ANNUAL REPORT 2013

INFLATION

WHY IT IS VERY LOW, AND WHY IT MATTERS

FEDERAL RESERVE BANK *of* CLEVELAND

Cleveland | 216.579.2000
1455 East Sixth Street, Cleveland, OH 44114

Cincinnati | 513.721.4787
150 East Fourth Street, Cincinnati, OH 45202

Pittsburgh | 412.261.7800
One Oxford Centre, Suite 3000, 301 Grant Street, Pittsburgh, PA 15219

FEDERAL RESERVE BANK *of* CLEVELAND

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Access the Federal Reserve Bank of Cleveland's 2013 financial statements on our website at www.clevelandfed.org/annualreport.

The Federal Reserve System is responsible for formulating and implementing US monetary policy. It also supervises certain banks and other financial institutions and provides financial services to depository institutions and the federal government.

The Federal Reserve Bank of Cleveland is one of 12 regional Reserve Banks in the United States that, together with the Board of Governors in Washington, DC, compose the Federal Reserve System. The Federal Reserve Bank of Cleveland, including its branch offices in Cincinnati and Pittsburgh, serves the Fourth Federal Reserve District—Ohio, western Pennsylvania, the northern panhandle of West Virginia, and eastern Kentucky.

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President's Letter

One of the Federal Reserve's mandates is maintaining stable prices. During my more than three decades in the Federal Reserve System, the focus has been primarily on avoiding high and variable inflation, and over most of that period, the Federal Reserve has successfully fulfilled its objective to keep inflation in check.

More recently, however, our attention has turned to a less familiar concern—persistently low inflation. While high inflation has well-known costs for economic performance, the problems posed by persistently low inflation can be equally harmful.

As its title promises, this year's annual report essay examines why inflation is low, and why it matters.

First, our researchers explore the relatively new phenomenon of low inflation. High inflation rates have been the focus of attention for the last several decades. It has been only in the aftermath of the most recent financial crisis that the Federal Reserve has had to look more carefully at how to guard against both overshooting *and* undershooting our inflation objective.

Our researchers explain why the US economy is currently experiencing a bout of sustained low inflation. Using a range of tools, our researchers have identified two main sources: slow economic growth, which has put very little upward pressure on prices and wages; and special, temporary forces that have held back some prices, such as the deceleration of medical care costs.

Finally, our researchers discuss appropriate monetary policy responses to persistently low inflation. Crucially, appropriate responses depend on the underlying forecast for inflation. Our current forecast is that steady economic growth should gradually push up inflation toward the Federal Open Market Committee's longer-run objective of 2 percent, particularly as some temporary forces that had been dampening inflation fade.

Over the past decade, the Bank's research staff has made tremendous contributions to our understanding of inflation. This year's annual report essay synthesizes and updates some of their most recent work, which we have also put on display in our new Inflation Central website at ***www.clevelandfed.org/inflation-central***. I hope you will find that site a valuable source of information on all things inflation, and I am sure you will see why the Federal Reserve Bank of Cleveland has developed a well-deserved reputation for meaningful and impactful inflation research.

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The Bank's inflation research is just one example of how we are fulfilling our mission to foster the stability, integrity, and efficiency of the nation's monetary, financial, and payments systems. In fact, based on our employees' wide range of expertise, we rolled out in 2013 a new strategic plan that capitalizes on their many talents. From bank supervision to payments innovation to stakeholder engagement, the Bank's 2014–2016 strategic plan is bold, aspirational, and focused on the future. First Vice President Greg Stefani talks more about the plan in his letter on page 26. I also invite you to review our Bank "By the Numbers" following Greg's letter, and see how we stacked up in 2013. I think you'll like what you see.

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In 2013 as always, the Bank's boards of directors in Cleveland, Cincinnati, and Pittsburgh and its many advisory councils were vital in guiding and supporting our progress. They provide the Federal Reserve with crucial, real-time information about business conditions on the ground, help us pick up trends before they are reflected in the data, and help us make connections with other business leaders in the region. Our directors also oversee many aspects of the Bank, and in 2013 they were instrumental in helping to set the Bank's strategic direction. I would like to say a special thank you to the four directors who completed their terms in office at the end of 2013 and to our retiring Federal Advisory Council member:

- Paul G. Greig, chairman, president, and CEO of FirstMerit Corporation, who served three years on the Cleveland board, and who will serve as the Bank's Federal Advisory Council representative in 2014
- Peter S. Strange, chairman of Messer, Inc., who served six years on the Cincinnati Branch board, the last two years as chairman
- Glenn R. Mahone, partner and attorney at law at Reed Smith LLP, who served six years on the Pittsburgh Branch board, the last two years as chairman
- Todd D. Brice, president and CEO of S&T Bancorp, Inc., who served on our Pittsburgh Branch board for six years
- James E. Rohr, executive chairman of PNC Financial Services Group, Inc., who served three years on our Cleveland Board and three years as the Fourth District's representative to the Federal Advisory Council, of which he served as chair in 2013

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It has been 11 years since I participated in my first meeting of the Federal Open Market Committee as the incoming president and CEO of the Federal Reserve Bank of Cleveland. Little did I know back then what was in store for the nation's economy. The financial crisis, severe recession, and slow recovery have been a challenging and humbling experience, and it has been an honor to represent the Fourth Federal Reserve District during this extraordinary period in our country's economic history. The one constant during my entire tenure at the Bank has been the extraordinary dedication and professionalism of the employees of the Federal Reserve Bank of Cleveland. As I get ready to retire from the Bank, I know this fine organization is in good hands.

It also gives me great comfort to know that I do not have to say goodbye. We have a term for current and former employees, directors, and advisory council members—we are Fed Family. Once a member, always a member.

Sandra Pianalto
President and Chief Executive Officer

INFLATION

WHY IT IS VERY LOW, AND WHY IT MATTERS

Edward S. Knotek II
Vice President of Economic Forecasting

Todd E. Clark
Vice President of Macroeconomic Policy

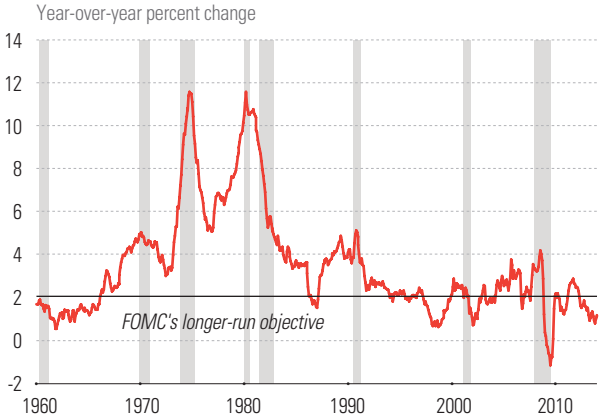
For the past 50 years or so, US policymakers frequently worried about—and fought against—inflation rates running at higher-than-desired levels. But since the financial crisis, they have had to deal with the opposite problem—inflation that is too low.

Inflation fell below 1 percent in 2013, according to the personal consumption expenditures (PCE) price index. At just under half the 2 percent longer-run objective of the Federal Open Market Committee (FOMC), a very low inflation rate is not good news. Often, low inflation is a symptom of an economy that is not firing on all cylinders. And when inflation is very low, deflation is only one adverse shock away.

In this essay, we dissect the recent decline in inflation and lay out its implications for the future, drawing on extensive research done here at the Federal Reserve Bank of Cleveland on inflation measurement and forecasting.

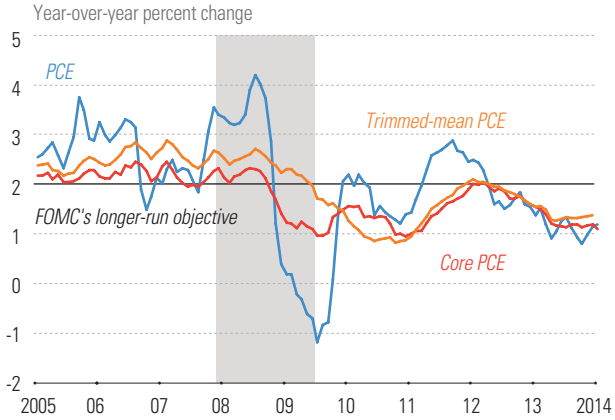
We are reasonably confident that inflation will rise gradually over the next few years toward the FOMC's longer-run objective of 2 percent. However, though the US economy has begun to regain its footing, the inflation forecast could change if unexpected events occur. Our recent experience with very low inflation has highlighted the need to guard against inflation rates that are too low as vigilantly as we guard against inflation rates that are too high.

Figure 1. **PCE inflation fell below 1 percent in 2013**



Note: Grey shading indicates a recession.
Sources: Bureau of Economic Analysis; National Bureau of Economic Research (NBER).

Figure 2. **Inflation's falloff is evident in most PCE measures**



Note: Grey shading indicates a recession.
Sources: Bureau of Economic Analysis; Federal Reserve Bank of Dallas; NBER.

Very low inflation: A recent phenomenon

Inflation then

Our last big battle with inflation began in the 1960s (figure 1). Prices began to rise steadily in the United States during that decade, and high inflation rates became a hallmark of the 1970s. During the 1970s and early 1980s, inflation twice shot above 10 percent—higher than it had been since the 1940s.

Then–Federal Reserve Chairman Paul Volcker has been credited with bringing inflation back down in the early 1980s by aggressively tightening monetary policy. Even with this shift in policy, however, sustained low inflation rates did not become the norm until the mid-1990s. Between 1995 and 2008, the FOMC succeeded in keeping inflation generally low; PCE inflation averaged just above 2 percent over this time.

This is not to say that inflation was completely conquered. Even as recently as 2008, FOMC members were concerned about the possibility of re-living the inflation patterns of the 1960s and 1970s. Memories of high inflation have a long life.

High inflation rates are problematic for an economy because they create distortions that hamper economic performance. For example, firms must constantly raise prices to keep up, and consumers waste their time shopping for bargains and protecting their financial assets from rising prices. Because of these distortions, it is clear why neither the public nor central banks are keen on high inflation.

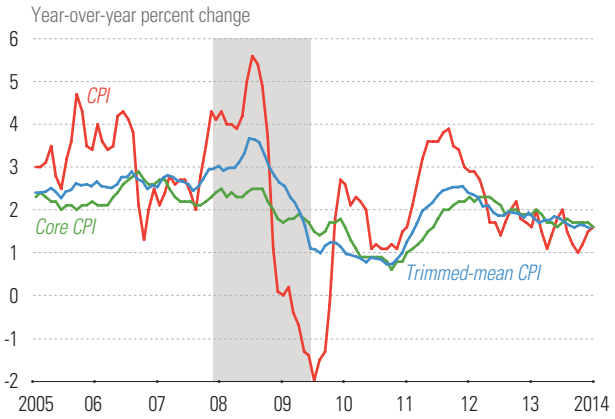
Another problem with high inflation is that it is costly to get inflation rates back down once they're too high. Though Volcker's shift in monetary policy successfully broke the back of high inflation, for example, the cost was a deep recession.

Inflation now

Since the most recent financial crisis, the story has been different. While inflation typically falls in the immediate aftermath of a recession, it usually rises during the ensuing economic recovery (figure 1). This time around, inflation has remained at very low levels for much of the past five years. Despite a short-lived surge of inflation in 2011, disinflation—when inflation decelerates—occurred again in 2012 and 2013.

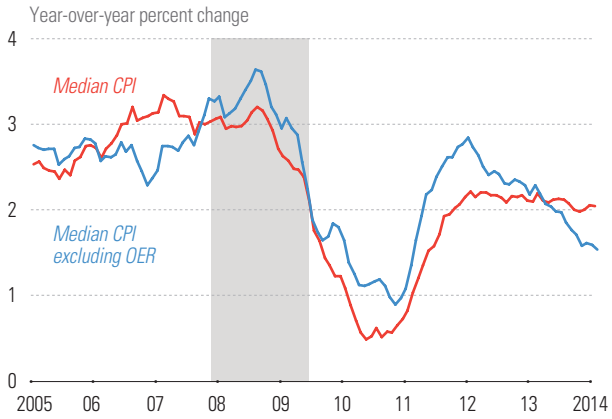
The falloff in inflation is evident in essentially the entire set of consumer price measures that policymakers find helpful in assessing inflation trends. PCE inflation—the FOMC's single preferred measure—fell from 2.5 percent in January 2012 to only 1.1 percent in December 2013. Some of this deceleration in PCE inflation has been driven by energy prices. However, measures of the underlying inflation trend that are less affected by energy prices—like the core PCE or the trimmed-mean PCE—have also slowed significantly. Core PCE inflation, which excludes the short-term volatility that can come from food and energy prices, declined from 2.0 percent to 1.2 percent over the same period. Trimmed-mean PCE inflation, which excludes the most extreme monthly price changes, experienced a similar decline (figure 2).

Figure 3. **CPI inflation fell over 2012 and 2013**



Note: Grey shading indicates a recession.
Sources: Bureau of Labor Statistics; Federal Reserve Bank of Cleveland; NBER.

Figure 4. **The median CPI has proven sensitive to OER in this recovery**



Note: Grey shading indicates a recession.
Sources: Bureau of Labor Statistics; Federal Reserve Bank of Cleveland; NBER.

Disinflation is also visible in the more familiar inflation measures based on the consumer price index (CPI). CPI inflation typically runs about a half percentage point higher than the PCE inflation rate. In other words, for PCE inflation to be at 2 percent, CPI inflation would typically need to run about 2.5 percent. CPI inflation fell sharply over the course of 2012 and 2013, as did core CPI inflation—which, like the core PCE measure, excludes food and energy prices. The Cleveland Fed's 16 percent trimmed-mean inflation series declined by a similar amount (figure 3).

One measure of the inflation trend that has remained relatively stable is the Cleveland Fed's median CPI (figure 4). Year-over-year inflation in the median CPI edged down from 2.2 percent at the start of 2012 to 2.1 percent at the end of 2013.

In general, the median CPI tends to be a useful tool for predicting future inflation trends, so its recent level suggests that CPI inflation should rise closer to 2 percent. But the median CPI may be misleading right now. Much of the stability of median CPI inflation reflects a balance between two divergent trends: first, an acceleration in the biggest component of shelter costs, owners' equivalent rent (OER), which is very often the component in the middle of the CPI; and second, broad disinflation among other components. Recalculating the median inflation rate without the OER component reveals a sharp slowing of underlying inflation from early 2012 to the end of 2013 that is much more in line with the other measures of inflation.

On the surface, very low inflation sounds like a good thing. If inflation is running at very low levels, then the purchasing power of a dollar is not diminished over time by significant increases in prices. But very low inflation is not always good. For one thing, it can be a sign that the economy is performing under its potential—and in fact, low inflation may actually be a contributing factor in the underperformance. For another, it raises the risk that the economy could fall into deflation. Deflation—where the general price level falls—causes similar problems as inflation in that businesses and consumers waste time and energy trying to work around its consequences. Some analysts view Japan's long period of near-zero inflation and very low economic growth as a vivid cautionary example of the dangers of extremely low inflation sustained over a long period of time.

The causes of the disinflation

Whether very low inflation is problematic depends in part on why it is low. Two complementary approaches can be used to determine the source of the falloff. The first might be characterized as a top-down approach: focus on overall inflation and disentangle the causes of the fall. The second might be characterized as a bottom-up approach: focus on more detailed measures of inflation and identify individual factors that pulled down important inflation components.

Our recent research using these approaches points to several key forces at play in the 2013 disinflation. First, the sluggish pace of the US economic recovery broadly helped to limit most price pressures. Second, enough slack remains in labor markets to keep the growth rate of labor costs very low by historical standards. Third, there is little pressure on consumer prices coming from commodities such as energy. Finally, some special, temporary forces—such as a deceleration of medical care inflation associated with changes in laws—have put some short-lived downward pressure on inflation.

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MEET THE MEASURES

Consumer Price Index, or CPI
The CPI, compiled monthly by the Bureau of Labor Statistics, measures the average price of a set (or market basket) of goods and services. The basket reflects all of the items a typical family buys. The CPI does not count the prices of all items equally, but weights each according to its share of total household expenses, so that changes in the index from one period to the next are broadly reflective of changes in a household's current cost of living. The weightings are determined from detailed expenditure information provided by families and individuals on what they actually bought.

41.5 %	Housing
16.4 %	Transportation
14.9 %	Food and beverages
7.6 %	Medical care
7.1 %	Education | communication
5.8 %	Recreation
3.4 %	Apparel
3.3 %	Other goods and services

Core CPI
The core CPI excludes food and energy prices, which tend to go up or down quite a bit over a short time period. These items' sharp, short-term movements can dominate the total, or headline, CPI reading and obscure the more long-term or underlying inflation trend.

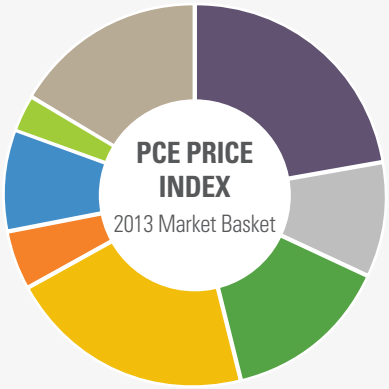
Median CPI
The Federal Reserve Bank of Cleveland created the median CPI as a way to measure underlying trend inflation. Instead of calculating a weighted average of all goods and services prices like in the CPI, the Cleveland Fed looks at the median price change—or the price change that's right in the middle of the long list of all price changes. According to our research, the median CPI provides a better signal of the inflation trend than the CPI, the CPI excluding food and energy, and the core PCE.

Owners' equivalent rent (OER) is the biggest component of shelter costs, and because of its importance, a measure of OER is very often the median CPI component. OER is published by the Bureau of Labor Statistics to measure implicit rent, or the amount a homeowner would pay to rent or would earn from renting his or her home in a competitive market.

Trimmed-Mean CPI
The trimmed-mean CPI, reported monthly by the Federal Reserve Bank of Cleveland, is a measure of underlying trend inflation excluding the components in the CPI that show the most extreme monthly price changes. Excluding 8 percent of the CPI components with the highest and lowest one-month price changes from each end of the price-change distribution results in a "16 percent trimmed mean" inflation estimate. This measure is much less volatile than either the CPI or the more traditional core CPI.

Personal Consumption Expenditures, or PCE
The PCE price index, computed by the Bureau of Economic Analysis, provides a measure of the prices paid for goods and services purchased by or on behalf of households. It is a somewhat broader measure of consumer prices than the CPI, and, due to technical aspects of its construction, the PCE is able to more accurately capture how consumers adjust their purchases in response to relative price changes. The PCE index relies largely on information from businesses, detailing what they've sold to households, to produce its weights.

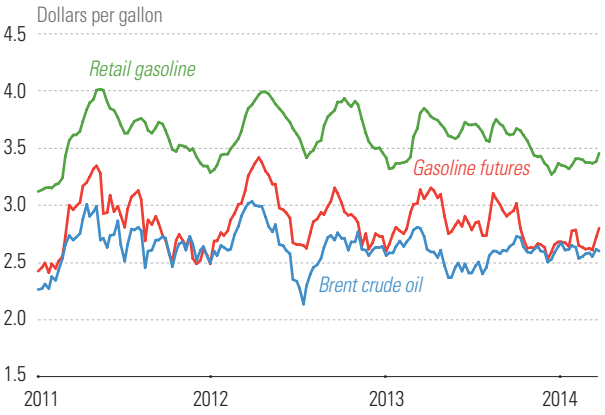
Core PCE
The core PCE price index measures the prices paid by consumers for goods and services without the volatility caused by movements in food and energy prices, which can be useful in assessing underlying inflation trends.



22.3 %	Housing
9.8 %	Transportation
14.1 %	Food and beverages
20.9 %	Medical care
4.9 %	Education | communication
8.6 %	Recreation
3.3 %	Apparel
16.1 %	Other goods and services

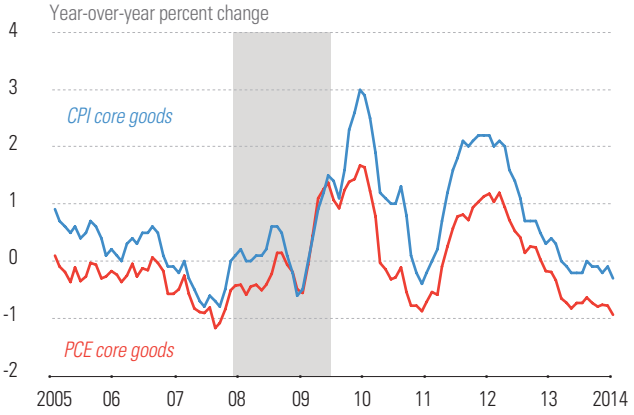
Trimmed-Mean PCE
The trimmed-mean PCE inflation rate is another measure of trend inflation using the PCE price index. Like the trimmed-mean CPI, the trimmed-mean PCE inflation rate is constructed by excluding the items that had the biggest increases or decreases in a given month. Removing the extreme price changes (both high and low) helps to filter out very noisy price changes in an effort to identify underlying trends in the monthly PCE inflation data. It is calculated by the Federal Reserve Bank of Dallas, using data from the Bureau of Economic Analysis.

Figure 5. Inflation has been held in check by flat commodity prices



Sources: *Financial Times*; Energy Information Agency; *The Wall Street Journal*.

Figure 6. Since early 2012, inflation in core PCE goods prices has fallen by about 2 percentage points



Note: Grey shading indicates a recession.
Sources: Bureau of Economic Analysis; Bureau of Labor Statistics; NBER.

The top-down approach

One way to implement the top-down approach is to use a forecasting model that characterizes the relationships among inflation, economic activity, labor costs, import prices, energy prices, and monetary policy. We use one such Cleveland Fed model to assess the contributions of various forces to the decline of core PCE inflation from the second quarter of 2012 through the fourth quarter of 2013.

Approximately three-fourths of the fall in core PCE inflation can be explained by the behavior of the model's inflation determinants. Variables that directly capture economic activity—GDP, employment, and unemployment—play the largest role. On balance, over the 2012 and 2013 period, GDP and employment grew more slowly than expected, while unemployment fell more slowly than expected. These shortfalls put downward pressure on inflation. Overall, real economic activity accounts for about one-half of the fall in inflation. Labor costs, import prices, and energy prices account for another one-fourth or so.

The remaining one-fourth of the decline in inflation since early 2012 cannot be explained by the model's inflation determinants. Instead, this portion of the decline in inflation is the result of unexpected, temporary events that are specific to inflation. Some of these forces are evident from a more bottom-up analysis.

The bottom-up approach

One way to implement the bottom-up approach is to split the price indexes into broad components. We split inflation into several parts—food and energy prices, core goods, and core services—and look at their recent behavior and key drivers.

A key driver of overall inflation is volatile movements in food and energy prices. The results of the decomposition show that for much of 2012 and 2013, inflation has been held in check by flat commodity prices. For example, retail gasoline prices trended down for much of last year (figure 5). This trend helped pull overall inflation below core inflation at times.

Inflation in core PCE goods prices, which exclude food and energy goods, has fallen by about 2 percentage points since early 2012 (figure 6). In an accounting sense, goods comprise approximately one-fourth of the core basket of consumer spending. Thus, the deceleration in goods' prices implies a reduction in core PCE inflation of about one-half of a percentage point, all other things equal.

Because a large number of goods are either imported to the United States or have some imported content, there is a significant connection between import prices and goods prices. Over the last few years, the deceleration of core goods prices has been driven in part by an even sharper deceleration in prices of imported goods (figure 7). The falloff in import prices likely reflects slow growth in the global economy and the strength of the dollar.

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FOOD FOR THOUGHT

Meat, poultry, fish, and eggs cost more today than they did a year ago. Four percent more, in fact. This is *not* necessarily inflation, though it's hard to wrap your head around this when you're at the checkout.

Inflation is a general rise in prices across the board. It affects all prices, not just a few. The bacon you bought that gave you sticker shock is just one price, albeit a potentially important one for some households. Rising prices in food, gas, or other commodities that keep your household running can prompt us to make adjustments in our lives—perhaps squeezing in three errands on one run to save on gas. While these choices can tell us something about how households are faring, they don't tell us much about inflation itself, which has much broader implications for the economy as a whole.

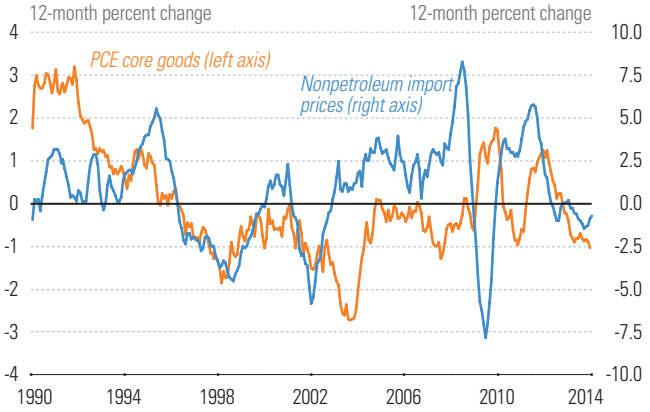
Inflation is usually measured by tracking the prices of a broad basket of goods and services, such as with the Consumer Price Index (CPI). The CPI is a weighted index of a typical consumer's market basket, which does include food, though its weight is only roughly 15 percent of the basket. In that way, rising food prices in general do affect the CPI, but there are a lot of other components to consider as well (see "Meet the Measures" on page 9).

Food prices can also be affected by things like poor weather conditions: the freezing temperatures in the Northeast, drought in the West, snow in the Midwest. Bad weather can, for example, prevent the transportation of food supplies to processors and retailers, driving up prices temporarily. But that's just it: These types of price changes are temporary, not an indicator of a longer-term trend.

Another thing to keep in mind when it comes to commodity prices: basic supply and demand. A shortage of, say, oranges because of drought in the West prompts a price increase, encouraging people to buy fewer oranges. Apples, on the other hand, may have a great harvest and be abundant; their price goes down, encouraging people to buy them instead. In this way, a balance is struck.

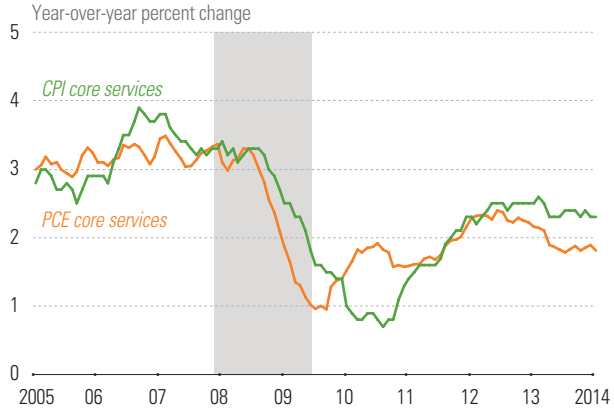
Inflation or not, rising food prices are frustrating for consumers, and something that economists do keep an eye on lest they turn into broader inflation. If, for instance, drought continues and livestock levels don't pick up in the West, rising food prices may be more than just temporary and could feed into the longer-term outlook for inflation.

Figure 7. **The deceleration of core goods prices has been driven in part by falling imported goods prices**



Sources: Bureau of Economic Analysis; Bureau of Labor Statistics.

Figure 8. **Services inflation has slowed since early 2012**



Note: Grey shading indicates a recession.
Sources: Bureau of Economic Analysis; Bureau of Labor Statistics; NBER.

Compared with inflation in goods prices, inflation in services prices has been much more stable. However, even core PCE services inflation has slowed since early 2012, from 2.3 percent to 1.9 percent at the end of 2013 (figure 8). Services comprise about three-fourths of the core PCE basket, which means that this more modest reduction in services inflation implies a roughly one-third percentage point reduction in core inflation.

Because the primary cost in the provision of services is labor, the low rate of services inflation is likely attributable to the historically low rate of growth of labor costs that has prevailed since the end of the recession (figure 9). From the mid-1990s through 2007, labor costs as measured by the Employment Cost Index (ECI) increased at an average rate of more than 3 percent. But since 2009, the ECI has been rising only about 2 percent per year.

Using CPI instead of PCE inflation measures paints a mostly similar picture, with a few key differences. Since early 2012, inflation in the CPI for core goods has fallen sharply, in lockstep with the corresponding PCE-based measure (figure 6). However, inflation in the CPI for core services has edged down only slightly since early 2012, while the PCE-based measure slowed more significantly (figure 8).

Cleveland Fed research has attributed the widening gap between PCE and CPI services inflation to several forces. One important source of the gap is shelter costs, which have a larger weight in CPI services and whose inflation rates have been running above those of some other components of services. Putting a relatively large weight on a component with a relatively high rate of inflation—even if the rate of inflation is not high in an absolute sense—causes inflation in the services component of the CPI to run above inflation in PCE services.

Another important source of the CPI–PCE gap in services inflation is medical care costs and the larger weight they receive in PCE services. Inflation in medical care costs as measured by the PCE index has slowed sharply, partly as a result of downward pressures on Medicare prices associated with the Affordable Care Act. As a result, the deceleration of medical care costs has put more downward pressure on PCE services inflation than on CPI services inflation.

Monetary policy options for handling very low inflation

The FOMC's longer-run inflation objective of 2 percent seeks a balance between inflation being far enough away from zero to make the threat of deflation low, and inflation being low enough to mitigate many of the economic distortions associated with high inflation. An inflation rate of only 1 percent therefore falls short of meeting the right balance between these tradeoffs, especially in the current policy environment.

Basic macroeconomics and a large body of research suggest that central banks should ease monetary policy when inflation falls below or is expected to fall below the central bank's inflation objective. But since December 2008, the FOMC's primary monetary policy tool, the federal funds target rate, has been at 0 to 0.25 percent—what is effectively the zero lower bound on nominal interest rates. Thus, there exists a limit on the extent to which monetary policymakers can provide additional accommodation through normal channels.

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MONETARY POLICY PRIMER

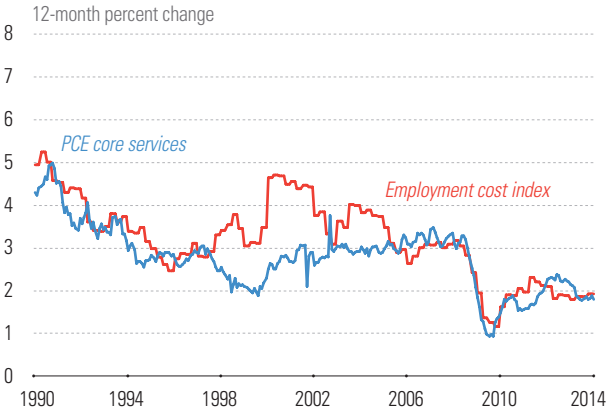
THE FEDERAL RESERVE IS RESPONSIBLE FOR MAKING SURE THERE IS ENOUGH MONEY AND CREDIT TO SUPPORT ECONOMIC GROWTH, BUT NOT SO MUCH THAT OUR DOLLAR LOSES ITS PURCHASING POWER. THIS IS THE CORE OF MONETARY POLICY.

The goals of monetary policy—maximum employment and price stability—were given to the Federal Reserve by Congress and are known as the Fed's **dual mandate**. These goals mean that we want as many Americans as possible who want jobs to have jobs, and that we aim to keep the rate of increase in consumer prices low and stable.

Price stability can be thought of as an inflation rate low enough and predictable enough that it doesn't play a big role when firms and consumers are making financial decisions. Take, for example, a business that is considering whether to enter into a long-term contract with a supplier. If this business is confident enough about the general level of prices in the future, it can make the decision more easily knowing it will get a fair deal both now, and later. With confidence in the likely inflation rate, employers can give raises without fear, layoffs are fewer because businesses remain profitable, and employment gets closer to its maximum level.

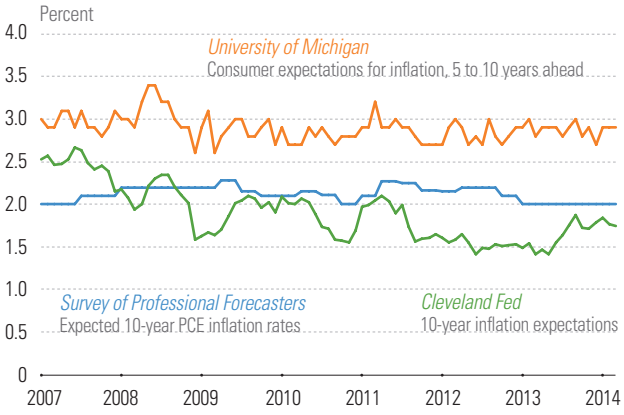
People need the same confidence to do their longer-term planning, such as for retirement, and for deciding when to make big purchases. Having confidence in both price stability and job security encourages people to act now instead of waiting until there are fewer uncertainties.

Figure 9. Since 2009, the ECI has been rising only about 2 percent per year



Sources: Bureau of Economic Analysis; Bureau of Labor Statistics.

Figure 10. Longer-term inflation expectations have been roughly stable for some time



Sources: University of Michigan; Federal Reserve Banks of Cleveland and Philadelphia.

As a result, the FOMC has been using other policy tools to provide additional monetary accommodation. These include large-scale asset purchases (buying large volumes of an expanded set of eligible securities on the open market) and forward guidance on future interest rate policy (providing information about future policy decisions). Countering a hypothetical adverse shock to the economy that slowed the pace of recovery or pushed the economy into recession would require using these other policy tools to an even greater extent than the FOMC has so far.

Making its way toward 2 percent

In thinking about how policy should respond to very low inflation today, the forecast for inflation's future trajectory plays a crucial role. A forecast of falling or continued stagnant inflation would call for different policy actions than a forecast of rising inflation.

Recent historical behavior is often a good predictor of future inflation. But inflation expectations, economic slack, and a host of other factors influence the inflation process as well and can offer some insights into where inflation is likely to be in the future.

In evaluating these factors, the news has been reasonably encouraging. For starters, take inflation expectations. Over time, inflation expectations help to anchor the inflation process; that is, inflation tends to return to its expected rate.

There are a variety of ways to measure inflation expectations based on surveys of consumers, professional economists, and businesses; implicit measures of inflation derived from financial markets; and combinations of the two. Most of these measures show that longer-term inflation expectations have been roughly stable for some time (figure 10).

The Cleveland Fed's longer-term inflation expectations series had been running at low levels throughout 2012 and the first part of 2013. But more recently, these inflation expectations have moved closer to 2 percent. The relative stability of long-run inflation expectations provides one reason to think that the recent low inflation readings are likely to be temporary.

A second factor likely to lift inflation going forward is a generally improving economy. The economy has grown at a moderate pace since the end of the recession, but this steady growth has reduced the amount of idle resources and general slack in the economy. The labor market continues to recover from the recession, and over the course of 2013 the unemployment rate fell by more than 1 percentage point and nonfarm businesses' payrolls expanded by more than 2 million workers.

With inflation expectations remaining stable, the economy continuing to grow, and some of the transitory factors that weighed on inflation in 2013 unlikely to be repeated, most forecasters call for a gradual rebound in inflation over the next few years. In their assessment in March 2014, participants on the FOMC forecasted that PCE inflation would likely step up by the end of 2014 and continue to rise in 2015 and 2016 until it neared the FOMC's longer-run inflation objective of 2 percent (figure 11).

Thus, the most likely outcome for inflation is not further disinflation or outright deflation, but rather a gradual increase in the rate of inflation. Because inflation in the future depends partly on monetary policy decisions today, such a projection suggests that policymakers believe that today's policy settings are appropriate to return inflation to the level that the FOMC has determined is most consistent with the goal of price stability.

inflation 101

AN INFLATION OBJECTIVE

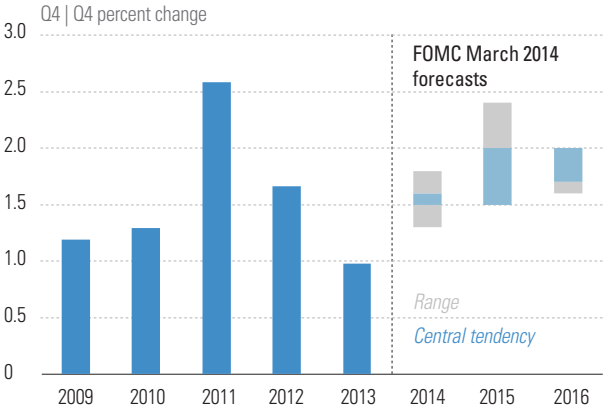
Inflation is a general rise in the prices of things we buy. When people have the money to buy more products than can be produced, it creates an imbalance, prices go up, and the result is inflation.

Inflation can reduce the purchasing power of your money. With **inflation much higher** than the FOMC's 2 percent inflation objective, workers whose wages don't rise as fast as prices may have problems paying their bills. And people on fixed incomes can suffer because their incomes might not adjust completely and they would not be able to buy as much as they could before.

With **inflation lower** than the objective, it is likely that the economy isn't firing on all cylinders, and businesses will try to reduce their costs to maintain or regain profitability. One way they might do this is by increasing efficiencies, such as through layoffs. Another way could be through lower wage growth. In the extreme, if this behavior is replicated throughout the economy, unemployment is likely to rise while both wages and prices are lower. Efficiencies and lower wage growth can then reinforce the downward movement of prices.

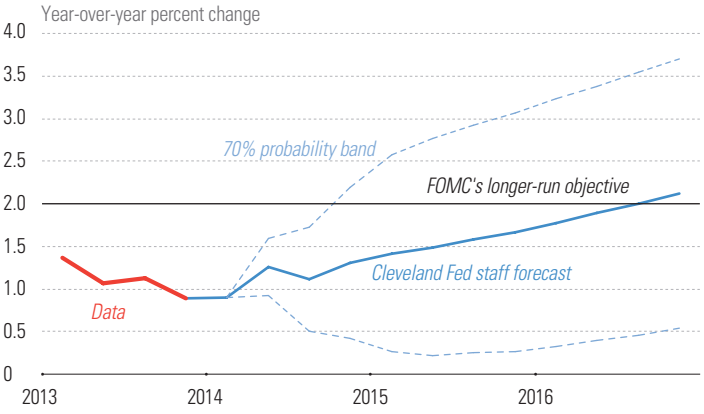
We do want to have a bit of inflation. To borrow the theme from Goldilocks, the FOMC's 2 percent longer-run inflation objective seeks a balance that is "**just right**" to keep the economy humming along. Not too hot (high inflation) and not too cold (deflation). A 2 percent objective sets an expectation and makes it less likely that the economy will experience deflation if it takes a turn for the worse.

Figure 11. The FOMC forecasted that PCE inflation would likely rise until it neared 2 percent



Sources: Federal Reserve Board; Bureau of Economic Analysis.

Figure 12. The most likely PCE inflation rate by the end of 2015 will be around 1.7 percent



Sources: Bureau of Economic Analysis; Federal Reserve Bank of Cleveland.

Of course, forecasts are inherently uncertain, and this is especially true for inflation. What could occur that would generate a higher or lower inflation trajectory? One possibility is a supply disruption in a major oil-producing economy that causes the price of oil to soar, producing much higher inflation than what is currently anticipated. A sharp pick-up in the pace of economic growth could also produce higher inflation, as firms become more confident in their ability to raise prices to offset rising costs of production.

But shocks are also possible that would drive inflation lower than anticipated, such as a renewed downturn in the economy from a collapse in consumer confidence. One Cleveland Fed forecasting model suggests that the most likely inflation rate by the end of 2015 will be around 1.7 percent, but the uncertainty surrounding this projection is high: The model suggests there is a 70 percent probability that inflation will be between 0.25 percent and 3 percent (figure 12). So clearly policymakers will have to watch the data closely to see that inflation actually does evolve in the desired fashion.

A symmetric inflation objective

The range of possible outcomes in figure 12 makes clear that inflation could either sharply accelerate or remain at very low levels for some time; in other words, the risks to the inflation outlook are two-sided. Either of these scenarios would likely warrant a monetary policy response. Recent post-meeting statements show that the FOMC is committed to mitigating deviations of inflation on both sides of its longer-run objective, consistent with a symmetric inflation objective.

With the federal funds rate target already set to the range of 0 to ¼ percent, providing additional monetary accommodation to combat fears of further disinflation would likely require using other policy tools. One possibility could be asset purchases—beginning a new program of purchases of long-term assets if the current program has ended or picking up the pace of purchases if the current program has not yet ended. Alternatively, monetary policymakers could impose strong forward guidance on the target for the federal funds rate, suggesting that the target would not change until inflation returns to a certain level. Imposing such an inflation "floor" could add accommodation automatically if the inflation outlook were to weaken, which would help stimulate the economy and bring inflation back toward the floor.

At the same time, the FOMC is prepared to remove accommodation quickly to combat a surge in inflation, if that were to become necessary. Thus far, the historically large size of the Federal Reserve's balance sheet has failed to cause high inflation rates, an experience shared over a longer time span by the Bank of Japan. But a large balance sheet can complicate the process of raising policy rates. To this end, the FOMC has new tools—such as the term deposit facility, fixed-rate overnight reverse repurchase agreements, and the payment of interest on excess reserves—to assist in the withdrawal of monetary accommodation at the appropriate time and pace in order to help achieve its goals of maximum employment in the context of price stability.

This essay has explained why low inflation can turn into "too much of a good thing." Our analysis suggests that today's low inflation is primarily the result of the economy taking a long time to recover from the severe recession of 2007-2009. Over the long run, the Federal Reserve has the tools to keep inflation from running too high as well as too low. And over the past 30 years, it has a solid history of doing just that. These factors, along with the progressively improving economy, lead us to conclude that inflation is on a course to gradually reach the FOMC's 2 percent objective.

All data cited in this essay are as of March 27, 2014.

For more analysis of the research mentioned in this essay, visit Inflation Central at www.clevelandfed.org/inflation-central. There, you can also find up-to-date estimates of inflation expectations and much more.

"Behind Recent Disinflation: 2010 Redux?"
by Edward S. Knotek II and William Bednar

"Forecasting Implications of the Recent Decline in Inflation,"
by Todd E. Clark and Saeed Zaman

"Forecasting Inflation? Target the Middle,"
by Brent Meyer, Guhan Venkatu, and Saeed Zaman

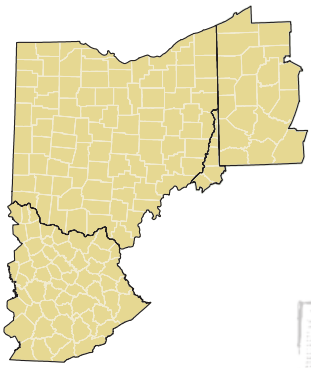
"The Future of Inflation,"
by Joseph G. Haubrich

"What's Up in Inflation? Shelter and OER,"
by Edward S. Knotek II and William Bednar

"When Might the Federal Funds Rate Lift Off? Computing the Probabilities of Crossing Unemployment and Inflation Thresholds (and Floors),"
by Edward S. Knotek II and Saeed Zaman

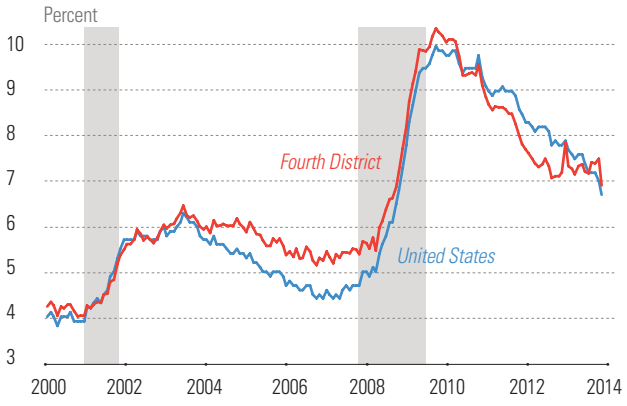
STATE OF THE REGION

As of April 30, 2014



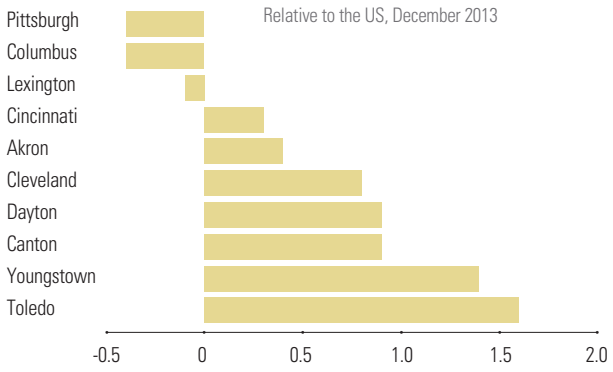
The Federal Reserve Bank of Cleveland serves the Fourth Federal Reserve District, which comprises Ohio, western Pennsylvania, eastern Kentucky, and the northern panhandle of West Virginia. In 2013, the pace of recovery in the region's labor market began to lag the nation's. Research suggests that employment performance is linked to educational attainment, and that a region's longer-run economic prospects are tied to the value of their workers' skill levels.

Figure 1. Our region's unemployment rate rose above the nation's in 2013



Note: Grey shading indicates a recession.
Source: Bureau of Labor Statistics.

Figure 2. At the end of 2013, only three of the region's MSAs had unemployment rates lower than the nation's



Source: Bureau of Labor Statistics.

2013 developments in the Fourth District's labor market

The pace of recovery in the Fourth Federal Reserve District's labor market slowed in 2013, while the nation's picked up, according to the most recently available data. This is a shift, as the District's unemployment rate had been below the national average for much of the recovery. Time will tell for sure which patterns will persist, as one of the biggest challenges in assessing recent regional or local employment performance is that the data are often subject to sizeable revisions.

At the end of 2012, the District's unemployment rate, at 7.2 percent, was more than half a percentage point lower than the US average of 7.8 percent. Only a few months prior, the District's unemployment rate was almost a full percentage point lower than the national average. But by the end of 2013, the District could no longer boast the better unemployment rate: During the year, the nation's unemployment rate fell 1.2 percentage points to 6.7 percent, while the District's fell only 0.3 percentage points to 6.9 percent (figure 1).

Changes in unemployment rates across the District's metropolitan statistical areas (MSAs) during 2013 show, like the District itself, less-robust improvement in labor market conditions. Of the 19 MSAs located at least partly in the District, nine are among the nation's 100 most populous. These nine, which we will call the District's major MSAs, accounted for almost 70 percent of its employment in 2013. At the end of 2012, unemployment rates for seven of the nine major MSAs were less than the national average.

However, a year later, this was true for only three of them—Columbus, Pittsburgh, and Lexington. For the two MSAs that had higher unemployment rates than the US at the end of 2012—Toledo and Youngstown—these changed from being 0.1 and 0.2 percentage points higher than the US average at the time, respectively, to more than a percentage point above it by December 2013 (figure 2).

> By the end of 2013, the District could no longer boast a better unemployment rate than the nation's.

We see similar patterns in another survey that tracks employment. At the end of 2012, the District had seen slightly stronger cumulative employment gains during the recovery than the US, but because US employment grew at a rate that was about twice as fast as that in the District in 2013, this was no longer true by the end of last year. A few District MSAs kept pace with the nation. For instance, Columbus and Cincinnati experienced employment growth of about 1.5 percent in 2013, close to the national growth rate of roughly 1.7 percent. Akron grew faster than that at about 2.1 percent. But two metro areas in the District experienced outright employment declines: Pittsburgh's employment fell slightly in 2013, while Dayton's declined almost a full percent.

Differences in employment growth across the District's metro areas

To help understand what might be behind the District's recent employment performance, we take a longer look back. Shorter-term fluctuations often obscure longer-term drivers of employment growth differences, and it's important to identify these longer-term drivers because they will likely remain meaningful as the recovery continues. As a result, we will consider employment changes during the entire recovery to this point, from mid-2009 to the end of 2013.

To identify the factors that have driven employment changes during this period, one place to start is with some of the key issues that were important in the recession. The boom and bust in housing prices, for example, was arguably a precipitating cause of the recession, and differences in the declines of residential real estate values led to differences in the severity of employment losses across America's MSAs. Another example is the manufacturing sector, which was hard hit during the recession, especially the transportation equipment subsector. The Labor Department reported that transportation equipment "lost the greatest number of jobs in manufacturing and accounted for a disproportionate share of the jobs lost in durable goods" production. In fact, the severity of the recession forced two of the three major American automakers to restructure. Both manufacturing and motor-vehicle-related production—a key component of the transportation equipment subsector—have above-average concentrations in the District.

During the recession (essentially 2008 through the middle of 2009), these two factors—changes in an area's housing prices and its manufacturing intensity—did indeed explain a fair amount of the variation in employment changes across the nation's major MSAs. Together, they accounted for about 25 percent of the variation in the 150 most populous metro areas. Both factors were measured before the recession, so the direction of causality is assumed to be from these factors to employment changes during the recession, not the other way around.

Within the District, home-price appreciation before the recession was relatively modest. For the 10 District MSAs that rank among the nation's 150 largest, nominal increases in home prices from 2000 to 2007 ranged from roughly 20 percent (Canton) to 36 percent (Pittsburgh), a fairly narrow band, which was well below the median increase (almost 50 percent) for this set of 150 metro areas. For context, consider that about 20 percent of these metro areas actually saw their home values more than double during this period. Across all of these major American MSAs, larger prior home-price increases predicted larger employment declines during the recession. However, this was not true in the Fourth District, partly because home-price increases in the 10 major District MSAs were fairly modest and closely clustered.

What mattered more in the District were differences in manufacturing intensity. Historically, the District has been home to many types of manufacturing. In fact, some of its cities are still associated with the materials they became known for producing around the turn of the century—glass in Toledo, rubber in Akron, steel in Pittsburgh. Aerospace production has been and continues to be important in the District, as does automotive production, in which Ohio ranks second nationally.

Many of the District's MSAs remain above average in the share of their workers devoted to the manufacturing sector. Of the 10 we will consider, eight had a higher fraction of employment in manufacturing than the national average of about 10 percent in December 2007. The exceptions were Columbus (8.0 percent) and Pittsburgh (8.6 percent). The most manufacturing-intensive MSA among these 10 was Canton (17.5 percent). In the District, as in all 150 major MSAs, higher manufacturing intensity in December 2007 was associated with larger employment declines during the recession.

Many of the District's MSAs remain above average in the share of their workers devoted to the manufacturing sector.

Interestingly, while these two variables are important in explaining employment changes during the recession, they are not statistically significant predictors of employment changes during the recovery. However, when we examine a third variable in conjunction with the other two, the third one — educational attainment — is statistically significant, and thus a partial explanation for employment changes that

For District MSAs, it seems likely that their economic prospects will be tied to the value of their workers' skill levels.

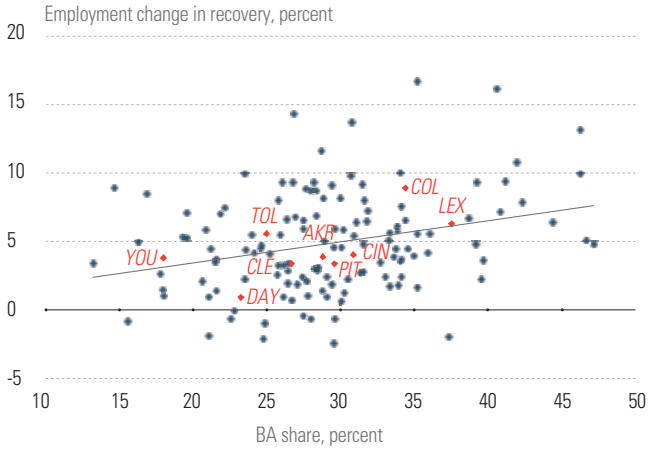
have taken place during the recovery. Specifically, MSAs that had higher rates of adults holding undergraduate degrees in 2010 tended to experience stronger employment gains during the recovery. Indeed, within the District, places like Lexington and Columbus, which have high shares of adults with bachelor's degrees (BAs), have also seen some of the strongest employment gains during the recovery (figure 3).

The value of human capital

To be sure, we need to be careful when interpreting this result: In a simple statistical model that includes BA attainment, prior home prices, and manufacturing intensity, there remains a fair amount of unexplained variation in employment changes across metro areas during the recovery. Nevertheless, this correlation is consistent with other evidence on what drives income and employment growth in subnational economies over the longer term, such as Cleveland Fed research from 2005 on education and innovation. This study highlights human capital—whether measured directly as educational attainment or indirectly through local patent production—as a key driver of these differences throughout the better part of the twentieth century. More recently, other research has shown that areas known as "brain hubs" have tended to post especially strong employment growth, while manufacturing centers have tended to struggle. For District MSAs, it seems likely that their economic prospects will be tied to the value of their workers' skill levels. We have evidence of this over the longer term, but that relationship is also apparent in this recovery.

All data cited in this essay are as of April 2014.

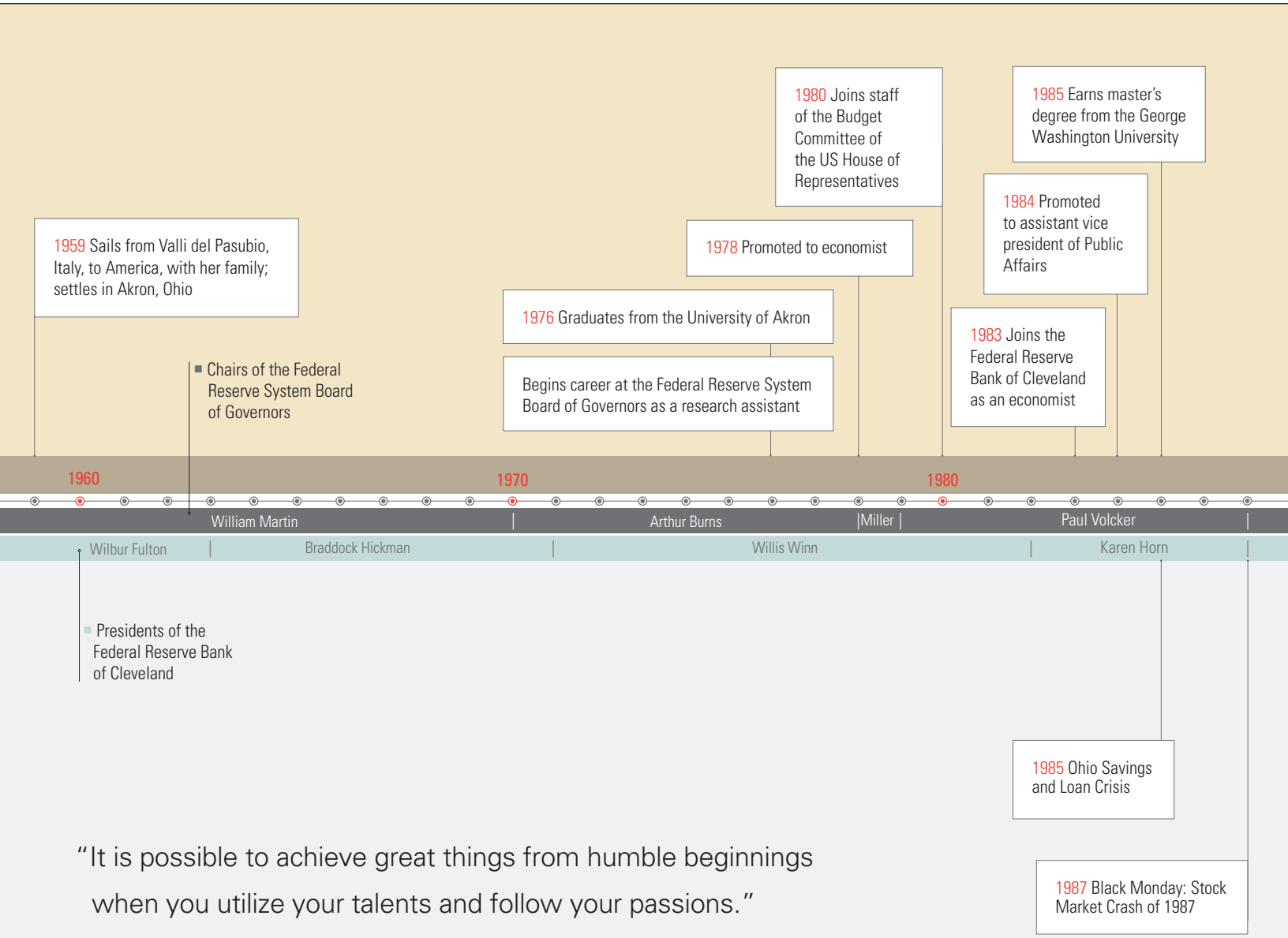
Figure 3. MSAs with higher BA attainment experienced stronger employment gains during the recovery



AKR: Akron
CIN: Cincinnati
CLE: Cleveland
COL:Columbus
DAY: Dayton
LEX: Lexington
PIT:Pittsburgh
TOL: Toledo
YOU: Youngstown

Source: Bureau of Labor Statistics.

THE LIFE AND TIMES OF SANDRA PIANALTO



"It is possible to achieve great things from humble beginnings when you utilize your talents and follow your passions."

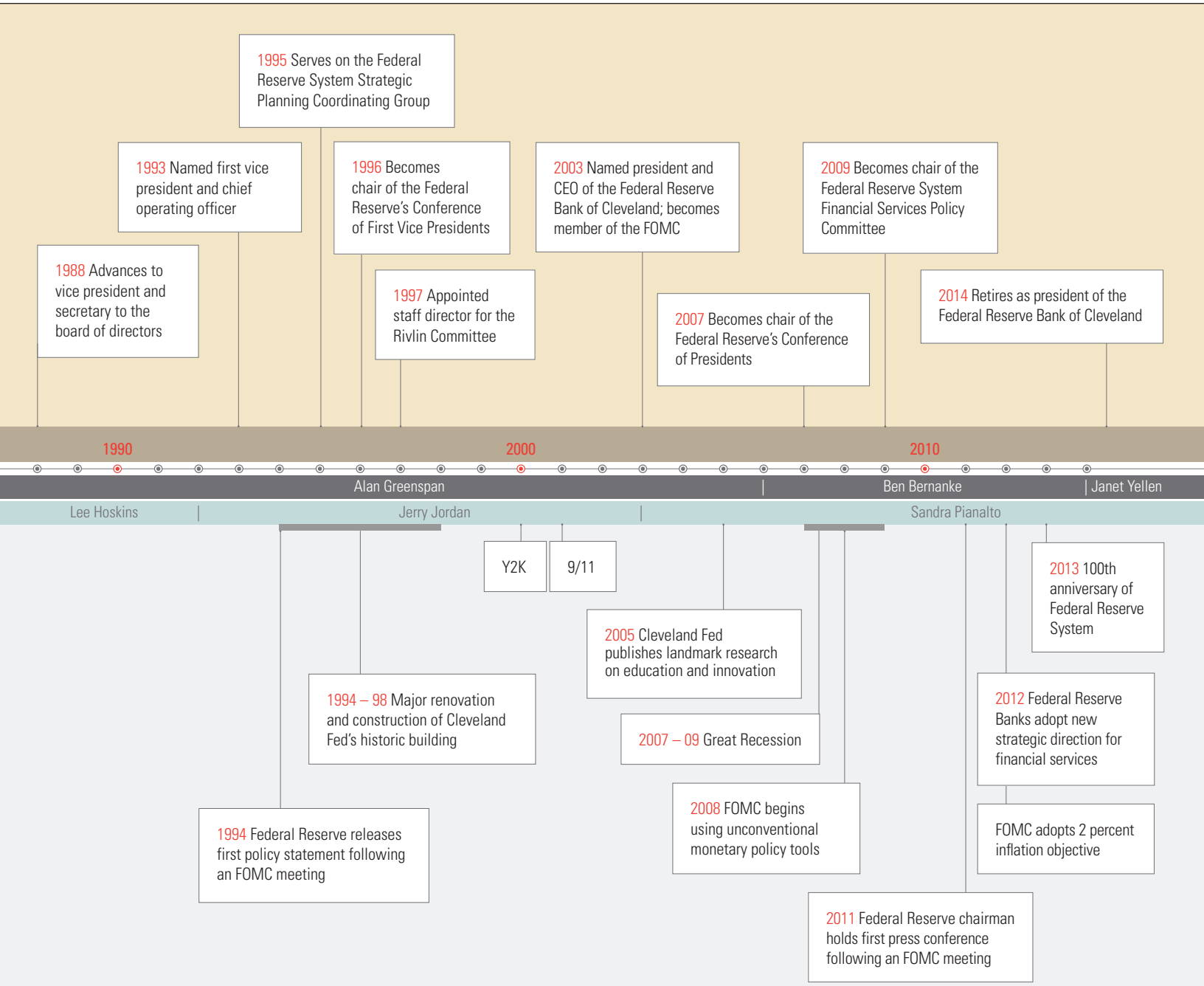
Sandra Pianalto

Ten Milestones in Sandy Pianalto's Life at the Federal Reserve

Highlights from the more than three-decade career of retiring Federal Reserve Bank of Cleveland President and CEO Sandy Pianalto.

1. First Day at the Federal Reserve

In August 1976, a newly hired research assistant named Sandy Pianalto got a tour of the Federal Reserve Board of Governors' Eccles Building in Washington, DC. The high point of the tour was the board room where the Federal Open Market Committee meets. For Pianalto, an immigrant to the United States at age five who had decided early on that she would dedicate herself to public service, it was a career-changing moment. "I was impressed with the huge mahogany table in the center of the room," she later said. "And I thought to myself, I would love to sit at that table someday."



5
age when Sandy emigrated from Italy

2. Appointed to No. 2 Post at the Federal Reserve Bank of Cleveland

Pianalto's journey to eventually get a seat at that table took a leap forward in 1993. To the surprise of many of her more senior colleagues, Pianalto was named first vice president and chief operating officer (COO) of the Federal Reserve Bank of Cleveland, the Bank's second-highest ranking official. Having worked at the Bank for the previous 10 years with increasing responsibilities—though no operations experience—Pianalto began with an ambitious vision. First up was changing the culture of the tradition-bound institution. Some of the differences were symbolic, such as opening up the officers' dining room to all employees. Others involved driving new behaviors and were longer in the making, such as moving away from a command-and-control style of management to a more participative, collaborative style, and breaking down silos. The goal was to build an inclusive workplace where employees were encouraged to share their ideas.

36
years in the Federal Reserve System

3. Victory Over Y2K

It felt like a century's worth of preparation crammed into a few months. Everything was tested—internal operations, software applications, building systems, electronic payments, check processing, and cash processing. Across the Federal Reserve System, 90 million lines of code were examined, with about 10 percent remediated before the changeover. The Federal Reserve System distributed billions of dollars in currency as a backstop.

6
positions held within the Fed

Pianalto herself spent New Year's Eve at the Bank along with dozens of colleagues (sans champagne). They rang in the New Year with nary a glitch. In hindsight, there were people who suggested that Y2K was never a serious threat in the first place. But Pianalto and others on the front lines would be the first to say that the reason it turned out to be a non-event—within the financial services industry, at least—was directly attributable to the work done by the Federal Reserve and the financial services industry more broadly.

6
Fed chairs under which Sandy served

4. Leading a Payments Evolution, Part One

In 1997, Pianalto was appointed staff director for the Committee on the Federal Reserve in the Payments Mechanism, a Federal Reserve-commissioned review chaired by Vice Chair Alice Rivlin, to study the future role the Federal Reserve should have in the payments system. The committee reached two general conclusions: The Federal Reserve should remain a provider of both check collection and automated clearing house services, while ensuring access for all depository institutions; the Federal Reserve should play a more active role in enhancing the efficiency of those payments services and helping to evolve strategies for moving to the next generation of payment instruments. The Rivlin Committee was lauded for drawing on the expertise of a range of subject matter experts inside and outside of the Federal Reserve System, reflecting a collaborative spirit that would become Pianalto's hallmark.

42
votes cast as member of the FOMC

5. Rallying on 9/11

In many ways, days like September 11, 2001, were what the Fed was created for—as a stabilizing force during trying times. Financial markets across the globe were impaired and consumer confidence was threatened after the terrorist attacks. Pianalto, who was still the first vice president and COO at the time, joined conference calls with colleagues across the Federal Reserve and made the decision locally with President Jerry Jordan to keep the Federal Reserve Bank of Cleveland open for business. In the days that followed, the Federal Reserve Bank of Cleveland lent millions of dollars through its discount window to banks impacted by the disruptions to financial markets that occurred following the attacks. Throughout, the Bank's operations remained fully functional, with no disruption in processing of currency, checks, and electronic payments. Pianalto observed: "It's times like this when we truly see that our Bank motto, 'Our people make the difference,' is more than just words on paper—it's a reality."

90
FOMC meetings attended

6. Presidential Timbre

On February 1, 2003, Pianalto became the 10th president and CEO of the Federal Reserve Bank of Cleveland, succeeding the retiring Jerry Jordan. The announcement of her appointment in the Bank's auditorium had been met with raucous cheers. "I was excited but I was also worried," Pianalto said. "I started to wonder, 'Why are employees so excited for me? What are they expecting?' When I asked several employees, I got the same answer, 'We expect that you won't change, and that you will continue to care about employees.'"

951
total full-time employees Sandy supervises at the Bank*

7. Check Consolidation

For decades, the single largest operation in the Federal Reserve System was check clearing. The Federal Reserve Bank of Cleveland once processed 11 million paper checks every night in the Fourth District. But as technological innovation made other forms of payment popular, Americans simply stopped writing paper checks like they used to. Starting in 2003, check operations were consolidated across the Federal Reserve System. The consolidation was painful for employees who lost their jobs. Pianalto noted that having to part with valuable employees is always the most difficult part of a CEO's role. Throughout the consolidation, the Federal Reserve Bank of Cleveland maintained a leadership role in check processing. In 2008, the Bank's check function was selected as the final paper check processing site and the final site for check adjustments for the entire Federal Reserve System. Pianalto observed at the time that the decision reflected the Bank's long-term commitment to efficiency, effectiveness, and customer service. One positive outcome of the consolidation was that it led the Bank to focus not just on operational excellence, but also on thought leadership. The last paper check was processed at the Federal Reserve Bank of Cleveland on December 31, 2012.

31
years employed at the Federal Reserve Bank of Cleveland

8. Landmark Research on Education and Innovation

Early into her tenure as president and CEO of the Federal Reserve Bank of Cleveland, Pianalto challenged her staff of research economists to better understand why the Fourth District wasn't growing as fast as most of the regions in the country. In response, they looked at the 50 states over a 75-year period. During that entire period two factors stood out as the most important for driving income growth: education and innovation. The message resonated strongly with Pianalto. She has cited that landmark 2005 study in many of her speeches over the years, and the lesson from that study continues to resonate across the region in the form of growing recognition among policymakers and elected officials about the importance of supporting education and innovation.

8
honorary degrees Sandy holds

1
Cleveland Fed president with longer presidential tenure

9. Weathering the Financial Crisis

While traveling overseas in the summer of 2007, Pianalto took a call from one of the Bank's directors. He was worried about slowly worsening conditions in financial markets. It was one of the first hints of the crisis that would become full-blown a year later. Pianalto said later she felt humbled by the financial crisis, which prompted a realization that there were serious gaps in the Federal Reserve's field of vision. "I think it is fair to say that the Federal Reserve was too narrowly focused on banks and not the broader financial system," she said. "The crisis taught us differently. There was a lot we didn't know and much we couldn't control." That said, she took pride in the quick response and aggressive actions taken across the Federal Reserve System. At the Federal Reserve Bank of Cleveland alone, almost $100 billion was lent to institutions through its discount window during 2008. Efforts like that ultimately helped to prevent a financial market meltdown. Also, creative and aggressive monetary policies prevented a depression and helped to put the economy on a path to recovery.

11
years as president and CEO of the Cleveland Fed

9
Cleveland Fed presidents before Sandy

10. Leading a Payments Evolution, Part Two

In 2009, Pianalto took over as chair of the Financial Services Policy Committee, the body responsible for directing payments services at the Federal Reserve Banks. Pianalto looked forward to the challenge of a world where technology was fast expanding the possibilities for all sorts of payments, and helping the Federal Reserve adapt to the new environment. The Financial Services Strategic Plan that the Committee unveiled in 2012 provided the framework for collaboration with the payments industry to further improve the speed, safety, and efficiency of modern-day payments. "To succeed in improving our nation's payments system, we must continue to engage and find ways to leverage our collective strengths and resources," Pianalto told an annual conference of payments industry leaders in 2013. Pianalto hands over the reins with a well-laid foundation for leading the development of the next generation of payments systems in the United States.

11
community boards and organizations on which Sandy has served

* as of December 31, 2013

Gregory L. Stefani
First Vice President and
Chief Operating Officer

Federal Reserve Bank of Cleveland

Message from the First Vice President

BOLD. CLEAR. ASPIRATIONAL.

These three words describe the Federal Reserve Bank of Cleveland's 2014–2016 Strategic Direction: a plan that will establish us as a premier Reserve Bank and an influential voice in and for the Fourth Federal Reserve District—the region we serve.

In 2013, we set out to develop a strategic direction that would capitalize on our knowledge and experience, engage us with our stakeholders, and resonate with our employees. We have built a strong hub of economic knowledge, particularly in inflation and household finance, and recognize our ability to further support the regional and national economies by increasing our focus in these fields. We have pioneered new ways to identify and analyze systemic risk, and see potential for advancing our knowledge of financial stability by integrating our supervisory and research capabilities. We have enhanced our revenue collection systems for the US Treasury with greater functionality, and continue to leverage new technologies. We have long been recognized for our operational efficiency and effectiveness, and see opportunities to become a driver of continuous improvement within the Federal Reserve System. We also know that our knowledge and experience are of little value in a vacuum, and that our success in executing our strategy hinges on how strong and relevant our voice is.

There are four key components to our plan—they are the pillars that support our mission and vision:

- *Voice of the Fourth District* by being an influential voice in our region and a leader in the Federal Reserve System
- *Promote Economic Growth and Development* by advancing research on key drivers of regional and national economic growth to guide policy decisions
- *Strengthen Financial Stability* by influencing policy decisions to strengthen our nation's financial system
- *Deliver Innovative Solutions* by proactively identifying and developing solutions to transform our Bank and our services

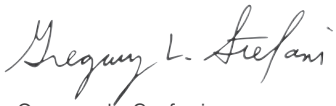
Executing on a strategic plan of this magnitude requires the commitment of talented, adaptable, and engaged employees—employees who are invested in our mission and vision and connected to our strategy. I am proud of our employees and their accomplishments and sincerely believe that our people make the difference. They drive our culture of innovation and continuous improvement. They listen to and inform our stakeholders and influence policy decisions on issues important to our region and nation. They expand our presence and serve as our ambassadors. Our employees are the voice of the Fourth District—they are the Federal Reserve Bank of Cleveland.

I invite you to see for yourself their impact—how they make the difference, every day. Last year alone, we collected more than $600 billion dollars on behalf of the US Treasury for government agencies, exchanged nearly 6 billion currency notes for member depository institutions, hosted close to 10,000 education program participants, conducted more than 150 examinations of financial institutions, published impactful research on inflation, labor markets, and housing, and shared our knowledge in 150-plus speeches. You can learn more about our employees' successes—their innovations, their expertise, their influence, and their reach—in our "By the Numbers" infographic on the pages that follow.

The year 2013 ended with a significant milestone for the Federal Reserve; on December 13, we began to commemorate our centennial—100 years of service to our region and our nation. As part of the commemoration, we reaffirmed our commitment to promote economic prosperity for all Americans for the next 100 years, and beyond. The Federal Reserve Bank of Cleveland is excited to have begun work in 2014 that will help us both fulfill our commitment and reach our vision of being a premier Reserve Bank. We look forward with great anticipation to the remainder of 2014 and to the years ahead.

In closing, on behalf of our employees and our Boards of Directors, I extend our sincere appreciation to Federal Reserve Bank of Cleveland President and Chief Executive Officer Sandra Pianalto. Sandy is scheduled to retire at the end of May 2014. It was under her leadership that the Cleveland Fed strengthened our policy focus and broadened our expertise to become more of a knowledge-based organization. It was also by following her vision that we developed our bold, new strategic direction.

On a more personal note, Sandy and I have both spent more than three decades here at the Cleveland Fed, and I've been especially privileged as first vice president to work alongside her for the past three years. She has not only been my trusted colleague, but also an advisor, a confidante, and a coach. All of us affiliated with the Federal Reserve Bank of Cleveland are forever grateful for Sandy's leadership and friendship, and we wish her the best in her future pursuits.



Gregory L. Stefani
First Vice President and Chief Operating Officer

THE CLEVELAND FED BY THE NUMBERS

FOR THE YEAR 2013

14	consecutive years the Cleveland Fed has been a NorthCoast 99 winner, which honors great workplaces for top talent in Northeast Ohio
3	years recognized by Commission on Economic Inclusion as Best-in-Class for supplier diversity
1	time the Cincinnati Branch hosted then-Chairman Ben Bernanke in 2013
301	address of the new Pittsburgh Branch at One Oxford Centre on Grant Street
218,000,000	transactions collected by the Debit Gateway on behalf of the US Treasury
561,000,000,000	dollars processed through the Debit Gateway
115,000,000,000	revenue collected through Pay.gov on behalf of the US Treasury
59,000	customer calls fielded by Pay.gov reps
155	exams conducted at financial institutions
21	papers either published or accepted in peer-reviewed journals
259,937,000	currency notes shredded
5,986,552,000	currency notes exchanged
25,992	visitors screened for safety by Cleveland Fed officers
7,280	visits from armored courier vehicles

951

Federal Reserve Bank of Cleveland employees

Innovation

Expertise

Influence

Reach

25	percent new minority hires
178	percent improvement in pool of qualified, diverse vendors
3,107	subscribers to community development e-updates
35	meetings with regional workforce development stakeholders to understand employment challenges
530	teachers reached through Cleveland Fed programs
532,429	copies of *Great Minds Think: A Kid's Guide to Money* distributed since publication in 2007
47	Fourth District cities represented in the high school writing contest on the future of money
9,276	participants in onsite Cleveland Fed education programs
2,796	students who engaged in Cleveland Fed programs
170	trees saved by the 10 tons of paper recycled by the Cleveland Fed
65	tons of construction waste recycled
291,799	dollar amount our 951 employees pledged to United Way
25,700	Twitter followers
157	public speeches given
700	substantive media stories mentioning the Cleveland Fed

1

Federal Reserve Bank of Cleveland

LEADERSHIP

Boards of Directors

Federal Reserve Banks each have a main office board of nine directors. Directors help set the Bank's strategic direction, supervise the Bank's budget and operations, and make recommendations on the discount rate on primary credit. Those directors who are not commercial bankers appoint the Bank's president and first vice president, subject to the Board of Governors' approval.

In addition, directors provide the Federal Reserve System with a wealth of information on economic conditions. This information is used by the Federal Open Market Committee in reaching decisions about monetary policy.

Class A directors are elected by and represent Fourth District member banks. Class B directors are also elected by Fourth District member banks and represent diverse industries within the District. Class C directors are appointed by the Board of Governors and also represent the wide range of businesses and industries in the Fourth District. Two Class C directors are designated as chairman and deputy chairman of the board.

The Cincinnati and Pittsburgh branch offices each have a board of seven directors who are appointed by the Board of Governors and the Board of Directors of the Federal Reserve Bank of Cleveland.

Terms for all directors are generally limited to two three-year terms to ensure that the individuals who serve the Federal Reserve System represent a diversity of backgrounds and experience.

Cleveland Board of Directors

As of December 31, 2013

Richard K. Smucker

Board Chairman

Chief Executive Officer

The J.M. Smucker Company
Orrville, Ohio

Christopher M. Connor

Board Deputy Chairman

Chairman and Chief Executive Officer

The Sherwin-Williams Company
Cleveland, Ohio

Tilmon F. Brown

Chief Executive Officer

New Horizons Baking Company
Norwalk, Ohio

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Cincinnati, Ohio

Paul G. Greig

Chairman, President, and Chief Executive Officer

FirstMerit Corporation
Akron, Ohio

Harold (Hal) Keller

President

Ohio Capital Corporation for Housing
Columbus, Ohio

Todd A. Mason

President and Chief Executive Officer

First National Bank of Pandora
Pandora, Ohio

John P. Surma

Executive Chairman

United States Steel Corporation
Pittsburgh, Pennsylvania

Susan Tomasky

Energy Industry Consultant and Former President

AEP Transmission
Columbus, Ohio

James E. Rohr

Federal Advisory Council Representative

Executive Chairman

The PNC Financial Services Group, Inc.
Pittsburgh, Pennsylvania

Cincinnati Board of Directors

As of December 31, 2013

Peter S. Strange

Board Chairman

Chairman

Messer, Inc.
Cincinnati, Ohio

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President and Chief Executive Officer

Citizens National Bank
Somerset, Kentucky

Charles H. Brown

Vice President and Secretary

Toyota Motor Engineering and Manufacturing, N.A.
Erlanger, Kentucky

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President and Chief Executive Officer

Dayton Children's Hospital
Dayton, Ohio

Gregory B. Kenny

President and Chief Executive Officer

General Cable Corporation
Highland Heights, Kentucky

Austin W. Keyser

Midwest Senior Field Representative

AFL-CIO
Columbus, Ohio

Amos L. Otis

Founder, President, and Chief Executive Officer

SoBran, Inc.
Dayton, Ohio

Pittsburgh Board of Directors

As of December 31, 2013

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Board Chairman

Partner and Attorney at Law

Reed Smith LLP
Pittsburgh, Pennsylvania

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President and Chief Executive Officer

S&T Bancorp, Inc.
Indiana, Pennsylvania

Charles L. Hammel III

President

PITT OHIO
Pittsburgh, Pennsylvania

Dawne S. Hickton

Vice Chair, President, and Chief Executive Officer

RTI International Metals, Inc.
Pittsburgh, Pennsylvania

Sean McDonald

President and Chief Executive Officer

Precision Therapeutics, Inc.
Pittsburgh, Pennsylvania

Petra Mitchell

President

Catalyst Connection
Pittsburgh, Pennsylvania

Grant Oliphant

President and Chief Executive Officer

The Pittsburgh Foundation
Pittsburgh, Pennsylvania

Business Advisory Councils

As of December 31, 2013

Business Advisory Council members are a diverse group of Fourth District businesspeople who advise the president and senior officers on current business conditions. Each council—in Cincinnati, Cleveland, Columbus, Dayton, Erie, Lexington, Pittsburgh, and Wheeling—meets with senior Bank leaders at least twice yearly. These meetings provide anecdotal information that is useful in the consideration of monetary policy direction and economic research activities.

Cincinnati

Stuart Aitken
Chief Executive Officer
dunnhumby USA
Cincinnati, Ohio

Robert Buechner
Shareholder
Buechner, Haffer, Meyers, Koenig Co., LPA
Cincinnati, Ohio

Calvin Buford
Partner, Corporate Development
Dinsmore & Shohl, LLP
Cincinnati, Ohio

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Chairman
Cast-Fab Technologies, Inc.
Cincinnati, Ohio

Christopher Cole
Chief Executive Officer
Intelligrated
Cincinnati, Ohio

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President
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Cincinnati, Ohio

Terry Grundy
Director, Community Impact
United Way of Greater Cincinnati
Cincinnati, Ohio

José Guerra
President
L5 Source
Cincinnati, Ohio

Jim Huff
Chairman Emeritus
Huff Realty
Ft. Mitchell, Kentucky

Vivian Llambi
President
Vivian Llambi & Associates, Inc.
Cincinnati, Ohio

O'dell Owens
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Cincinnati State Technical and Community College
Cincinnati, Ohio

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Principal
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Cleveland

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Warrensville Heights, Ohio

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Chardon, Ohio

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Logan Clutch Corporation
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Gena Lovett
Chief Diversity Officer
Alcoa Forging and Extrusions
Cleveland, Ohio

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Fairlawn, Ohio

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United Labor Agency
Cleveland, Ohio

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Maumee, Ohio

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President
Ohio AFL-CIO
Columbus, Ohio

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Momentive Performance Materials
Columbus, Ohio

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Columbus, Ohio

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Columbus, Ohio

Kenny McDonald
Chief Economic Officer
Columbus 2020
Columbus, Ohio

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President and Chief Executive Officer
Fifth Third Bank, Central Ohio
Columbus, Ohio

Andy Rose
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Nationwide Mutual Insurance
Columbus, Ohio

Dayton

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Miller-Valentine
Dayton, Ohio

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Dayton, Ohio

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TESSEC
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Centerville, Ohio

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Moraine, Ohio

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Voss Auto Network
Centerville, Ohio

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Dayton, Ohio

Mark Walton
Director of Community and Economic Development
Fifth Third Bank
Dayton, Ohio

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Logistics Plus
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McManis & Monsalve
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Lexington

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Ann McBrayer
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Lexington, Kentucky

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Sturgill Professor of Economics
University of Kentucky
Lexington, Kentucky

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AU Associates
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Pittsburgh

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Pittsburgh, Pennsylvania

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Urban Innovation 21
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Glimcher Group
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United Food & Commercial Workers
Local 23
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John Clarke
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IBEW Local #141
Wheeling, West Virginia

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United Electric
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and Associate Broker
Paull Associates Insurance | Real Estate
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St. Clairsville, Ohio

Jim Squibb
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Beyond Marketing
Wheeling, West Virginia

Erikka Storch
Chief Financial Officer
Ohio Valley Steel Company
Wheeling, West Virginia

Ronald L. Violi
Managing Director
R & V Associates
Pittsburgh, Pennsylvania

Community Depository Institutions Advisory Council

As of December 31, 2013

The Community Depository Institutions Advisory Council is composed of representatives from commercial banks, thrift institutions, and credit unions in the Fourth Federal Reserve District.

Council members meet with the Bank president and senior officers at least twice yearly to provide information and insight from the perspective of community depository institutions. These meetings provide anecdotal information that is useful in the formulation of supervisory and monetary policy direction.

The chair of each District Bank's council also has the responsibility of reporting twice yearly to the Federal Reserve Board of Governors in Washington, DC.

Eddie Steiner
Council Chair
President and CEO
CSB Bancorp, Inc.
Millersburg, Ohio

Mark Brennan
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Clearview Federal Credit Union
Moon Township, Pennsylvania

Patrick Ferry
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Members Heritage Federal Credit Union
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President, and Chief Executive Officer
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James O. Miller
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The Citizens Banking Company
Sandusky, Ohio

Robert Oeler
President and Chief Executive Officer
Dollar Bank
Pittsburgh, Pennsylvania

Gary Soukenik
President and Chief Executive Officer
Seven Seventeen Credit Union
Warren, Ohio

Bick Weissenrieder
Chairman and Chief Executive Officer
Hocking Valley Bank
Athens, Ohio

Charlotte Zuschlag
President and Chief Executive Officer
ESB Financial Corporation
Ellwood City, Pennsylvania

Officers and Consultants

As of December 31, 2013

Sandra Pianalto
President and Chief Executive Officer

Gregory L. Stefani
First Vice President and Chief Operating Officer

Mark S. Sniderman
Executive Vice President and Chief Policy Officer

⊙ ⊙ ⊙

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Senior Vice President

Stephen H. Jenkins
Senior Vice President

Mark S. Meder
Senior Vice President and General Auditor

Terrence J. Roth
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Mark E. Schweitzer
Senior Vice President and Director of Research

Susan M. Steinbrick
Senior Vice President

Anthony Turcinov
Senior Vice President

Peggy A. Velimesis
Senior Vice President

Lisa M. Vidacs
Senior Vice President

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Todd E. Clark
Vice President

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Stephen J. Ong
Vice President

Thomas S. Sohlberg
Vice President

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Vice President

Guhan Venkatu
Vice President and Senior Regional Officer

Nadine Wallman
Vice President

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Assistant Vice President

Tracy L. Conn
Assistant Vice President

Brian C. Dragoo
Assistant Vice President

Jenni M. Frazer
Assistant Vice President

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Diana C. Starks
Assistant Vice President

Jason E. Tarnowski
Assistant Vice President

Michael Vangelos
Assistant Vice President

Carolyn M. Williams
Assistant Vice President

⊙ ⊙ ⊙

Dean A. Longo
Consultant

John P. Robins
Consultant

Acknowledgments

Mark Schweitzer
Senior Vice President and Director of Research

Lisa Vidacs
Senior Vice President, Outreach, Community Relations, Public Affairs

Iris Cumberbatch
Vice President and Public Affairs Officer

Todd E. Clark
Edward S. Knotek II
Guhan Venkatu
Contributing Authors

Amy Koehnen
Editor

Michele Lachman
Maureen O'Connor
Associate Editors

Natalie Bashkin
Graphic Designer

Greg Johnson
Frederick Friedman-Romell
Web Designers

William Bednar
Doug Campbell
Laura Flaugh
Myndi Liva
Nelson Oliver
Contributors

Portrait Photography
Alejandro Rivera Photography
Chris Pappas Photography
Eric Mull Photography

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