THE LION'S SHARE

Are Markets Becoming Less Competitive?

Federal Reserve Bank of Richmond
2018 ANNUAL REPORT

Contents

Page 2

Page 16

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.

Cover photo: Andy Gehrig, iStock by Getty Images

Message from the President

Market Power Affects Suppliers and the Broader Economy

Have markets become less competitive? It's an important question to study, as Tim Sablik and Nicholas Trachter discuss in this year's annual report essay, which begins on the following page. Firms that face less competition might charge more and produce less. They might pay lower wages or forgo productive investments.

The question is also difficult to answer. For example, the increasing concentration of most industries in the United States would seem to be evidence that market power has increased. But, as Tim and Nico note, it's possible that industries could become more concentrated because the most efficient firms are outcompeting their rivals. In addition, while concentration has increased nationally, in many industries concentration actually has decreased locally, suggesting that competition remains relatively strong in local markets.

Looking through my lens as a former consultant, one aspect of market concentration that strikes me as particularly important is the effect on suppliers: when firms get large, they acquire more bargaining power. This may be easiest to see in the retail sector. In 2017, the five largest retailers in the United States accounted for more than 35 percent of the 100 largest retailers' total U.S. sales. Manufacturers report being pressured to sell their products at lower prices lest they lose their places on stores' shelves. And, as the costs of transportation and information have declined, it has become easier for retailers to develop new suppliers, both domestic and foreign, to take the place of suppliers who can't meet their requirements. This increase in bargaining power is one reason why consumer goods inflation has been quite low over the past twenty years.

One way this bargaining power has been put into practice is the shift toward "private label" goods. Long gone are the days of "generic" food sold in black and white cans. Today, large retailers have the scale to develop their own brands, and the products they can distribute range from gourmet chocolate to pet food to clothing. By one estimate, the dollar share of private label goods will account for more than 25 percent of U.S. sales within the next decade.

Retail isn't the only sector where bargaining power has increased. Beginning in the auto industry, companies across sectors have invested significantly in the capabilities and sophistication of their purchasing departments. Executives are incentivized to avoid price increases, so they look for creative ways to reconfigure their operations to reduce purchasing volume and capture margin dollars from suppliers. When these efforts are successful, they paint a different picture of how market concentration might lead to higher profits—a picture with far lower inflationary pressures. Understanding how market power affects suppliers, and in turn the economy more broadly, is a topic I'm continuing to study.

The issues explored by Tim and Nico in this year's essay are timely and relevant for both policymakers and consumers. I hope you enjoy reading their essay, as well as the other sections of this year's annual report, including a message from our first vice president, Becky Bareford, and a review of the Fifth District's economic performance in 2018.

Tom Barkin
President

Recently, policymakers in the United States and Europe have expressed concerns that firms in certain sectors have become too large and too dominant.

Essay

Are Markets Becoming Less Competitive?

By Tim Sablik and Nicholas Trachter

Many sectors of the U.S. economy seem to be increasingly dominated by a handful of large and powerful players. The tech sector offers a number of well-known examples. The vast majority of smartphones run software developed by one of two companies—Apple or Google. For 98 percent of consumers, the talk and data services that power those phones come from one of four providers—Verizon, AT&T, T-Mobile, or Sprint. And virtually all of the web-based searching on phones and computers flows through one of Google's many platforms, to the point that "googling" has become synonymous with internet searching in general.[1]

Other industries are exhibiting signs of growing concentration as well. By one measure, concentration in the retail sector has increased by more than 400 percent since 1982, and concentration in finance has more than doubled since 1992.[2] Some policymakers have argued that this growing concentration is a sign of weakening competition. A 2016 report from the Council of Economic Advisers (CEA) under former President Barack Obama highlighted this concern: "When there is little or no competition, consumers are made worse off if a firm uses its market power to raise prices, lower quality for consumers, or block entry by entrepreneurs."[3]

The CEA report and other studies point to signs of rising market concentration and falling entry rates for new firms as evidence that markets are becoming less competitive. But while firms with market power are indeed more likely to operate in concentrated markets, concentration by itself is not necessarily a sign of market power. Markets could become concentrated because the most efficient companies outperform their less-productive competitors, for example. Such an outcome presumably would make consumers better off, not worse. Indeed, many sectors of the economy follow a life cycle in which the number of competitors gradually shrinks over time. Mature industries consolidate around the most efficient firms, and this consolidation is not necessarily the result of anticompetitive behavior.[4]

Thus, a key question for policymakers is whether market power, not simply market concentration, is on the rise. Researchers have been hard at work attempting to answer this question. But, as this essay will show, it may be too soon to reach a decisive conclusion.

It might be natural to infer that higher markups also would result in higher inflation, something that certainly would be a concern for the Fed. However, the relationship between markups and inflation is not entirely straightforward.

Why Market Power Matters to the Fed

The Federal Reserve is among the policy institutions keeping a close eye on competition. If firms' market power is rising, that could result in a number of changes for the economy that matter for monetary policy. Monopolistic firms would tend to charge higher prices above their costs of production and underproduce compared with those in competitive environments. The ratio of price to cost is known as the firm's "markup." A recent study found that "the welfare costs of markups are large," primarily because they act as a tax on output.[5] Firms with more market power also may invest less, resulting in slower productivity growth.[6] To the extent that this behavior is widespread across industries, it could lead to a general slowdown in productivity and, as a result, impair long-run economic growth.

It might be natural to infer that higher markups also would result in higher inflation, something that certainly would be a concern for the Fed. However, the relationship between markups and inflation is not entirely straightforward. Inflation is a measure of rising prices generally, but markups measure how much individual firms set prices above their costs. Thus, it is possible for markups to rise because firms facing little competition are able to set prices high or because efficient firms have found ways to reduce their costs while keeping prices stable. In the latter case, prices and inflation could remain flat. Inflation also measures the rate of change in prices across a period of time (typically year-over-year). As a result, even if markups were rising because firms with market power were raising prices, they would need to do so across time and across industries in order to have an impact on inflation. It also may be difficult to discern a connection between markups and inflation if the Fed is pursuing monetary policy that offsets inflationary pressure from markups.

Rising market power also has implications for maximizing employment, the other component of the Fed's dual mandate. Basic economics implies that businesses with market power withhold at least some production in order to keep prices high. Thus, if firms produce less due to a lack of competition, they also may hire fewer workers, which could raise unemployment or, in the long run, reduce workforce participation. And, to the extent that firms have the power to set wages in labor markets, they may be able to pay workers less.

The Fed tracks wage growth both as a sign of labor market health and as a signal of labor productivity. In a competitive environment, the largest portion of firms' productivity gains should be passed on to workers in the form of higher wages. Firms compete for labor, and the most productive firms will pay more for workers to expand production. But if firms face less competition for workers, they can reap the rewards of higher productivity as pure profits rather than passing them on in the form of wage increases. Thus, market competitiveness matters for how the Fed interprets changes in the rate of wage growth. Slow wage growth in a competitive market could be a sign of slowing productivity and economic growth, which might bolster the case for expansionary monetary policy. But slow wage growth in an increasingly monopolistic environment may not be a sign of slowing productivity because gains from productivity could be going to firm profits. In this case, the argument for expansionary monetary policy is weaker.

Higher market power also may reduce the effectiveness of the Fed's traditional monetary policy tool of influencing short-term interest rates. As noted earlier, firms with more market power may produce and invest less, depressing aggregate productivity growth. There is also some evidence

Three-fourths of smartphones are produced by Apple (46 percent) or Samsung (29 percent), according to Comscore, a market research firm.

that weak investment on the part of firms may depress the natural rate of interest in the economy. In a 2016 paper, Callum Jones of the International Monetary Fund and Thomas Philippon of New York University's Stern School of Business found that, given firm profitability, corporate investment in the United States has been lower than expected since the early 2000s. Had investment been more in line with expectations, they estimated that interest rates would have begun rising away from near-zero levels starting at the end of 2010 rather than in 2016, when rates actually did increase.[7] To the extent that increased market power among industry leaders is contributing to lower investment and real interest rates, the Fed may encounter the zero lower bound more often.

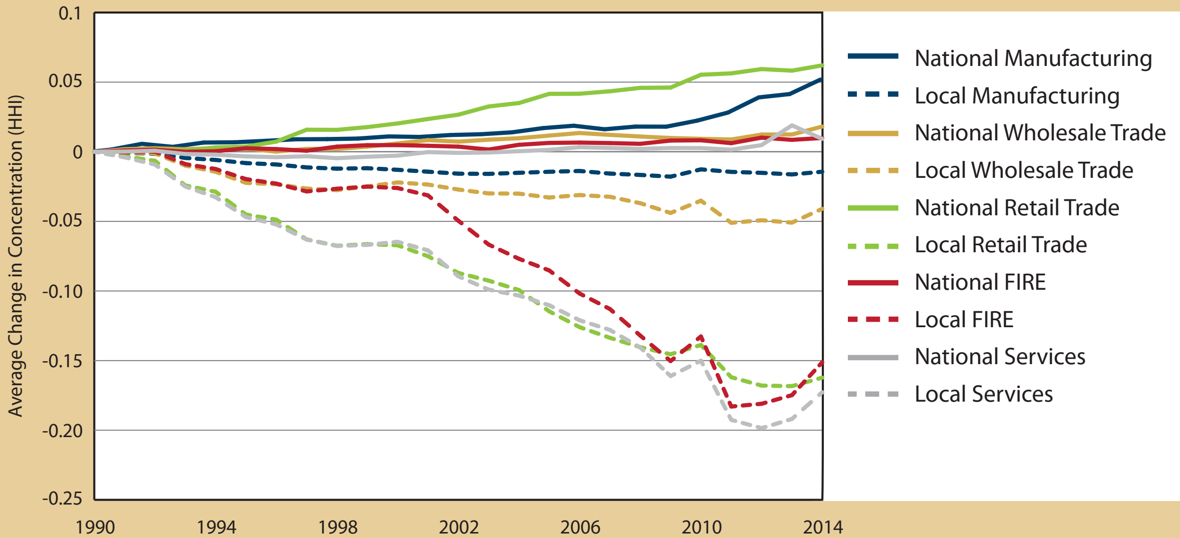
Firms with more market power also may be less responsive to monetary policy stimulus. One way that the Fed stimulates the economy during a downturn is by reducing the cost of capital by pushing interest rates down. But if firms are less inclined to invest because of market power and they have the ability to capture higher profits through markups, they may absorb some of the interest rate changes in the form of profits rather than investing more.[8] This result would tend to make traditional monetary policy less effective.

Clearly there are many reasons for the Fed to be concerned about a general increase in market power in the economy. But determining whether market power is actually going up is a challenge. Economists cannot directly measure changes in market power, but they can attempt to infer its presence by looking at other indicators, such as changes in industry concentration, markups, and firm profitability. Unfortunately for policymakers seeking clear guidance, the evidence in each of these cases has thus far been mixed.

Are Markets Becoming More Concentrated?

Increasing market concentration may be one of the most visible signs of rising market power. Firms with a large market share presumably face less competition than firms in markets with many players. Beyond the examples noted at the beginning of this

FIGURE 1: Average Industry Concentration Has Diverged Nationally and Locally since 1990



SOURCE: Esteban Rossi-Hansberg, Pierre-Daniel Sarte, and Nicholas Trachter, "Diverging Trends in National and Local Concentration," Federal Reserve Bank of Richmond Working Paper No. 18-15R, September 2018.

NOTE: Concentration is measured using the Herfindahl-Hirschman Index (HHI), which compares total sales for firms in an industry to the number of firms in that industry.

essay, researchers have documented a general rise in concentration across industries. One striking finding comes from a paper by Gustavo Grullon of Rice University, Yelena Larkin of York University, and Roni Michaely of the Geneva Finance Research Institute. They found that concentration levels have increased in more than three-quarters of U.S. industries over the past two decades. Moreover, the market shares of the four largest firms in most industries have increased, and both the average and median size of public firms (which tend to be larger than private firms) have tripled.[9]

As noted at the outset of this essay, rising concentration alone does not necessarily mean that market power is going up. Firms with large market shares still may be subject to competitive pressures from new entrants, for example. But research showing that startup activity has fallen since 2000 suggests that firms may be facing less outside pressure today than in the past.[10]

Another way concentration could rise without a comparable increase in market power is if the most efficient firms are capturing greater market share by outcompeting their rivals. Such a scenario would be less troubling for consumer welfare than monopolistic firms abusing market share. To address this point, Grullon, Larkin, and Michaely looked at data on stock market reactions to mergers and acquisitions. If firms are more profitable in concentrated markets because they face less competition, the authors reasoned that "the market should react more positively to announcements of transactions that further erode product market competition." Indeed, they found that the market reaction to mergers was more positive when the merger involved firms in concentrated industries.

While these findings seem to suggest that the recent rise in concentration is a sign that market power has been going up, such conclusions depend crucially on how one defines the market. Evidence presented by Grullon, Larkin, and Michaely, as well as others, shows concentration has gone up in national industry groups. But in many industries, competition happens locally not nationally. For example, Walmart may account for a large share of national retail sales, but in any given market, it may compete with other national chains as well as locally owned stores.

One of the authors of this essay (Trachter) along with Esteban Rossi-Hansberg of Princeton University and Pierre-Daniel Sarte of the Richmond Fed highlighted this distinction in a recent paper.[11] Using data from the U.S. National Establishment Time Series, they found that while national industry concentration rose on average from 1990 through 2014 across a variety of industry groups, local concentration in those same industries actually *declined*.[12] (See Figure 1.) Moreover, these two trends appear to be strongly correlated: a large fraction of workers in the economy are employed by industries that had both rising national and falling local concentration.

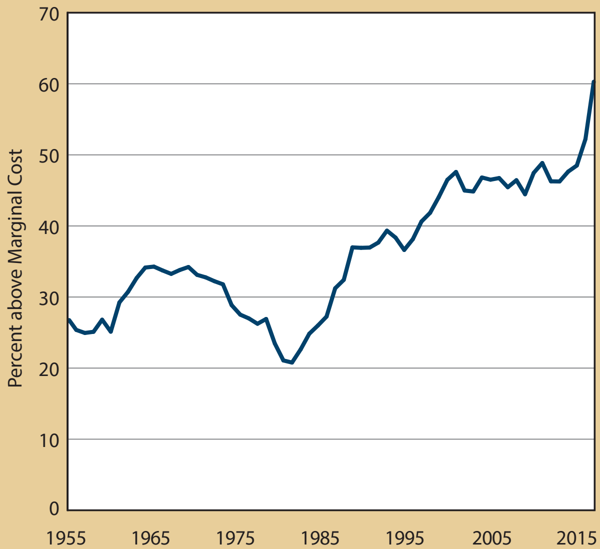
It would appear that rather than forcing the exit of local competitors when they enter a market, national brands such as Walmart or Starbucks simply add to the competition. To the extent that local competition determines market power, the findings that national industry concentration has been increasing may not be cause for alarm.

Measuring Markups

Rising markups could be another sign that firms are gaining market power. In a competitive environment, markups should be low. If firms tried to substantially raise their prices above their costs, new companies would enter the market to undercut them, driving the markups down. Thus, some researchers have pointed to evidence of higher markups as proof that markets have become less competitive.

One of the leading studies in this area of research comes from Jan De Loecker of Katholieke Universiteit Leuven and Jan Eeckhout of the Barcelona Graduate School of Economics. In a 2017 paper, they found that markups increased substantially across all U.S. industries, from 21 percent in 1980 to 61 percent in 2016.[13] (See Figure 2.) They found a similar increase in markups for firms globally in another paper, though the trend was strongest in North America and Europe.[14] Tying these results to observations of rising

FIGURE 2: Average Markups across the U.S. Economy



SOURCE: Jan De Loecker and Jan Eeckhout, "The Rise of Market Power and the Macroeconomic Implications," NBER Working Paper No. 23687, August 2017.

market concentration, De Loecker and Eeckhout found that the increase in markups has been driven by the top firms by market share in each industry.

While this research has received a lot of attention, measuring markups across the entire economy and across time has historically proven difficult to do. It requires economists to model industry competition and to make assumptions about how firms behave in order to estimate their marginal costs, which typically are not publicly known. These constraints have tended to limit economists to studying markups only in specific sectors of the economy where good data were available. De Loecker and Eeckhout took a different approach in order to overcome these constraints, but their findings remain a source of ongoing debate among economists.

For example, decisions about how to measure firm costs can change the result of markup estimates. Other researchers found that including the costs that firms face in marketing and delivering their products and services to consumers may largely account for the increase in markups.[15] These indirect costs have

Large nationwide retailers enjoy economies of scale, including massive distribution centers, that help keep their profits up and their prices down.

become a larger share of firms' variable costs since 1980, and it may be these rising costs rather than rising prices that De Loecker and Eeckhout measured.[16]

Given these measurement challenges, it is not yet clear whether estimates of rising markups necessarily point to rising market power. Researchers also have looked at whether firms in concentrated markets have more pricing power over their inputs of production, such as labor. If so, that might also suggest a rise in market power. Multiple studies do find that firms in concentrated sectors are able to pay lower wages.[17] But, again, to the extent that firms compete for labor locally in the same way that they compete for customers locally, it is important to study the ties between local concentration and wages.

A 2018 paper by Kevin Rinz from the U.S. Census Bureau found that while firms in concentrated sectors are able to pay lower wages, local employer concentration actually has been falling since the 1970s (in line with the findings of Rossi-Hansberg, Sarte, and Trachter). This result would suggest that firms' pricing power in terms of labor is actually falling in the geographies that matter most for employees.[18]

Rising Profits, Falling Investment

Some economists have looked at a third potential signal of rising market power: rising profits for the largest firms. As in the case of markups, measuring profits is challenging because they are typically not directly observable. Instead, researchers have proposed novel ways of inferring them from the data available. For example, the London Business School's Simcha Barkai examined the share of production accruing to labor and capital costs, which are known, and reasoned that any remainder must be accruing to firms in the form of profits.[19] He found that both the labor and capital shares have fallen over the past three decades, suggesting that the profit share has increased substantially over the same period.

But, as with markups, the difficulty of measuring firm profits has sparked disagreements among researchers. One study extended Barkai's methodology to the pre-1980 period and found that profits and productivity growth should have been much more volatile than what was actually observed over those decades if Barkai's assumptions were correct.[20] Economists also disagree over what may be driving the fall in capital and labor shares. David Autor of the Massachusetts Institute of Technology and his coauthors found that large firms in concentrated industries have higher productivity growth per worker than other firms, and this greater efficiency results in these "superstar" firms spending a smaller share of their total sales on labor income.[21]

Another dispute is whether capital investments have truly shrunk or whether they are being mismeasured. Nicolas Crouzet and Janice Eberly of Northwestern University's Kellogg School of Management found that the rise of intangible assets since the 2000s can explain much of the capital investment shortfall.[22] They found that intangible investments have been associated with productivity gains in some industries, such as the tech sector, suggesting that rising market concentration could be a symptom of greater efficiency and productivity.

On the other hand, intangibles also can be used by large firms to defend their market power from competitors. Research and development are often nonrival and excludable, which means other firms could benefit from that knowledge without diminishing the ability of the originating firm to use it, but legal restrictions such as patents and copyrights can make those assets exclusive to the owner. Such exclusivity promotes investment in intangibles, but it also may contribute to industry concentration by allowing firms to benefit from economies of scale and solidify their market power. Additionally, as firms face less competition, they may have fewer incentives to invest in both intangible and tangible capital.[23] Ultimately, as in the case of markups, the evidence on profits and investment remains inconclusive and evolving.

An Unsettled Debate

As the preceding survey of the literature on this topic shows, there is evidence both for and against the rise

Many economists agree that national industry concentration has been rising. But is this because the economy is increasingly driven by firms that rely on network effects and other economies of scale that naturally produce large winners?

of market power in the modern economy. In many cases, this conflicting evidence reflects different interpretations of phenomena that are inherently difficult to measure. Many economists agree that national industry concentration has been rising. But is this because the economy is increasingly driven by firms that rely on network effects and other economies of scale that naturally produce large winners? Or are large firms investing in assets protected by patents and copyrights to keep out competitors? Could both explanations be at play? Some of the apparent contradictions in evidence also may be explained by industry concentration trending up at the national level at the same time it is falling locally. This possibility raises another important question: Should policymakers be worried about higher national concentration when most markets for goods, services, and labor are local?

Unfortunately, the research does not yet provide decisive answers to these questions. It also could be the case that these trends are being driven by other factors unrelated to market competition. A recent study argues that the decline in new firm creation and the rise in market concentration can be explained by the aging U.S. population. The authors argue that as baby boomers age and retire, labor force growth is shrinking, leading to less startup activity. Existing firms age and grow, leaving even fewer workers to fuel startups and driving the rise in industry concentration.[24] Another study based on a model found that industry-leading firms have stronger incentives to invest in a low interest rate environment than laggard firms. To the extent that this is the case, the low interest rates of the

Four airlines—Delta, American, United Continental, and Southwest—account for more than three-fourths of the U.S. market, according to IBISWorld, a market research firm.

past decade could have contributed to rising concentration as leaders continued to invest and pull further away from smaller competitors.[25]

In summary, there is no shortage of explanations for the observed phenomena of rising market concentration and markups, and not all of those explanations point to a commensurate increase in market power. In his own review of the evidence, University of Chicago economist Chad Syverson summarized the debate this way: "The macro market power literature has offered an immense service by documenting and emphasizing the potential connections between several trends: labor's declining share of income, increasing corporate profits, increasing margins, increasing concentration, slower productivity growth, decreasing firm entry and dynamism, and reduced investment rates. … Where the literature, at this point at least, has not yet reached a conclusion is whether and to what extent increases in the average level of market power in the industry is responsible for each or all of these trends."[26]

Until that conclusion is reached, this topic will remain an important area of research in the years to come, and policymakers should weigh evidence carefully before deciding whether to respond to allegations of rising market power. ■

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

Endnotes

[1] For other examples, see Open Markets Institute, "America's Concentration Crisis," https://concentrationcrisis.openmarketsinstitute.org/.

[2] David Autor, David Dorn, Lawrence F. Katz, Christina Patterson, and John Van Reenen, "Concentrating on the Fall of the Labor Share," *American Economic Review: Papers and Proceedings 2017*, May 2017, vol. 107, no. 5, pp. 180–185.

[3] Council of Economic Advisers, "Benefits of Competition and Indicators of Market Power," Issue Brief, April 2016.

[4] Michael Gort and Steven Klepper, "Time Paths in the Diffusion of Product Innovations," *Economic Journal*, September 1982, vol. 92, no. 367, pp. 630–653.

[5] Chris Edmond, Virgiliu Midrigan, and Daniel Yi Xu, "How Costly Are Markups?" NBER Working Paper No. 24800, July 2018.

[6] It's also possible for this relationship to go in the opposite direction. Firms protected from competition may invest more knowing that they can reap all of the rewards of innovation themselves. This is the rationale behind patent protections in some fields, such as pharmaceuticals, where initial research and development is costly but replication is relatively cheap. Firms exposed to competition might choose to forgo costly research and instead free-ride on the efforts of other companies, resulting in fewer new drugs being developed. In theory, giving a firm temporary monopoly over a new drug provides an incentive to undertake costly research.

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[12] National and local banking also exhibit this trend. See Lawrence J. White, "Antitrust and the Financial Sector," Money and Banking blog, January 21, 2019.

[13] Jan De Loecker and Jan Eeckhout, "The Rise of Market Power and the Macroeconomic Implications," NBER Working Paper No. 23687, August 2017.

[14] Jan De Loecker and Jan Eeckhout, "Global Market Power," NBER Working Paper No. 24768, June 2018.

[15] James Traina, "Is Aggregate Market Power Increasing? Production Trends Using Financial Statements," University of Chicago Booth School of Business New Working Paper Series, No. 17, February 2018; Loukas Karabarbounis and Brent Neiman, "Accounting for Factorless Income," NBER Working Paper No. 24404, March 2018, revised June 2018.

[16] De Loecker and Eeckhout addressed this concern in more recent work with Gabriel Unger of Harvard University. They acknowledged that while such overhead as a share of costs has gone up in recent decades, it still cannot fully explain the rise in markups they found. See Jan De Loecker, Jan Eeckhout, and Gabriel Unger, "The Rise of Market Power and the Macroeconomic Implications," Manuscript, November 22, 2018.

[17] José Azar, Ioana Marinescu, and Marshall I. Steinbaum, "Labor Market Concentration," NBER Working Paper No. 24147, December 2017, revised February 2019; Efraim Benmelech, Nittai Bergman, and Hyunseob Kim, "Strong Employers and Weak Employees: How Does Employer Concentration Affect Wages?" NBER Working Paper No. 24307, February 2018.

[18] Kevin Rinz, "Labor Market Concentration, Earnings Inequality, and Earnings Mobility," U.S. Census Bureau CARRA Working Paper No. 2018-10, September 24, 2018.

[19] Simcha Barkai, "Declining Labor and Capital Shares," Manuscript, 2017.

[20] Karabarbounis and Neiman (2018).

[21] Autor et al. (2017).

[22] Nicolas Crouzet and Janice Eberly, "Understanding Weak Capital Investment: The Role of Market Concentration and Intangibles," Federal Reserve Bank of Kansas City Economic Policy Symposium Proceedings, Jackson Hole, Wyoming, August 24, 2018.

[23] Germán Gutiérrez and Thomas Philippon, "Investment-less Growth: An Empirical Investigation," NBER Working Paper No. 22897, December 2016, revised January 2017.

[24] Hugo Hopenhayn, Julian Neira, and Rish Singhania, "From Population Growth to Firm Demographics: Implications for Concentration, Entrepreneurship, and the Labor Share," NBER Working Paper No. 25382, December 2018.

[25] Ernest Liu, Atif Mian, and Amir Sufi, "Low Interest Rates, Market Power, and Productivity Growth," NBER Working Paper No. 25505, January 2019.

[26] Chad Syverson, "Macroeconomics and Market Power: Facts, Potential Explanations and Open Questions," Economic Studies at Brookings, January 23, 2019.

Regional Economic Activity Expands in 2018

Overall, the economy of the Fifth Federal Reserve District expanded in 2018, and by some measures, economic growth picked up compared with the past several years. Labor markets continued to tighten, as evidenced by expanding payrolls and widespread declines in unemployment rates that coincided with strong survey measures of wage growth in the Fifth District. Business conditions generally improved in 2018, with strong activity coming from a wide variety of industries; however, there were new or increasing headwinds from labor shortages, rising input costs, and the trade environment. There were also a few short-term disruptions during the year, such as severe weather events and a partial federal government shutdown. Residential housing markets continued to strengthen but at a slightly slower pace than in recent years, while commercial real estate activity remained strong and was largely on pace with 2017 growth.

Labor Markets

Overall, labor market conditions improved during the year. Total payroll employment in the Fifth District grew 1.3 percent from December 2017 to December 2018, but it lagged the national rate of 1.8 percent. Among jurisdictions in the Fifth District, year-over-year employment growth was weakest in the District of Columbia and in Virginia, at rates of 0.6 percent and 0.8 percent, respectively. Maryland and North Carolina came in slightly higher at 1.1 percent and 1.3 percent, respectively, while the strongest growth occurred in West Virginia (2.2 percent) and South Carolina (2.6 percent).

In the Fifth District as a whole, the most jobs were added in the professional business services industry, followed by education and health services and leisure and hospitality. In terms of percentage increase, the strongest growth of 3.2 percent occurred in the natural resources, mining, and construction sector, which was partially driven by considerable growth in construction employment in West Virginia. The information services industry, which is primarily print publications and other media, was the only industry in the Fifth District to contract in 2018, declining 0.4 percent (1,000 jobs) from December 2017 to December 2018.

By the end of the year, the unemployment rate in the Fifth District rested at 3.8 percent, which was just below the national rate of 3.9 percent. Virginia's unemployment rate remained the lowest in the Fifth District at 2.8 percent in December 2018, while the highest rates in December of 5.4 percent and 5.1 percent were reported in the District of Columbia and in West Virginia, respectively.

Although D.C. had the highest rate, counties that are part of its surrounding metropolitan area had some of the lowest rates in the Fifth District. In fact, the lowest rate among all counties was in Arlington, Virginia, which had 1.7 percent unemployment in December. Meanwhile, some of the highest unemployment rates occurred in West Virginia counties, particularly around the middle of the state, where an unemployment rate of 12.4 percent was reported in Calhoun County. The only other county in the Fifth District to report an unemployment rate above 10 percent was Worcester County on the Eastern Shore of Maryland. (See Figure 1.)

Compared with December 2017, jobless rates declined in every Fifth District jurisdiction, with the largest improvement occurring in South Carolina, where the rate fell 0.8 percentage points to 3.2 percent. At the local level, unemployment rates declined in all but eight counties of the Fifth District.

Moreover, county unemployment rates were lower in December 2018 than they were just prior to the Great Recession in the vast majority (82 percent) of Fifth District counties. However, by the end of 2018, no county had yet reached a historic low.

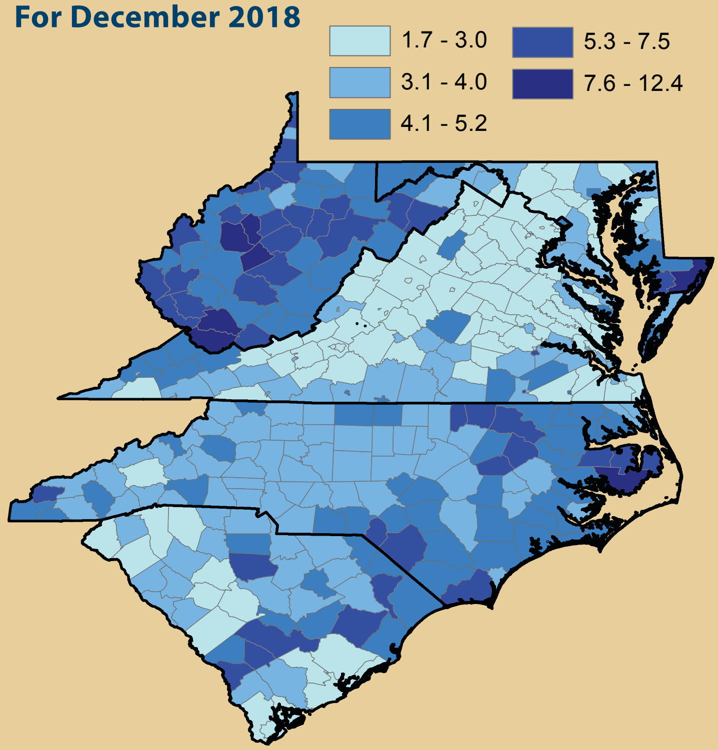
The tightening of labor markets also was evidenced by anecdotes from across the Fifth District. Throughout the year, a wide variety of firms indicated that finding and retaining workers was becoming increasingly difficult. A few firms, primarily in construction, even said that the labor shortage was constraining their growth. Many businesses increased starting wages to attract new hires and were giving existing employees raises to keep them from leaving, as turnover was also reportedly up. In addition to wage increases, there were many comments about enhanced nonwage incentives to attract and keep staff, such as signing bonuses, employee referral awards, and increased vacation time.

The Federal Reserve Bank of Richmond's survey data also indicated solid employment growth and rising wages in 2018. The Bank conducts monthly surveys of business conditions in the manufacturing and service sectors of the Fifth District. Among other questions, both surveys ask about changes in employment and wages. The Bank aggregates responses to these questions and creates diffusion indices in which positive values indicate that the share of firms reporting improvement exceeds the share of firms reporting decline.

The indices for manufacturing and service sector employment remained positive throughout the year, with the manufacturing index hitting a record high in August. In the last few months of the year, however, both readings declined slightly but remained in expansionary territory. Meanwhile, the survey indices for wages were well above zero and generally increased over the course of the year, reaching record highs in November 2018. (See Figure 2.)

The November survey also included a series of special questions on employment and wages, which showed that many businesses intended to increase employment in the near future and were using some combination of higher wages, sign-on bonuses, and enhanced benefits to attract candidates. And although a majority of businesses reported challenges in attracting and retaining workers with the necessary skills, only a small portion of firms expected those challenges to become a considerable restraint on growth in 2019.

FIGURE 1: Unemployment Rates by County For December 2018

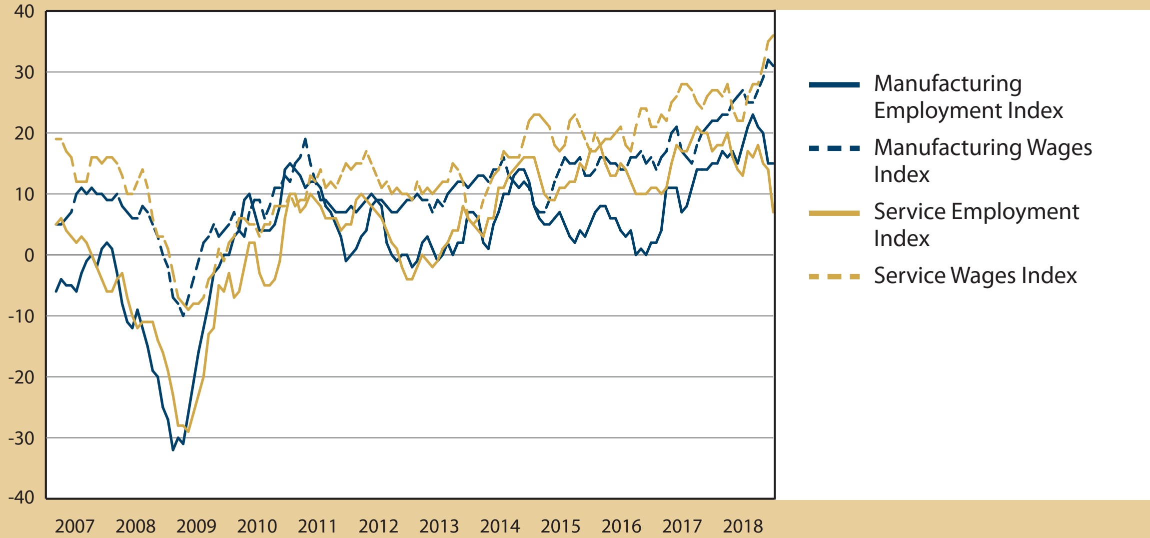


SOURCE: U.S. Bureau of Labor Statistics, 2018

Business Conditions

Manufacturing activity generally expanded in 2018, according to the Bank's survey of business conditions in the sector. The composite diffusion index for Fifth District manufacturing activity spent the majority of the year at elevated levels and hit a record high in September. In the last few months of the year, however, the index declined and dipped below zero in December—the first negative reading in more than two years. The December low was driven by a drop in new orders, with many comments indicating that the expected increases to tariffs on January 1, 2019, had a negative impact on business.

FIGURE 2: Fifth District Survey Measures of Employment and Wages



SOURCE: Richmond Fed Regional Surveys of Manufacturing and Service Sector Activity

NOTES: Survey responses are represented by diffusion indices. In each index, values equal the percentage of responding firms reporting an increase minus the percentage reporting a decrease. Values are expressed in three-month moving averages.

Overall, anecdotes from manufacturing contacts were positive across a diverse set of industries. Throughout the year, many firms reported strong growth, with some expressing plans to increase capacity through hiring, equipment investment, and/or plant expansions. At the same time, manufacturers also expressed concerns over staffing challenges, finding enough trucks to move goods, and rising raw materials costs. They attributed some of the rising materials costs to new or increased tariffs, such as those for steel and aluminum. A majority of manufacturing contacts said they were unable to fully pass these costs along to customers. Nonetheless, manufacturers were generally optimistic about their growth prospects for 2019.

In the service sector, overall business activity expanded in 2018, according to the Bank's survey measures. The index for revenues in the sector was fairly strong for most of the year, with notable exceptions in October and November, when the measure fell to negative one and negative five, respectively. Many of the comments in the surveys during those periods indicated that adverse weather, including hurricanes Florence and Michael, as well as new and increasing tariffs, had some negative effects on business.

Within the service sector, some of the strongest reports of growth in 2018 came from the transportation industry. Port activity was robust throughout the year with some record-setting volumes reported. Some of the import growth toward the end of the year was partially attributed to firms frontloading goods purchases ahead of expected tariff increases. Trucking demand was also strong in 2018, with reports of tight capacity and a shortage of drivers, which led to some increased demand for rail services. Positive reports also were given by firms ranging from engineering, law, and information technology to defense contracting, education, and hospitality. Most services firms expected growth to persist into 2019, but there were concerns about the pace of growth slowing in the near future.

Real Estate

On the whole, Fifth District housing markets grew moderately in 2018, with many metrics and comments echoing those from the past several years. House prices, according to CoreLogic Information Solutions, grew 3.3 percent on a year-over-year basis in the Fifth District, but trailed the national rate of 4.7 percent. Home prices rose most quickly in North and South Carolina at rates of 4.4 percent and 4.1 percent, respectively. Meanwhile, prices grew most slowly in Maryland (2.1 percent) and D.C. (2.3 percent). Anecdotes from residential real estate contacts broadly suggested that inventory levels remained low, with many homes both selling quickly and with multiple offers.

New home construction generally expanded throughout the year but at a somewhat slower pace than in 2017. As was the case in 2017, growth reportedly was constrained by a lack of available lots, labor shortages, and rising raw materials costs. Raw materials cost increases were exacerbated in the beginning of 2018 due to tariffs on Canadian lumber and on imported steel and aluminum. In terms of building permits, Fifth District jurisdictions issued a combined 114,022 single-family building permits in 2018, which was an increase of just 1 percent over 2017 and the slowest pace of growth reported since 2014.

Reports on the commercial real estate (CRE) sector were, on balance, more upbeat than residential reports. Although there were similar comments about difficulty finding workers and rising raw materials costs, CRE contacts generally reported solid to robust growth in 2018 across retail, industrial, office, warehousing, and multifamily subsectors. The robust growth in multifamily construction was evidenced by 7 percent growth in new building permits for structures with five or more housing units, which was about on pace with the 6.9 percent growth reported in the previous year.

Banking Conditions

Banking conditions continued to improve in 2018. Assets grew steadily through mergers and organic loan growth, and credit quality remained strong throughout the year. Rising interest rates drove record profits in 2018, but greater competition for deposits may hinder margin growth in the future if rates continue to increase.

Interest rates have started to rise in recent years, and Fifth District banks began seeing increases in net interest margins in 2018. Higher interest income and lower income taxes drove earnings to ten-year highs throughout the year. As of the fourth quarter, median return on average assets was 0.92 percent and 1.1 percent for banks in the Fifth District and nation, respectively.

During the year, median assets at Fifth District banks grew 4.3 percent, outpacing national median growth of 3.2 percent. Loans also grew steadily over the year in the Fifth District and nation, with median annual growth of 5.8 percent and 5.4 percent, respectively. In the Fifth District, particularly strong growth was observed in commercial and industrial portfolios (10 percent) and in non-owner-occupied commercial real estate portfolios (8.9 percent). The largest balance sheet concentration at Fifth District banks remained in commercial real estate, but those levels fell during the year.

Net loan losses and median nonperforming loan rates remained low and decreased in 2018, both at the Fifth District and national levels; however, nonperforming loan levels in the Fifth District remained about 0.19 percentage points higher than the national average. Though credit-quality indicators are improving generally, as competition for loans and deposits heats up, banks may face pressure to loosen underwriting standards and rely more heavily on volatile funding sources to achieve higher earnings.

Conclusion

On the whole, the Fifth District economy strengthened in 2018. Payroll employment expanded, most local unemployment rates ended the year below prerecession lows, and wage increases were reported across a broad spectrum of industries. Overall, business activity picked up, with considerable growth reported across industries, most notably in transportation. The general outlook among Fifth District firms is for continued, although perhaps more subdued, growth in 2019. ■

Our Commitment to Diversity and Inclusion

In my inaugural year as the Richmond Fed's first vice president and chief operating officer, I have been honored to partner with many talented individuals and groups within the Bank, the Federal Reserve System, and our communities. It's clear our team is committed to our public service mission—fostering the stability, integrity, and efficiency of our nation's monetary, financial, and payments systems.

First, I would like to thank President Tom Barkin and our Board of Directors for supporting my appointment and partnering with me throughout the transition. I also want to thank my predecessor, Mark Mullinix, a model leader, who retired after an impressive 32-year Federal Reserve career.

In 2018, Tom, Lyn McDermid—our System chief information officer—and I worked with the Bank's employees to define the Richmond Fed's strategy and priorities, leading our organization to act as one team to serve our communities and our customers. Our Bank's culture is at the heart of this endeavor. We're committed to doing the right thing, "leading from where we are" to make things better, and embracing differences and opportunities to grow that build upon our strengths and help us to improve continuously. Part of this strategy is continuing to build a workforce that represents the communities we serve and leverages the diverse skills and perspectives of our employees. Both diversity and inclusion strengthen our Bank and our communities. That's why we focus on making advancements in attracting and retaining a diverse array of talent, increasing diversity within our leadership pipeline, sustaining a culture that embraces differences, and cultivating greater diversity among our suppliers and community partners.

In 2018, we enhanced our recruiting practices by requiring a diverse talent pool for all stages of our hiring process. We recruited from a more diverse range of colleges, universities, and professional organizations while leveraging our existing employee networks to broaden our candidate pools. In 2018, the Bank made 188 external hires, including 44 percent minorities and 40 percent women, up 8 percentage points and 1 percentage point, respectively, since 2014. Also in 2018, we maintained our Bank's overall representation of women at 38 percent, with an 11 percent increase of women in senior executive roles, while increasing our overall minority representation by 2 percentage points to 34 percent.

In addition to developing a more representative workforce, we are fostering a culture of inclusion that enables each of us to bring our best self to work every day. I am pleased to share that we have high employee engagement—in fact, our recent employee-engagement index indicates the Bank is nine points above global norms when compared with other organizations that use the same survey. During 2018, we continued to strengthen our inclusive culture through a number of initiatives, including our eight employee resource networks and a discussion series that encourages dialogue about a variety of tough topics, including recent events that have highlighted racial tensions in our region, how to navigate change, and the impact of power and privilege. Our employee engagement is further supported by efforts to develop our workforce by providing experiential-learning opportunities for employees that widen the Bank's succession pipeline and prepare talent for critical roles.

In June 2018, more than 100 employees created a "human pride banner" that highlighted the Bank's inclusive workplace and increasingly diverse workforce.

We also are committed to partnering with minority- and women-owned businesses across our District. We increased our expenditures with diverse suppliers in 2018 by 34 percent. And to help maintain that momentum in 2019, we are strengthening our longer-term procurement forecasts to deepen our supplier pipelines and identifying opportunities to increase diverse supplier response rates to requests for proposals.

Last, but not least, we continue to collaborate with many diverse partners across our community. For example, we work with teachers, students, and the public to enhance our community's understanding of economics, personal finance, and the Federal Reserve System. In 2018, we directly reached 230 educators who potentially will influence more than 17,000 students from inner-city, majority-minority, and girls' high schools. Our employees also supplement the Bank's financial education efforts by using their sixteen hours of paid volunteer leave to support community programs such as Junior Achievement Finance Park and Boys and Girls Clubs.

I am proud of our team's dedication to and passion for achieving our public service mission and driving a positive impact within our communities. To learn more about our diversity and inclusivity initiatives, how to become a supplier for our Bank, or how to access our financial education programs and resources, I encourage you to visit us at richmondfed.org.

Becky C. Bareford
First Vice President and Chief Operating Officer

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 affiliated with financial institutions appoint the Bank's president and first vice president with approval from the Board of Governors.

The Bank annually selects 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 payments executives.

Thank You

Thank you to the directors who completed their service in 2018: Christopher J. Estes and Austin J. Slater Jr. of the Baltimore Board and Michelle A. Mapp and Laura C. Meagher of the Charlotte Board.

In January 2019, the Bank welcomed Eugene A. Woods to the Richmond Board and Tom Geddes to the Baltimore Board.

Lists of boards and councils on the following pages include members, titles, and affiliations as of December 31, 2018.

Board of Directors – Federal Reserve Bank of Richmond

From the left: *Kathy J. Warden, Thomas C. Nelson, Susan K. Still, William A. Loving Jr., Margaret G. Lewis, Ángel Cabrera, Robert R. Hill Jr., and Catherine A. Meloy*

CHAIR

Margaret G. Lewis
Retired President
HCA Capital Division
Richmond, Virginia

DEPUTY CHAIR

Kathy J. Warden
President and
Chief Executive Officer
Northrop Grumman Corporation
Falls Church, Virginia

Ángel Cabrera
President
George Mason University
Fairfax, Virginia

Robert R. Hill Jr.
Chief Executive Officer
South State Corporation and South State Bank
Columbia, South Carolina

William A. Loving Jr.
President and
Chief Executive Officer
Pendleton Community Bank
Franklin, West Virginia

Catherine A. Meloy
President and
Chief Executive Officer
Goodwill of Greater Washington and Goodwill Excel Center
Washington, D.C.

Thomas C. Nelson
Chairman, President, and
Chief Executive Officer
National Gypsum Company
Charlotte, North Carolina

Susan K. Still
President and
Chief Executive Officer
HomeTown Bankshares Corporation
and HomeTown Bank
Roanoke, Virginia

FEDERAL ADVISORY COUNCIL REPRESENTATIVE

Brian T. Moynihan
Chairman and
Chief Executive Officer
Bank of America
Charlotte, North Carolina

List includes members, titles, and affiliations as of December 31, 2018.

Board of Directors – Baltimore Branch

From the left:
Christopher J. Estes, Laura L. Gamble, Kenneth R. Banks, Susan J. Ganz, Wayne A. I. Frederick, and Mary Ann Scully
Not pictured:
Austin J. Slater Jr.

CHAIR

Susan J. Ganz
Chief Executive Officer
Lion Brothers Company, Inc.
Owings Mills, Maryland

Kenneth R. Banks
President and
Chief Executive Officer
Banks Contracting Company
Greenbelt, Maryland

Christopher J. Estes
Vice President, 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
Baltimore, Maryland

Austin J. Slater Jr.
President and
Chief Executive Officer
Southern Maryland Electric
Cooperative, Inc.
Hughesville, Maryland

List includes members, titles, and affiliations as of December 31, 2018.

Board of Directors – Charlotte Branch

From the left:
Michael C. Crapps,
R. Glenn Sherrill Jr.,
Laura Y. Clark,
Michelle A. Mapp,
Michael D. Garcia, and
Jerry L. Ocheltree
Not pictured:
Laura C. Meagher

CHAIR

Laura Y. Clark
President and
Chief Executive Officer
United Way of Central
Carolinas
Charlotte, North Carolina

Michael C. Crapps
President and
Chief Executive Officer
First Community Bank
Lexington, South Carolina

Michael D. Garcia
President, Pulp and
Paper Division
Domtar Corporation
Fort Mill, South Carolina

Michelle A. Mapp
Chief Executive Officer
South Carolina Community
Loan Fund
Charleston, South Carolina

Laura C. Meagher
Vice President,
General Counsel,
and Secretary
VF Corporation
Greensboro, North Carolina

Jerry L. Ocheltree
President and
Chief Executive Officer
Carolina Trust Bank
Lincolnton, North Carolina

R. Glenn Sherrill Jr.
Chairman and
Chief Executive Officer
SteelFab, Inc.
Charlotte, North Carolina

List includes members, titles, and affiliations as of December 31, 2018.

Community Depository Institutions Advisory Council

CHAIR

Robert A. DeAlmeida*
President and
Chief Executive Officer
Hamilton Bank
Towson, Maryland

Dabney T.P. Gilliam Jr.
President and
Chief Executive Officer
Bank of Charlotte County
Phenix, Virginia

L.E. Griffin
President and
Chief Executive Officer
Home Federal Savings and Loan
Bamberg, South Carolina

Mark D. Harrell
President and
Chief Executive Officer
CNB Bank
Berkeley Springs, West Virginia

William L. Hedgepeth II
President and
Chief Executive Officer
Select Bank and Trust Company
Dunn, North Carolina

James L. King
President and
Chief Executive Officer
The Bank of Monroe
Union, West Virginia

Theresa B. Mann
President and
Chief Executive Officer
The Partnership Federal Credit Union
Arlington, Virginia

Gary R. Mills
President and
Chief Executive Officer
First Community Bank
Bluefield, Virginia

Ronald D. Paul
Chairman and
Chief Executive Officer
EagleBank
Bethesda, Maryland

R. Arthur Seaver Jr.
Chief Executive Officer
Southern First Bank
Greenville, South Carolina

Robert F. Shuford Jr.
President and
Chief Executive Officer
Old Point National Bank
Hampton, Virginia

Judy R. Tharp
President and
Chief Executive Officer
Piedmont Advantage Credit Union
Winston-Salem, North Carolina

**In 2018, 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, 2018.

Community Investment Council

CHAIR

Deborah McKetty
President and
Chief Executive Officer
CommunityWorks
Greenville, South Carolina

Oswaldo Acosta
Director of Small Business Services
Latino Economic Development Center
Washington, D.C.

Michael D. Atkinson
Senior Vice President, Manager of Community Development
First Citizens Bank and Trust Company
Raleigh, North Carolina

David Dodson
President
MDC
Durham, North Carolina

Vince Ford
Senior Vice President for Community Health
Palmetto Health
Columbia, South Carolina

Earl F. Gohl
Former Federal Co-Chair
Appalachian Regional Commission
Washington, D.C.

Rochelle S. Goodwin
Senior Associate Vice President for Academic and Public Strategy
West Virginia University
Morgantown, West Virginia

Thomasina Hiers
Director, Baltimore Civic Site
The Annie E. Casey Foundation
Baltimore, Maryland

Jody Keenan
State Director
Virginia Small Business Development Center
Fairfax, Virginia

John Maneval
Deputy Director, Multifamily Housing and Business Lending
Maryland Department of Housing and Community Development
Lanham, Maryland

Thomas M. Watson
Executive Director
Rural Support Partners
Asheville, North Carolina

List includes members, titles, and affiliations as of December 31, 2018.

Payments Advisory Council

CHAIR

Karen Buck
Executive Vice President, Commercial, Retail, and Payment Operations
TD Bank
Mount Laurel, New Jersey

Todd Bogdan
Chief Operating Officer
NewDominion Bank
Charlotte, North Carolina

Bill Bunn
Executive Vice President, Retail Banking
First Bank
Southern Pines, North Carolina

Kim Bunn
Senior Vice President and Operations Executive
Bank of America
Jacksonville, Florida

Richard Chin
Senior Vice President and Treasurer
Pentagon Federal Credit Union
Alexandria, Virginia

Sheryl Colleton
Senior Vice President and Operations Director
United Bank
Chantilly, Virginia

John Kevin Cranford
Senior Vice President
BB&T Corporation
Charlotte, North Carolina

Robert E. Dael
President and Chief Executive Officer
MACHA—The Mid-Atlantic Payments Association
Hanover, Maryland

Jeff W. Dick
Chairman and Chief Executive Officer
MainStreet Bank
Fairfax, Virginia

Kathy Dye
Vice President, Information Technology
West Virginia Central Credit Union
Parkersburg, West Virginia

Margo D. Foust
Senior Vice President, Operations and Process Improvement
American National Bank and Trust Company
Danville, Virginia

Terry Garner
Senior Vice President, Deposit Operations
Southern First Bank
Greenville, South Carolina

Martha J. Haymaker
President and Chief Executive Officer
Calhoun Banks
Grantsville, West Virginia

Jamin M. Hujik
Executive Vice President
CresCom Bank
Charleston, South Carolina

Adrian S. Johnson
Senior Vice President and Chief Financial Officer
MECU of Baltimore, Inc.
Baltimore, Maryland

E. Stephen Lilly
Chief Operating Officer
First Community Bancshares, Inc.
Bluefield, Virginia

Alison Lyewski
Senior Vice President, EIS Transaction Operations
SunTrust Bank
Orlando, Florida

Devon Marsh
Senior Vice President, Payment Industry Relations Office
Wells Fargo Bank
Winston-Salem, North Carolina

Avery Miller
Director of Enterprise Payments
Capital One Bank
Richmond, Virginia

Tracy J. Nelms
Executive Vice President
TowneBank
Suffolk, Virginia

Holly Pingatore
Senior Vice President and Director of Deposit Operations
South State Bank
Charleston, South Carolina

Melissa A. Quirk
President and Chief Operating Officer
Provident State Bank
Preston, Maryland

Rick Rhoads
Senior Vice President, E-Services
State Employees' Credit Union
Raleigh, North Carolina

Susan G. Riel
Senior Executive Vice President and Chief Operating Officer
EagleBank
Bethesda, Maryland

D.J. Seeterlin
Chief Information Officer
Chesapeake Bank
Kilmarnock, Virginia

Woody Shuler
Vice President, Finance
SRP Federal Credit Union
North Augusta, South Carolina

Laura Steele
President and Chief Executive Officer
ePayResources
Dallas, Texas

Eric Tichenor
Senior Vice President and Chief Financial Officer
MVB Bank
Fairmont, West Virginia

Chris Tolomeo
Senior Vice President, Banking Services
M&T Bank
Amherst, New York

Paul Trozzo
Senior Vice President
PNC Bank
Pittsburgh, Pennsylvania

Tynika Wilson
Senior Vice President, Debit Card and Funds Services
Navy Federal Credit Union
Vienna, Virginia

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, 2018.

Management Committee

From the left: *William O. Riley, David E. Beck, Becky C. Bareford, Kartik B. Athreya, Lisa A. White, Thomas I. Barkin, Michelle H. Gluck, Michael D. Stough, Goutam R. Gandhi, and Matthew A. Martin*

Thomas I. Barkin
President and Chief Executive Officer

Becky C. Bareford
First Vice President and Chief Operating Officer

Kartik B. Athreya
Executive Vice President and Director of Research

David E. Beck
Senior Vice President and Baltimore Regional Executive

Goutam R. Gandhi
Senior Vice President and Chief Information Officer

Michelle H. Gluck
Executive Vice President, General Counsel, and Chief Risk Officer

Matthew A. Martin
Senior Vice President and Charlotte Regional Executive

William O. Riley
Senior Vice President and Chief Technology Officer,
Currency Technology Office

Michael D. Stough
Senior Vice President and General Auditor

Lisa A. White
Executive Vice President, Supervision, Regulation, and Credit

List includes members of the management committee and titles as of December 31, 2018.

Management Committee

From the left: *William O. Riley, David E. Beck, Becky C. Bareford, Kartik B. Athreya, Lisa A. White, Thomas I. Barkin, Michelle H. Gluck, Michael D. Stough, Goutam R. Gandhi, and Matthew A. Martin*

Thomas I. Barkin
President and Chief Executive Officer

Becky C. Bareford
First Vice President and Chief Operating Officer

Kartik B. Athreya
Executive Vice President and Director of Research

David E. Beck
Senior Vice President and Baltimore Regional Executive

Goutam R. Gandhi
Senior Vice President and Chief Information Officer

Michelle H. Gluck
Executive Vice President, General Counsel, and Chief Risk Officer

Matthew A. Martin
Senior Vice President and Charlotte Regional Executive

William O. Riley
Senior Vice President and Chief Technology Officer,
Currency Technology Office

Michael D. Stough
Senior Vice President and General Auditor

Lisa A. White
Executive Vice President, Supervision, Regulation, and Credit

List includes members of the management committee and titles as of December 31, 2018.

Bank Officers and Senior Professionals

Eliana Balla
Financial Economist and Senior Manager

Steven T. Bareford
Assistant Vice President

Ronald G. Barnes
Assistant Vice President

Jeremy B. Caldwell
Vice President

Niranjan Chandramowli
Vice President

Christy R. Cleare
Vice President

Kerri A. Coard
Vice President

Cary B. Crabtree
Assistant Vice President

Jeffrey B. Deibel
Assistant Vice President

Natalie A. DePasquale
Assistant Vice President

Todd E. Dixon
Vice President

Cathryne C. Doss
Vice President and Chief Data Officer

Adam M. Drimer
Assistant Vice President

Huberto M. Ennis
Group Vice President

Gregory J. Ewald
Vice President and Deputy General Counsel

Kevin W. Fergusson
Vice President and Medical Director

Craig W. Frascati
Large Bank Principal Examiner

Gina E. Friese
Assistant Vice President

Joan T. Garton
Vice President

Jeffrey R. Gerlach
Vice President

Richard B. Gilbert
Vice President

Nicole N. Girardin
Assistant Vice President

Rebecca Goldberg
Vice President

Keith R.G. Goodwin
Assistant General Counsel

Grey Gordon
Senior Economist

William H. Gregg
Assistant Vice President

Borys M. Grochulski
Senior Economist

Jennifer J. Hall
Assistant General Counsel

Donovan O. Harper II
Senior Vice President

Mattison W. Harris
Vice President

Ann S. Harrison
Assistant Vice President

James R. Hart
Assistant Vice President

Charles A. Hodges
CTO Senior Professional

Kimberley Fuller Homan
Assistant Vice President

Andreas L. Hornstein
Senior Advisor

Kathleen R. Houghtaling
Vice President

Cathy I. Howdyshell
Vice President

Lawrence S. Hull
CTO Senior Professional

Leonard G. Johns
Assistant Vice President

Gregory A. Johnson
Vice President and Assistant General Auditor

John Bailey Jones
Senior Economist and Research Advisor

Diane R. Knapp
Assistant Vice President

D. Keith Larkin
Assistant Vice President

Thomas A. Lubik
Senior Advisor

Ann B. Macheras
Group Vice President

D. Keith Maglinger
Vice President

Jody B. Martin
Assistant Vice President

Jonathan P. Martin
Assistant Vice President

Christian Matthes
Senior Economist

Laura H. Mayer
Vice President

Andrew S. McAllister
CTO Senior Professional

Diane H. McDorman
Vice President

Sonya Y. Mills-Harvey
Assistant Vice President

Aaron B. Moody
Assistant Vice President

Cheryl R. Moore
Vice President

Christopher W. Murphy
Assistant Vice President

Urvi Neelakantan
Senior Policy Economist

Lisa T. Oliva
Group Vice President

Kerri R. O'Rourke-Robinson
Vice President

Raymond E. Owens III
Senior Economist and Policy Advisor

Christopher J. Palumbo
Assistant Vice President

Hemangini R. Parekh
Large Bank Principal Examiner

Christin L. Patel
Assistant Vice President and Corporate Secretary

Patricia A. Perry
Assistant Vice President

Santiago M. Pinto
Senior Policy Economist

Stanley F. Poszywak
Large Bank Principal Examiner

William C. Robinson
Assistant Vice President

Melanie M. Rose
Assistant Vice President

Todd M. Ryan
Large Bank Principal Examiner

Steven D. Sanderford
Large Bank Principal Examiner

Pierre-Daniel G. Sarte
Senior Advisor

Jason C. Schemmel
Assistant Vice President

Karen J. Schettino
Vice President and Chief Financial Officer

Felipe F. Schwartzman
Senior Economist

Michael J. Seifert
Assistant Vice President

Fred E. Shuford Jr.
Assistant Vice President

Brielle M. Stanley
Group Vice President and Chief Human Resources Officer

Matt S. Steiger
Assistant Vice President

Kelly J. Stewart
Assistant Vice President

Markus A. Summers
Vice President

Alexander T. Swartz
Assistant Vice President

Nicholas Trachter
Senior Economist

James Trotta
Vice President

Christopher E. Tunstall
Assistant Vice President

John R. Walter
Senior Economist and Policy Advisor

Zhu Wang
Senior Economist

Lauren E. Ware
Assistant Vice President

Phillip C. Watts
Assistant Vice President

Roy H. Webb
Senior Economist and Policy Advisor

John A. Weinberg
Policy Advisor

Richard F. Westerkamp Jr.
Senior Vice President

John M. Wiatt III
Assistant Vice President

Michael L. Wilder
Vice President

Meghan F. Wlaz
Assistant Vice President

Alexander L. Wolman
Vice President

Terry J. Wright
Group Vice President

H. Julie Yoo
Vice President

List includes officers, senior professionals, and titles as of December 31, 2018.

National IT Management Council

From the left: *Devon A. Bryan, Kristi A. Coy, Kathryn K. Smith, Robert I. Turner, Lyn McDermid, Scott C. Furman, Ghada M. Ijam, Tamera S. Hornsby-Fink, and David N. Alfano*

Lyn McDermid
System Chief Information Officer

David N. Alfano
Senior Vice President and
Chief Administrative Officer

Devon A. Bryan
Executive Vice President and
Chief Information Security Officer

Kristi A. Coy
Senior Vice President for End User Services

Scott C. Furman
Senior Vice President for Organizational Excellence

Tamera S. Hornsby-Fink
Senior Vice President and
Deputy Chief Information Security Officer

Ghada M. Ijam
Senior Vice President for Program and Project Services

Kathryn K. Smith
Executive Vice President for Treasury Services

Robert I. Turner
Executive Vice President and
Chief Operating Officer

List includes members of the management council and titles as of December 31, 2018.

National IT Officers and Senior Professionals

Abigail T. Baker
Assistant Vice President

Ian W. Beirnes
Business Architect

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List includes officers, senior professionals, and titles as of December 31, 2018.

Audited Financial Statements and Notes

The audited annual financial statements of the Federal Reserve Bank of Richmond as of and for the years that ended on December 31, 2018, and December 31, 2017, are incorporated here by reference. They are available from the Board of Governors of the Federal Reserve System at www.federalreserve.gov/aboutthefed/files/richmondfinstmt2018.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 Federal Reserve Board's Statement of Auditor Independence is provided below.

Statement of Auditor Independence

The Federal Reserve Board engaged KPMG to audit the 2018 combined and individual financial statements of the Reserve Banks.[1]

In 2018, KPMG also conducted audits of internal controls over financial reporting for each of the Reserve Banks. Fees for KPMG services totaled $7 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 2018, 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.

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The *2018 Annual Report* also is available on the Bank's website: www.richmondfed.org.

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