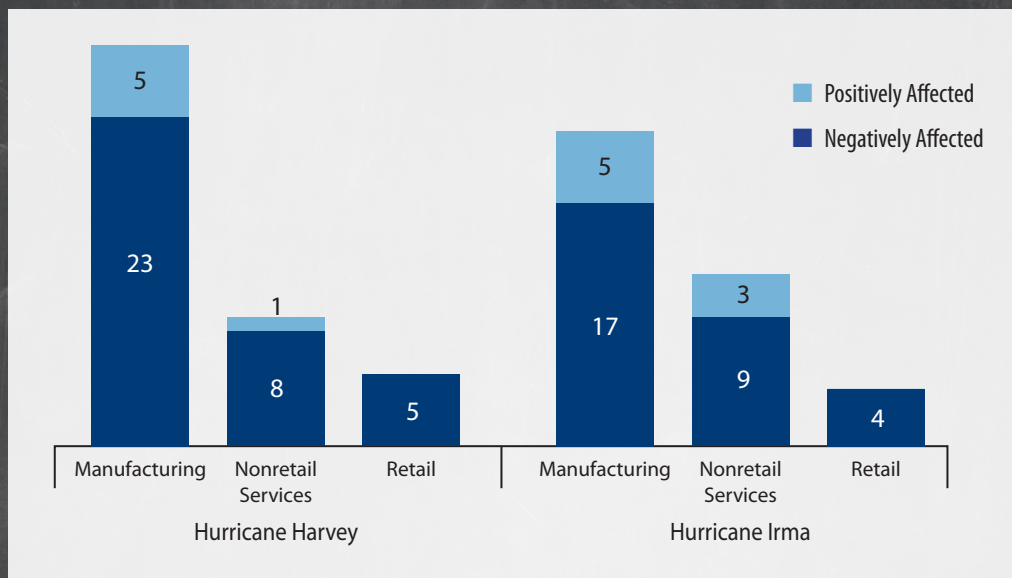


Figure 2:
Survey Respondents
Who Reported Being
Affected (Positively
or Negatively) by
Hurricane Harvey or
Hurricane Irma

SOURCE: Richmond Fed survey of Fifth District businesses, October 2017
 NOTE: Two-thirds of 158 total respondents reported no effects from either hurricane.

Anecdotal reports from manufacturers were also generally positive throughout the year. Some of the most consistently positive accounts came from manufacturers of metals, computer and electrical components, plastics, rubber, and corrugated packaging and pulp. Food manufacturers reported solid growth but faced narrow profit margins. Several manufacturers cited increased production coming as a result of investment in new equipment. However, despite consistently positive index readings for employment from the Bank’s survey, many expressed challenges finding and retaining skilled labor.

In August and September, Hurricanes Harvey and Irma had some direct and indirect effects on District manufacturers, most of which were negative. The most noted impacts were supply chain disruptions and increased prices for items such as gas, freight, lumber, and plastic resin. There were also some reports of plant and mill shutdowns, delayed delivery times and lagged payments, and decreased sales in affected locations. On the other hand, a few manufacturers saw sales and production increase as new orders were diverted to them from plants that were directly hit by the storms.

Services firms consistently reported expanding business activity in 2017, according to the Bank’s services sector survey, in which the revenues index for the sector remained above zero all year, ranging from ten to thirty. Anecdotally, some of the strongest growth was reported by transportation and hospitality services. For example, ports in Maryland and South Carolina reported record levels of cargo units shipped, while many hotels and restaurants across the District benefited from robust tourist activity.

The retail industry also strengthened in 2017, according to both anecdotes and the Richmond Fed survey, in which the index for revenues remained well above zero all year. Despite reports of intensifying competition from online retailers, many brick-and-mortar establishments experienced growth in sales, particularly for big-ticket items such as furniture, appliances, and recreation and outdoor equipment.

The survey indexes for employment in the manufacturing and services sectors were mostly consistent with the labor market data. The manufacturing index for employment

Fifth District localities issued a total of 154,511 residential building permits in 2017, an 11.3 percent increase from 2016.



started the year off at a value of six and rose over the course of the year to end at a reading of twenty. Manufacturers generally said that strengthening demand for their products drove the need to hire. However, many also noted difficulty finding workers with the requisite skills, a problem that put upward pressure on starting wages. These reports were supported by the survey measure of manufacturing wages, which steadily rose during the year.

Likewise, the services sector measure of employment averaged seventeen during the year, which was up from an average of thirteen in 2016. In the nonretail subsector, the employment index was consistently elevated at values typically between fifteen and twenty. Meanwhile, the same index in the retail subsector, which also held above zero all year, peaked at forty in July, which was the highest reading in the survey's twenty-five-year history. As in the manufacturing industry, the index for wages in the overall services sector trended higher in 2017, averaging twenty-four (up from twenty in 2016).

Fewer services firms were affected by the hurricanes than manufacturers, but almost all of the reported effects were negative. The most common impact was a decline in sales in the affected regions. Additionally, some services firms noted that the storms caused transportation and warehousing disruptions and delayed deliveries from suppliers.

Real Estate

Fifth District housing markets improved in 2017. House prices, according to CoreLogic Information Solutions, grew 4.2 percent from the previous year, which lagged the national annual growth rate of 6.6 percent. House prices in North Carolina and South Carolina rose the fastest (5.5 percent and 5.3 percent, respectively), while prices in D.C. grew the slowest (2.5 percent). Contacts also noted low inventory levels and said that desirable properties were selling quickly.

Residential construction expanded, on the whole, despite growing constraints in the availability of buildable lots, rising materials costs, and challenges finding construction workers. In several cases, the constraints drove up prices for new homes at a faster rate than for existing homes. Although multifamily construction started to slow in many markets, some areas continued to report expansion in multifamily compared with 2016. Fifth District jurisdictions issued a combined 154,511 residential building permits in 2017, which was an increase of 11.3 percent from the prior year. Single-family permits grew 12.4 percent, while multifamily permits grew 8.9 percent. Total housing starts grew slightly slower than total permits, increasing 8.7 percent in 2017.

Commercial real estate activity also expanded in 2017, particularly for industrial development and for warehousing and distribution centers. There were also some reports of strong demand for more health care space. In some markets, the demand for retail construction picked up, particularly for smaller spaces and in mixed-use developments. Office and retail leasing generally rose, and average rents reportedly moved higher.

Banking Conditions

Bank consolidation continued in 2017, and Fifth District banking conditions improved overall. However, net interest margins remained compressed, some banks utilized increasingly higher levels of volatile funding sources to support loan growth, and small pockets of credit-quality problems began to develop.

District banks' earnings improved in 2017, though earnings challenges remained. The District's median return on average assets of 0.78 percent, as of the third quarter, reached its highest level since 2007, but the District median stayed below the national median of 0.98 percent. Earnings improvements were primarily the result of lower overhead expenses with about two-thirds of District banks improving their efficiency ratios. However, small District banks continued to be less efficient compared with larger institutions, a fact that may be fueling industry consolidation. While interest rates increased over the year, District banks' net interest margins remained flat. In addition, banks' fourth-quarter earnings across the nation were negatively impacted by corporate tax reform. Bankers expect to benefit from the lower corporate tax rate over the long term, but the new law required many institutions to recognize one-time write-downs to their deferred tax assets in the fourth quarter.

Loan growth was solid and supported by increasing capital ratios on average. District banks' balance sheets expanded at a median pace of 6.1 percent, slightly above the national year-over-year median growth rate of 5.8 percent. Although slower than the prior year, loan growth remained strong across all lending categories, particularly in the commercial real estate (CRE) sector. In addition, some District banks continued to maintain relatively heavy reliance on potentially volatile funding sources, which may include brokered deposits, uninsured deposits, and listing service deposits. While, on average, noncore funding levels have trended downward since the financial crisis, District levels continued to be higher than national levels.

Nonperforming loans and net losses remained low; however, credit-quality indicators deteriorated slightly in a few specific areas, such as the consumer category at large banks and in CRE portfolios at some small and midsize banks. On average, District banks' loan loss provisions declined slightly as a percent of total expenses from a year ago.

Conclusion

On balance, the Fifth District economy expanded in 2017 and outpaced growth in 2016 by many metrics. Employment increased during the course of the year, and tighter labor market conditions put more pressure on firms to raise starting wages or expand benefits. Residential and commercial real estate activity picked up in 2017, although builders faced headwinds of a shortage of available lots and difficulty finding workers. In general, businesses across the District reported growing optimism throughout 2017 that extended into a positive outlook for growth in 2018. ■

The Richmond Fed Operates Around the Clock

As one of twelve Reserve Banks in the Federal Reserve System, the Richmond Fed performs several key functions. It contributes to the formulation of monetary policy. It supervises and regulates banks as well as bank and savings and loan holding companies that are headquartered in the Fifth Federal Reserve District. And it processes currency and electronic payments for depository institutions and acts as a fiscal agent for the federal government. In addition, the Richmond Fed works with a variety of partners to strengthen communities throughout the Fifth District. Given the importance of these public-service responsibilities, the Bank operates around the clock every day.



As an examiner of large financial institutions, Jadrian Jones travels to conduct onsite examinations. Bank supervision is a key function of the Richmond Fed.



At a pre-FOMC meeting, research economists listen intently to a discussion of inflation dynamics led by senior economist Felipe Schwartzman.



Assistant cash manager Neesha Livingston moves twenty-dollar bills toward the currency-processing equipment in the Bank's Richmond office. Processing cash is a critical service to banks and the public.



Senior regional economist Andy Bauer, who works in the Baltimore office, introduces a speaker at the Bank's Industry Roundtable Summit. Roundtables are one way the Bank gathers regional economic information.



Smash, an automated vehicle in the Charlotte office's cash operation, does all the heavy lifting, while his mechanical coworkers, Flash and Crash, take a break in the background.

Conducting Monetary Policy

The Federal Open Market Committee (FOMC) conducts monetary policy—primarily by setting and influencing interest rates—to promote stable prices, maximum employment, and moderate long-term interest rates.

The Richmond Fed's Research Department helps prepare the Bank's president for monetary policy deliberations at FOMC meetings, advises him on banking- and financial-regulatory policy, and helps him develop views on economic issues of relevance to residents in the Fifth District. The department also seeks to be the premier source of economic information and analysis to District stakeholders. These functions require that the department's economists remain at the frontier of scholarly research, that the department's economics writers convey key concepts through publications for the general public, and that the department's economic educators create engaging content for students. The department's functions also require extensive regional outreach—with surveys, business roundtables, advisory groups, and the Bank's directors—to better understand business and economic conditions in the Fifth District and the nation.

Supervising and Regulating Banks

Another primary function of the Richmond Fed is to supervise and regulate banks as well as bank and savings and loan holding companies headquartered in the Fifth District. Working together with agencies at the state level and with the comptroller of the currency and the Federal Deposit Insurance Corporation at the national level, Reserve Banks help to promote confidence in the U.S. banking system.

At the Richmond Fed, staff members determine the soundness of institutions' assets by conducting regular examinations and inspections to evaluate the effectiveness of policies, management, operations, and risk-management practices. Examiners also assess compliance with banking laws and regulations and sensitivity to various risks, including risks related to the quality and reliability of institutions' computer systems and networks.

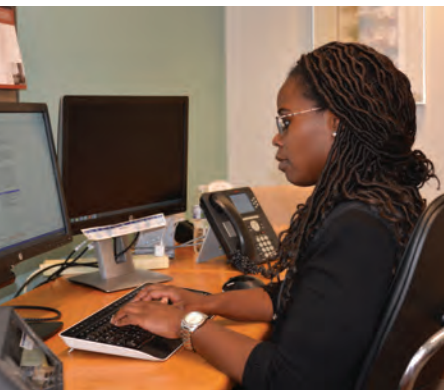


Steve Wilson (left) and Brent Hassell manage examinations in the community and regional group of the Supervision, Regulation, and Credit Department.



Regional community development manager Jen Giovannitti (left) meets with Evette Roots and Reggie Gordon at the City of Richmond's Office of Community Wealth Building.

Linda Hall pitches in on a Habitat for Humanity project in Hanover County, Virginia. Linda is the civic engagement office program lead in the Outreach Department.



Tichia Fleming provides guidance to managers in the Human Resources Department, where she is an HR business partner. HR strives to make the Bank a great place to work.

Processing Cash and Electronic Payments

Reserve Banks often are described as “bankers’ banks.” In other words, they provide services to depository institutions that are similar to the services that depository institutions provide to their customers.

For example, when people in the Fifth District demand more currency from the banking system, depository institutions withdraw cash from their accounts at the Richmond Fed. Conversely, when people in the Fifth District demand less currency from the banking system, depository institutions deposit surplus cash in their accounts at the Richmond Fed.

The Bank also helps facilitate electronic payments, including funds transfers (via Fedwire) and the automated clearinghouse (ACH). Fedwire typically conveys large-value, time-critical payments, while the ACH allows depository institutions to send electronic credits and debits to each other. The direct deposit of paychecks, Social Security benefits, and tax refunds are typical examples of ACH credits. The direct payment of mortgage installments and utility bills are common examples of ACH debits.

Strengthening Communities

The Richmond Fed’s Community Development Group works with local partners to identify and address economic challenges and opportunities in low- and moderate-income communities in the Fifth District. In doing so, the group focuses on people, places, small businesses, and policies and practices.

The focus on people includes identifying and promoting best practices in workforce development and financial education. The small business focus supports such firms in the Fifth District by gathering and analyzing data related to small businesses’ access to technical and financial resources. The focus on places includes studying and advancing comprehensive community development efforts that are geographically specific, while the policy and practice focus looks for ways to advance the field of community development more



In Centralized Payroll Operations, business analyst Laura Blackmon checks withholding amounts for local, state, federal, Social Security, and Medicare taxes.



Advanced operations technician Duke Turpin in National IT verifies that servers are running properly.



General ledger and payroll accounting supervisor Stan Pruemer transmits balance sheet information to the Board of Governors of the Federal Reserve System.

generally. For example, the department assists banks in implementing the Community Reinvestment Act, which requires depository institutions to help meet the credit needs of their communities, including low- and moderate-income neighborhoods.

Supporting the Bank's Operations

To support the key functions outlined above, many Richmond Fed staff members provide a variety of services that are necessary for any large organization to function efficiently and effectively. Examples include accounting, auditing, client services, corporate communications, corporate planning, facilities management, health services, human resources, information management, law enforcement, legal services, risk mitigation, statistical analysis, and technological solutions.

In addition to these supporting roles, the Richmond Fed hosts and provides leadership for four support functions throughout the Federal Reserve System: National IT, the Currency Technology Office, the National Procurement Office, and Centralized Payroll Operations.

As their names imply, Centralized Payroll Operations provides payroll services to all twelve Reserve Banks' employees, while the National Procurement Office leverages the combined purchasing power of the Reserve Banks. The Currency Technology Office is responsible for supplying the processing equipment, software, and authentication sensors to all Reserve Banks to ensure confidence in the use of U.S. currency globally.

The Bank's largest system-wide support function is performed by National IT, which provides enterprise information technology architecture and standards, enterprise information security policy and assurance, computing and network operations, project services, and end-user services to all Reserve Banks and their national product and support offices. National IT also provides services to the Board of Governors of the Federal Reserve System and the U.S. Treasury. ■



Patty Belisle, a sourcing analyst in the National Procurement Office, negotiates contracts to ensure that the Federal Reserve System is getting the best value from vendors.

Boards, Councils, Officers, and Senior Professionals

FEDERAL RESERVE BANK OF RICHMOND BOARD OF DIRECTORS

The Bank's Board of Directors oversees management of the Bank and its Fifth District offices, provides timely business and economic information, participates in the formulation of national monetary and credit policies, and serves as a link between the Federal Reserve System and the private sector. Six directors are elected by banks in the Fifth District that are members of the Federal Reserve System, and three are appointed by the Board of Governors. Directors who are not bankers appoint the Bank's president and first vice president with approval from the Board of Governors.

The Bank's Board of Directors annually appoints the Fifth District's representative to the Federal Advisory Council, which consists of one member from each of the twelve Federal Reserve Districts. The council meets four times a year with the Board of Governors to consult on business conditions and issues related to the banking industry.

BALTIMORE AND CHARLOTTE BRANCHES BOARDS OF DIRECTORS

The Bank's Baltimore and Charlotte branches have separate boards that oversee operations at their respective locations and, like the Richmond Board, contribute to policymaking and provide timely business and economic information about the District. Four directors on each of these boards are appointed by the Richmond directors, and three are appointed by the Board of Governors.

COMMUNITY DEPOSITORY INSTITUTIONS ADVISORY COUNCIL

Created in 2011, the Bank's Community Depository Institutions Advisory Council advises the Bank's management and the Board of Governors on the economy, lending conditions, and other issues from the perspective of banks, thrifts, and credit unions with total assets under \$10 billion. The council's members are appointed by the Bank's president.

COMMUNITY INVESTMENT COUNCIL

Established in 2011, the Community Investment Council advises the Bank's management about emerging issues and trends in communities across the Fifth District, including low-income and moderate-income neighborhoods in urban and rural areas. The council's members are appointed by the Bank's president.

PAYMENTS ADVISORY COUNCIL

Created in 1978, the Payments Advisory Council serves as a forum for communication with financial institutions about financial services provided by the Federal Reserve. The council helps the Bank respond to the evolving needs of its banking constituency. Council members are appointed by the Bank's first vice president.

THANK YOU

Thank you to the directors who completed their service in 2017: Calvin G. Butler Jr. of the Richmond Board and Claude Z. Demby of the Charlotte Board.

In 2017, the Bank welcomed Laura C. Meagher to the Charlotte Board.

Lists of boards and councils on the following pages include members, titles, and affiliations as of December 31, 2017.

Board of Directors—Federal Reserve Bank of Richmond

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HCA Capital Division
Richmond, Virginia*

DEPUTY CHAIR

Kathy J. Warden

*Corporate Vice President
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*Chairman and
Chief Executive Officer
Bank of America
Charlotte, North Carolina*



Front: Margaret G. Lewis; from the left, second row: William A. Loving Jr. and Susan K. Still; third row: Kathy J. Warden, Ángel Cabrera, and Calvin G. Butler Jr.; back row: Catherine A. Meloy, Thomas C. Nelson, and Robert R. Hill Jr.

Board of Directors—Baltimore Branch

CHAIR

Susan J. Ganz

Chief Executive Officer
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Owings Mills, Maryland

Kenneth R. Banks

*President and
Chief Executive Officer*
Banks Contracting Company
Greenbelt, Maryland

Christopher J. Estes

*Consultant on Business
Development and Advocacy*
Rebuilding Together of
Washington, D.C.

Wayne A. I. Frederick

President
Howard University
Washington, D.C.

Laura L. Gamble

Regional President
Greater Maryland
PNC
Baltimore, Maryland

Mary Ann Scully

*Chairman, President, and
Chief Executive Officer*
Howard Bancorp
Ellicott City, Maryland

Austin J. Slater Jr.

*President and
Chief Executive Officer*
Southern Maryland Electric
Cooperative, Inc.
Hughesville, Maryland



*From the left, front row: Kenneth R. Banks and Susan J. Ganz;
middle row: Mary Ann Scully, Austin J. Slater Jr., and Wayne A. I. Frederick;
back row: Christopher J. Estes and Laura L. Gamble*

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Chief Executive Officer*
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Charlotte, North Carolina



*From the left, front row: Laura Y. Clark and Claude Z. Demby;
middle row: Michelle A. Mapp, Michael D. Garcia, and R. Glenn Sherrill Jr.;
back row: Michael C. Crapps and Jerry L. Ocheltree*

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**In 2017, Robert A. DeAlmeida served as the Fifth District's representative on the Community Depository Institutions Advisory Council at the Board of Governors of the Federal Reserve System.*

List includes members, titles, and affiliations as of December 31, 2017.

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Chief Executive Officer
Freedom First Federal
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List includes members, titles, and affiliations as of December 31, 2017.

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CHAIR

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Kim Bunn

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Senior Vice President and Treasurer
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President and Chief Executive Officer
MACHA—The Mid-Atlantic Payments Association
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Chairman and Chief Executive Officer
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Fairfax, Virginia

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American National Bank and Trust Company
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Senior Vice President, Deposit Operations
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Grantsville, West Virginia

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Avery Miller

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Chief Information Officer
Chesapeake Bank
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ePayResources
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David Willis

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Scott P. Young

Director of Payments and Card Services
Bank-Fund Staff Federal Credit Union
Washington, D.C.

Gayle Youngblood

Assistant Vice President, Product Management
State Employees Credit Union of Maryland
Linthicum, Maryland

List includes members, titles, and affiliations as of December 31, 2017.

Management Committee

Mark L. Mullinix

Interim President and Chief Operating Officer

Kartik B. Athreya

Executive Vice President and Director of Research

Becky C. Bareford

*Senior Vice President, OMWI
Director, Human Resources, and
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Baltimore Regional Executive*

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*Senior Vice President and
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*Senior Vice President and
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*Senior Vice President and
General Auditor*

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*Executive Vice President,
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Credit*



From the left, front row: Michelle H. Gluck, Mark L. Mullinix, and Kartik B. Athreya; middle row: Becky C. Bareford, David E. Beck, Goutam R. Gandhi, and Lisa A. White; back row: Roland Costa, Michael D. Stough, and Matthew A. Martin

List includes members of the management committee and titles as of December 31, 2017.

Bank Officers and Senior Professionals

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Senior Manager*

Steven T. Bareford

Assistant Vice President

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Assistant Vice President

Jeremy B. Caldwell

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Vice President

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Assistant Vice President

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Assistant Vice President

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Vice President

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Assistant General Auditor*

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Assistant Vice President

D. Keith Larkin

Assistant Vice President

Thomas A. Lubik

Senior Advisor

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Assistant Vice President

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Assistant Vice President

Christian Matthes

Senior Economist

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Assistant Vice President

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Vice President

Diane H. McDorman

Vice President

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Vice President

Johnnie E. Moore

Assistant Vice President

Christopher W. Murphy

Assistant Vice President

Urvi Neelakantan

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Group Vice President

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Vice President

Dennis H. Ott Jr.

Assistant Vice President

Raymond E. Owens III

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Assistant Vice President

Hemangini R. Parekh

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Patricia A. Perry

Assistant Vice President

Santiago M. Pinto

Senior Policy Economist

Stanley F. Poszywak

Large Bank Principal Examiner

William O. Riley

Senior Vice President

William C. Robinson

Assistant Vice President

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Assistant Vice President

Todd M. Ryan

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Steven D. Sanderford

Large Bank Principal Examiner

Pierre-Daniel G. Sarte

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Assistant Vice President

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Felipe F. Schwartzman

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Assistant Vice President

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Assistant Vice President

Sandra L. Tormoen

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Assistant Vice President

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Assistant Vice President

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Senior Economist

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Assistant Vice President

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*Senior Economist and
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Policy Advisor

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Vice President

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Assistant Vice President

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Vice President

Terry J. Wright

Group Vice President

H. Julie Yoo

Vice President

*List includes officers, senior
professionals, and titles as of
December 31, 2017.*

National IT Management Council

Lyn McDermid

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*Senior Vice President and
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Devon A. Bryan

*Executive Vice President and
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Ghada M. Ijam

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*Senior Vice President,
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Kathryn K. Smith

*Executive Vice President for
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Robert I. Turner

*Executive Vice President and
Chief Operating Officer*

*List includes members of the
management council and titles
as of December 31, 2017.*



Front: Lyn McDermid; from the left, second row: Scott C. Furman and Robert I. Turner; third row: Ghada M. Ijam, David N. Alfano, and Kathryn K. Smith; back row: Devon A. Bryan, James A. Lammers, and Matthew D. Larson

National IT Officers and Senior Professionals

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Assistant Vice President

Ian W. Beirnes
Business Architect

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Gwendolyn Collins
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Vice President

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Jeanette L. Willette
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Fritz Zeigler
Operational Stack Engineer

List includes officers, senior professionals, and titles as of December 31, 2017.

Financial Statements

The audited annual financial statements of the Federal Reserve Bank of Richmond as of and for the years ended December 31, 2017, and December 31, 2016, are incorporated here by reference. They are available at the Board of Governors of the Federal Reserve System at www.federalreserve.gov/aboutthefed/files/richmondfinstmt2017.pdf. That public disclosure also provides: Notes to Financial Statements, Management's Report on Internal Control over Financial Reporting, and the Independent Auditor's Report.

The Board of Governors' Statement of Auditor Independence is provided below:

Statement of Auditor Independence

The Federal Reserve Board engaged KPMG to audit the 2017 combined and individual financial statements of the Reserve Banks.¹

In 2017, KPMG also conducted audits of internal controls over financial reporting for each of the Reserve Banks. Fees for KPMG services totaled \$6.8 million. To ensure auditor independence, the Board of Governors requires that KPMG be independent in all matters relating to the audits. Specifically, KPMG may not perform services for the Reserve Banks or others that would place it in a position of auditing its own work, making management decisions on behalf of the Reserve Banks, or in any other way impairing its audit independence. In 2017, the Bank did not engage KPMG for any non-audit services.

¹ In addition, KPMG audited the Office of Employee Benefits of the Federal Reserve System (OEB), the Retirement Plan for Employees of the Federal Reserve System (System Plan), and the Thrift Plan for Employees of the Federal Reserve System (Thrift Plan). The System Plan and the Thrift Plan provide retirement benefits to employees of the Board, the Federal Reserve Banks, the OEB, and the Consumer Financial Protection Bureau.

**The Federal Reserve Bank of Richmond
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and Joseph Mengedoth.

**The 2017 Annual Report also is available on the Bank's website:
www.richmondfed.org.**



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