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Editor
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Regional Economist
Public Affairs Office
P.O. Box 442
St. Louis, MO 63166-0442



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Perceptions of discrimination and patterns of household incomes differ between blacks and whites.

Read more at www.stlouisfed.org/re.

A Year in Review

St. Louis Fed President James Bullard has been a participant in Federal Open Market Committee (FOMC) deliberations since April 2008. Bullard actively engages with many audiences—including academics, policymakers, business and community organizations, and the media—to discuss monetary policy and the U.S. economy and to help further the regional Reserve bank's role of being the voice of Main Street.

Some of his key policy presentations during 2018 are summarized below, in chronological order. To see all of Bullard's public presentations, please visit www.stlouisfed.org/from-the-president.

R-Star Wars: The Phantom Menace

Feb. 26, 2018: In Washington, D.C., Bullard discussed the natural real rate of interest (commonly called r^* , or r-star) and its implications for the Fed's key policy rate (the federal funds target rate). He considered three factors that can influence the natural real rate of interest and noted that the U.S. is currently in a regime (or state) of low productivity growth, appears to be in a low-growth state for the U.S. labor force, and is in a regime of a high desire for safe assets (the most important of the three factors). He concluded that the natural safe real rate of interest, and hence the appropriate policy rate, is relatively low and unlikely to change very much over the forecast horizon.

U.S. Monetary Policy: A Case for Caution

May 11, 2018: Speaking in Springfield, Mo., Bullard outlined five reasons for caution in raising the policy rate further based on current macroeconomic conditions. Those reasons are: 1) market-based inflation expectations remain low; 2) the current policy rate setting is neutral (putting neither upward nor downward pressure on inflation); 3) the yield curve is relatively flat and yield curve inversion (whereby short-term interest rates exceed long-term interest rates) is possible; 4) business investment has room to grow; and 5) labor markets are in equilibrium.

The Case of the Disappearing Phillips Curve

June 19, 2018: Bullard discussed the “flattening Phillips curve” in advanced

economies during a panel at the ECB (European Central Bank) Forum on Central Banking in Sintra, Portugal. The Phillips curve refers to the empirical relationship between inflation and unemployment, which used to be negative but has been drifting toward zero since the inflation targeting era began in the 1990s. He attributed the flatter empirical Phillips curve to improved monetary policy during this era, noting that inflation has generally been lower, less volatile and closer to stated inflation targets. “Today's G-7 monetary policymakers are unlikely to glean a reliable signal for monetary policy based on empirical Phillips curve slope estimates—they have to look elsewhere,” he said.

Assessing the Risk of Yield Curve Inversion: An Update

July 20, 2018: In Glasgow, Ky., Bullard talked about the possibility that the yield curve would invert, which he first discussed in a presentation on Dec. 1, 2017. He commented that there is a material risk of yield curve inversion over the forecast horizon if the FOMC continues on its present course for raising the policy rate, as suggested by the FOMC's June 2018 projections. Such an inversion is a “naturally bearish signal for the economy,” he said. He noted that inversion is best avoided in the near term by caution in raising the policy rate. “Given tame U.S. inflation expectations, it is unnecessary to push monetary policy normalization to such an extent that the yield curve inverts,” he said.

How to Extend the U.S. Expansion: A Suggestion

Sept. 5, 2018: In New York, Bullard laid out a possible strategy for extending the U.S. economic expansion. The strategy relies on placing more weight on financial market signals, such as the slope of the yield curve and market-based inflation expectations, than is customary. He noted that many current approaches to monetary policy strategy continue to overemphasize the now-defunct empirics of the Phillips curve. “Handled properly, current financial market information can provide the basis for a better forward-looking monetary policy strategy,” he said. He also noted that



President Bullard speaking in Glasgow, Ky.

these signals could help the FOMC better identify the neutral policy rate. “The flattening yield curve and subdued market-based inflation expectations suggest that the current monetary policy stance is already neutral or possibly somewhat restrictive,” he said.

Some Consequences of the U.S. Growth Surprise

Oct. 8, 2018: In Singapore, Bullard discussed the surprisingly strong performance of the U.S. economy relative to projections made by the FOMC in the first half of 2017. A key consequence of this growth surprise, Bullard said, is that it has allowed the FOMC to normalize its policy rate along a projected path, with attendant consequences for global financial markets. He added that a continuation of the growth surprise likely requires faster U.S. productivity growth.

Modernizing Monetary Policy Rules

Oct. 18, 2018: In Memphis, Tenn., Bullard discussed modernizing a popular monetary policy rule, a version of the Taylor rule, whose construction was based on U.S. data from the 1980s and 1990s. Since then, he noted, three important macroeconomic developments have altered key elements of policy rule construction: lower short-term real interest rates, the disappearing Phillips curve and better measures of inflation expectations. “Incorporating these developments yields a modernized policy rule that suggests the current level of the policy rate is about right over the forecast horizon,” Bullard said. ^{RE}

(This article was published online Nov. 15.)

How Important Are Production Networks to the U.S. Economy?

By Sungki Hong, Hannah G. Shell and Qiuhan Sun



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KEY TAKEAWAYS

- As manufacturing grows more sophisticated, industries become more interconnected through production networks.
- By analyzing input-output data, economists can measure the independence and interdependence of U.S. industries in the production of their goods and services.
- Studying production networks can reveal how industries' output growth and job growth are increasingly correlated.

Introduction

The structure of modern industrial production is highly complicated. As the manufacturing process becomes more sophisticated, firms and sectors are increasingly interconnected with each other through production networks.

As a result of these production networks, an economic downturn in one industry (referred to as an industry-specific shock) will be felt by all its industry partners. New research on production networks suggests industry-specific shocks actually account for at least half of the volatility in aggregate growth.¹

An industry's final output can be sold directly to consumers or passed down to another industry as an intermediate input for more production. One can view the production network as a river flowing from raw materials down to the final consumer. When an industry is closer to

final consumers, we call it a downstream industry; when its production is closer to raw materials, it's an upstream industry.

Downstream industries are also referred to as buyer industries because they tend to buy more products from a broad swath of upstream industries, while upstream industries are referred to as supplier industries because they mainly supply materials to other industries. Industries can be both downstream and upstream relative to one another. For example, automobile production is a downstream industry for steel manufacturers but an upstream industry for a law firm that purchases vehicles so that its lawyers can meet with clients.

This article aims to outline the production network structure of the U.S. economy by identifying the key industries that are central suppliers and buyers and by exploring the importance of the automotive industry to the U.S. economy during the 2007-09 Great Recession.

Models of Production Networks

Figure 1 displays three simplified theoretical models of production networks that illustrate the importance of one industry to the overall network.

In the first case, all industries operate independently. They produce output with workers and physical capital but do not use inputs from other industries or sell their output to other industries as an input. All output goes directly to final household consumption.

The second case is a network that resembles an O-ring. All industries sell to a single downstream industry and purchase from a single upstream industry. In contrast to the first case, if there is a disruption to industry 1's manufacturing process, it would affect not only the downstream buyer (industry 2) but also the supplier (industry 5). This case also illustrates how industries can be both upstream and downstream relative to other industries.

The third case is a star-type network. In this case, there is a central hub (industry 3), and the others are peripheral

industries. Industry 3 could play a prime role as a buyer (downstream industry) in the economy (e.g., the automobile industry). The auto industry takes various products from other industries, including glass, electronic equipment and steel, then assembles them together to produce a car. Industry 3 could also play a role as a central supplier (upstream industry), such as the oil industry. In either case, if a negative shock occurs to industry 3, it would be transmitted to the rest of the economy. In contrast, a shock to industry 1 would have a contained impact.

U.S. Input-Output Linkages

Input-output tables produced by the Bureau of Economic Analysis (BEA) allow us to study the actual production network of the U.S. economy. Input-output tables quantify how much each industry buys from other industries. They are used by policymakers, economists and business owners to understand the structure of the U.S. economy.

We can construct two measures from the input-output tables to learn about the predominant upstream and downstream industries in the U.S. production network.

One measure is the material cost share, which is found by taking the material costs paid to an upstream industry as a ratio of the gross output of the purchasing industry. The material cost share helps identify which industries are important suppliers, or upstream industries, to several other industries.

For example, for each \$100 of output generated by the petroleum refining industry, around \$50 is from a commodity purchase from the oil and gas extraction industry. In contrast, less than \$5 flows from the petroleum refining industry to the oil and gas extraction industry for each \$100 created by the extraction industry.

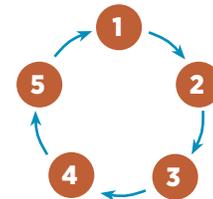
Analyzing the material cost shares for the U.S. economy reveals that some industries appear to be important suppliers, or upstream industries, for others.

Figure 1

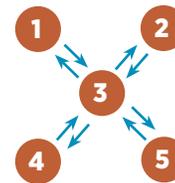
Three Types of Networks



i. Independent Sectors



ii. Ring-Dependent Sectors



iii. Centralized Sectors



ABOUT THE AUTHORS

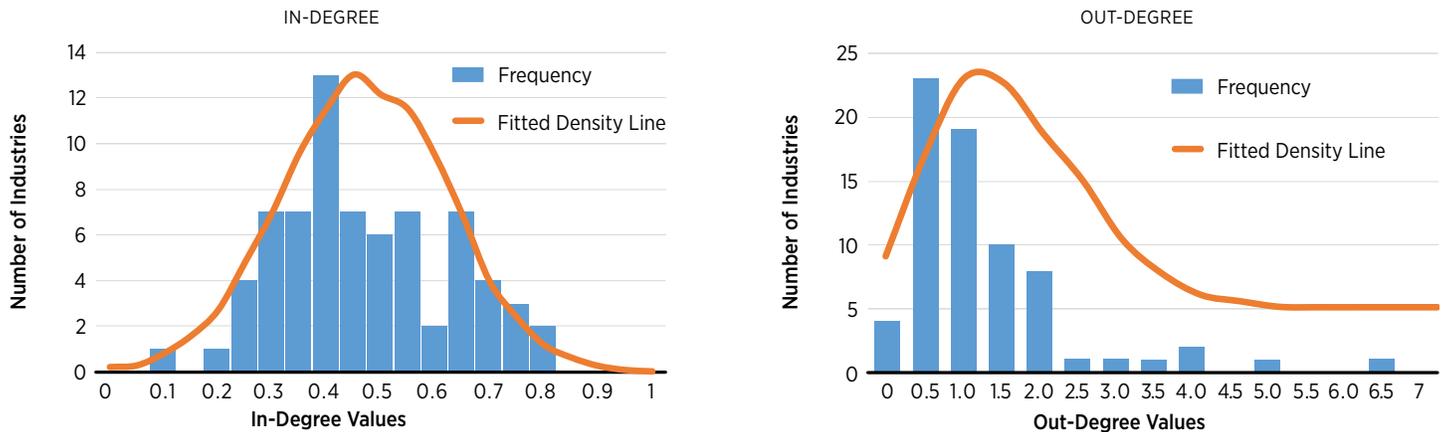
Sungki Hong (left) is an economist at the Federal Reserve Bank of St. Louis. His research interests include macroeconomics and industrial organization. He joined the St. Louis Fed in 2017. Read more about the author and his research at <https://research.stlouisfed.org/econ/hong>.

Hannah G. Shell (center) is a senior research associate at the Federal Reserve Bank of St. Louis.

Giuhan Sun (right) is a research associate at the Federal Reserve Bank of St. Louis.

Figure 2

In-Degree and Out-Degree Distributions



SOURCES: Bureau of Economic Analysis and authors' calculations.

NOTES: The histograms show the distribution of in-degree and out-degree values for 71 industries in 2016. In-degree is calculated as the ratio of an industry's total material costs over its total revenue. Out-degree is calculated as the sum of the output share of downstream purchasers' material inputs that come from that industry.

For example, many industries rely on the “other services” industry; this industry includes legal services, computer systems design and related services, management of companies and enterprises, food services and drinking places, etc. Other noteworthy upstream or supplier industries are wholesale and retail, F.I.R.E. (finance, insurance and real estate), primary metals, and fabricated metals.

Another measure we can construct from the input-output tables is the output share. This measure takes the output purchased by a downstream industry from an upstream industry and divides it by the upstream industry's total output.

The output share gives information on which industries are predominant purchasers, or downstream industries. For example, if industry A produces \$100 and industry B purchases \$50 from industry A, the output share measure is 0.5 from A to B. In the case of the earlier example, the output share from the oil and gas extraction industry to the petroleum refining industry is 0.82, meaning that the petroleum refining industry purchases \$82 of each \$100 produced by the oil and gas extraction industry.

Fewer industries stand out as predominant buyers than those that stand out as predominant suppliers. The industries that stand out as large buyers are construction, motor vehicles (auto industry), other services and government.²

The measures constructed from the input-output tables help us draw a few conclusions about U.S. production networks. First, industries tend to rely heavily on outputs from firms within the same industry. Second, there are a few dominant upstream (supplier) industries that stand out, while the downstream output share (purchasing) appears to be more evenly spread across many industries.

Measures of Interdependence and Independence

The previous section focused on industry-to-industry flow, looking at the entire web of the production network. In this section, we quantify an industry's degree of integration with the rest of the economy by using two aggregated summary measures.

The first measure is called “in-degree” and is calculated as the ratio of an industry's total material costs over total final output (or total revenue). A high in-degree value implies that the industry is more reliant on using intermediate inputs for production.

In the left panel of Figure 2, we plot a histogram of in-degrees for the U.S. production network, which is divided into 71 industries. The distribution of in-degrees is a bell curve, centered on the mean of 0.44. It implies that, on average, 44 percent of an industry's revenue is used to pay

for the inputs purchased from upstream industries.

The range of in-degree distribution is small. The industry at the 75th percentile has an in-degree value 1.7 times larger than the industry at the 25th percentile. The apparel, leather and allied products industry has the highest in-degree value, at 0.75, followed by the motor vehicles, bodies and trailers, and parts industry.

Next, we evaluate an industry’s importance as an intermediate input supplier for the whole economy by using a measure called “out-degree.” An industry’s out-degree is calculated by determining the output share of downstream purchasers’ material inputs that come from that industry, and then taking a sum over all the downstream industries.

For example, if industry A sells its outputs only to three other industries and these three industries use only the materials from industry A, then industry A’s out-degree value is 3. A higher out-degree means that an industry has many downstream purchasers that are highly dependent on material inputs from it.

We plot the distribution of out-degrees in the right panel of Figure 2. We see that many industries’ out-degree values are centered on 1, with a few outliers in the right tail of distribution. The outliers are mostly service-based industries, like professional, scientific and technical services, real estate, and management. The outliers are not surprising for out-degrees, as all industries have to employ certain services to operate. For example, every industry requires lawyers to assist with the legality of business operations.

The range of the out-degree distribution is much wider than that of the in-degrees. The ratio of the 75th percentile industry to 25th percentile industry is 6.4. These numbers suggest that the distribution of upstream suppliers (out-degrees) is more dispersed than the distribution of downstream buyers (in-degrees).

This section tells us that a lot of industries in the U.S. rely on intermediate goods for production; however, on the supply side, there are several industries that are smaller suppliers and a few industries that are dominant suppliers.

Comovement of Linked Industries

So far, we have looked at how industries are connected to the supply chain from a

stationary perspective. Another useful perspective is to understand how the degree of connection in the input-output network determines the dynamics of industry output and employment. One would expect that if two industries are closely connected in the input-output network, there should be a strong comovement in the industries’ output and employment.

We examine two measures for industry output—gross output and value added. The BEA defines gross output of an industry as the market value of that industry’s production in terms of goods and services.³

Value added is the way the BEA measures gross domestic product (GDP). It’s a measure of the amount of output from an industry that could be attributed to only the labor and physical capital used to process the intermediate inputs during production. The value added of an industry is also the contribution of a private industry to overall GDP. A simple way to think of value added is that it’s the difference between an industry’s gross output and the cost of its intermediate inputs.⁴

As an additional measure of industry dynamics, we look at industry payroll employment growth as well.⁵

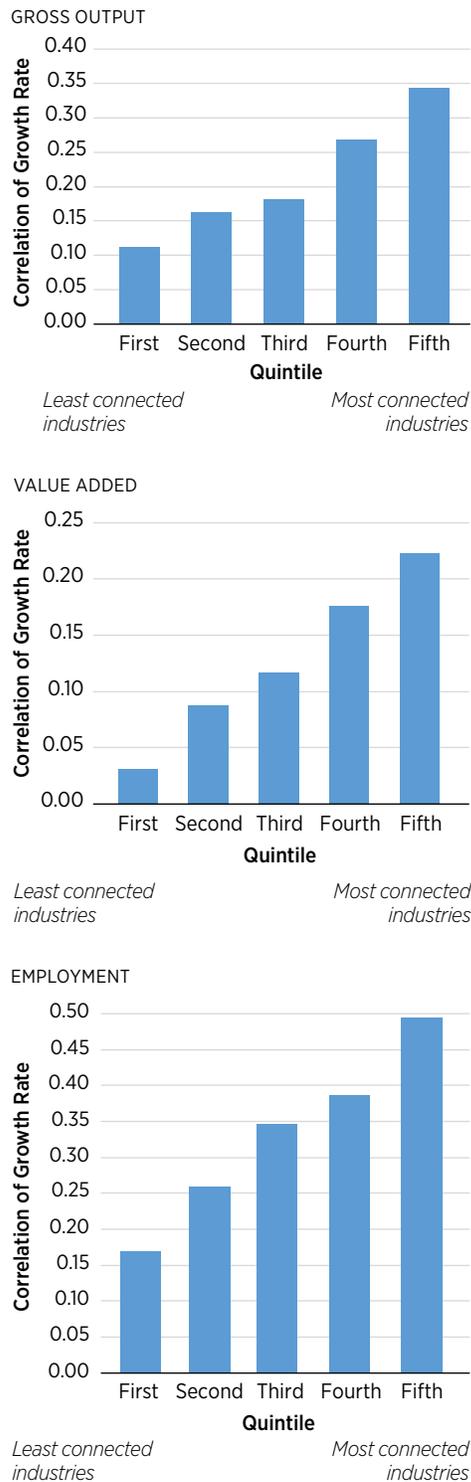
To measure the closeness of two industries, we calculate the share of intermediate materials by taking the amount of materials exchanged between two industries and then dividing it by the total output from the two industries. This calculation is essentially an output-weighted average of the material shares between the two industries. For example, the material share from oil and gas extraction to petroleum refining is 0.5, and the reverse from petroleum refining to oil and gas extraction is 0.05. After weighting the material shares by each industry’s output, the closeness measure is then 0.275.

Then we organize each industry pair into quintiles based on the intermediate material share. Next, we find the correlation of each industry pair’s gross output, value added and employment growth over time, and finally take the average of the correlation coefficient for each group of industry pairs. The resulting data are presented in Figure 3.

Essentially, we have five industry groups that are organized from least

Figure 3

Comovement of Gross Output, Value Added and Employment Growth Rates

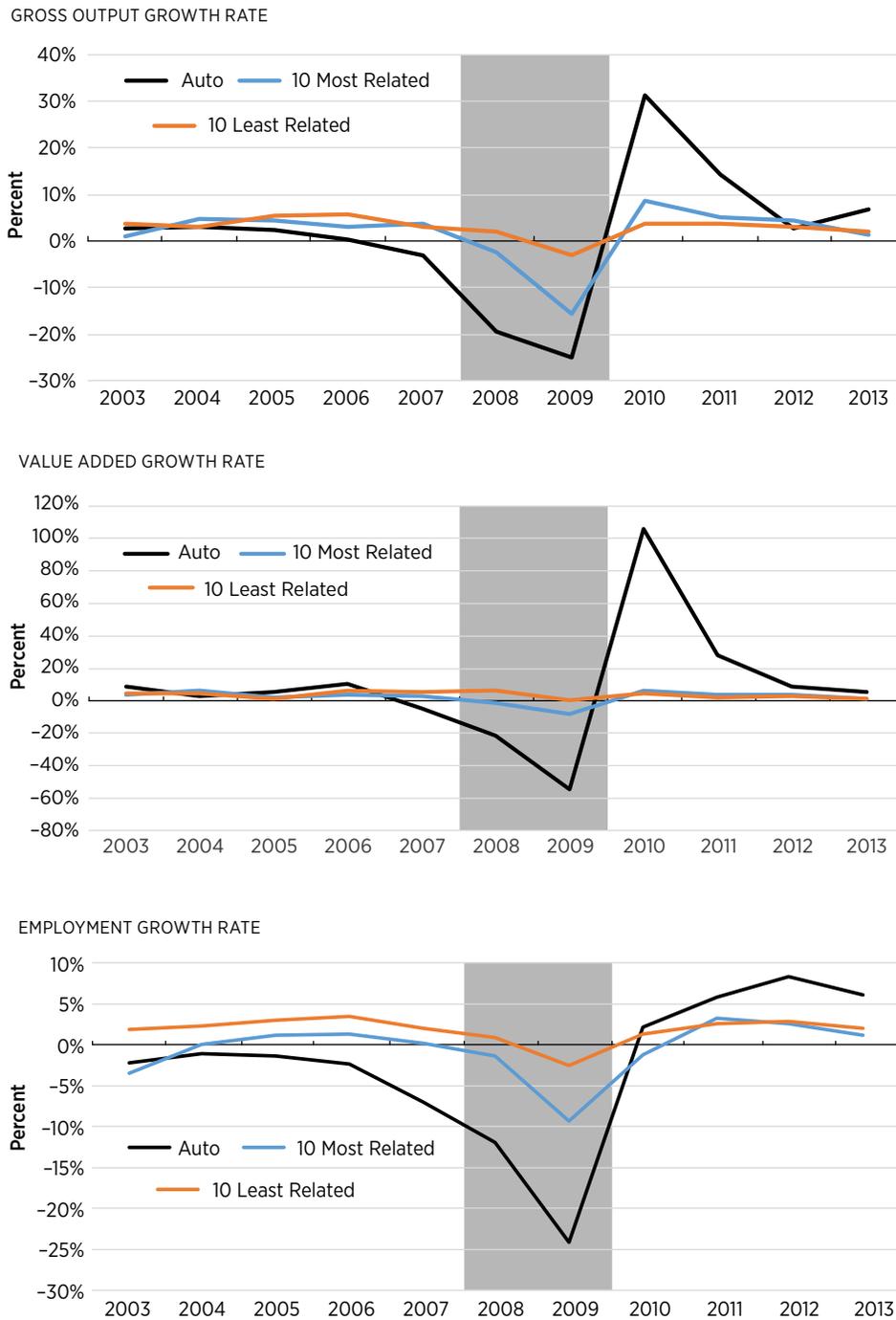


SOURCES: Bureau of Economic Analysis, Bureau of Labor Statistics and authors’ calculations.

NOTES: The calculations are based on annual data on 71 industries. Gross output and value added data range from 1948 to 2016. Employment data range from 1940 to 2017.

Figure 4

Growth Rates of Automotive Industry and Top 10 Most and Least Related Industries



SOURCES: Bureau of Economic Analysis, Bureau of Labor Statistics and authors' calculations.

NOTES: The calculations are based on annual data on the 71-industry level. The shaded area represents the 2007-09 recession.

connected (first quintile) to most connected (fifth quintile) and a correlation coefficient for each industry group that shows, on average, how the industries in each group move together. From the graphs, we see that the correlation between industries' output and employment growth increases as the linkage between industries becomes stronger. This pattern follows our observation that economic activity of one industry likely passes through to its related industries.

Case Study: The Auto Industry

One of the key industries in the U.S. economy is the motor vehicles, bodies and trailers, and parts manufacturing industry, which we'll refer to as the auto industry. The importance of the auto industry to the U.S. economy was brought to the forefront of policy discussions during the 2007-09 recession.

A combination of high fuel costs, a product concentration on fuel-inefficient SUVs and the onset of a recession left U.S. automakers Chrysler and General Motors (GM) asking the government for help in 2008 as the two companies faced the prospect of bankruptcy. The third U.S. automobile manufacturer, Ford, did not need a bailout but still advocated for the government to bail out its competitors. The following quote is from the congressional testimony of Ford's then-CEO Alan Mulally in 2008:

"Should one of the other domestic companies declare bankruptcy, the effect on Ford's production operations would be felt within days—if not hours. Suppliers could not get financing and would stop shipments to customers."⁶

Mulally was referring to the highly interconnected nature of the auto industry. If Chrysler or GM were to go out of business, the upstream industries Ford relies on for inputs would also fail, leading to a complete disruption of Ford's production. Terms like "too big to fail" surfaced during the 2007-09 crisis to describe the phenomenon of these large, interconnected firms. A firm that is too big to fail is one that is a key hub to the U.S. production network. Its failure would be felt throughout the economy.

We can quantify the size of the auto industry in the U.S. production network

by using the metrics we've already explored. The industry has one of the highest in-degree values, meaning it largely relies on intermediate inputs for production. With the exception of apparel and leather production, the auto industry has the highest in-degree value for the U.S. economy, with 75 percent of output going to pay for intermediate materials. The auto industry purchases a large amount of inputs from the other services, wholesale and retail, metals manufacturing, and nonelectrical machinery manufacturing industries.

The auto industry doesn't have a large out-degree relative to the rest of the economy, likely because most of the industry's finished products go directly to consumers. However, there are industries in the manufacturing sector—such as metals, textiles, and rubber/plastics—that purchase inputs from the auto industry. These downstream industries would be impacted by a negative shock also.

Using the 2007-09 recession as an example of a negative shock, Figure 4 shows the interconnected nature of the production network surrounding the auto industry.

While the 2007-09 recession was not necessarily a shock to the auto industry alone, the auto industry was one of the hardest hit by the recession. A deadly combination of decreased consumer demand for vehicles and tighter lending practices that made it hard for consumers to get financing hurt automakers worldwide. High gas prices leading into the recession had already decreased demand for larger vehicles, making the downturn especially fatal for U.S. automakers.

If the 2007-09 recession was felt equally across the economy, we would see that all industries move similarly. Rather, comparing output patterns for the auto industry and other industries closely and not closely tied to it, we see that not all industries were impacted to the same degree.

The black lines show the year-over-year growth rate of gross output, value added and employment for the auto industry from 2003 to 2013. The gray bar highlights the time period when the U.S. economy was in recession. The blue and orange lines show the average growth rates for the auto industry's 10 most and least related industries based on material cost share.

In each graph, we see that the black line drops during the 2007-09 recession and rebounds immediately following the recession. The blue line, which represents the auto industry's top 10 suppliers, also shows a sharp drop followed by a resurgence in the gross output and employment growth graphs, and the same pattern—but slightly softer—in the value added graph. The orange line does not share the same degree of comovement as the black and blue lines. This line represents the growth rates of the 10 industries least related to the auto industry.

These graphs highlight the importance of the network structure of the U.S. economy. The auto industry is a central hub for many upstream suppliers, and any shock to the auto industry will be felt far beyond the industry itself. However, industries that are relatively isolated from the auto industry won't experience as much turmoil.

Conclusions

In this article, we explored U.S. production networks. The production network is a complex subject that still needs greater understanding. To quantify the impact of one industry on the whole economy, economists need more theories and empirical evidence.

We showed that the U.S. economy is characterized as a centralized economy, in which a number of key industries buy and supply most of the materials in the economy. While many industries are large buyers, there are fewer large suppliers. Some of the central supplier and buying industries, like wholesale trade, also tend to be large in terms of economic output in the economy.

These linkages are important for understanding industry dynamics. As industries are increasingly dependent on each other, their output growth and employment growth are increasingly correlated. This dependency is true for both input and output relationships. **RE**

(This article was published online Jan. 8, 2019.)

ENDNOTES

- ¹ See Atalay.
- ² Of course, here we have ignored the main buyer of the economy—households. We do not consider them within the input-output framework since they mainly provide labor to the economy.
- ³ The BEA's definition of gross output can be found at <https://www.bea.gov/help/faq/183>.
- ⁴ The BEA's definition of industry value added can be found at <https://www.bea.gov/help/faq/184>.
- ⁵ For more details on payroll employment and its survey source (Current Employment Statistics survey), see www.bls.gov/web/empsit/cesfaq.htm.
- ⁶ See Carvalho, p. 24.

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Dealing with the Leftovers: Residual Seasonality in GDP

By Michael T. Owyang and Hannah G. Shell



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KEY TAKEAWAYS

- In recent decades, GDP growth in the first quarter has been substantially weaker than growth in other quarters, even after adjusting for typical seasonality.
- This phenomenon, called residual seasonality, makes it difficult for policymakers to know whether a weak first quarter is due to an actual downturn or an understated number.
- Another economic measure—gross domestic income—provides additional information for policymakers to determine whether the first-quarter GDP number reflects actual conditions.

Over the past few decades, one pronounced characteristic of gross domestic product (GDP) is that its growth rate during the first quarter of the year has been substantially lower than the growth rate during other quarters, even after adjusting for the typical seasonality.

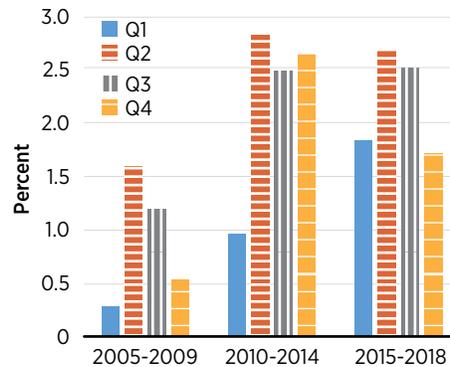
This pattern can be seen in Figure 1, which shows the average growth rate of GDP for each of the four quarters for different periods: 2005-2009, 2010-2014 and 2015-2018. In each period, average GDP growth is markedly lower in the first quarter.

During 2005-2009, GDP growth in the first quarter averaged around 0.25 percent, a fraction of the average growth rate of other quarters in the same period. The discrepancy worsened in the 2010-2014 period. First-quarter GDP averaged around 1 percent in these years, while the other quarters' growth rates were much higher—around 2.5 percent.

Economists have dubbed this phenomenon “residual seasonality,” suggesting that the published first-quarter GDP growth rate is artificially low and that actual growth is more in line with that of

Figure 1

Gross Domestic Product (GDP) Growth by Quarter



NOTES: The quarterly growth rate is an annualized average rate. The data end in the first quarter of 2018.

SOURCES: FRED (Federal Reserve Economic Data) and authors' calculations.

the other quarters. Residual seasonality has even been recognized by the Bureau of Economic Analysis (BEA), which has made efforts to correct it in the most recent comprehensive revisions to GDP.

Residual seasonality presents a problem for both forecasters and policymakers attempting to make timely evaluations of the economy. If the first-quarter GDP number appears to be low even after adjusting for typical seasonal patterns, how should the policymaker react? If the number has a residual seasonal component that is keeping it artificially low, policy actions that take the understated value as true could overstimulate an economy that is otherwise doing well. On the other hand, not reacting to a truly low number—under the belief that it is only a manifestation of a remaining seasonal component—could put the Federal Reserve in danger of being behind the curve.

What Is Residual Seasonality?

Before addressing residual seasonality, one first has to understand seasonality in general and why it is removed from economic data. Economic data have predictable variation throughout the year, caused by weather, regularly timed events (e.g., summer vacation) and holidays, and the seasonal nature of production (e.g., agriculture).

Economists call this predictable variation “seasonality” and usually remove it to compare the data across consecutive quarters. For example, nonseasonally adjusted fourth-quarter GDP in the U.S. tends to be higher than third-quarter GDP, when people often save for the holidays. Thus, a decrease in nonseasonally adjusted GDP from the second quarter to the third quarter would be predictable; however, without this knowledge, a decrease might instead look like the beginning of a recession. Further, large seasonal fluctuations overshadow the important movements in the underlying trend, which policymakers must identify to make decisions.

While some features of weather are predictable (e.g., people go out less in winter when it is colder), unusually severe weather events are not accounted for during seasonal adjustment. These events include catastrophic events, such as hurricanes and blizzards. Typically, economists view these events as temporary disruptions that shift consumption or production to a later time period. For example, a hurricane on the East Coast might cause a shift in production from one quarter to the next. However, these events are not generally predictable and do not occur every year. Thus, they would not be removed as part of seasonal adjustment.

Residual seasonality, like seasonality in general, is a predictable pattern of output

ABOUT THE AUTHORS

Michael T. Owyang is an economist and assistant vice president at the Federal Reserve Bank of St. Louis. His research focuses on business cycles and time series econometrics. He joined the St. Louis Fed in 2000. Read more about the author and his research at <https://research.stlouisfed.org/econ/owyang>.

Hannah G. Shell is a senior research associate at the Federal Reserve Bank of St. Louis.



that occurs over the year, but current methods are failing to measure it. Thus, residual seasonality is not removed in the initial seasonal adjustment process. As might be gleaned from its name, residual seasonality is the leftover seasonality that remains in already deseasonalized data.

Why Might Residual Seasonality Exist?

GDP data are collected by the BEA. Because elements of GDP are available at different times, the BEA collects components of GDP (e.g., consumption, investment) and aggregates them into the final number. Across the quarter, the BEA releases estimates of the data, some of which involve projections of GDP components. The data are seasonally adjusted using a complex algorithm developed by the Census Bureau that removes both the trend and seasonal components from the raw data.

One might think that the BEA collects the data on the components, aggregates them and then seasonally adjusts the aggregate. For various reasons, however, the BEA instead chooses to deseasonalize the components of GDP. Moreover, the BEA does not deseasonalize all the components of GDP. Several economists have independently identified the same residual seasonal patterns in nonresidential structures, government consumption and exports components of GDP, supporting the idea that small seasonalities unaccounted for in the components could be producing noticeable seasonal patterns in the aggregate.¹

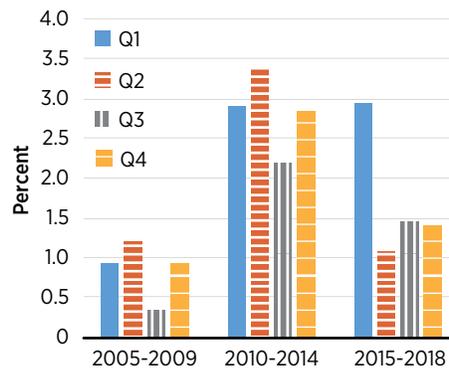
How Important Is Residual Seasonality?

Residual seasonality introduces additional uncertainty for policymakers. One way to measure the potential impact of low first-quarter data on policy rates is to use the Taylor rule, a standard policy tool that suggests an interest rate based on inflation and the actual level of GDP relative to potential GDP.

Economists at the Federal Reserve Bank of San Francisco and the Federal Reserve Bank of Cleveland estimate that first-quarter residual seasonality over the past 10 years ranges from -0.8 to -1.5 percent.² If first-quarter GDP were reported as 1 percent lower than the actual value due to residual seasonality, the output gap would widen, which could mean dropping rates by 0.5 percentage point under the Taylor

Figure 2

Gross Domestic Income (GDI) Growth by Quarter



NOTES: The quarterly growth rate is an annualized average rate. The data end in the first quarter of 2018.

SOURCES: FRED (Federal Reserve Economic Data) and authors' calculations.

rule. But policymakers, aware of residual seasonality, wouldn't react, thus keeping rates higher than recommended by the Taylor rule.³

Still, policymakers seeking to make the most timely adjustments to interest rates could try to reduce the effect of residual seasonality by looking at additional indicators of aggregate activity that are not subject to the same magnitude of residual seasonality.

The BEA tested both GDP and gross domestic income (GDI) for residual seasonality and found that while GDP does exhibit residual seasonality, GDI does not.⁴

GDI is another measure of total economic output. The two measures are theoretically equivalent; GDI measures economic activity in terms of income earned, and GDP measures in terms of production. They differ slightly in practice because of differences in source data. GDP is the more common measure because the GDI source data are released on a less timely basis than the GDP data, and the GDI sources are more difficult to map into higher frequency components (e.g., GDP can be traced to monthly personal consumption expenditures).

Figure 2 plots the average growth rates in GDI by quarter for the same time periods as shown in Figure 1. During the first two periods, first-quarter GDI growth is only slightly lower than second-quarter GDI growth and is much higher

than first-quarter GDP growth in the same periods, as seen in Figure 1. During the last period, GDI growth is actually higher in the first quarter than the other quarters.

Looking at GDI growth in addition to GDP growth gives the policymaker additional information on economic activity. If the policymaker observes a relatively low first-quarter GDP number and a GDI number that is more in line with expectations, it is likely that the GDP number is understated because of residual seasonality. By observing GDI along with GDP, the policymaker can make a more informed decision regarding policy rates. RE

(This article was published online Oct. 19.)

ENDNOTES

- 1 These components are not necessarily the components that are unadjusted by the BEA.
- 2 See Lunsford, and Rudebusch et al.
- 3 The impact of residual seasonality on the policy rule is muted, however, as the policy rule is based on the output gap, which considers the level of reported GDP relative to potential GDP.
- 4 See the BEA's report on residual seasonality, www.bea.gov/research/papers/2016/residual-seasonality-gdp-and-gdi-findings-and-next-steps.

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The Role of Age in Determining Stock-Bond Investment Mix

By Guillaume Vandenbroucke



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KEY TAKEAWAYS

- The standard view says households should invest heavily in stocks when young and then shift to less-risky bonds as they grow older.
- One argument says young people should follow this advice because they have a long investment horizon. Another attributes this view to the longer work life of young people.
- Yet U.S. households don't appear to follow this investment pattern, according to data from the Survey of Consumer Finances.

There is a standard view that as one becomes older, it is prudent to invest more in bonds and less in stocks. The stock market is seen as a young person's game, while the bond market is considered to be more conservative and better suited to the needs of soon-to-be retirees.

But what really motivates this view? The question is rather technical, requiring significant knowledge in finance and mathematics. This article, however, will explore two often-cited arguments in a nontechnical way, discuss their validity and finally present the facts.¹

The Theory

1. Young households should invest in stocks because they have a longer time horizon.

The logic behind this view is rooted in the fact that stocks generally outperform bonds over long periods of time, even though stocks are riskier than bonds. For instance, from 1889 to 1978, the annual real return on U.S. Treasury bills (a riskless bond) averaged 0.8 percent, while the annual real return on the S&P 500 (a collection of risky stocks) averaged 6.98 percent.²

To put these numbers in perspective, imagine a 20-year-old with \$1,000 to invest. Investing it all in the riskless bond for 20 years would yield about \$1,173, while investing it all in the risky S&P 500 for 20 years would yield \$3,855. Clearly, despite the risk, investing in stocks seems the better choice, but who can wait for 20 years? The young.

Yet the logic above is incomplete for two reasons. First, it is true that stocks outperform bonds in the long run, but the potential for a disastrously bad outcome when investing in the stock market also increases as the horizon of the investment increases. If households are very sensitive to risk, they will perceive potential losses as a negative feature of the stock market.

In other words, young people with a strong enough dislike for risk will view the stock market as too risky *because* they are young (and thus have a long investment horizon) and they are focused on the potential for disaster. On the other hand, young people willing to take risks will view the stock market as less risky *because* they are young and they are focused on the potential for growth.

Second, households can change their portfolio composition at any time, albeit at a cost; therefore, a household's investment horizon is only as long as the interval between changes to its portfolio. This implies that there is, for all intents and purposes, no difference between a long and a short investment horizon: A young household does not have to keep a constant share of its investment (possibly all of it) in the stock market for 20 years but may choose to do so by electing, annually, to keep its portfolio composition constant. There's no such thing as a "long" horizon when the portfolio can be readjusted annually.³

Thus, if young households should indeed invest more in stocks than in bonds, the reason cannot be that they have a longer time horizon than the old. Let us then turn to another, better argument.

2. Young households should invest more in stocks because they will work longer.

To understand this argument, it is worth taking a small detour and defining what economists mean by "wealth." A financial asset is worth a certain amount of dollars, say \$100, because it is supposed to generate income streams in the future. These future income streams can take the form of interest payments to bondholders or dividends to stockholders.

When buyers are willing to pay \$100 to acquire the asset, it means that they currently value the future stream of dollars from this asset at \$100. Thus, the value of the asset—or, equivalently, the wealth of the asset holder—is determined by the future income promised by the asset, and this, in turn, is reflected in the current price of the asset.

Most people do not receive all their income from financial assets, though. They also work. A person's work can be viewed as an asset because it is the source of future income. Economists refer to this notion as "human capital wealth," i.e., the value of a worker's future income stream. In fact, the labor income of the average worker is much less risky than the stock market, and therefore, human capital can be viewed more as a bond than as a stock.

Unlike a financial asset, however, a person's human capital wealth decreases with age and becomes zero upon retirement, i.e.,

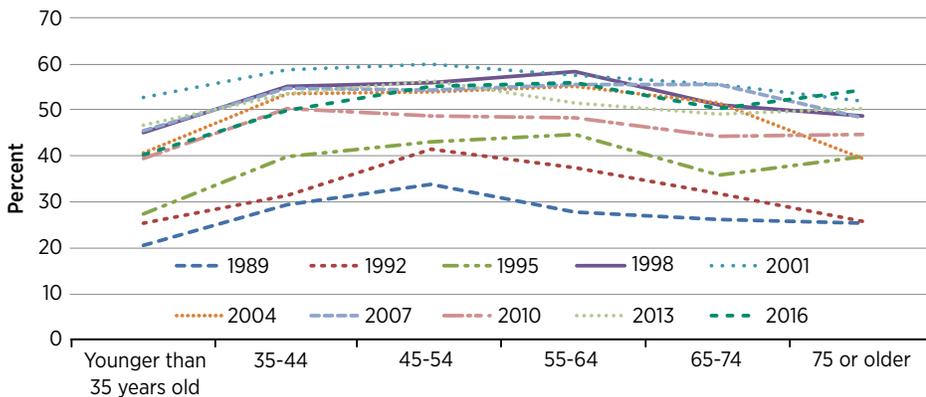
ABOUT THE AUTHOR

Guillaume Vandenbroucke is an economist and research officer at the Federal Reserve Bank of St. Louis. His research focuses on the relationship between economics and demographic change. He joined the St. Louis Fed in 2014. Read more about the author and his research at <https://research.stlouisfed.org/econ/vandenbroucke>.



Figure 1

Stockholdings as Share of Total Financial Assets, by Age of Household Head



SOURCE: Survey of Consumer Finances.

NOTE: The share of stockholdings is the average for all U.S. households within that age group.

no labor income is to be generated after retirement. With this view in mind, a person's wealth is the sum of his financial wealth and his human capital wealth. The best portfolio allocation should be decided by taking into account human capital wealth and the fact that this wealth approaches zero as retirement becomes imminent.

Specifically, consider a household that finds it's best to split its wealth 50-50 between risky and riskless investment at any age. When the household is young, human capital wealth—which is nearly riskless—is large.⁴ Hence the household needs more stocks than financial bonds to achieve its 50-50 goal. Upon reaching retirement, however, human capital wealth approaches zero, and financial bonds must be used to achieve a 50-50 goal. This is a valid reason why young households should hold more stocks than older households.

The Reality

What do U.S. households actually do then? The Federal Reserve Board and the U.S. Department of the Treasury sponsor a triennial survey, known as the Survey of Consumer Finances. The survey asks a representative sample of U.S. families questions about their finances in order to gather information on income, savings and investment by household.

Figure 1 gets at the core of the question: It plots the fraction of a household's

financial assets that is invested in the stock market, either directly or indirectly. Each line represents a different survey year.

The message from Figure 1 is that a clear pattern linking the age of the household's head and the stock-versus-bond composition of the household's financial assets is missing. That is, there are no clear trends indicating that older households hold proportionally less stock than young households. In 2016, for instance, the household whose head was younger than 35 held 40.2 percent of its assets in stocks, while the household whose head was in the age range of 65-74 held 50.2 percent of its assets in stocks.

If anything, the relationship between age and portfolio composition is the opposite of what is prescribed by economic reasoning. Does this mean that the logic described earlier is wrong? Does it mean that U.S. households make wrong choices? Probably neither of the above explains the inconsistency. Instead, this suggests that there are determinants other than age in the decision to acquire stocks versus bonds. This is still an active, fairly technical, area of research. RE

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Makenzie Peake, a research associate at the Federal Reserve Bank of St. Louis, provided research assistance.

ENDNOTES

- ¹ An excellent article published in 1996 by economists Ravi Jagannathan and Narayana Kocherlakota discusses this question at a technical level. I have relied extensively on their analysis for this article.
- ² See Mehra and Prescott.
- ³ An example can help to illustrate this point: Suppose that the safe rate of return is 1 percent, while the stock market return is -10 percent for the coming year and +10 percent forever after. Suppose also that people "foresee" these returns. The best investment strategy is to invest for 1 year in bonds only, and then readjust the portfolio to invest in stocks only. This is true regardless of the number of years the investment might last, i.e., the "horizon."
- ⁴ Labor income is not completely riskless, of course. There is the risk of becoming unemployed for some period of time. But this risk turns out to be relatively small compared to the fluctuations of the stock market and is sometimes compensated by unemployment insurance.

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Unauthorized Immigration in the U.S.: Trends in Recent Years

By Subhayu Bandyopadhyay and Asha Bharadwaj



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KEY TAKEAWAYS

- The number of unauthorized immigrants in the U.S. grew rapidly from 1990 to the Great Recession. Since then, this population has leveled off.
- Mexico remains the biggest source nation of unauthorized immigrants, but the net inflows from that country have often been negative since the Great Recession.
- Changes in Mexican immigration may be due to reduced economic opportunities in the U.S. relative to those in Mexico or increased enforcement of U.S. immigration laws.

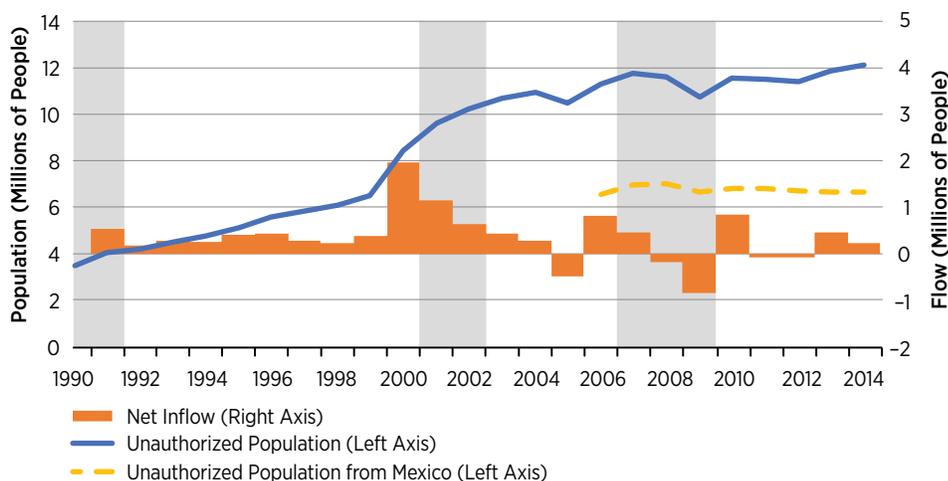
Immigrants contribute to the U.S. economy through their labor, skills and entrepreneurial capital. And immigration has long been considered a key part of the American experience. However, large inflows of immigrants can increase competition for jobs, thereby driving down wages for workers already residing in the country.

Keeping economic as well as social concerns in mind, lawmakers enact legislation that establishes the appropriate level of legal immigration and the process for foreigners to lawfully enter the U.S. Any person entering the U.S. or living in the country in violation of these laws is an “unauthorized immigrant.”

The Pew Research Center estimates that there were 10.7 million unauthorized immigrants in the U.S. in the year 2016 (according to preliminary estimates). To put this number in perspective, the total foreign-born population, as measured using census data, was about 43.7 million in 2016.¹ Given its substantial share of the foreign-born population and its centrality in the current policy debate, we focus this article on the evolution of unauthorized

Figure 1

Unauthorized Immigrants: Population and Flows, 1990-2014



SOURCES: Department of Homeland Security, Warren and Warren, and authors' calculations.

NOTES: Gray areas represent recessions as defined by the National Bureau of Economic Research. DHS data are not available for the years 2001 through 2004; for this period, we use data from Warren and Warren.

immigration in recent years. In particular, we first discuss how the population of unauthorized immigrants evolved from 1990 until 2014 (the latest year in our data sources) and how this evolution is related to unauthorized immigration from Mexico. (Data availability limits the time periods over which we look into the following issues.)

We then outline the leading source nations of unauthorized immigrants and see how the immigrant flows evolved from 2005 to 2014, the latest year when these data are available. Next, we look at the state of residence of the unauthorized immigrants in the U.S. for the years 1990 and 2014, and compare changes between these years. Finally, we discuss the evolution of U.S. enforcement, as evidenced by the

deportation of unauthorized immigrants between 1990 and 2016.

The Unauthorized Immigrant Population

Figure 1 traces the total population of unauthorized immigrants in the U.S. over the period 1990-2014. In 1990, the total unauthorized immigrant population in the U.S. was 3.5 million. This population grew through the 1990s, averaging an annual rise of around 330,000; by 1999, the total population reached 6.5 million. It increased further between 2000 and 2007. The expansion of the U.S. economy in the years leading to the Great Recession was likely an important factor responsible for this.

There was a significant dip in the unauthorized immigrant population at the time

ABOUT THE AUTHORS

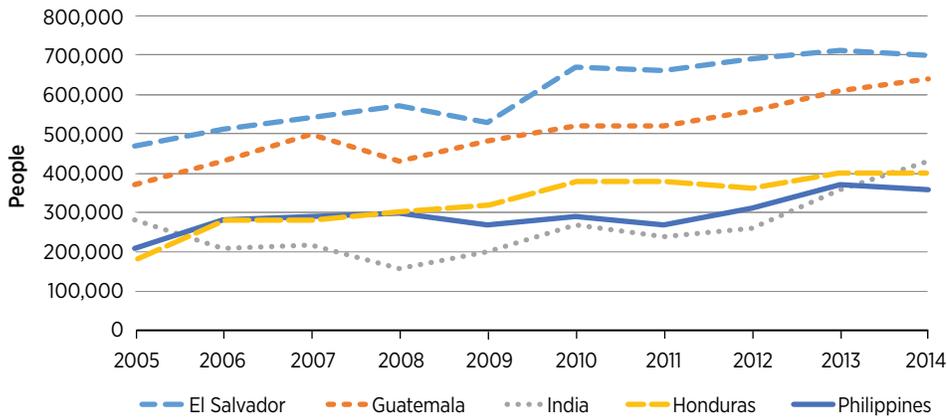
Subhayu Bandyopadhyay (left) is an economist and research officer at the Federal Reserve Bank of St. Louis and editor of the *Regional Economist*. His research interests include international trade, development economics and public economics. He has been at the St. Louis Fed since 2007. Read more about the author and his research at <https://research.stlouisfed.org/econ/bandyopadhyay>.

Asha Bharadwaj (right) is a research associate at the Federal Reserve Bank of St. Louis.



Figure 2

Unauthorized Immigrant Population by Country of Origin (Leading Countries after Mexico)



SOURCE: Department of Homeland Security.

of the Great Recession (December 2007-June 2009). The lack of employment opportunities, among other factors, likely played a role in bringing this population down by around a million people between 2007 and 2009 (11.8 million and 10.8 million, respectively). Coinciding with the economic recovery, immigration rebounded, with the number of unauthorized immigrants at 12.1 million in 2014. According to recent estimates by the Pew Center, the population in 2015 was around 11 million and around 10.7 million in 2016. The overall picture is one of a sharp rise in unauthorized immigration at the turn of the century, followed by modest growth until 2007 and then a leveling off.

Unauthorized Immigration from Mexico

The dashed yellow line in Figure 1 traces the unauthorized immigrant population from Mexico. In 2005, Mexican nationals represented around 57 percent of the total unauthorized immigrant pool, making that country by far the largest source nation of unauthorized immigrants.

Unauthorized immigration from Mexico peaked in 2008 at 7.0 million (60.6 percent of the total) and then modestly declined to 6.6 million (54.8 percent of the total) in 2014. The initial drop was probably associated with the Great Recession, but we have not seen increases in recent years due to a combination of factors, including demographic changes in the Mexican economy (such as the slowdown of population growth and decline in fertility rates).²

Compared with the early 2000s, there has also been more enforcement effort. For example, the budget for the U.S. Customs and Border Protection (CBP) increased from \$6.3 billion in 2005 to \$11.7 billion in 2012 (in absolute dollars),³ according to a report by the Migration Policy Institute. Further, the size of the Border Patrol has doubled since 2004, increasing from 10,819 agents in 2004 to 21,370 in 2012.⁴

Other Major Source Nations

Figure 2 presents the population of unauthorized immigrants from other major source nations: El Salvador, Guatemala, India, Honduras and the Philippines. Although modest in comparison to the numbers from Mexico, the level of unauthorized immigrants from El Salvador steadily increased from around 470,000 in 2005 to around 700,000 in 2014. Similar patterns are seen for Guatemala, India, Honduras and the Philippines. These increases for source nations other than Mexico (which actually showed a decline in 2014) contributed to total unauthorized immigration peaking at 12.1 million in 2014. However, the overall contribution of any of these nations is not large, with El Salvador—the largest source among these nations—contributing only 5.8 percent of the total unauthorized immigrant population in 2014.

Increasing violence in these source nations⁵ and the availability of better

(continued on Page 21)

ENDNOTES

- ¹ “Foreign-born” is defined by the Census Bureau as anyone who is not a U.S. citizen at birth. Details are available at www.census.gov/topics/population/foreign-born.html.
- ² See Passel et al., and Massey.
- ³ In 2012 dollars, CBP’s budget increased from \$7.4 billion to \$11.7 billion.
- ⁴ See Meissner et al.
- ⁵ See www.pewhispanic.org/2013/09/25/2011-national-survey-of-latinos/; and www.pewhispanic.org/2017/12/07/rise-in-u-s-immigrants-from-el-salvador-guatemala-and-honduras-outpaces-growth-from-elsewhere/.
- ⁶ Charts (from 2005-2014) for this section and the following section are available from the authors on request.

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Bourbon and Whiskey Distillers Face Rosy Tourism, Vexing Tariffs

By Kathryn Bokun, Jim Fuchs, Charles S. Gascon and Suzanne Jenkins



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KEY TAKEAWAYS

- Bourbon and other American whiskeys have become targets of retaliatory tariffs amid global trade disputes.
- Distilling whiskey is an important source of economic activity for Kentucky and Tennessee.
- Tourism related to whiskey has provided another way to tap growth from regional distilleries.

For many American whiskey producers, the summer season has traditionally been a time when production is slowed down to allow for annual distillery maintenance, thereby providing producers with the opportunity to plan for the next round of distilling, mixing, storing and bottling that typically begins in the fall. An expected surge in global demand has become a vital part of their planning.

This past summer, however, producers—both large and small—found it much more difficult to plan for the future as they tried to gauge the impact of retaliatory tariffs on American whiskey imposed by U.S. trading partners. First imposed in late June and early July, stiff tariffs have remained in place in key export markets like the European Union (EU).

For the Eighth Federal Reserve District states of Kentucky and Tennessee,¹ the economic and cultural significance of whiskey production makes the current

trade situation especially poignant. Kentucky produces about 95 percent of the world's bourbon, and Tennessee is the home of Jack Daniel's—the world's most popular Tennessee whiskey.

The Whiskey Boom

Domestic and foreign demand for U.S. whiskeys has surged in recent years, thanks to improved economic conditions worldwide and a growing taste for premium and craft whiskey products. In the U.S., employment at distilleries (which produce all types of spirits) has almost doubled since 2003, from just over 7,200 jobs to 13,700 in 2017.

In 2017, combined U.S. revenues for bourbon and other American-style whiskeys like Tennessee and rye hit \$3.4 billion, up 8.1 percent from the previous year and up about 160 percent since 2003, according to the Distilled Spirits Council. Of this amount, exports reached \$1.13 billion in 2017, an increase of more than 75 percent over the past two decades; 2017 was also the sixth year in a row that exports topped \$1 billion. While this represents less than 0.1 percent of total U.S. exports, whiskey makes up 64 percent of the country's distilled spirit exports.

Kentucky Bourbon

In 1964, the U.S. Congress passed a resolution declaring bourbon a “distinctive product” that can be produced only in the United States.² Thanks to a combination of climate and other factors, close to 95 percent of all bourbon comes from the

state of Kentucky, according to the Kentucky Distillers' Association (KDA).

Since 2003, the number of distilleries in Kentucky has more than tripled—from 14 to 48 in 2017—and more are being planned for construction or expansion. While the data do not identify the types of spirits produced in these distilleries, it is primarily Kentucky bourbon. Distilleries employ about 4,600 people in Kentucky, which is about one-third of total distillery employment in the U.S. but only 0.3 percent of that state's total workforce.

While it is difficult to measure the economic impact of the bourbon industry on the state, estimates can be produced. Disentangling the actual production of spirits from other activities, such as inputs in the supply chain and associated tourism, is important for understanding how the industry is being measured. The following steps produce an estimate of the value added from production.

Kentucky is about a \$203 billion economy, as measured by gross domestic product (GDP) for the state. The food, beverage and tobacco (FBT) manufacturing industry, a broader sector that includes distilleries, produces about \$7.5 billion, or 3.7 percent of state output. Distilleries employ about 15 percent of all FBT workers and pay these workers about 29 percent of all FBT earnings. Using either the employment share or earnings share implies that GDP from distilleries is between \$1.1 billion and \$2.2 billion per year, respectively, or up to about 1 percent of the state's economy.

ABOUT THE AUTHORS

Kathryn Bokun (far left) is an intern at the Federal Reserve Bank of St. Louis.

Jim Fuchs (left) is an assistant vice president at the Federal Reserve Bank of St. Louis.

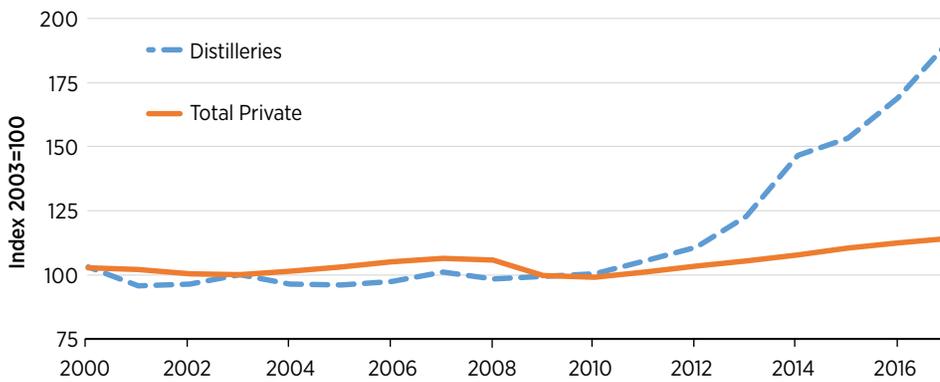
Charles S. Gascon (right) is a regional economist and a senior coordinator in the Research Division at the Federal Reserve Bank of St. Louis. His focus is studying economic conditions in the Eighth District. Read more about the author and his research at <https://research.stlouisfed.org/econ/gascon>.

Suzanne Jenkins (far right) is a senior policy analyst at the Federal Reserve Bank of St. Louis.



Figure 1

Job Growth: U.S. Distilleries versus U.S. Private Sector



SOURCE: Quarterly Census of Employment and Wages.

Yet Kentucky’s bourbon industry reaches far beyond the production of spirits. The Kentucky bourbon business generated more than \$8.5 billion in annual revenues in 2017, according to a report produced by the University of Louisville’s Urban Studies Institute and the KDA.

The report estimated that bourbon manufacturing had the state’s second-largest job multiplier effect, at around 3.0; that is, every one distillery job results in three additional jobs beyond manufacturing. These estimates could imply that the bourbon industry contributes far more than 1 percent to the state’s economy but likely somewhere around 3 percent.

In addition, Kentucky distillers pay an ad valorem state tax per barrel for every year a barrel ages. Revenues from this tax are used to fund education, public safety, public health and other needs. In 2017, distillers paid close to \$18 million in ad valorem barrel taxes.

Tennessee Whiskey

Compared with Kentucky bourbon, there are fewer producers of Tennessee whiskey, in part due to the statewide prohibition that had for many years limited the distillation of drinkable spirits to just three of Tennessee’s 95 counties (Lincoln, Moore and Coffee). This prohibition was lifted in 2009. There are now more than 30 distilleries across the state, with more being planned. Tennessee whiskey can be produced only in the state and following specific processes per various federal and state legislation.

In 2017, Tennessee whiskey was the state’s eighth-largest export, valued at \$665 million, according to the U.S. Census Bureau.³ There are currently two major producers of Tennessee whiskey: Brown-Forman’s Jack Daniel Distillery, based in Lynchburg, and Cascade Hollow Distilling, which is based in Tullahoma and owned by the U.K.’s Diageo.

Jack Daniel’s is the top-selling American whiskey in the world, accounting

In 2017, Tennessee whiskey was the state’s eighth-largest export, valued at \$665 million, according to the U.S. Census Bureau.

Table 1

2018 Tariffs on U.S. Bourbon and Whiskeys

Country	EU	Canada	Turkey	Mexico	China
2018 Tariff	25%	10%	40%	25%	25%
2017 Export Value	\$667 million	\$48.7 million	\$20.2 million	\$13.4 million	\$8.9 million

NOTE: Tariff rates as of Oct. 1.

SOURCE: Distilled Spirits Council.



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for about 70 percent of all U.S. whiskey exports. Foreign sales represent about half of Brown-Forman's overall sales.

Retaliatory Tariffs

In late June and early July, the European Union, Canada, Mexico, Turkey and China responded to aluminum and steel tariffs imposed by the U.S. with tariffs of their own on a variety of U.S. products, including whiskey. (See Table 1.)

The day Mexico announced its tariff, share prices of major U.S. distillers tumbled on concern that the trade war could escalate. In the EU, which accounts for about a quarter of U.S. whiskey exports, major distributors were expected to raise prices on American whiskey and bourbon brands that they sell in this region. Companies also reportedly built stockpiles in Europe to mitigate the impact of the tariff. For smaller producers, who have indicated they cannot absorb similar price increases, they are considering a price cut in order to maintain market share. Concerns remain that excess supplies of major brands meant for export will weigh on smaller nonexporting U.S. producers.

While the direct impact of the tariff is measured by a percentage increase in prices, a greater concern is the potential loss of foreign markets. Whiskey is a quintessential American product, and producers believe changes in sentiment toward the U.S. will negatively impact the demand for their product. Moreover, unlike other iconic American products like Harley-Davidson motorcycles that have been subject to tariffs, federal law requires that bourbon be produced in the U.S., limiting a distiller's ability to shift production overseas to offset costs if tariffs remain in place for an extended period.

Tourism—A Bright Spot

Tourism has grown to be a very powerful component to the economics of whiskey in Kentucky and Tennessee. The KDA launched the Kentucky Bourbon Trail in 1999, followed by the Kentucky Bourbon Craft Trail in 2012. In 2017, there were 23 distilleries that participated in the trails, drawing close to 1.2 million visitors. As a comparison, wine-growing Napa Valley in California—a region adjacent to the San Francisco metropolitan area, with a population of over 4.3 million—welcomed

3.5 million visitors in 2016.

A 2014 report by the Urban Studies Institute examined the economic impact of bourbon tourism, finding that whiskey tourists tend to be “relatively affluent” visitors who make “multi-night hotel stays in Kentucky.” The report estimated the economic impact of bourbon tourists on Jefferson County alone equaled \$2.5 million per year.

The Tennessee Whiskey Trail, modeled after the Kentucky Bourbon Trail, launched in June 2017. It is an initiative of the Tennessee Distillers Guild and currently features about 25 stops.

Conclusion

A growing U.S. appetite for distilled spirits has fueled rapid growth for distillers of bourbon and other American whiskeys. Amid a solid labor market, U.S. consumers are also more willing to spend on high-end brands. Meanwhile, foreign consumers continue to embrace these spirits as consumable symbols of America.

Foreign sales have been a particular sweet spot for distillers, though recent trade disputes may slow export growth to the EU and other trading partners and weaken the profitability of this business. Despite the new challenge abroad, interest in not only the beverage but the mystique of distilling—as evidenced by whiskey-related tourism—should buffer any international slowdown. **RE**

(This article was published online Nov. 20.)

ENDNOTES

- ¹ Headquartered in St. Louis, the Eighth Federal Reserve District includes all of Arkansas and parts of Illinois, Indiana, Kentucky, Mississippi, Missouri and Tennessee. This article uses state-level data for Kentucky and Tennessee.
- ² See Bourbon Whiskey Designated As Distinctive Product of U.S. Concurrent Resolutions—April 21, 1964. www.gpo.gov/fdsys/pkg/STATUTE-78/pdf/STATUTE-78-Pg1208.pdf.
- ³ See State Exports from Tennessee. U.S. Census Bureau. www.census.gov/foreign-trade/statistics/state/data/tn.html.

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Measuring Levels of Debt in the Eighth District's Key Metro Areas

By Ryan Mather and Don E. Schlagenhauf



The Eighth Federal Reserve District is composed of four zones, each of which is centered around one of the four main cities: Little Rock, Louisville, Memphis and St. Louis.

KEY TAKEAWAYS

- Debt growth slowed in both the U.S. and the Eighth District from the first quarter of 2018 to the second.
- Mortgage debt growth in Eighth District MSAs has been declining recently, and delinquency rates for mortgage debt have started to decline.
- Overall, the data do not seem to indicate that a severe debt problem may be brewing.

debt, as well as home equity lines of credit (HELOCs).

Rather than focusing on developments in the Eighth District, however, we decided it would be potentially more useful to aggregate debt statistics to the city level. Hence, this article reports on consumer debt levels by type of debt for the largest metropolitan statistical areas (MSAs) in the District: St. Louis; Memphis, Tenn.; Louisville, Ky.; and Little Rock, Ark.

National and Eighth District Developments

Table 1 presents the inflation-adjusted² growth in consumer debt for the U.S. and the Eighth District in the most recent quarters for which data are available.

As can be seen, all categories of debt growth slowed in both the U.S. and the Eighth District from the first quarter of 2018 to the second. Nationally, total consumer debt grew by 1.58 percent in the second quarter. In the Eighth District, total consumer debt showed almost no growth.

Auto debt—which had been rising quickly enough in 2017 to create some concern in the popular press—seems to have slowed. The decline in mortgage debt growth, especially in the Eighth District, suggests a slowing housing market.

Eighth District MSAs

While district-level data may be of interest, data allowing trends to be observed at the MSA level are likely more useful for private interests and public policymakers. In this section, we report overall consumer debt developments for Little Rock, Louisville, Memphis and St. Louis. The data are constructed from the CCP by building individual records into representations of household debt and matching them to MSAs.

In general, the MSA growth rates displayed the same patterns as those observed in the nation. The growth in total debt fell for all areas during and after the Great Recession. It was not until 2014 that total consumer debt began to increase once again in most MSAs.

Little Rock tended to have higher debt growth rates compared with those of other MSAs from 2008 until 2015. Total debt growth in Memphis and St. Louis, by contrast, has been below that observed nationally for most of the last decade.

In Figure 1, these trends in real consumer debt are broken down by category.

In each of the included cities, the growth in mortgage debt has been beneath the national average for several quarters. St. Louis and Little Rock have actually seen a net decrease in mortgage

In a prior Regional Economist article, we introduced data that can be used to evaluate consumer debt developments in the Eighth District.¹ The Federal Reserve Bank of New York's Consumer Credit Panel (CCP) is based on an anonymized 5 percent sample of credit files provided by the credit monitoring company Equifax. In this article, we once again used the CCP to develop statistics that can be used to monitor auto, credit card and mortgage

Table 1

Debt Scorecard: The U.S. and Eighth District

	Quarterly Percentage Change, Year-over-Year			
	United States		Eighth District	
	Q1:2018	Q2:2018	Q1:2018	Q2:2018
Auto	2.71%	2.08%	2.43%	1.79%
Credit Card	4.44%	3.73%	3.05%	2.21%
Home Equity Line of Credit	-4.47%	-5.28%	-1.45%	-4.79%
Mortgage	2.26%	1.67%	0.15%	-0.52%
Total	2.18%	1.58%	0.86%	0.01%

SOURCES: Federal Reserve Bank of New York/Equifax Consumer Credit Panel and authors' calculations.

NOTE: Data as of Aug. 13.

ABOUT THE AUTHORS

Don E. Schlagenhauf (left) is an economist at the Federal Reserve Bank of St. Louis. His research focuses on macroeconomics and policy, with emphasis on housing. He joined the St. Louis Fed in 2017. Read more about the author and his research at <https://research.stlouisfed.org/econ/schlagenhauf>.

Ryan Mather (right) is a research associate at the Federal Reserve Bank of St. Louis.



debt. As mentioned previously, this is likely caused by a slowing mortgage market.

HELOC debt growth also declined in each MSA during the second quarter of 2018, with Memphis experiencing the largest decline. Auto debt growth was quite strong until 2016. After that point, however, auto debt growth began to slow in most of the MSAs.

Table 2 offers a focused view of the first two quarters for the current year, showing that auto debt in Louisville, Memphis and St. Louis all grew in the modest range of 0.46 percent to 3.82 percent in the second quarter. Little Rock was an outlier as auto debt actually declined slightly. These data may suggest some slowing in auto sales during the second quarter of 2018.

Accumulation of credit card debt seems likewise to be slowing across all MSAs more so than the national average. Generally, the MSA-level data track closely with national data for each component in terms of year-over-year growth.

When Do Debt Increases Signal a Problem?

An increase, or even a sustained increase, in any debt category does not necessarily signal a problem as long as debtors continue to demonstrate an ability to repay. To provide clarity, then, we also monitored 90-day delinquency rates in each MSA by debt category.³ The idea is that increasing both consumer debt and corresponding delinquency rates could signal a possible debt problem.

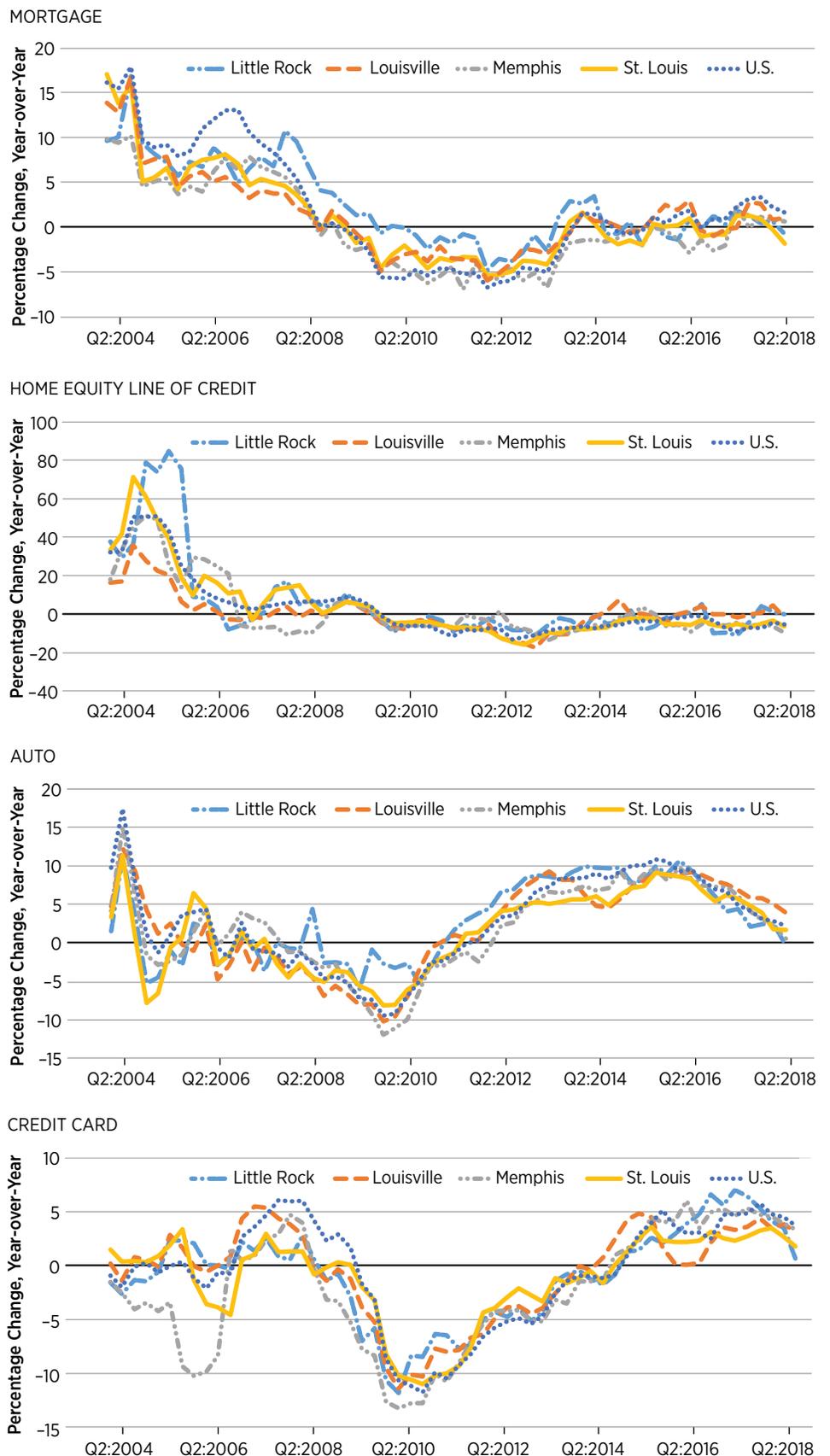
Table 2 also shows the difference between each quarter's delinquency rate and the corresponding rate of the same quarter a year ago. If these rates were compared to the growth in delinquency rates that occurred just prior to the Great Recession, one would see that current rates for each debt category are substantially smaller.

As can be seen in Table 2, the delinquency rates for MSAs in the HELOC and mortgage categories declined during each of the last two quarters in all but two cases. The other categories defy a consistent story, but delinquency rates were well below Great Recession levels with two exceptions: credit card delinquencies in Little Rock and auto delinquencies in Louisville.

(continued on bottom of next page)

Figure 1

Total Real Consumer Debt by Category



SOURCES: Federal Reserve Bank of New York/Equifax Consumer Credit Panel and authors' calculations.
NOTE: Data as of Aug. 13.

Immigration

(continued from Page 15)

economic opportunities in the U.S. played a major role in this uptick of immigration. These factors were likely complemented by the “network effect,” which is the chance to join relatives and family who have already migrated.

Host States of Unauthorized Immigrants

The largest host states in 2014 were California, Texas, Florida, New York, Illinois and New Jersey.⁶ Among these states, California (2.9 million) and Texas (1.9 million) together accounted for 40 percent of the total U.S. unauthorized immigrant pool in 2014. This is not surprising given that these two states share borders with Mexico, the largest source for unauthorized immigrants.

These same top six states accounted for 59.7 percent of unauthorized immigrants in 2014. They had the largest shares in 1990 as well, although the rank of the bottom four states was different (New York, Florida,

Illinois and New Jersey). All these states saw an increase in the pool of unauthorized immigrants, but the rise in Texas is probably the most remarkable. Texas went from hosting 440,000 in 1990 to hosting 1.9 million in 2014, which was more than a fourfold increase. California started in 1990 with a much larger pool of 1.5 million and had 2.9 million in 2014, experiencing less than a twofold increase. Florida, New York, Illinois and New Jersey also experienced sharp growth in the share of unauthorized immigrants, with New Jersey experiencing the most growth (a fivefold increase from 1990), and New York experiencing the least growth (less than twofold).

Unauthorized Immigrant Deportations

In 1990, deportations totaled around 30,000, which was around 0.9 percent of the total pool of unauthorized immigrants at the time. Deportations peaked at 433,000 in 2013, which was 3.6 percent of the unauthorized immigrant pool that year. Viewed through a longer lens, deportations have steadily increased both in absolute and relative terms since 1990, from 188,000

(2.2 percent of the pool) in 2000 to 340,000 (3.0 percent) in 2016. As mentioned earlier, U.S. enforcement has gone up in recent years compared with enforcement in the early 2000s, which has probably led to a greater proportion of unauthorized migrants being detected and deported.

Conclusion

Unauthorized immigration to the U.S. has dominated the news in recent years. While it increased rapidly in the 1990s until the time of the Great Recession, recent data show a leveling off of unauthorized immigration and indeed a modest reduction from the 2014 peak. The net inflow from Mexico has often been negative on a year-to-year basis since the onset of the Great Recession. This may be due to the lack of adequate economic opportunities in the U.S. relative to those in Mexico, or a more effective or activist enforcement policy. Regardless, the future evolution of unauthorized immigration in the U.S. will depend on a combination of these factors. **RE**

(This article was published online Dec. 6.)

Table 2

Debt Scorecard: Eighth District MSAs

Metropolitan Statistical Area	Debt Type	Year-over-Year Percentage Change in Debt		Year-over-Year Difference in Delinquency Rates	
		Q1:2018	Q2:2018	Q1:2018	Q2:2018
Little Rock, Ark.	Mortgage	0.68%	-0.79%	-0.16	-0.01
	HELOC	1.11%	-0.25%	0.07	-0.24
	Auto	2.45%	-0.43%	0.53	0.32
	Credit Card	3.47%	0.63%	1.51	0.78
Louisville, Ky.	Mortgage	0.82%	1.03%	-0.41	-0.46
	HELOC	4.33%	-1.78%	-0.20	-0.58
	Auto	4.95%	3.82%	0.70	0.24
	Credit Card	3.81%	3.14%	0.55	0.21
Memphis, Tenn.	Mortgage	0.86%	0.62%	-0.38	-0.27
	HELOC	-6.60%	-9.84%	-0.34	0.04
	Auto	2.06%	0.46%	0.29	-0.44
	Credit Card	3.84%	3.36%	0.39	0.31
St. Louis	Mortgage	-0.21%	-1.84%	-0.15	-0.32
	HELOC	-3.32%	-6.29%	-0.55	-1.09
	Auto	1.66%	1.64%	0.44	0.30
	Credit Card	2.64%	1.80%	-0.18	-0.20

SOURCES: Federal Reserve Bank of New York/Equifax Consumer Credit Panel and authors' calculations.

NOTE: The differences in delinquency rates are expressed in percentage points. Data as of Aug. 13.

Overall, the data do not seem to indicate that a severe debt problem may be brewing. **RE**

(This article was published online Dec. 26.)

ENDNOTES

- ¹ Headquartered in St. Louis, the Eighth Federal Reserve District includes all of Arkansas and parts of Illinois, Indiana, Kentucky, Mississippi, Missouri and Tennessee.
- ² We express all debt adjusted for inflation using the personal consumption expenditures chain-type price index.
- ³ The 90-day delinquency rate is found by dividing the volume of loan payments 90 or more days past due by the total volume of loan payments.

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Forecasters See U.S. GDP Growth Easing in 2019 after 2018 Surge

By Kevin L. Kliesen



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KEY TAKEAWAYS

- Professional forecasters are expecting the U.S. economy to grow about 3 percent in 2018, its biggest gain in more than a decade.
- While growth appears solid, there were some worrisome signs in the third quarter, including an unexpected slowdown in business fixed investment.
- Professional forecasters see economic growth easing to 2.4 percent in 2019.

What Are Professional Forecasters Predicting for 2018-2019?

	Actual	Forecast	
Percent Change (Q4/Q4)	2017	2018	2019
Real Gross Domestic Product	2.5	3.1	2.4
Personal Consumption Expenditures Price Index	1.8	2.1	2.1
Percent (Average, Q4)			
Unemployment Rate	4.1	3.7	3.6

SOURCES: Federal Reserve Bank of Philadelphia and Haver Analytics.

Despite some crosscurrents, U.S. economic conditions remain favorable. Real gross domestic product (GDP), the broadest measure of economic activity, is poised to increase by about 3 percent in 2018, which would be its largest increase in more than a decade. More impressively, job growth has been exceptionally strong, and the unemployment rate has dropped to its lowest level in about 50 years. These tailwinds have been offset to some extent by declining activity in the housing sector and an unexpected slowdown in business fixed investment.

Although many industries have been throttled by rising cost pressures, headline inflation has moderated over the past few months and may continue to do so because of the recent collapse in crude oil prices. Despite forecasts of inflation remaining anchored near 2 percent, the latest Federal Open Market Committee (FOMC) projections suggest policymakers are likely to raise their policy rate—the federal funds rate target—three or four more times between now and the end of 2019.

Rearview Economics—Size Distortions Are Possible

After increasing at a 3.2 percent annual rate over the first half of 2018, real GDP advanced at a 3.5 percent rate in the third

quarter. Although the third-quarter estimate was modestly stronger than the forecast consensus, the report nonetheless revealed some positive and negative developments. First, consumer spending has been brisk and appreciably stronger than real after-tax incomes. At some point, though, the growth of consumer spending is likely to slow to more closely match income growth. Second, government outlays continue to strengthen—both at the federal level and at the state and local level. But with the federal budget deficit projected to rise to nearly \$1 trillion in fiscal year 2020, the pressure to reduce the budget deficit will likely intensify.

Other aspects of the third-quarter GDP report were more worrisome. First, real residential fixed investment—mostly new-home construction—has declined in five of the past six quarters. This development is potentially alarming because housing usually peaks before a business recession.

Second, perhaps more importantly, the growth of real business fixed investment (BFI) has slowed unexpectedly since the first quarter. The slowing in

BFI growth is puzzling given strong GDP growth, healthy corporate earnings and tax incentives for firms to boost capital expenditures.

Third, exports of goods and services fell sharply in the third quarter. Slowing global growth outside the United States, trade disputes with key trading partners and a stronger value of the dollar have helped slow exports.

Finally, inventories accumulated at a rapid rate in the third quarter. This accumulation likely reflects some combination of an unexpected slowing in final sales (GDP less inventory investment), firms stocking up in anticipation of holiday sales, and increased purchases of foreign goods ahead of tariff increases. Despite these concerns, forecasters expect real GDP to increase at about a 2.5 percent rate in the fourth quarter.

Labor markets are still strong. In the year to date, nonfarm payrolls have increased by an average of 212,500 per month. This compares favorably to an average gain of about 180,000 per month over the first 10 months of 2017. The

ABOUT THE AUTHOR

Kevin L. Kliesen is a business economist and research officer at the Federal Reserve Bank of St. Louis. His research interests include business economics, and monetary and fiscal policy analysis. He joined the St. Louis Fed in 1988. Read more about the author and his research at <https://research.stlouisfed.org/econ/kliesen>.



ECONOMY AT A GLANCE

All data as of Dec. 13, 2019

unemployment rate measured 3.7 percent in October, and the number of job openings continues to exceed the number of unemployed persons. Growth of labor productivity continues to strengthen modestly, which has helped to boost wage growth. Output per hour (labor productivity) in the nonfarm business sector increased at a 3 percent rate in the second quarter and at a 2.2 percent rate in the third quarter.

Inflation Still Near FOMC's Target

The personal consumption expenditures price index has increased by 2.2 percent over the four quarters ending in the third quarter of 2018, which is slightly above the FOMC's inflation target of 2 percent. The question for policymakers is whether the risks for the near-term inflation outlook are skewed to the upside or downside.

Developments that could slow the growth of consumer prices over the near term include the recent plunge in crude oil prices and a rising value of the U.S. dollar (which helps lower import prices). However, there are factors that suggest the inflation risks are tilted to the upside. These include increased input costs associated with tariffs on steel, aluminum, lumber and other imported materials. Indeed, the strong economy has allowed many firms to pass along a portion of these price increases through the supply chain. Still, long-term inflation expectations remain anchored near the FOMC's inflation target of 2 percent.

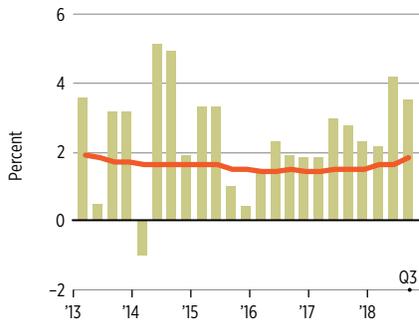
The Near-term Outlook

As seen in the accompanying table, the Survey of Professional Forecasters predicts that real GDP growth will slow from 3.1 percent in 2018 to 2.4 percent in 2019. The unemployment rate is forecast to average 3.6 percent in the fourth quarter of 2019, down slightly from four quarters earlier. Inflation is expected to be 2.1 percent in 2018 and 2019. RE

(This article was published online Nov. 21.)

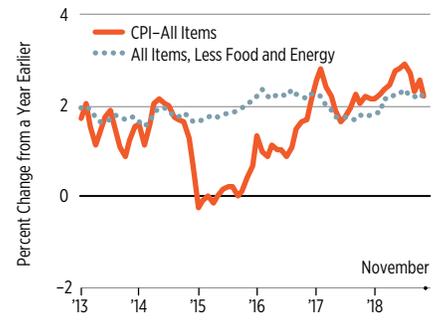
Rachel Harrington, a research intern at the Federal Reserve Bank of St. Louis, provided research assistance.

Real GDP Growth

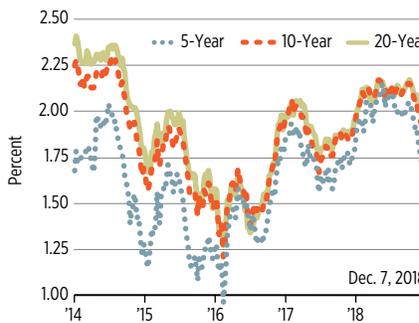


NOTE: Each bar is a one-quarter growth rate (annualized); the red line is the 10-year growth rate.

Consumer Price Index (CPI)

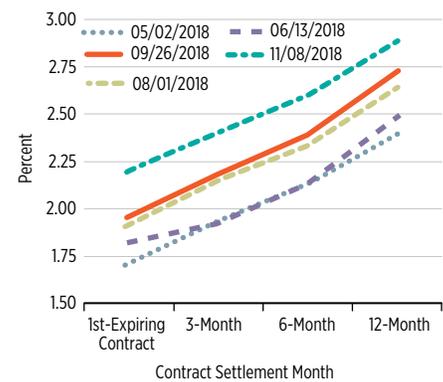


Inflation-Indexed Treasury Yield Spreads



NOTE: Weekly data.

Rates on Federal Funds Futures on Selected Dates



Civilian Unemployment Rate

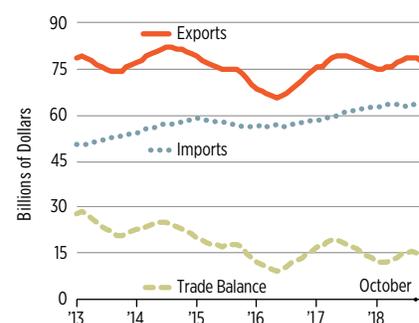


Interest Rates



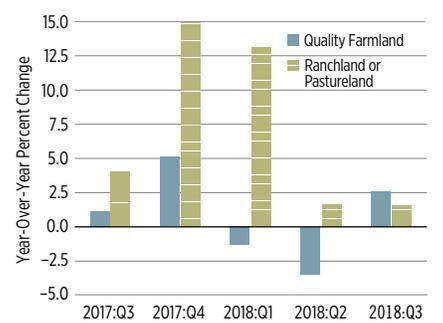
NOTE: On Dec. 16, 2015, the FOMC set a target range for the federal funds rate of 0.25 to 0.5 percent. The observations plotted since then are the midpoint of the range (0.375 percent).

U.S. Agricultural Trade



NOTE: Data are aggregated over the past 12 months.

Average Land Values Across the Eighth District



SOURCE: Agricultural Finance Monitor.

On the web version of this issue, 11 more charts are available, with much of those charts' data specific to the Eighth District. Among the areas they cover are agriculture, commercial banking, housing permits, income and jobs. To see those charts, go to www.stlouisfed.org/economyataglance.



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