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Unemployment Rate
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of Labor Market Health?

President Bullard
Lessons from the Past
on Raising Rates



Growth around the World Is Still Below the Trend

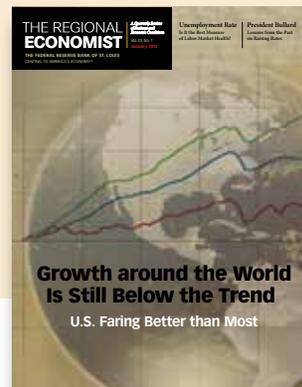
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Growth around the World Still Below Trend

By Juan M. Sánchez

The world’s output for 2014 is expected to end up being below trend, and the forecast for this year doesn’t look much better. Once again, the U.S. is performing better than most other developed countries.



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By Charles S. Gascon and Michael A. Varley

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Pattern in Job Gains after Recessions Appears To Be Changing

By Kevin L. Kliesen and Lowell R. Ricketts

Following the two latest recessions, the growth in high-paying jobs was stronger, on a percentage basis, than was the growth in low-paying jobs. The opposite happened after the previous two recessions.

When Unemployment Falls, Does the Average Wage Go Up?

By James D. Eubanks and David G. Wiczer

As the unemployment rate declines, many people assume that the average wage in the U.S. will increase. However, the average doesn’t move that fast over a single business cycle. And any movement over the long term is more in favor of high-wage earners than low-wage earners.

Liftoff: A Comparison of Two Normalization Cycles

Many Federal Open Market Committee (FOMC) participants have said that the policy rate (i.e., the target for the federal funds rate) should come off the zero lower bound in 2015, with the exact timing dependent on how key macroeconomic indicators evolve. Given that this initial increase would mark the start of a normalization cycle, now is a good time to review the previous two major normalization cycles to see what we can learn from them.¹

The first normalization cycle for comparison began in 1994. The policy rate since September 1992 had been at 3 percent, which at the time was considered exceptionally low relative to the federal funds rate during the 1970s and 1980s. U.S. macroeconomic data indicated a strong economy toward the end of 1993. For instance, real gross domestic product (GDP) growth accelerated in the fourth quarter, job growth was slightly stronger on average and inflation was threatening to move higher. In what was largely a surprise to financial markets, the FOMC began a normalization cycle in February 1994 and continued raising rates throughout that year.² In contrast to the second normalization cycle I will highlight, the FOMC raised the policy rate by 25 basis points sometimes, by 50 basis points other times and by 75 basis points on one occasion. Also, the policy rate was left unchanged at a few meetings. The pace was adjusted in reaction to the incoming macroeconomic data and in this sense was data-dependent, or state-contingent. The normalization cycle ended in February 1995, with a policy rate of 6 percent.

Financial markets generally viewed this adjustment to higher interest rates as disorderly. In fact, the bond market had one of its

worst years in 1994. The 10-year Treasury yield, for instance, rose roughly 2 percentage points that year. Despite being disorderly, the 1994 normalization turned out to be a success for the U.S. economy. The policy rate was returned to a more normal level, and the economy boomed in the second half of the 1990s—one of the best periods for economic growth in the postwar era.

The second normalization cycle for comparison took place in 2004-06. The policy rate had been 1 percent since June 2003. Leading up to the June 2004 FOMC meeting, real GDP growth remained solid, gains in nonfarm payroll employment had increased in recent months and inflation had risen. The FOMC raised the policy rate to 1.25 percent in June 2004 and continued with a mechanical pace of increase of 25 basis points at each of the next 16 meetings. Thus, there was almost no state contingency with this normalization cycle. In terms of communication, the FOMC was more transparent regarding its expectations for future increases in the policy rate than it had been previously. This cycle ended in June 2006, bringing the policy rate to 5.25 percent.

Financial markets viewed this form of normalization as much more orderly than the 1994 case and, therefore, a success. However, this normalization cycle may have been counterproductive. The housing bubble inflated even more during this two-year period as financial markets found ways to create investments in housing based on cheap financing—investments that ultimately proved disastrous. Although policymakers were cognizant that house prices were rising and that mortgage finance was increasing, the general view was that the air could be let out of the bubble slowly and without



dramatic macroeconomic consequences. In actuality, the opposite occurred. The housing bubble burst, starting in 2006, right about the time the normalization cycle ended. House prices fell about 30 percent, and the U.S. experienced a severe recession.

What are the lessons from these two episodes? Although the 1994 normalization cycle was considered disorderly (i.e., uneven amounts that were somewhat unpredictable), it seemed to set up the U.S. economy for success in the second half of the 1990s. On the other hand, the 2004-06 normalization cycle was considered orderly (i.e., perfectly even amounts that were generally anticipated) but, in retrospect, turned out to be suboptimal because it allowed for the continuation of speculation in housing markets and in mortgage finance. For the upcoming normalization cycle, some combination of the two—the data dependency from the 1994 case and the transparency from the 2004-06 case—would probably provide the optimal method of returning the policy rate to normal. 

James Bullard, President and CEO
Federal Reserve Bank of St. Louis

ENDNOTES

¹ For related commentary, see my essays “1994,” Federal Reserve Bank of St. Louis *National Economic Trends*, July 2004; and “The Taylor Principle and Recent FOMC Policy,” Federal Reserve Bank of St. Louis *Monetary Trends*, September 2006. They can be found at <http://research.stlouisfed.org/econ/bullard>.

² See <http://research.stlouisfed.org/fred2/graph/?g=WYM>.

Growth around the World Is Still Below the Trend

U.S. Faring Better than Most

By Juan M. Sánchez

The recovery of the U.S. economy from the 2007-09 recession has been slow but uninterrupted. Unfortunately, the same cannot be said about other regions in the world. Put in the context of international headwinds, the U.S. recovery looks stronger and the projected growth for this year more valuable to overall world growth. As will be seen below, more of the world's new output will be generated by the U.S. in 2014-2015 than in 2000-2007.

According to the Oct. 7 World Economic Outlook (WEO) of the International Monetary Fund (IMF),¹ during the first half of 2014 there were several pieces of disappointing news: weaker activity in Russia; slower growth in Latin America, mainly Brazil; weaker-than-forecast expansion of gross domestic product (GDP) in Japan; weaker activity in China; and stagnant growth in the euro area. These international headwinds are not new, we argue here, and may account, at least partly, for the slow recovery of the U.S. economy.

The world's output for 2014 is projected to be only 3.3 percent. (See table.) This is much lower than previous averages at the world level. For instance, in 2006 and 2007, the two years prior to the recession, yearly world output growth was about 5.6 percent. The poor performance of world output in the past year is primarily due to the low growth projected for advanced economies,² only 1.8 percent. Again, this is

Projected Growth by Region

	Percent Change			
	October Projections		Difference from July Projections	
	2014	2015	2014	2015
World Output	3.3	3.8	-0.1	-0.2
Advanced Economies	1.8	2.3	0.0	-0.1
United States	2.2	3.1	0.5	0.0
Euro Area	0.8	1.3	-0.3	-0.2
Germany	1.4	1.5	-0.5	-0.2
France	0.4	1.0	-0.4	-0.5
Italy	-0.2	0.8	-0.5	-0.3
Spain	1.3	1.7	0.1	0.1

SOURCE: The International Monetary Fund's World Economic Outlook.

significantly lower than the growth rate of advanced economies in previous years—close to 3 percent in 2006 and 2007. Among the advanced economies, the U.S. has the highest projected growth rate for 2014, at 2.2 percent. Growth in the euro area, however, is projected to be much lower, 0.8 percent.

Projections for the year 2015, also shown in the table, are slightly better. The world output is projected to increase 3.8 percent in 2015 vs. 3.3 in 2014. Advanced economies' output is projected to grow 2.3 in 2015 vs. 1.8 in 2014. The euro area is projected to grow 1.3 in 2015 vs. 0.8 in 2014. Although growth is projected to be better in 2015, the projections are below previous averages. The

average growth for the years 2000-2007 was 4.5 percent for the world, 2.6 percent for advanced economies and 2.2 for the euro area.

The last two columns of the table contain useful information to understand how things changed since July 2014, when the previous projections of the WEO were published. Those columns report the change in the projections between July and October 2014. If we focus on projected output growth, an increase in the forecast (a positive number in the last two columns of the table) means that forecasters must have received positive news during those periods. If changes in projections were negative, bad news must have been received. Notice that most of the numbers in the last two columns are negative, except for those for the U.S. and Spain (and Spain's numbers are very close to zero). And some of those changes are very large. For instance, for 2014 the growth projected for Germany, France and Italy was reduced by 0.5, 0.4 and 0.5 percentage points, respectively.

How We Got Here: A "News Index"

Based on the table discussed above, we created a "news index" that accumulates the revisions to the forecast. As mentioned above, in the context of output growth, the sign of the revision in the projections indicates the sign of the news. Moreover, the size of the revision is indicative of the dimension of the news. In particular, the size of the revision

can be compared with the usual growth of output (or any other variable for that matter) to have a sense of the size of the news. Considering output growth, a 0.1 revision (as observed for Spain for 2014 and 2015) can be interpreted as mildly positive news, while a -0.5 revision (as observed for Italy for 2014) indicates very negative news.

Moreover, note that this metric can be computed for the forecast of any macro-

The Deflation Scare

Figure 1 shows inflation in the advanced economies since September 2011. The red line fluctuates around zero, with the largest accumulated value at 0.7 percentage point. As mentioned above, fluctuations around zero are expected if revisions do not contain much news but just noise corrections.

However, note the decline of almost 1 percentage point from April 2013 to April 2014.

FIGURE 1
"News Index," Advanced Economies' Inflation



SOURCE: World Economic Outlook.

economic variable. The difference is that the sign of the revision may not necessarily coincide with the sign of the news. For instance, in an inflationary context, a reduction in the predicted inflation would be good news.

Since we intend to use this metric to analyze how we got to the forecasts of October 2014, we accumulated this news (changes in forecasts) since September 2011. In particular, we accumulated the revisions for both years (the year of the report and the next year) for each report. The fact that we used both years explains why there are two observations for every date.³ At any particular period, the index indicates the sum of all revisions in all the WEO publications for that variable forecast starting in September 2011.

Since forecasters use data with "noise," every time they produce a new forecast we expect it to be different from the previous one. But if these changes in the projections are based on noise and not on news, we expect no systematic pattern when we accumulate the series. If forecasts are accurate, we also would expect little noise; so, changes should be small unless there is news about the state of the economy.

Although the decline may seem small, it represents an adjustment of about 50 percent, given that inflation in advanced economies is usually about 2 percent. These accumulated downward revisions of inflation for advanced economies are in line with news during that time that generated fear of deflation.

Bad News on Output Growth

Figure 2 shows the same news index but constructed with the projections of output growth in the world and advanced economies. The results are a clear indication of international headwinds since September 2011. Focus first on world output growth (blue dotted line). It reached a depth of 4.5 percent in October 2014. To realize how large this number is, recall that average growth for the years 2000-2007 was 4.5 percent. Notice that about half of the decline occurred during the first quarter considered (fall 2011-winter 2012), when Europe entered into a recession. But after a few reports with good news (until July 2012), there was a very long sequence of negative news, accounting for the other half of the decline.

The index for advanced economies (red line) is even more surprising. It declines to almost 4 percentage points. (Recall that the

These international headwinds are not new, we argue here, and may account, at least partly, for the slow recovery of the U.S. economy.

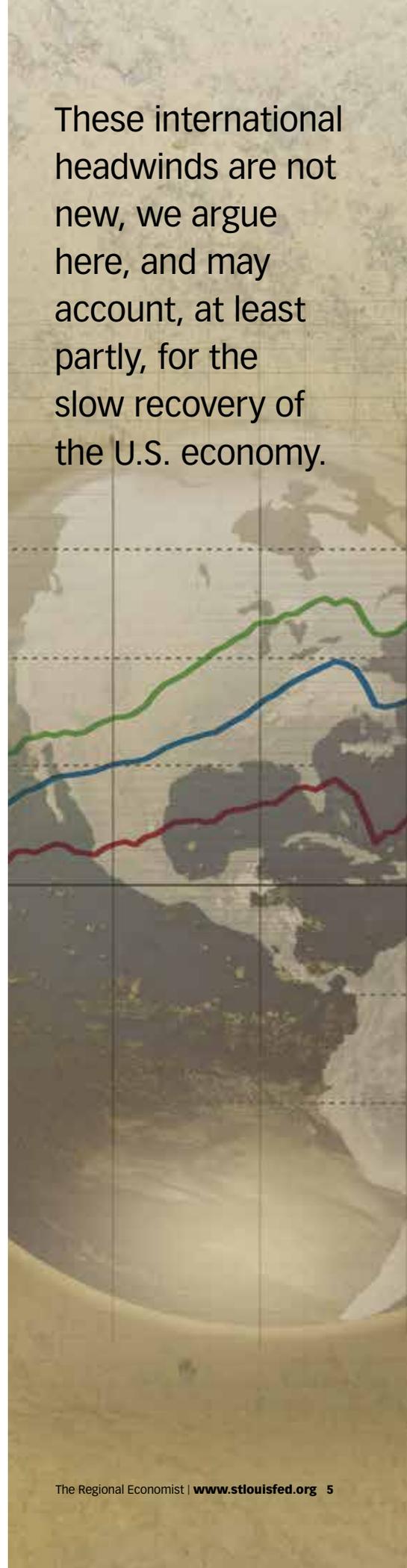
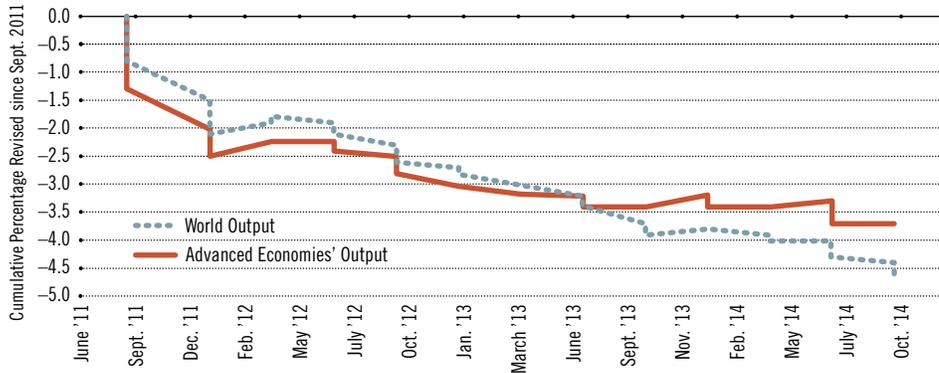
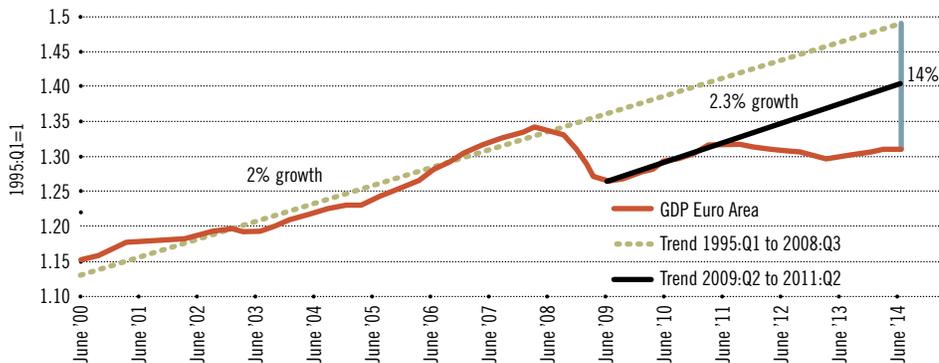


FIGURE 2
“News Index,” World and Advanced Economies’ Output Growth



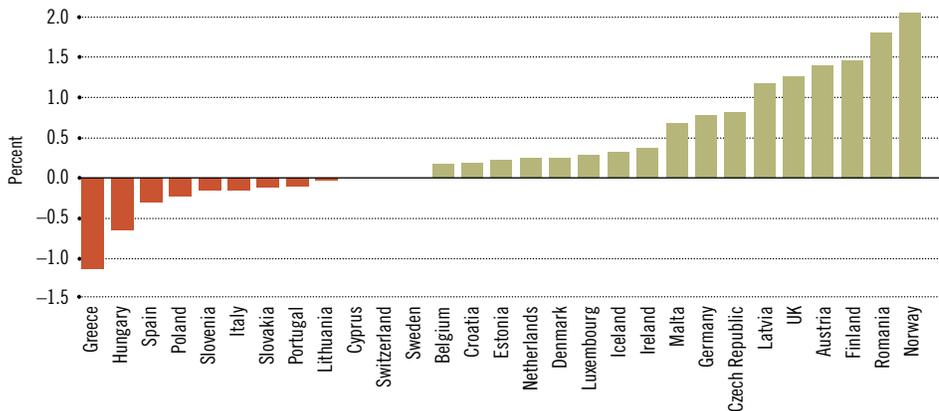
SOURCE: World Economic Outlook.

FIGURE 3
Euro Area GDP



SOURCE: Organization for Economic Cooperation and Development.

FIGURE 4
Low Inflation in Europe: September 2014 vs. September 2013



SOURCE: Haver Analytics.

average growth for advanced economies during 2000-2007 was only 2.6 percent.) A large part of the bad news about world output growth can be accounted for by the performance of advanced economies. In particular, as it will be clearer below, international headwinds fly to North America over the North Atlantic Ocean from Europe.

Europe, Again

Europe’s economic performance has been quite poor, with some exceptions, since the third quarter of 2008. Figure 3 shows euro area GDP since 2000. As shown above, the projected growth for 2014 and 2015 is well below average. Figure 3 shows GDP in the euro area at constant prices, normalized such that 1995:Q1 is equal to 1.

Two other series are included in Figure 3. The first one is the trend growth before the crisis (from 1995:Q1 to 2008:Q3). Growth averaged 2 percent during that period. The other series is the trend for the two years following the end of the recession (2009:Q2 to 2011:Q2). The growth during that period was back to trend (actually a bit higher, 2.3 percent vs. 2.0 percent before). This figure also shows that GDP is 14 percent below the prefinancial crisis trend and about 7 percent below the trend from 2009:Q2 to 2011:Q2.

Importantly, the recovery that followed the 2011-12 recession in the euro area was very weak, with GDP growing slower than the two trends discussed above. Thus, the gap between GDP and its trend (sometimes referred to as “the output gap”) is not narrowing but expanding.

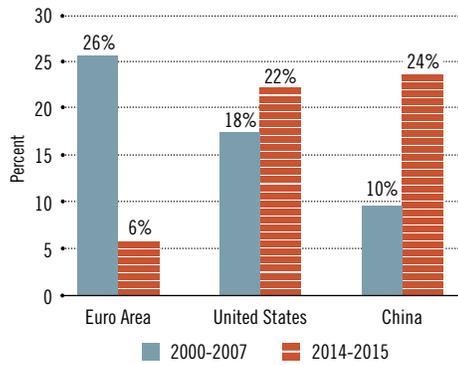
Double Dip or Triple Dip?

As shown in Figure 3, Europe had what is called a double-dip recession. This term is used to describe a recession that follows right after another one. Recent data indicate that Europe may be close to a new recession. This would be a very rare triple-dip recession.

There exists an index that can be used to evaluate the performance of Europe in the month after the last report of GDP. This index, called EuroCOIN, is a real-time cyclical indicator for the euro area; it is constructed using 1,000 macroeconomic time series from the major countries in the area. EuroCOIN is available quickly and at monthly frequency. While the last data available (at this writing) on GDP correspond

FIGURE 5

Where Will Growth Come from in 2015?



SOURCE: World Economic Outlook.

to the second quarter, EuroCOIN is already available for September 2014. In this last month, the indicator fell to 0.13 (from 0.19 in August), the lowest level in 12 months. This indicates that Europe, again, will be the source of headwinds for U.S. growth during the coming years.

Monetary Policy in Europe

The European Central Bank (ECB) has announced a range of actions to bolster its economy: a reduction in policy rates in September, targeted credit easing and other measures to boost liquidity. In particular, the ECB has declared an objective of expanding its balance sheet back to early 2012 levels, implying a 1 trillion euro expansion.

This policy is a response to the poor projected growth and the low inflation in Europe. Figure 4 displays the change in prices (inflation) between September 2013 and September 2014. Only two countries,

Norway and Romania, had inflation close to 2 percent (2.1 and 1.8 percent, respectively). Several countries had negative inflation. For instance, Greece’s inflation was –1.1 percent.

The ECB’s actions to bolster its economy and boost liquidity may include purchases of member countries’ government bonds. For most of the countries in the euro area, the yields for 10-year government bonds are already very low. They actually declined abruptly during September, perhaps in anticipation of this policy. This plan to buy bonds may improve economic conditions, to the extent that it helps in reducing financing costs and in stimulating demand.

China and the U.S.: Engines of Growth in 2015

Finally, the conditions described above for Europe imply that China and the U.S. will probably account for most of the world’s growth in 2015. The blue bars in Figure 5 display the share of the growth in output that was contributed between 2000 and 2007 by the euro area, the U.S. and China: 26, 18 and 10 percent, respectively. The contributions for the expected growth between 2014 and 2015 are very different. The euro area will contribute only 6 percent; the lion’s shares will be contributed by the U.S. (22 percent) and China (24 percent). Ω

Juan Sánchez is an economist at the Federal Reserve Bank of St. Louis. For more on his work, see <http://research.stlouisfed.org/econ/sanchez>.

ENDNOTES

- ¹ The World Economic Outlook is available on the website of the International Monetary Fund at www.imf.org/external/ns/cs.aspx?id=29.
- ² The main criteria used by the WEO to classify the world into advanced economies and emerging market and developing economies are (1) per capita income level, (2) export diversification—so oil exporters that have high per capita GDP would not make the advanced classification because about 70 percent of their exports are oil, and (3) degree of integration into the global financial system. The list of countries that are considered to be advanced economies includes Australia, Austria, Canada, France, Germany, Italy, Japan, the United Kingdom and the United States.
- ³ For some periods, there is only one observation. That happens when one of the revisions is zero.



Sovereign Debt Crisis in Europe Recalls the Lost Decade in Latin America

By Maria A. Arias and Paulina Restrepo-Echavarria



The recent European debt crisis may seem like *déjà vu*. Many of its characteristics are reminiscent of the Latin American debt crisis of the 1980s, which led to what is known as the lost decade. In this article, we explore the similarities of and point out the differences between both crises.

Similarities

During the 1970s, Latin America was experiencing an era of high growth. Output, investment and per capita consumption were surging. The excess liquidity generated by oil-exporting countries when oil prices rose and the resulting high savings of those countries facilitated borrowing abroad. This borrowing was supposed to finance infrastructure projects but ended up financing consumption.

However, after 1979, an increase in oil prices by the Organization of the Petroleum Exporting Countries (OPEC) led to the start of what is known as the Volcker era. Paul Volcker, then the chairman of the Federal Reserve, increased interest rates sharply in order to control inflation in the U.S. economy, causing payments on foreign debt to become more expensive for Latin America, which had borrowed heavily from U.S. banks. Most Latin American countries were oil importers at the time; so, higher prices for imported oil, combined with the now more expensive debt, should have generated an adjustment in borrowing and spending. Instead, debt went from being 30 percent of gross domestic product (GDP) on average in 1979 to nearly 50 percent in 1982 for the larger Latin American countries. (See Figure 1.) This situation became

unsustainable and ended up with Mexico's default in 1982, followed soon by the default of other countries in the region.

The picture is quite similar for peripheral Europe. Greece, Spain, Portugal and Ireland were getting capital inflows since the beginning of the 2000s. (See Figure 2.) These newfound resources were meant to finance investment. Instead, as in Latin America, the excess liquidity went to finance a consumption boom. Debt went from being 90 percent of GDP on average in 2000 to 200 percent in 2009 (see Figure 1), right before Greece first requested financial aid from the International Monetary Fund. Similarly, debt-to-GDP ratios soared in Spain, Portugal and Ireland, which also sought financial support to pay their sovereign debts in the following years.

So, in both Latin America prior to the 1980s and peripheral Europe at the start of the 21st century, output, investment and consumption were growing rapidly. Liquidity levels were extraordinarily high and were accompanied by capital inflows and fast-rising levels of debt to GDP. Then, an external shock struck, making the situation unsustainable. Capital flows reversed (see Figure 2), and many countries defaulted.

What Was Different?

The kind of external shock that triggered each of the crises, the composition of the debt, the interest rates that the regions were facing and the relationships among the countries involved were different.

For Latin America, the external shock was the hike in U.S. interest rates, which was a consequence of the rise in oil prices.

For Europe, the Great Recession of 2008-09 triggered the crisis.

Figure 1 shows the composition of the debt-to-GDP ratio in both regions. The solid lines depict total debt, while the dashed lines show only public debt. Note that for Latin America, public debt was driving the increase in total debt, while in Europe, private debt was actually driving the increase in total debt.

Figure 3 shows the respective real interest rate that was being faced by Latin America and peripheral Europe in the years preceding and during the crises.¹ As discussed above, it is clear that Latin America was enjoying low interest rates prior to the crisis and then experienced a sharp rise in rates at the beginning of the 1980s. Europe, on the other hand, faced much higher interest rates from the start; those interest rates continuously decreased over time.

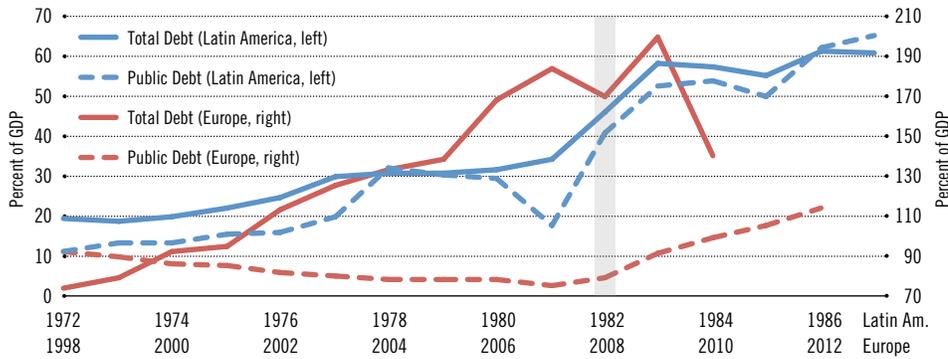
Figures 1 and 3 portray the main differences between both crises. The jump in interest rates for Latin America made the debt very expensive to repay, leading countries to default by failing to service their debt. The relatively high level of debt held by countries in Europe's periphery simply became unsustainable when output, investment and per capita consumption started to decline after the Great Recession.

The Aftermath

The Latin American debt crisis resulted in the well-known lost decade for the region, during which initial fiscal readjustments and austerity did little but reinforce anemic growth. Currency devaluation, an emphasis on trade expansion (see Figure 2)

FIGURE 1

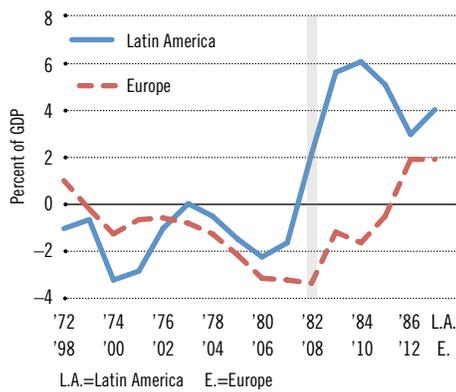
Total Debt and Public Debt by Region



SOURCES: International Monetary Fund, Penn World Tables, Reinhart and Rogoff, and author's calculations.

FIGURE 2

Net Exports by Region

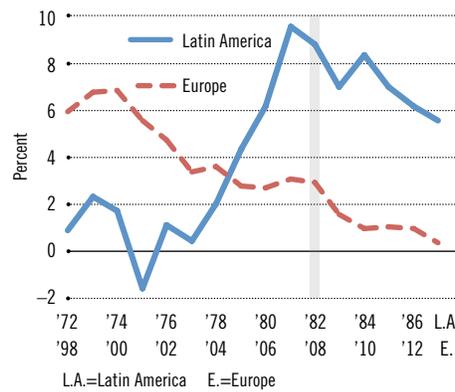


SOURCE: World Bank

NOTE: Net exports can be used as a proxy to reflect net capital flows, whereby negative net exports represent a positive capital inflow to the region.

FIGURE 3

Real (Inflation Adjusted) International Lending Rate



SOURCE: International Monetary Fund

ENDNOTE

¹ The interest rate for Latin America corresponds to the rate posted by a majority of the top 25 insured U.S.-chartered commercial banks (by assets in domestic offices), while that for Europe is the average of the respective rates posted by banks in Germany, France and Great Britain—the primary lenders for the peripheral European countries. The real lending interest rate is calculated using the GDP deflator.

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 Reinhart, Carmen M.; and Rogoff, Kenneth S. *This Time Is Different: Eight Centuries of Financial Folly*. New Jersey: Princeton University Press, 2009.

NOTE FOR ALL FIGURES: Data in each figure represent aggregate averages for select Latin American countries between 1972 and 1987 and for select European countries between 1998 and 2013. The Latin American countries in the sample are Argentina, Brazil, Chile and Mexico, while the European countries in the sample are Greece, Ireland, Italy, Portugal and Spain. The gray vertical bar represents the start of the debt crisis in both regions: 1982 in Latin America and 2008 in Europe.

and eventually debt restructuring through what was known as the Brady Plan helped the countries in the region regain strength and return to economic growth.

As for the situation in Europe, being part of the Economic and Monetary Union (EMU) without having broader fiscal integration limited what policies could be implemented by the individual countries to jump-start the economy after the crisis. Austerity measures and some debt restructuring have been part of monetary authorities' response. But the European Union has moved to integrate even further by creating

joint supervisory authorities and a closer fiscal union, including the most recent banking union, which took effect Nov. 4, 2014. Ultimately, more unified coordination and governance could strengthen the fiscal union and lead to greater economic stability. 

Paulina Restrepo-Echavarria is an economist and Maria A. Arias is a research associate, both at the Federal Reserve Bank of St. Louis. For more on Restrepo-Echavarria's work, see <http://research.stlouisfed.org/econ/restrepo-echavarria>.

Measuring Underground Economy Can Be Done, but It Is Difficult

By Paulina Restrepo-Echavarría



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The informal economy, also known as the underground economy or black market, is very hard to measure. A good example is the produce vendor on the street who sells the same vegetables you find in the supermarket but handles only cash and pays little or no taxes. Nevertheless, this sector adds considerable value to the economy. In developing countries, the informal sector has been estimated to account for about 36 percent of gross domestic product (GDP). In developed countries, it has been estimated to be about 13 percent of GDP.¹ (See table.) So how do economists measure the informal sector? This article explains the two main approaches—direct and indirect—and the difficulties that each entails.

Average Size of the Informal Economy (% of GDP, 2002-2003)

Developed Countries	13%
Developing Countries	36%

SOURCE: Schneider.

Direct Approaches

These methods rely on surveys, samples based on voluntary replies, tax audits and other compliance methods. The problem is that the results depend directly on the questions asked by the survey, and few surveys are alike. As a result, it is very difficult to use the same parameters to measure and compare the informal economy in different countries.

Usually, what ends up happening is that the definition that is used has to be very simple and contain only one parameter. For example, the informal sector may be defined as those people who do not have the right to a pension when they retire. Clearly, this definition excludes several important elements

that would describe the informal economy differently. Another very common definition is that people are considered to work in the informal economy if they work for a firm that has N or fewer workers. But a firm can be very small and still comply with the law, and its production can be reported to the authorities, meaning that its value added will appear in the GDP despite being a small firm.

If what is used is a direct questionnaire, people are not usually willing to admit that they are not reporting taxes or that they are engaging in fraudulent behavior, either because they feel afraid of getting caught or because they feel ashamed since they know this is a moral issue. This makes it difficult to estimate the extent of undeclared work.

Finally, a direct estimate of the informal economy can also be obtained by calculating the discrepancy between income declared for tax purposes and that measured by selective checks. For example, one can compare the number of jobs declared by firms with the number of employed people found through household surveys. The number of employed people exceeding the number of jobs represents the informal workforce. Once the informal number of workers is identified, informal workers can be attributed the same net compensation as similar workers in the formal economy.²

Indirect Approaches

These are macroeconomic approaches that try to use an indicator of the informal economy as a proxy for its size or growth.

Discrepancy between the National Expenditure and Income Statistics

In theory, the income measure of GDP and the expenditure measure should be

equal to each other. However, informal activities can show up in the expenditure measurement but not in the income measurement. This is because the income side is measured through the value added of registered firms (the formal economy), while on the expenditure side there is some self-reporting. Thus, the difference between these two measures is an indicator of the size of the informal economy. The problem with this estimate is that statisticians would like to make the difference between the two as small as possible; so, using the initial measure rather than the published measure would be ideal.³ Moreover, there are differences due to sampling and statistical errors, which cannot be disentangled from the amount that can be explained by the informal economy.

Discrepancy between Official and Actual Labor Force

Assuming that the total labor force participation is constant, all else being the same, then any decrease in the labor force participation in the official economy can be seen as an indicator of an increase in the activity in the informal economy.⁴ The problem with this method is that changes in labor force participation can be due to other causes. For example, following the recent recession, many people have exited the labor force. It could also be the case that people work in both the informal and formal economy; so, this is not a very good estimator.

The Transactions Approach

In 1979, economist Edgar Feige developed this approach based on the quantitative theory of money $MV = pT$, where M is money,

V is velocity, p is prices and T is total transactions. The main assumption is that the relationship of the volume of transactions and official gross national product (GNP) is constant over time.⁵ Using the value of total transactions (pT) as an estimate of nominal GNP, he calculated the informal economy as the difference between nominal GNP and the official GNP. Several issues arise with this approach. He had to assume there is a base year when there was no informal economy. Then, the assumption that the ratio of transactions to official GNP is constant over time was quite strong. Additionally, obtaining accurate estimates of the total number of transactions was difficult.

The Currency Demand Approach

This approach uses the correlation between currency demand and tax pressure, assuming that informal activities operate with cash.⁶ Thus, if the tax burden increases and so does the demand for money, then that increase in the demand for money reflects an increase in the informal economy.

In order to calculate the excess in money demand, the economists behind this approach estimated an equation for money demand using econometric methods. They controlled for development of income, payment habits, interest rates and other related variables. In the equation, they also included government regulation, direct and indirect tax burden, and the complexity of the tax system. The most common critiques to this approach are the following:

- Not all the transactions in the shadow economy are paid in cash.
- Most studies using this approach include only the tax burden factor and ignore others, such as “tax morality,” regulation and attitudes toward the state. (There are usually no reliable data on these factors.)
- A rise in currency demand deposits is usually due in large degree to a slowdown in demand deposits and not to a rise in currency due to informal economic activity.
- Also, most studies assume that both the formal and informal economy have the same velocity of money.⁷

The Physical Input (Electricity Consumption) Method

This method assumes that electricity consumption is the best physical indicator

of both formal and informal economic activity. It has been observed that the electricity/GDP elasticity is usually close to 1.⁸ So, by using electricity as a proxy for the overall economic activity and then subtracting from it the official estimates of GDP, we get an indicator of informal economic activity. The difference between the growth of electricity consumption and official GDP is then attributed to the growth of the informal economy.

The critiques to this approach rely on the fact that not all informal activities require a considerable amount of electricity, or, if they do, other energy sources such as gas, oil and coal could be used. Also, the use of electricity has become more and more efficient in both types of economies. Finally, there may be differences in the elasticity of electricity/GDP across countries or changes over time.

Ultimately, the approach used to measure the informal economy depends on the specific question being asked by the researcher. For macroeconomic studies, indirect approaches usually suffice, but direct approaches are more generally used for microeconomic studies. Newer methods being developed to better gauge the size of the informal economy involve more-technical, model-based estimations. 

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ENDNOTES

- 1 See Restrepo-Echavarria.
- 2 This is the approach used in Italy. See Bovi.
- 3 There is usually some degree of statistical discrepancy between the income and expenditure measures because of how the data are constructed. The initial estimations, before the data are revised to sort the majority of this discrepancy and balance both sides of the equation, are not usually published. Only the final measures are published, once the discrepancy is accounted for.
- 4 The labor force participation rate is calculated as the labor force divided by the working-age population.
- 5 GNP is often used to estimate total transactions as it also includes national currency transactions that originate in other countries, whereas GDP is a measure of transactions only within the particular country.
- 6 This approach was first proposed by Cagan, and then Tanzi took the method a step further. See Cagan, as well as Tanzi.
- 7 The velocity of money is the rate at which money circulates in the economy or the rate at which people spend money.
- 8 The electricity/GDP elasticity is a measure of how sensitive GDP growth is to changes in electricity consumption. If the absolute value of the elasticity is greater than 1, a larger change in electricity consumption is needed to achieve a 1 percent change in GDP; if the elasticity is less than 1, a smaller change in electricity consumption is needed to achieve a 1 percent change in GDP; if the elasticity is equal to 1, a 1 percent change in electricity consumption is associated with a 1 percent change in GDP.

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Youth Labor Force Participation Continues To Fall, but It Might Be for a Good Reason

By Maria Canon, Marianna Kudlyak and Yang Liu

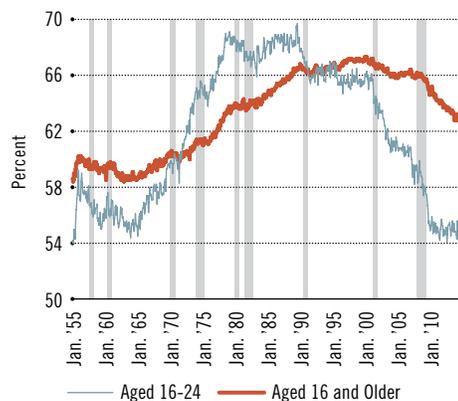


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The aggregate labor force participation (LFP) rate measures the share of the civilian, noninstitutionalized population (16 years and older) that is either employed or nonemployed but looking for work. The LFP rate reached its peak of 67.1 percent in 2000 and has been declining since, accelerating during the Great Recession.

Workers between 16 and 24 years of age constitute the demographic group that has experienced one of the most substantial declines in labor force participation. Figure 1 shows participation rates for these youth since 1955. The LFP rate for this group increased more or less steadily until 1979, reaching 68.8 percent in September 1979, then remained above 65 until 2000 before starting its sharp decline.¹ The rate was down to 54.9 percent in September 2014. Was the decline homogeneous across different subsets of youth? The question is important: If a

FIGURE 1
Labor Force Participation Rate: 1955-2014



SOURCES: Organization for Economic Cooperation and Development (OECD) and Federal Reserve Economic Data (FRED).

NOTE: The gray bars represent recessions. The final data point is from September 2014.

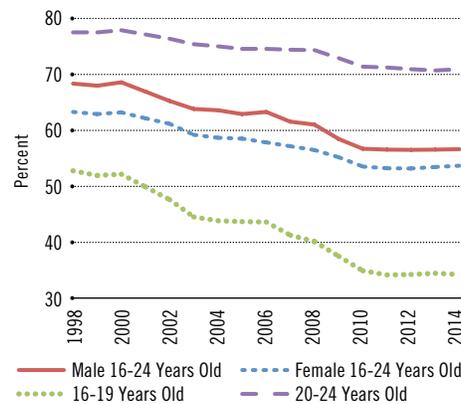
larger fraction of young people are attending school today than in the 1980s or 1990s, then the currently low labor force participation rate of youth might signal good news, implying a more-skilled prime-working-age labor force and possibly higher aggregate LFP rates in the future. On the other hand, if young potential workers are neither in the labor force nor in school, incorporating them into the labor force in the future might not be an easy task.

In this article, we review the trends in youth labor force participation by age, gender and education, focusing on the distinction between those in school and those not in school.

Less Education=Bigger Decline

There are two distinct age groups among these youth: those between 16 and 19 years old and those between 20 and 24 years old. A large share of the first group is transitioning

FIGURE 2
Labor Force Participation Rate



SOURCES: U.S. Bureau of Labor Statistics (BLS) and National Bureau of Economic Research (NBER).

NOTE: The data start in 1998 for this and the remaining figures because that's the earliest year for which the needed microdata from the Current Population Survey are available. The 2014 numbers are calculated using the average of the numbers from January through September.

from high school to college; thus, one should expect low labor force participation rates for this group. Workers between 20 and 24 years old are, instead, transitioning from college to either graduate school or to the labor market; thus, one should expect the LFP rate of this group to be closer to the LFP rate of the prime working-age population.

As can be seen in Figure 2, the 16-19 group experienced a large decline from 1998 until 2014 in the LFP rate, from 52.8 percent to 34.2 percent, a decrease of 35.2 percent. For the 20-24 group, the LFP rate declined from 77.5 percent to 71 percent, a decrease of 8.4 percent.

The decline in the LFP rate was similar for men and women, 17.1 percent for men and 15.2 percent for women for the entire 16-24 group.

Figure 3 shows that the decline of youth labor force participation was not homogeneous across education groups. Those between 16 and 24 with less than a high school diploma experienced the largest decline in the LFP rate: from 50.3 percent in 1998 to 29.8 percent in 2014, a 40.8 percent decrease. This decline was primarily driven by people 16-19; their LFP rate declined by 45.4 percent. Young people with at most a high school diploma also experienced a significant decline of their LFP rate, from 78.2 percent to 68.4 percent. The 16-19 group drove this decline, as well. Those with some college experienced a decline similar to that of high school graduates. Finally, young workers with at least a college degree did not experience significant changes in their LFP rate; it decreased from 84.5 percent in 1998 to 82.4 percent in 2014.

In School or Not in School?

Because of their ages, many of those not in the labor force (nonparticipants) are expected

to be still in school. But are they? In the Current Population Survey, conducted by the Census Bureau for the Bureau of Labor Statistics, a young individual who is out of the labor force can, in principle, be classified as either in school, not in school, disabled or retired.² A young individual who is not in school of any kind and not working is often referred to by the acronym NEET: Not in Education, Employment or Training.

The decline in youth labor force participation corresponds to a higher fraction of them attending school. Figure 4 shows that school attendance for the 16-24 population without a high school diploma increased from 38 percent in 1998 to 60 percent in 2014. This increase was driven by the younger population. While 39.8 percent of those 16-19 were attending school in 1998, 58.5 percent of them were attending school in 2014. (School attendance for the 20-24 population increased significantly less, going from 11.6 percent in 1998 to 17.4 percent in 2014.)

The second most-prevalent reason for not being in the labor force was NEET. Among those in the 16-19 group, 6.1 percent were NEET in 2014; for those in the 20-24 group, 9.2 percent were NEET in 2014. Lower-educated individuals (those with a high school diploma at most) were more likely to be NEET.

The fraction of NEET did not change significantly from 1998 until 2014 for the entire 16-24 population. But its relative stability masks heterogeneous trends across

education groups. (See Figure 5.) Although the NEET fraction for those with less than a high school diploma decreased by about 1 percentage point between 1998 and 2014, the NEET fraction increased significantly for the population with a high school diploma (in particular for the 16-19 group, whose percentage rose from 8.2 percent in 1998 to 12.4 percent in 2014) and for the population with some college education.

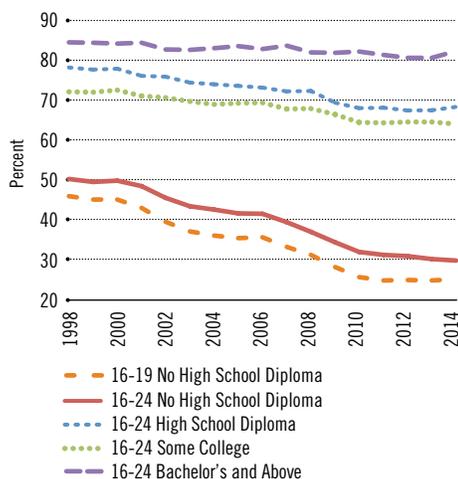
Interestingly, the 16-24 population with at most a high school diploma has some noticeable incidence of disability. This is not observed for the young population with at least some college.

In conclusion, the data from the Current Population Survey show that since 1998 most of the decline in youth labor force participation corresponds to an increase in school attendance (in particular of the 16-19 population). The fraction of the NEET population did not change significantly over this period, but within education groups the trends have been different. A more-detailed study of these labor trends among youth is needed to understand the future incorporation of these people into the labor market. 

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FIGURE 3

Labor Force Participation Rate

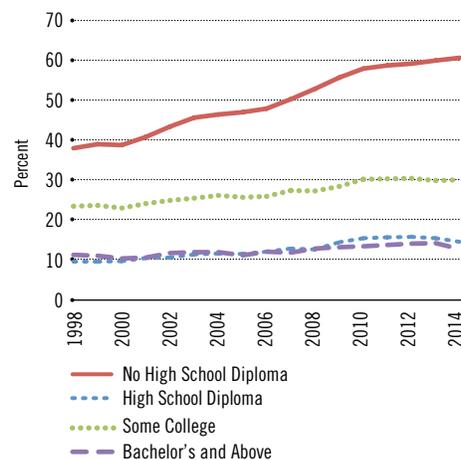


SOURCES: BLS and NBER.

NOTE: The 2014 numbers are calculated using the average of the numbers from January through September.

FIGURE 4

In School to Population Ratio: 16-24



SOURCES: BLS and NBER.

NOTE: The 2014 numbers are calculated using the average of the numbers from January through September.

ENDNOTES

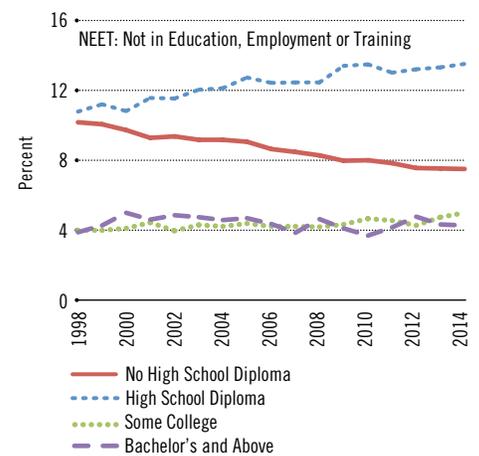
- 1 See Canon, Debbaut and Kudlyak for an analysis on the decline of the aggregate labor force participation rate.
- 2 Being retired is one of the options given to everyone who is asked in the Current Population Survey why he or she is not working. Fewer than 0.03 percent of young people pick this option.

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FIGURE 5

NEET to Population Ratio: 16-24



SOURCES: BLS and NBER.

NOTE: The 2014 numbers are calculated using the average of the numbers from January through September.

Assessing the Health of the Labor Market: The Unemployment Rate vs. Other Indicators

By Maximiliano Dvorkin



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One of the goals of the Federal Reserve System, particularly of the Federal Open Market Committee (FOMC), is to achieve maximum employment. Therefore, staff and officials across the System put great effort into analyzing the current conditions of the labor market. Unfortunately, there is no widespread consensus on the definition of maximum employment or how far the economy is from it. Until recently, the unemployment rate has been the hallmark indicator of labor market health;¹ even Fed Chair Janet Yellen argued in 2013 that “the unemploy-

It has been argued that the current level of the unemployment rate may not be capturing all the relevant information about the health of the labor market.

ment rate is probably the best single indicator of current labor market conditions.”²

Currently, the unemployment rate stands very close to its natural level, indicating that the labor market has returned to some semblance of normal.³ However, unemployment may fall for reasons other than improved economic conditions. For example, it may fall when unemployed workers become discouraged and stop looking for work; then, they are no longer being counted as a part of the labor force.

In much of the recent policy debate, it has been argued that the current level of the unemployment rate may not be capturing all the relevant information about the health of the labor market and that it is best to look

at a broad range of labor market indicators. Most notably, attention has shifted to variables like labor force participation, involuntary part-time employment and long-term unemployment.

Summarizing all this data is not a simple task since these different variables do not always move in tandem. For this reason, economists have developed several tools to distill key information that might be common to many of these observed variables (unemployment rate, labor force participation rate and dozens of other indicators) and might be driving those variables. In particular, the Federal Reserve Board of Governors and the Federal Reserve Bank of Kansas City introduced in 2014 indexes that they developed on labor market conditions.⁴ The goal of these indexes is to get a handle on “labor market conditions” or “labor market health”; these are terms that are not precisely defined and are even harder to measure.

Although these tools are indexes, much like the Consumer Price Index or the Industrial Production Index, the labor market conditions indexes use relatively sophisticated statistical procedures to weight some labor market variables more heavily than others. These statistical procedures let the data determine which indicators are more informative of the movements in the underlying labor market conditions.

In this article, I compare and contrast the labor market conditions indexes with one another and with the unemployment rate to see what labor market insights can be gained.

I found a couple of things. First, despite some differences in their construction and the variables used, the three indexes that I reviewed seem to provide essentially the same information. This similarity is not

surprising since they are, after all, trying to capture the same object, namely the general health of the labor market. Second, the indexes have a strong negative correlation with the unemployment rate, that is, a rising index is associated with a falling unemployment rate. This strong link confirms that the unemployment rate is a reliable proxy for unobserved labor market health.

Measuring Labor Market Conditions

The goal of these indexes is to distill the information from a large set of observed labor market variables using a statistical model. Once the final index is calculated, the levels are interpreted as relative labor market conditions. A level higher than zero indicates that labor market conditions are above the historical average, while a level below zero indicates that labor market conditions are relatively poor compared with historical averages.

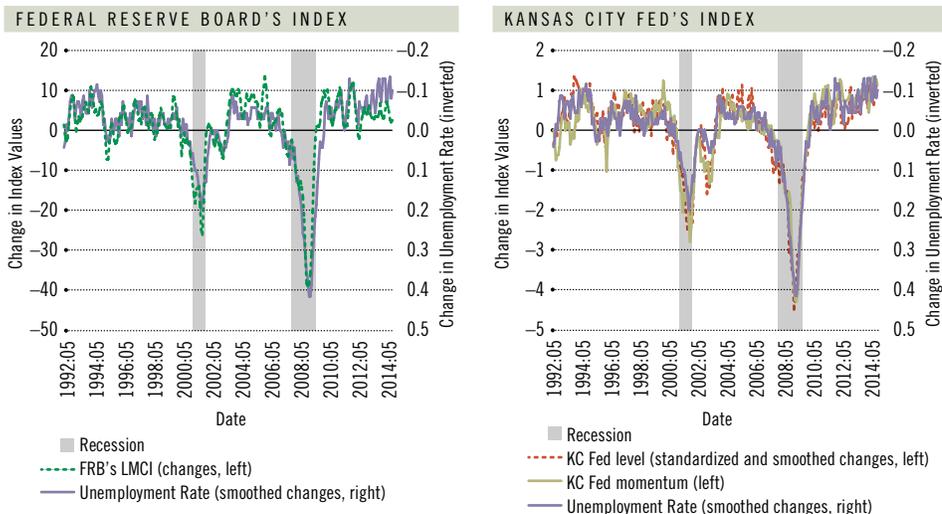
The index developed by the Federal Reserve Board of Governors (FRB) uses 19 labor variables of the U.S. economy. These variables are measured monthly; the sample starts in July 1976. The index is reported in average monthly changes instead of the index levels.

The Federal Reserve Bank of Kansas City has developed two indexes on labor market conditions; it uses 24 variables with a monthly frequency, and the sample starts in January 1992. The first index is interpreted as the level of conditions in the labor market; the second reflects the momentum, or changes, in these conditions.

Figure 1 shows the evolution of the *changes* in labor market conditions as captured by the different indexes, and Figure 2 shows the same evolution for the *level* of labor market

FIGURE 1

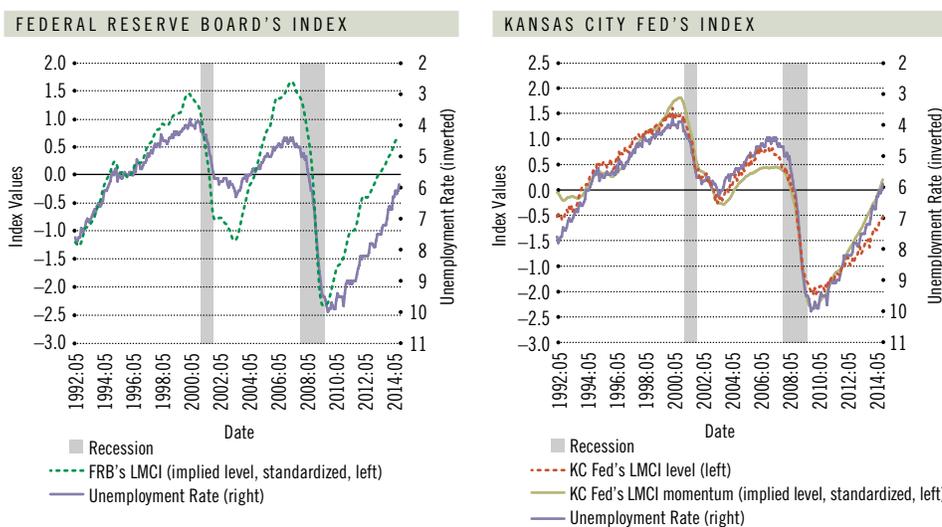
Changes in Labor Market Conditions Indexes (LMCI) and in the Unemployment Rate



SOURCES: Author's calculations using data from the Federal Reserve Board of Governors, the Federal Reserve Bank of Kansas City and the Bureau of Labor Statistics.

FIGURE 2

Levels of Labor Market Conditions Indexes and the Unemployment Rate



SOURCES: Author's calculations using data from the Federal Reserve Board of Governors, the Federal Reserve Bank of Kansas City and the Bureau of Labor Statistics.

conditions. For the FRB's index and the KC Fed's momentum index, I recovered the levels from the reported changes.⁵ As illustrated by the figures, the information that these three different measures provide is remarkably similar, which is not surprising since the statistical method to construct the different indexes is the same and they employ similar labor market variables.

In each of these figures, I also plotted the unemployment rate for the same period. Since in Figure 1 I analyzed the changes in the indexes, I also plotted the changes in the unemployment rate, while in Figure 2 I plotted the levels.⁶ In periods of expansion,

labor market conditions, as captured by the different indexes, improve and the unemployment rate falls. The opposite happens in downturns. To ease the comparison between the indexes and the unemployment rate, I inverted the axis for the unemployment rate in the figures.

It is evident from the figures that the unemployment rate and the indexes are highly synchronized. While nothing in the statistical procedure behind the indexes imposes this strong link between them and the unemployment rate, the data suggest that

continued on Page 16

ENDNOTES

- 1 The unemployment rate is defined as the ratio of people actively looking for work to the sum of people actively looking for work and those currently employed.
- 2 In 2013, Janet Yellen was vice chair of the Federal Reserve. For more information on her remarks on the unemployment rate and its role in monetary policy, see Yellen.
- 3 Under this view, the concept of natural rate of unemployment, the rate that will prevail in the long run in the absence of short-term cyclical factors, can provide adequate information on the level of maximum employment. The Congressional Budget Office most recently estimated the natural rate of unemployment to be between 5.5 percent and 5.8 percent in 2014.
- 4 See Hakkio and Willis, as well as Chung et al.
- 5 I call these implied levels.
- 6 To eliminate some of the very high frequency volatility on the monthly changes in the unemployment rate, I take a seven-month centered moving average on these changes with equal weights, which is what I present in the graph. At the end of the period, this average contains only current and past values.
- 7 In statistical lexicon, the R² for these regressions is close to 1.

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Hakkio, Craig S.; and Willis, Jonathan L. "Kansas City Fed's Labor Market Conditions Indicators (LMCI)." *The Macro Bulletin*, Aug. 28, 2014. See <http://kansascityfed.org/publicat/research/macrobulletins/mb14Willis-Hakkio0828.pdf>.

Yellen, Janet L. Speech at the 2013 National Association for Business Economics Policy Conference. See www.federalreserve.gov/newsevents/speech/yellen20130302a.htm.

continued from Page 15

the unemployment rate is very informative of the underlying conditions in the labor market. In fact, a simple linear regression between the unemployment rate and the different indexes suggests that the bulk of the variability of the unemployment rate is due to movements in the indexes.⁷

While labor market conditions are not directly observed, the previous results lead to an important conclusion. If we were to use only the unemployment rate, or its changes, to predict the conditions in the labor market, the prediction error would be small. In other words, the unemployment rate has a very high signal-to-noise ratio for measuring labor market conditions.

Conclusion

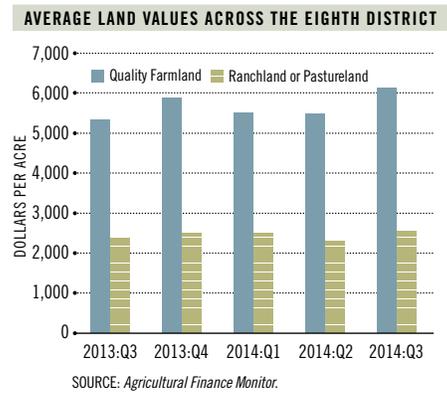
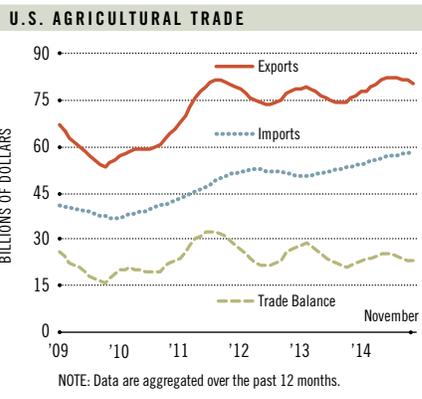
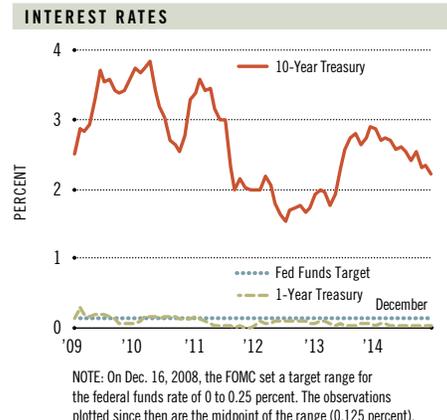
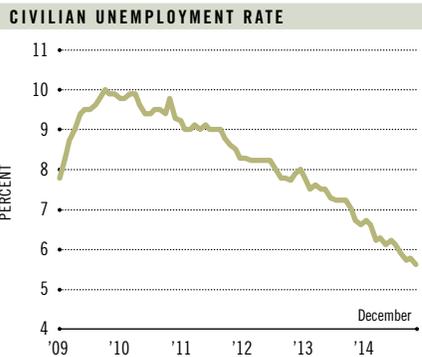
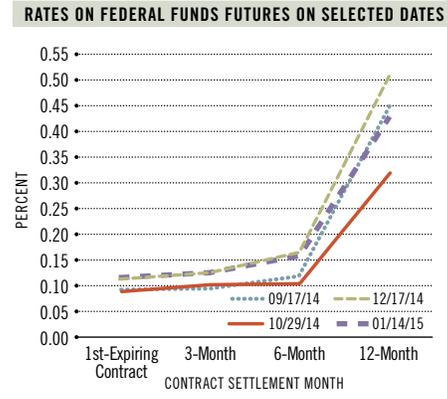
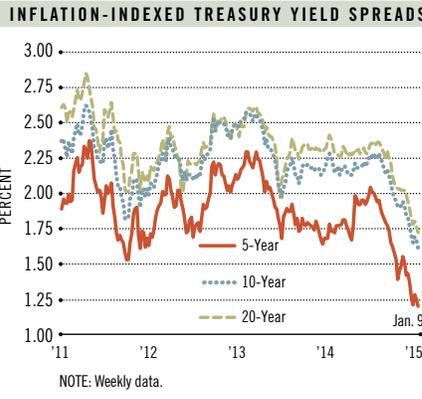
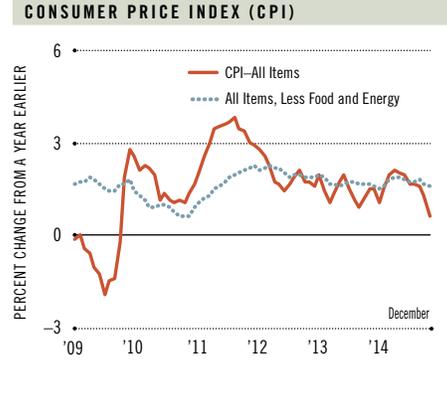
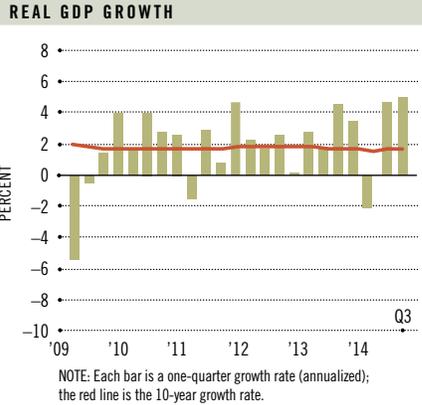
The U.S. economy has recently experienced the largest economic downturn in postwar history. Five years have passed since the official end of the recession, yet the difficult question on how far we are from full employment remains.

With unemployment returning to normal levels, it has been argued that the unemployment rate may not properly capture the current amount of slack in the economy; as a result, labor market conditions indexes have been proposed as a new measure of labor market health. These indexes have the advantage of summarizing information from many different variables. At the same time, they are the result of a statistical procedure requiring several steps to compute and a nontrivial amount of judgment.

In this article, I showed that the unemployment rate is reflective of underlying labor market health, as represented by the indexes. In addition, a closer inspection of the figures suggests that this strong link between the indexes and the unemployment rate does not appear to have changed recently, which suggests that the unemployment rate is still as good at measuring labor market conditions as it has been in the past. 

Maximiliano Dvorkin is an economist at the Federal Reserve Bank of St. Louis. Hannah Shell, a research analyst at the Bank, provided research assistance. For more on Dvorkin's work, see <http://research.stlouisfed.org/econ/dvorkin>.

Eleven more charts are available on the web version of this issue. Among the areas they cover are agriculture, commercial banking, housing permits, income and jobs. Much of the data are specific to the Eighth District. To see these charts, go to www.stlouisfed.org/economyataglance.



Pace of Growth Is Expected To Quicken

By Kevin L. Kliesen

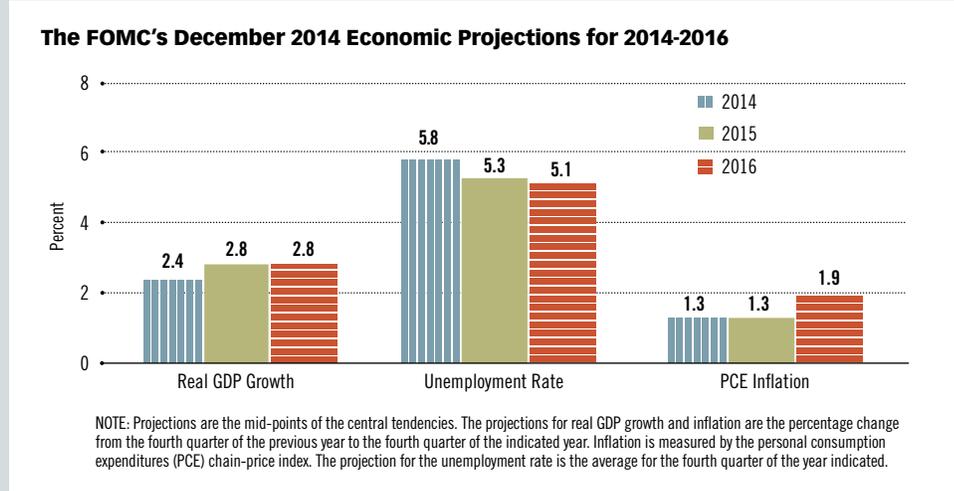
Despite an early stumble in 2014, the U.S. economy has performed well over the past year. Job growth has been strong, inflation expectations remain low and financial market stresses are lower than average. Prevailing economic conditions at the end of 2014 suggest that the probability of faster real GDP growth and continued low inflation in 2015 outweighs the probability of slower growth and higher inflation.

A Look Back

Forecasters and policymakers were optimistic in late 2013 about the U.S. economy's prospects for 2014. Over the second half of 2013, growth of real gross domestic product (GDP) had increased at a 4 percent annual rate. In addition, the unemployment rate had fallen to 6.7 percent in December 2013, and inflation remained unusually low (1.2 percent). The consensus of private forecasters and the majority of the Federal Open Market Committee (FOMC) was that real GDP would increase by about 3 percent in 2014 and that inflation would remain below the FOMC's target of 2 percent.

However, the economy stumbled coming out of the gate, as real GDP fell at a 2.1 percent annual rate in the first quarter of 2014. Although some were alarmed by this development, most viewed the unexpected decline in economic activity as a temporary setback, influenced in part by adverse weather. Indeed, over the remainder of the year, the stock market would reach record highs, measures of business and consumer confidence would reach multiyear highs, and the unemployment rate would fall below 6 percent—much faster than most forecasters had anticipated. Importantly, inflation and interest rates would remain quite low and stable.

In short, following the first-quarter hiccup, the economy began developing some significant forward momentum in the spring: Growth of real GDP measured 4.6 percent in the second quarter and 5 percent in the third quarter. The pace of economic activity is expected to



slow modestly in the fourth quarter to about 2.75 percent. Overall, real GDP growth is expected to be about 2.5 percent in 2014 and accelerate to about 3 percent this year.

A Look Ahead

When forecasting the macroeconomy, it is important to consider how developments in 2014 could affect the U.S. economy's performance in 2015. Some of these developments have been positive, and some have been negative. Two potential negative developments stand out: concerns about the economic health of the global economy and an increase in the trade-weighted value of the dollar.

At the conclusion of the European Central Bank's meeting Dec. 4, bank President Mario Draghi reported that the staff's forecast for European real GDP growth in 2015 had been revised "substantially downward" to 1 percent. But Europe's slow growth is not an outlier. Following a tax hike in the first quarter of 2014, Japan slipped into a recession; the country is expected to grow by less than 1 percent in 2015. Growth in Asia's other large economy, China, is also expected to be lower in 2015 than it has been in years.

The corrosive effect of slower global growth on the U.S. economy is likely to be magnified by a substantial appreciation of the U.S. dollar since late July 2011. During December 2014, the real value of the dollar rose to its highest level since June 2009. Although Canada and Mexico are the United States' two largest trading partners, and their economies show few obvious strains, slow global growth and a stronger dollar could lead to weaker growth of U.S. exports in 2015. If so, manufacturers may slow their planned capital expenditures.

Three positive developments stand out. First, and perhaps most important, is the aforementioned forward momentum, which is being manifested by strong employment growth and a larger-than-expected decline in the unemployment rate. Second, crude oil prices have fallen substantially since mid-June. Historically, falling energy prices have helped to boost the real purchasing power of consumers, spurring faster growth of consumer expenditures. As an example, car and light-truck sales in 2014 were at their highest since 2006. Falling oil prices also tend to lower headline inflation and—for a time at least—inflation expectations and nominal interest rates. However, some policymakers are worried that inflation will drift too far below the FOMC's target of 2 percent.

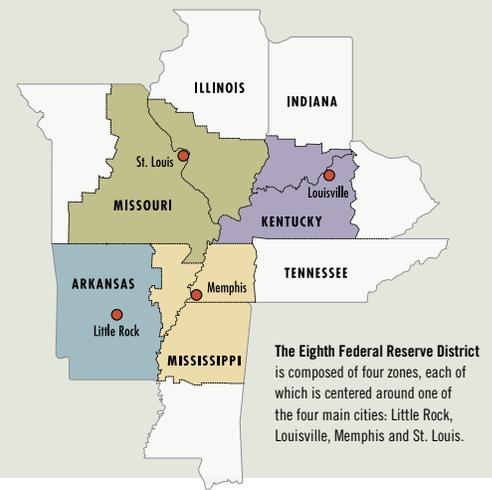
Macroeconomic policy is the third positive development. On the fiscal side, government expenditures are no longer a negative contribution to real GDP growth, as they were from 2011 to 2013. Of note, state and local government finances have improved. Regarding monetary policy, financial markets expect the stance of monetary policy to remain extraordinarily accommodative in 2015 even if, as some Federal Reserve policymakers have suggested, the Fed's target for short-term interest rates rises slightly.

Overall, then, key economic and financial market indicators at the end of 2014 suggest that the U.S. economy is likely to strengthen further in 2015. [Q](#)

Kevin L. Kliesen is an economist at the Federal Reserve Bank of St. Louis. Lowell R. Ricketts, a senior research associate at the Bank, provided research assistance. See <http://research.stlouisfed.org/econ/kliesen> for more on Kliesen's work.

Income Inequality Is Growing in the District, but Not as Fast as in the Nation

By Maximiliano Dvorkin and Hannah Shell



The evolution of national income inequality is a major topic in current economic discussions. In a recent speech, Federal Reserve Chair Janet Yellen described the issue as one of the most important of our time: “By some estimates, income and wealth inequality are near their highest levels in the past hundred years, much higher than the average during that time span and probably higher than for much of American history before then.”¹

Less discussed is the evolution of income inequality on a subnational level. Not all regions in the U.S. exhibit the same inequality patterns as the nation does. Using data from the annual March supplement of the Current Population Survey, we analyzed the long-term trends of income inequality in the Eighth District. We found that although inequality in the District has increased, it has done so at a slower pace than has occurred in the nation as a whole.²

There are several ways to measure inequality. The most common is in terms of income, but inequality can also be measured by consumption and by wealth.³ Each measure has different implications for the level of inequality found. In general, measuring inequality through wealth yields the most unequal distribution, while income inequality is slightly less unequal, and consumption inequality is even less unequal.⁴

This article focuses on income inequality, using total earnings and disposable income as the variables for analysis. We chose total earnings because this variable represents gross labor income—it excludes income earned from financial wealth, income from government transfers (such as welfare) and deductions due to income taxes. Disposable income is the amount individuals have left

from all income sources after paying taxes and receiving government benefits. Comparing disposable income to total earnings can show how effective the government is at mitigating inequality.

Income Inequality in the District

Overall, income inequality has increased in the Eighth District. From 1979 to 2009, the income ratio of a person in the top 10 percent of the income distribution to that of a person in the bottom 10 percent has grown from 5.7 to 6.2.⁵ This means an individual at the top of the distribution now earns slightly more than six times as much as someone at the bottom. Moreover, the entirety of this increase is due to larger earnings in the top of the distribution.

Over the 30 years studied, income in the 90th percentile has grown by more than 8 percent in real terms, while income in the 10th percentile has remained essentially flat in those same inflation-adjusted terms. These numbers indicate that the top-echelon income earners are taking home more, but the rest of the population’s purchasing power is about the same or even less than 30 years earlier.

Eighth District vs. U.S.

Clearly, income inequality has increased in the Eighth District, but how does this compare with the evolution of income inequality in the U.S.? Economists commonly use Gini coefficients to answer these types of questions. A Gini coefficient measures inequality across a distribution of individuals, giving a value between zero (expressing perfect equality) and 1 (expressing perfect inequality). The table shows the average Gini coefficients over two five-year

periods for the U.S. and the Eighth District. In terms of inequality measured by annual earnings, inequality in the Eighth District rose 0.03 points, from 0.36 in the first period to 0.39 in the second period. In the U.S., inequality increased 0.05 points, from 0.36 to 0.41. By this measure, the U.S. and the Eighth District started at the same place in the beginning of our analysis but ended with income inequality for the nation higher than income inequality in the Eighth District.

In terms of inequality measured by disposable income, the Eighth District has kept pace with the U.S. The Gini coefficients on disposable income have increased 0.07 points in both the U.S. and the District between the two periods. However, the absolute level of inequality in the Eighth District remains below the U.S. in both periods reported.⁶

Average Gini Coefficients for Annual Earnings and Disposable Income

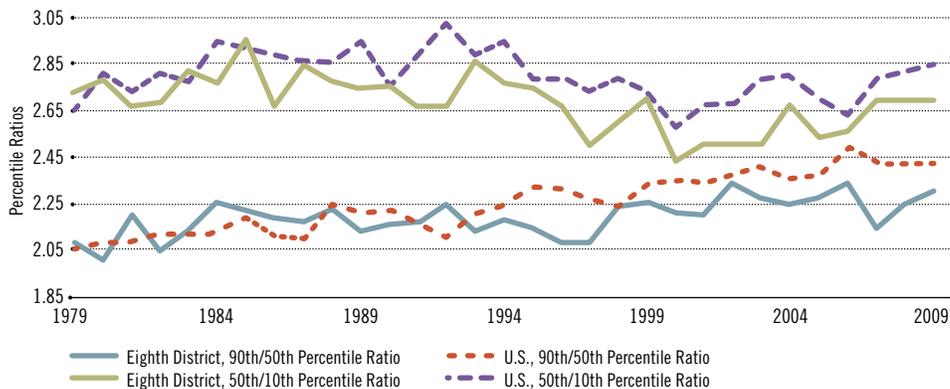
	Eighth District	U.S.
Earnings		
1979-1984	0.36	0.36
2004-2009	0.39	0.41
Disposable Income		
1979-1984	0.33	0.34
2004-2009	0.40	0.41

SOURCES: Authors’ calculations using data from the U.S. Census Bureau and the U.S. Bureau of Labor Statistics provided by Unicon Corp.

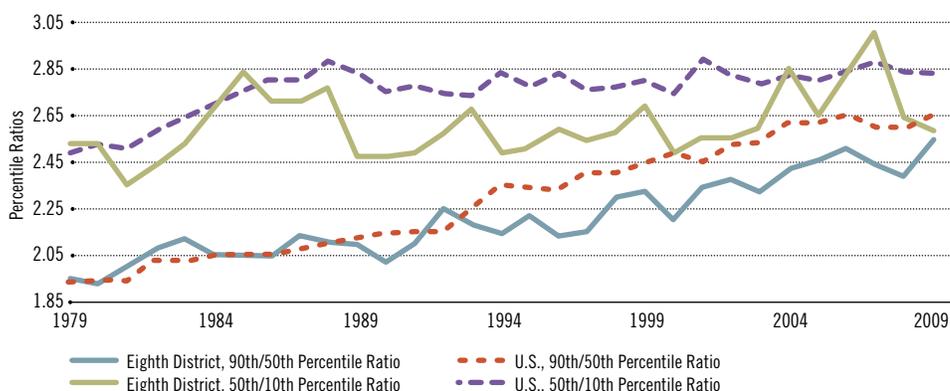
Another way to compare inequality over time and regions is to calculate ratios of various percentiles of the income distribution. For example, the 90th to 50th percentile ratio compares the income of a person who stands at the 90th percentile of the income distribution, that is, a top earner, to that of a person who stands at the 50th percentile

Income Inequality Ratios for Total Earnings and Disposable Income

A) Percentile Ratios, Total Earnings



B) Percentile Ratios, Disposable Income



SOURCES: Authors' calculations using data from the U.S. Census Bureau and the U.S. Bureau of Labor Statistics provided by Unicon Corp.

of the distribution, that is, a middle-income earner. Figures A and B show the 90th to 50th and the 50th to 10th percentile ratios for earnings and disposable income in the Eighth District and the U.S. In 1979, the 90th to 50th percentile ratios for earnings and disposable income started out at about 2 in both the U.S. and the Eighth District. A ratio of 2 means that the top-income earners in both the measures studied made about twice as much as the middle class. In the 30 years since, the ratios for the U.S. (dashed lines) have increased more rapidly than the ratios for the District. Both ratios appear to have followed a similar trend until the early 1990s, when the income inequality in the U.S. began to increase more rapidly than in the Eighth District. In 2009, the U.S. top-income earners were earning more than 2.4 times the middle class. In the District, these top individuals were earning about 2.3 times more.

In sum, income inequality is increasing primarily in the upper end of the distribution, between the top-income earners and

the middle-income earners. Although the level of income inequality is higher in the lower end of the distribution, this level has not dramatically increased over the period studied. In the upper end of the distribution, an increasing trend is clearly visible.

Conclusion

Economists continue to debate the source of the increase in inequality in the past few decades. The above analysis shows that although income inequality in the Eighth District has increased, it has done so at a slower pace than in the nation as a whole. Moreover, despite the different paces of increase, both the U.S. and the Eighth District have experienced increased income inequality primarily in the upper end of the distribution. ⁹

Maximiliano Dvorkin is an economist and Hannah Shell is a research analyst, both at the Federal Reserve Bank of St. Louis. For more on Dvorkin's work, see <http://research.stlouisfed.org/econ/dvorkin>.

ENDNOTES

- 1 See Yellen.
- 2 There are some limitations when using data from the annual March supplement of the Current Population Survey. These data are somewhat limited at the subnational level. In particular, geographic identifiers do not follow the Federal Reserve district boundaries. For this reason, we compute measures of income inequality for the Eighth District by including individuals living in the following states at the time of the survey: Missouri, Arkansas, Mississippi, Tennessee, Kentucky, and Indiana. This is, therefore, an approximation to the population living in the Eighth District's territory. While part of the state of Illinois lies in the Eighth District, we decided to exclude it in the analysis since most of Illinois' population, including that of the city of Chicago, does not.
- 3 For more details on various measures of inequality in the U.S., see speech by St. Louis Fed President James Bullard to the Council on Foreign Relations on June 26, 2014, at <https://www.stlouisfed.org/from-the-president/speeches-and-presentations/2014/income-inequality-and-monetary-policy>.
- 4 See the study by Heathcote, Perri and Violante and the study by Ricketts and Waller.
- 5 We study the evolution of income inequality from 1979 to 2009 because of data availability.
- 6 The higher Gini coefficient for disposable income as compared to earnings doesn't necessarily mean the government hasn't been effective at mitigating inequality. Disposable income starts with earnings, then adds income from financial wealth and subtracts government transfers. Therefore, before government transfers take place, we would expect income to be more unequal than earnings.

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A Tale of Four Cities: Widespread Growth in Northwest Arkansas

By Charles S. Gascon and Michael A. Varley



Sam Walton, the founder of the Walmart chain, started with this "dime store" in Bentonville, Ark. The store now serves as the Walmart museum.

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When Sam Walton opened in 1950 the dime store in Bentonville, Ark., that would evolve into the giant retailer Walmart, to say the area was sparsely populated would be an understatement. Even 20 years later, when the first Walmart distribution center was opened in Bentonville, the city had just over 5,000 people. Today, these environs have grown so much that they comprise their own metropolitan statistical area (MSA).

The Fayetteville-Springdale-Rogers MSA (which includes Bentonville) is home to almost a half-million people. A region more often referred to as Northwest Arkansas, this MSA covers four counties, one of which is across the border in Missouri.

This strong growth is relatively dispersed among the MSA's counties. Although the core counties of Benton and Washington have been leading the way with an average population growth of at least 2.4 percent, every county in the region has experienced average growth faster than that of the nation since 1971. Thus, not only has Northwest Arkansas experienced the fastest population growth of any MSA located in Arkansas, but it is also the only MSA in Arkansas (with at least two counties in the state) that has experienced an average population growth above the national average in all counties.

Strong growth in real income per capita has gone hand-in-hand with the growth in population. Per capita income in Northwest Arkansas has grown about 2 percent annually since 1970, compared with 1.4 percent in the U.S. as a whole. (See Figure 1.) At

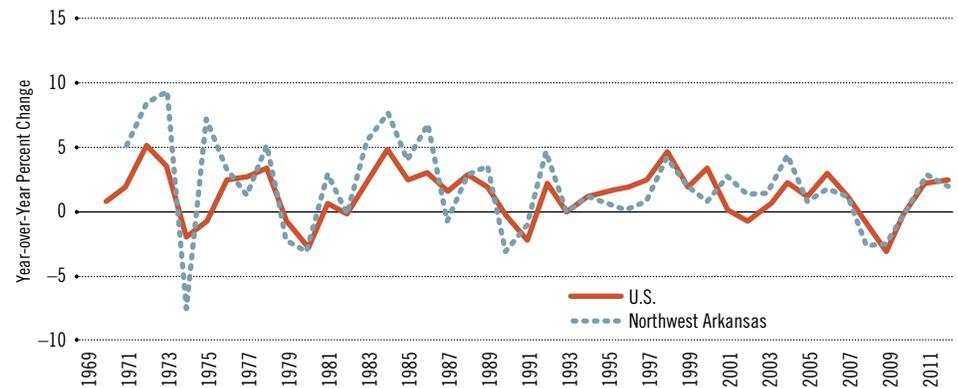
these rates, Northwest Arkansas doubles its income every 35 years, while the U.S. needs 50 years to do the same.

As a result, per capita income in Northwest Arkansas has converged with the national average. As of 2012, income per capita in Northwest Arkansas was about \$36,000, about \$6,000 below the national average. After adjusting for the lower cost

of living in the region, per capita income in Northwest Arkansas was at that time, in effect, \$40,000, just \$2,000 shy of the national average.

Annual, inflation-adjusted income growth has been relatively uniform across all counties since 1971, although Benton (2 percent per year) and Washington (1.8 percent) exhibited greater growth than

FIGURE 1
Per Capita Personal Income Growth



SOURCES: Census Bureau/Federal Reserve Economic Data (FRED) and Haver.

NOTE: Data are presented at an annual frequency, and the range is 1971-2012. In 2012, per capita income growth was 2.33 percent in the U.S. and 1.96 percent in Northwest Arkansas.



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Northwest Arkansas is home to not just one but multiple “city centers,” each with its own specialty. Fayetteville, for example, is a source of college-educated, skilled labor, thanks to the university there. Tyson Foods (above) is a key industry in the Rogers area. It’s also the second-largest employer in the MSA.

Madison (1.3 percent) and the Missouri county of McDonald (1.5 percent).

Multiple City Centers

Although the growth rates alone are noteworthy, arguably more impressive is how this growth has occurred across multiple cities in the region. Economic activity in most metro areas typically revolves around one city center. The economic growth in Northwest Arkansas is supported by four cities: Fayetteville, Springdale, Rogers and Bentonville.

More than half the metro area’s residents reside in these four cities, each of which brings prosperity to the region in its own way. Fayetteville, where the University of Arkansas is located, is a source of skilled labor. Of its residents age 25 and older, 44.8 percent have a bachelor’s degree or higher, placing it between the cities of Boston (43.9 percent) and Austin, Texas (45.6 percent).

A few miles north of Fayetteville are the cities of Springdale and Rogers. This area is home to two of the region’s major employers: Tyson Foods, a multinational food corporation, and J.B. Hunt, a trucking and transportation company. Both cities also have strong manufacturing and construction sectors. In Springdale, 34 percent of the workforce is employed in one or the other sector; in Rogers, 22 percent. As a result of widespread growth in the region and opportunities for employment, many families have moved to this part of the state

and now call Springdale and Rogers home. About 20 percent of the population in this area is foreign-born, and nearly 30 percent of residents in Springdale and in Rogers are Hispanic or Latino, about twice the national rate. More than 10 percent of the firms in each of these cities are Hispanic-owned.

The smallest of the four cities in the MSA is Bentonville, but as home to Walmart, it has experienced some of the fastest growth in the region. The population of the city increased about 14 percent from April 2010 to July 2013, nearly twice the growth rate of the other three cities and almost six times the national rate. Bentonville is also the wealthiest of the four cities; its median household income tops \$60,000—nearly 20 percent higher than each of the other three aforementioned cities.

Economic Outlook

The region has been growing at a remarkable pace for nearly 50 years. However, such robust growth was not immune to the financial crisis of 2008 and subsequent recession. Since 2007, Northwest Arkansas has been experiencing population growth that is below average for the area, with Madison County losing population in 2011 and 2012, and McDonald County doing the same in 2010 and 2011. It is too early to tell if this is a cyclical phenomenon or if the MSA is experiencing a permanent slowdown in population growth. Long-term trends indicate that

MSA Snapshot

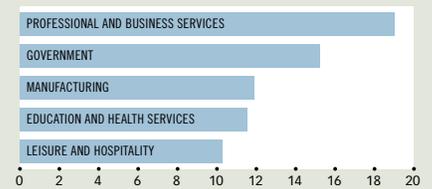
Northwest Arkansas

Population.....	491,966
Personal Income (Per Capita).....	\$35,980
Cost of Living.....	-13.8%
Employment.....	219,300
Unemployment Rate.....	4.5%
Pop. (Age 25+) w/Bachelor’s Degree or Higher.....	27.3%

NOTES: Population is from the Bureau of Economic Analysis (BEA), as of 2013. Per capita income is the 2012 annual figure from the BEA and was created averaging county income data using population weights. Cost of living figure is from Sperling’s Best Places and is an annual figure for 2013; it is shown above as relative to the national average. The unemployment rate and employment figure are from the November 2014 release from the Bureau of Labor Statistics. The percentage of the population with a bachelor’s degree or higher is from the U.S. Census Bureau; it is a five-year estimate from 2008-2012.

LARGEST SECTORS BY EMPLOYMENT

(Percent of Nonfarm Employment as of October 2014)

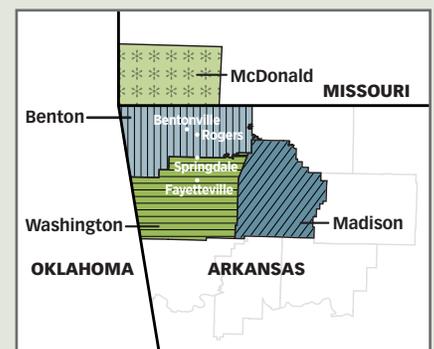


LARGEST LOCAL EMPLOYERS

1. Walmart.....	28,000
2. Tyson Foods Inc.....	12,000
3. University of Arkansas.....	4,000
4. J.B. Hunt.....	2,600

NOTE: Totals are from the U.S. Department of Housing and Urban Development, as of January 2012.

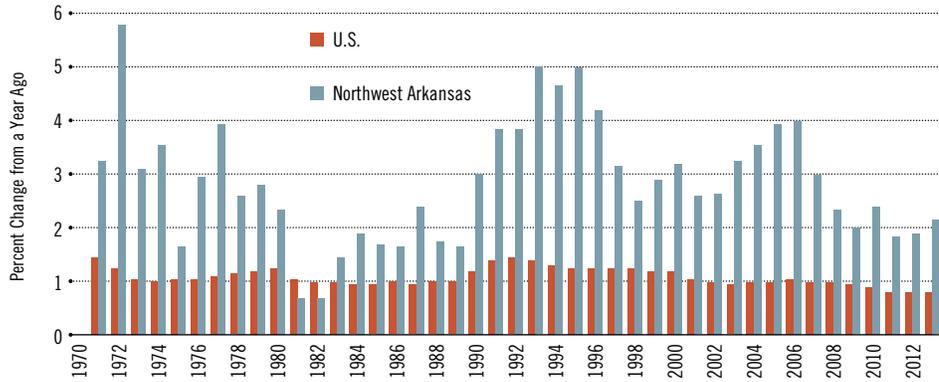
NORTHWEST ARKANSAS



NOTES: The colors do not correspond to any specific values; they are used solely to identify the outline of the metro area. McDonald County is in Missouri but is included as part of the metropolitan statistical area.

FIGURE 2

Population Growth: U.S. vs. Northwest Arkansas

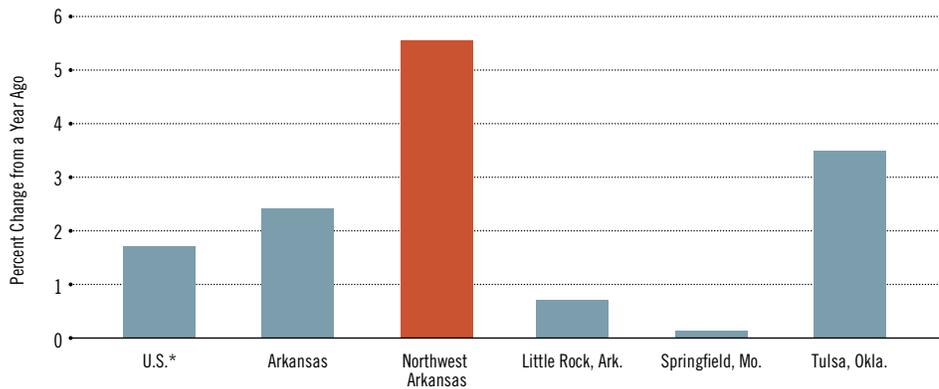


SOURCES: Census Bureau and Haver.

NOTE: Data are presented at an annual frequency, and the range is 1971-2013. In 2013, population growth was 0.7 percent in the U.S. and 2.08 percent in Northwest Arkansas.

FIGURE 3

Real GDP Growth 2013



*U.S. is average of all metro areas.



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Thanks to the University of Arkansas, Fayetteville is a major source in the state for skilled labor. Of the city's residents 25 and older, 44.8 percent have a bachelor's degree or higher—on par with Boston and Austin, Texas.

impact of the recession on the local housing market. From 2006 to 2013, new permits for private housing fell 60 percent, worse than both national and state declines of 45 percent. The ability of Northwest Arkansas to weather such a downturn in housing is a good sign of stable growth in the MSA.

Despite the uncertainty surrounding recent population growth, which is most likely a reflection of economic growth in the MSA, comparing the region to the nation as a whole paints an optimistic outlook. In 2013, the region's economy (measured by real gross metropolitan product) grew by 5.6 percent, three times the national rate and much faster than the nearby MSAs of Little Rock, Ark.; Tulsa, Okla.; and Springfield, Mo. In fact, only 25 of the nation's 381 MSAs experienced faster growth in 2013, placing Northwest Arkansas firmly in the top 10 percent of the fastest-growing MSAs in the nation. (See Figure 3.)

the region's population growth is positively correlated with the U.S. business cycle. As the national economy gains momentum, population growth in the region may pick up again.

While population growth has slowed, income growth has returned to the long-run average rate after being hit by the Great Recession. Real income per capita in the region declined during the first two years of the recession, but incomes rebounded in 2011 and 2012 (the latest year data are available). All the Arkansas counties are doing particularly well with all three experiencing above-average income growth (relative to the long-run trend) at some point after the end of the Great Recession; however, McDonald County (Missouri) is showing the effects of the downturn, with a decline in income in both 2011 and 2012.

This recovery in the MSA is particularly notable considering the significant

Charles S. Gascon is a regional economist and Michael A. Varley is a research analyst, both at the Federal Reserve Bank of St. Louis. For more on Gascon's work, see <http://research.stlouisfed.org/econ/gascon>.

ASK AN ECONOMIST



Guillaume Vandenbroucke is a senior economist at the Federal Reserve Bank of St. Louis, where he has worked since mid-2014. His research focuses on human capital and schooling, as well as on demographic questions related to such topics as fertility and marriage. He enjoys reading, swimming and spending time with his family. For more on his research, see <http://research.stlouisfed.org/econ/vandenbroucke>.

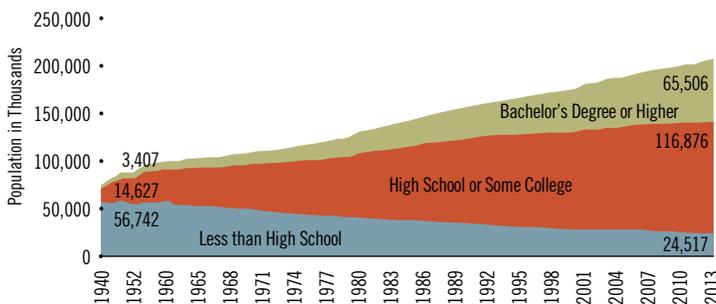
Q: *How much education do Americans get? How has this figure changed over time?*

A: These are important questions. Education is a primary determinant of an individual's lifetime earnings. At a macroeconomic level, understanding the evolution of educational attainment is relevant, given the importance of human capital to the national income of countries.

On average, Americans spend about 14 years in school. Educational attainment has increased remarkably since early in the 20th century, as can be seen in the chart. In 1940, 76 percent of those 25 and older had not completed high school; by 2013, only 12 percent hadn't.

Diego Restuccia at the University of Toronto and I have a paper in which we asked what caused this substantial trend.¹ We developed a model in which individuals can accumulate human capital (i.e., become educated) and assessed how much technological progress and changes in life expectancy contributed to the increase of educational attainment. We found that skill-biased technical change represented the most important factor in accounting for the increase in educational attainment. In other words, the main reason why more people sought education was because technology keeps rewarding educated people with better and better paychecks. This may sound obvious, but there are many other reasons for people to continue their education. Knowledge could be enjoyable, for instance. After all, even retired people sometimes go back to school to learn about something they are interested in. Yet, we are finding that the strongest of all reasons is that education simply is a good investment.

Population Age 25 and Over by Educational Attainment: 1940-2013



SOURCES: www.census.gov/hhes/socdemo/education/data/cps/historical/index.html and www.oecdbetterlifeindex.org/topics/education.

ENDNOTE

¹ See www.economics.utoronto.ca/public/workingPapers/tecipa-446.pdf.

WHAT DOES THE ST. LOUIS FED DO? FIND OUT IN "100 YEARS OF SERVICE"

In a report published recently to mark the 100th anniversary of the St. Louis Fed and the Fed System, you will learn not only about the founding and history of these institutions, but you will get a **first-person account of the work** of each department at the St. Louis Bank today. For example, Chris Waller, the head of our Research department, explains the academic-style research that our economists undertake. Julie Stackhouse talks about the sophisticated approach taken to bank supervision these days. Karen Branding highlights the importance of earning the public's trust. Other essays discuss the payments system, our work for the Treasury, internal and external audits of the St. Louis Fed, and many other aspects of day-to-day operations.

The core of "100 Years of Service," however, is the history. You will read about the financial instability in the country that led to **the birth of the Fed**, our nation's third attempt at a central bank. You will also find out why, a half-century later, the St. Louis Fed came to be known as the **maverick in the Fed System**.

You can scroll through the book—or download it in the iTunes store—online at www.stlouisfed.org/annual-report/2013. There, you will also find a seven-minute **video** that captures some of the highlights.

DECK THE HALLS—WITH INFOGRAPHICS FROM THE ST. LOUIS FED

As you take down holiday decorations in your workspace, consider putting up something almost as colorful and even more thought-provoking: some of our new infographics on subjects related to the economy. One illustrates the history of **dissenting votes** on the Federal Open Market Committee; it highlights key data from a recent article in our research journal, the *Review*. Another one breaks down the pros and cons of traditional and alternative providers of **financial services** (from banks to pawnshops). The changing landscape of **housing market conditions** around the country is the subject of a third graphic; it, too, highlights key data from in-depth reports that are also available from the St. Louis Fed. These and more can be seen at www.stlouisfed.org/infographics. When you follow the links, you can print the infographics yourself.



We welcome letters to the editor, as well as questions for "Ask an Economist." You can submit them online at www.stlouisfed.org/re/letter or mail them to Subhayu Bandyopadhyay, editor, *The Regional Economist*, Federal Reserve Bank of St. Louis, P.O. Box 442, St. Louis, MO 63166-0442.



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NEXT ISSUE

The Synchronization of Business Cycles across Countries



As the world shrinks, countries' business cycles—those shifts from expansion to recession and back again—are becoming more synchronized. This means that a shock—good or bad—that is felt in one country may reverberate in other countries. Countries whose cycles are not connected to anyone else's do not suffer—or enjoy—the ripple effects from other countries. This interconnectedness is often thought of as a global phenomenon, but increasingly of late, its importance is being felt more on the regional level. Find out more in the April issue of *The Regional Economist*.

There's Still Time To Tell Us What You Think

Our survey of *Regional Economist* readers is still open. If you didn't return the postcard that was attached to the last issue, you still have time to go online to take this quick survey. Go to www.stlouisfed.org/publications/regional-economist and look for the orange survey button in the right-hand column.

Tell us how to improve
The Regional Economist
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Your responses will help us determine what changes, if any, we should make in the coming year. In addition, we want to know a bit about you—to ensure that we are writing for the right audience.

Sincerely,

The RE team at the St. Louis Fed

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