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Economic Risks of Climate Change: An Overview

This article provides an overview and a framework for considering the economic risks of climate change and CO2 emissions regulation. A regional index is introduced that quantifies risks based on exposure to agriculture, energy and flood zones.

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No Recession

BY MARK ZANDI—FEBRUARY 9, 2016

Financial markets are very unsettled. Since this time last year, credit spreads in the bond market have gapped out, the value of the U.S. dollar has surged, and oil and other commodity prices have tumbled. Most disconcerting have been the wild swings in the stock market, which has suffered its worst start to any year on record. There is increasingly ominous talk that the troubled financial markets are signaling, or may even precipitate, a recession.

While the turmoil in financial markets will do some damage to the economy—Moody's Analytics has lowered its forecast for real GDP growth this year by half a percentage point to 2.3%—the recession talk is off base. Indeed, the economy is creating lots of jobs across all pay scales, and the remaining slack in the labor market is being quickly absorbed. The economy remains firmly on track to reach full employment by midyear.

Market spasms

Financial markets have suffered a series of wrenching spasms over the past year and a half. The selloff has been especially hard in the market for below-investment-grade or high-yield corporate bonds. The yield spread between high-yield corporates and 10-year Treasury yields is approaching 800 basis points (see Chart 1). This is more than double the spread that prevailed in summer 2014, when markets were calm.

The value of the U.S. dollar also has soared. The real broad trade-weighted dollar is up a stunning nearly 20% since summer 2014, and is as strong as it has been since the early 2000s. The dollar is up against nearly all currencies, but most notably against the U.S.'s largest trading partners, including Canada, Mexico, Europe and Japan.

Of course, oil prices have cratered during this period, free-falling from more than $100 per barrel to near $30 recently. Other energy and commodity prices have also slumped. Copper prices, which are often a good barometer of global economic conditions, are currently trading near $2 per pound, down from $3.25 in summer 2014.

Most disconcerting perhaps has been the violent step down in stock prices. As measured by the Standard & Poor's 500 index, stock prices are down more than 10% from their all-time peak reached in May. Some $2 trillion in stock wealth has evaporated.

Oil price bottom

Financial markets will stabilize only when oil prices do. The plunge in oil prices is the proximate catalyst for the selloff in markets, as the previously high-flying stocks and bonds of energy companies have cratered. The low oil and other commodity prices have also hobbled many emerging economies that U.S. multinationals and their shareholders had thought would power their long-term growth.

Driving oil prices lower has been Saudi Arabia's surprise decision to increase its oil production rather than offset the surge in production in U.S. shale fields. The world is awash in oil since the Saudis have calculated that while lower oil prices will be uncomfortable for them, they will be unbearable for higher-cost oil producers in the rest of the world, including in the U.S.

Global energy companies have been naturally reluctant to cut production, hoping that prices would rebound, but their day of reckoning is at hand. Prices are well below the long-run cost of production in many parts of the world (see Chart 2). Many energy companies borrowed too much in the good times and are running out of cash needed to make their debt payments. Bankruptcies, mergers and acquisitions are in the offing, and production cuts should soon follow. This

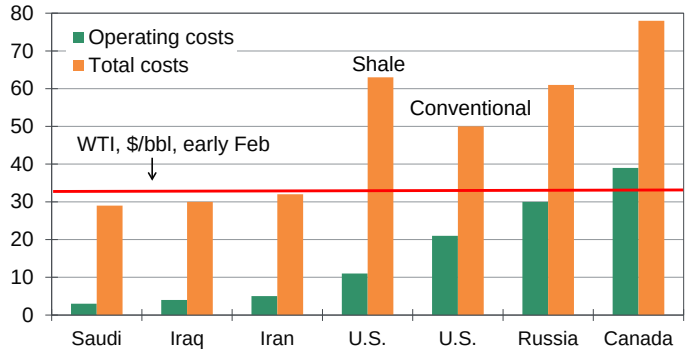
Chart 1: Financial Markets Are Under Stress

Indicator	Latest	1 mo ago	1 yr ago	5 yrs ago
S&P 500 index	1,875	2,056	2,029	1,316
Real broad trade-weighted dollar	101.2	99.2	93.2	83.2
West Texas Intermediate, $	31.98	36.36	45.84	90.91
30-yr fixed mortgage rate, %	3.72	3.97	3.69	4.81
High-yield corporate bond spread, bps	773	482	493	528
Copper prices, $ per pound	2.07	2.10	2.59	4.58
Emerging market bond spread, bps	857	793	1050	423

Sources: Six Financial, Freddie Mac, Moody's Analytics

Chart 2: Global Oil Production Set to Turn Down

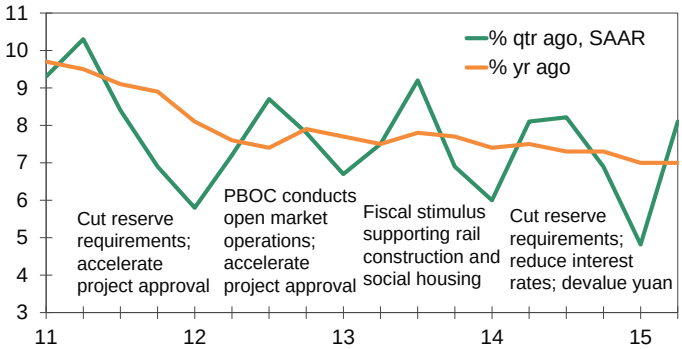
Oil production costs, $ per barrel



Sources: EIA, Moody's Analytics

Chart 3: China Should Hit Near Growth Target

Chinese real GDP growth



Sources: Chinese National Bureau of Statistics, Moody's Analytics

should be the basis for more stable oil prices and financial markets later in the spring.

China holds firm

Nervous investors will also calm down once it is clear that China's economy is holding firm. China is the second largest economy in the world, after ours, and more importantly, many U.S. multinationals had previously sold their investors on the idea that China would propel their long-term growth. If China underperforms, so too will those companies and their stock prices.

It is reasonable to question whether China's economy will be able to throttle back gracefully, but the almost hysterical pronouncements of China's economic demise are overdone. China has its problems, and is surely overstating its growth rate, yet it is still growing strongly and has enormous financial resources. It has more than $3.2 trillion in reserves at last count, which can be used to stimulate the economy—Chinese authorities are very willing to do this—or to defend the value of the Chinese currency (see Chart 3).

China is not Thailand circa 1998, when global investors fled that country, crushing the Thai baht, and igniting the Asian financial crisis. Asian companies that had levered up on dollar-denominated debt were forced to default, resulting in a debilitating recession. Capital flows to and from China have opened up in recent years, but only modestly, and could be easily shut down if the outflows became a problem. Chinese authorities have significant control over their economy and financial system, making a hard landing in China unlikely, at least any time soon.

Fed goes slow

Investors also have agita over the Federal Reserve's decision to begin raising interest rates. It is common for financial markets to struggle when the Fed normalizes interest rates during economic recoveries. Investors are even more on edge this go-round, as the Fed is exiting from the emergency policies it implemented in response to the financial crisis. Short-term rates had been effectively set at zero since late 2008.

But the Fed has shown significant sensitivity to financial market conditions. The decision to begin raising rates was ostensibly delayed from September to December because of a previous bout of selling in markets. We also now expect the next rate hike to be delayed until June to give markets a chance to find a bottom. Investors will learn that the Fed means what it says, namely that it will take several years to normalize rates.

Assessing the damage

Even if financial markets settle soon as anticipated, the turmoil in markets has already harmed the economy. Gauging the degree of harm is extraordinarily complicated given the myriad channels through which financial conditions impact the economy.

The clearest damage is the impact the stronger dollar is having on U.S. trade. Struggling emerging market economies, hurt by weaker oil and commodity prices, are crimping exports. Weaker stock prices and the resulting loss of wealth weigh on consumer spending via the negative wealth effects. Lower stock prices and higher credit spreads increase businesses' cost of capital and thus impede investment and hiring. And then there is the dark pall all of this puts on consumer and business sentiment and the willingness to spend and invest.

There are some positive crosscurrents. While the lower oil prices are devastating for the energy industry they are more or less good for the rest of the economy. The U.S. economy still consumes more oil than it produces. So, if the price of oil goes down, the economy ultimately wins. Mortgage rates have also declined as scared investors have piled into risk-free Treasury and mortgage securities.

Based on simulations of the Moody's Analytics macro model, which accounts for much of this complexity, the financial market turmoil will slice approximately half a percentage point from 2016 real GDP growth. This is under the assumption that oil and stock prices are near a bottom, that credit spreads are at an apex, and that while the dollar will appreciate further, the pace of appreciation will slow considerably.

No recession

Tighter financial conditions will slow the expansion, but there is little prospect that the tighter conditions will result in a recession, as a growing chorus seems to fear. It brings to mind the quip by the late Economics Nobel Laureate Paul Samuelson that,

"Wall Street indexes predicted nine out of the last five recessions."

Indeed, of the 20 market corrections—peak-to-trough declines of 10% or more—in the past half century, only six were followed by recessions (see Chart 4). Recessions are always preceded by big declines in stock prices, as investors sniff out weakening sales and profits at big publicly traded companies. But investors are a fickle bunch and will sell for lots of reasons that may or may not be linked to what is going on in the broader economy.

None of the other tried-and-true signals of impending recession are even flashing yellow. Unemployment insurance claims remain extraordinarily low, the unemployment rate is falling and not rising as it does prior to recessions, and consumer confidence remains resilient. The shape of the Treasury yield curve also remains firmly positive; recessions have always been preceded by inversions with long-term rates falling below short rates.

The selloff in financial markets should also be put into a broader context. Not more than a year ago there was substantial hand-wringing that the stock, bond and other asset markets were overvalued, or perhaps even worse, in a bubble. Fed Chair Janet Yellen ruminated publicly that many high-flying biotechnology stocks were turning speculative. It was unheard of for a Fed official to make such a pronouncement, and signaled her discomfit that a bubble could be forming, which, if it burst, might ignite another financial crisis and recession.

The recent decline in financial markets is thus in many respects therapeutic. Any froth in these markets has been wrung out. Of course, this will not be comforting until financial markets find a true bottom.

Chart 4: "Wall Street Indexes Predict 9 of the Past 5 Recessions."

S&P 500 Corrections and Bear Markets				ADS Business Conditions
Peak	Trough	% change	During a recession?	Index, points, NSA
4/28/1971	8/9/1971	-10.7	No	-0.9
9/8/1971	11/23/1971	-11	No	0.2
1/11/1973	10/3/1974	-48.2	Yes	-2.4
11/7/1974	12/6/1974	-13.6	Yes	-1.4
7/15/1975	9/16/1975	-14.1	No	-0.0
9/21/1976	3/6/1978	-19.4	No	2.0
9/12/1978	11/14/1978	-13.6	No	0.6
10/5/1979	11/7/1979	-10.2	No	-0.0
2/13/1980	3/27/1980	-17.1	Yes	-2.6
11/28/1980	8/12/1982	-27.1	Yes	-2.7
10/10/1983	7/24/1984	-14.4	No	-1.3
8/25/1987	12/4/1987	-33.5	No	0.2
7/16/1990	10/11/1990	-19.9	Yes	-1.0
7/17/1998	8/31/1998	-19.3	No	1.1
3/24/2000	10/9/2002	-49.1	Yes	-1.1
11/27/2002	3/11/2003	-14.7	No	-0.1
10/9/2007	3/9/2009	-56.8	Yes	-2.5
4/23/2010	7/2/2010	-16	No	-0.7
4/29/2011	10/3/2011	-19.4	No	0.4
4/2/2012	6/1/2012	-9.9	No	0.0

Sources: Philadelphia Fed, S&P Dow Jones Indices LLC, Moody's Analytics

Forecast Assumptions

BY MARK ZANDI—FEBRUARY 9, 2016

Monetary policy

The Federal Reserve began normalizing interest rates at the mid-December Federal Open Market Committee meeting, raising short-term rates by 0.25 percentage point from the effective zero lower bound that had prevailed since the financial crisis.

Rate normalization will be a lengthy process. The Fed has said it will be slow to increase short-term rates, implying that the funds rate will not normalize until well after the economy has returned to full employment. If the economy performs consistently with the Moody's Analytics outlook, the economy is expected to achieve full employment by mid-2016, and short-term interest rates will not normalize until mid-2018.

There is a consensus that the federal funds rate consistent with normalization—the equilibrium rate, or R*—has fallen since the crisis, but there is little consensus regarding by how much. Forecasts provided by Fed officials of the funds rate in the long run would suggest that they estimate the equilibrium rate to be approximately 3.5%. This is equal to the sum of the Fed's 2% inflation target, the economy's potential growth rate, and the impact of various economic headwinds.

Though not well defined, the most significant headwind is the higher required capitalization and liquidity of the banking system post-crisis. If regulators require that banks must hold more capital and be more liquid, then the banks' return on equity and assets will be lower. Thus, for the system to extend the same amount of credit to the economy at the same lending rates, the system's cost of funds needs to fall by a like amount as its returns. That is, banks' lending margins—loan rates less cost of funds—must be maintained. This can be achieved if the Fed adopts a lower equilibrium rate and thus lowers banks' cost of funds.

Like the Fed, Moody's Analytics also estimates the equilibrium rate to be 3.5%, equal to 2% inflation, plus 2.2% potential real GDP growth, less 0.7% to account for the economic headwinds.

Normalization also means that the Fed will allow its balance sheet to diminish. The balance sheet swelled to nearly $4.5 trillion in Treasury and mortgage securities as a result of four rounds of quantitative easing. In a full-employment economy, the Fed's balance sheet should be closer to $1 trillion. The Fed is expected to slowly right-size its balance sheet by allowing the securities it owns to mature and prepay. It will begin this process in early 2017, and it should take about a decade to complete.

The behavior of bond investors could complicate the job of normalizing monetary policy. The economic outlook is based on a steady but orderly rise in long-term rates, with 10-year Treasury yields rising from near 2% currently to 4% by early 2018 (see Chart 1). This is below the estimated nearly 4.5% normalized 10-year Treasury yield consistent with an economy at full employment. Long-term yields will not normalize until global central banks end their quantitative easing programs, and the Fed's balance sheet shrinks. This is not likely until closer to early in the next decade.

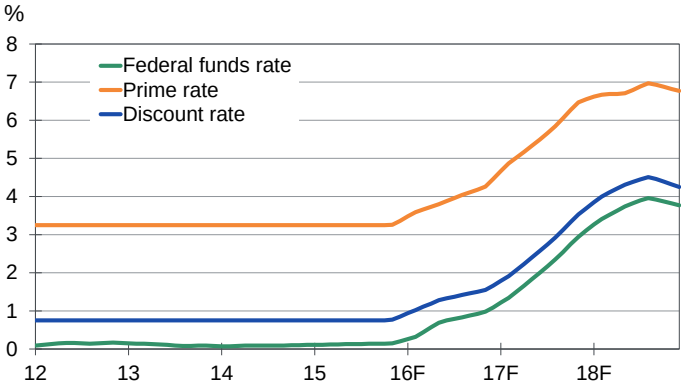
If interest rates take approximately this path, the economy should be able to handle the increase reasonably gracefully. Lower unemployment and stronger wage growth should largely trump the impact of higher mortgage rates on the housing market, and steadily rising corporate earnings should underpin stock prices.

In theory, the Fed should be able to successfully manage the normalization of monetary policy, carefully calibrating increases in rates and winding down its balance sheet without spooking long-term bond investors. And empirical evidence from the Fed's management of earlier rounds of QE suggests it should be able to pull this off.

Fiscal policy

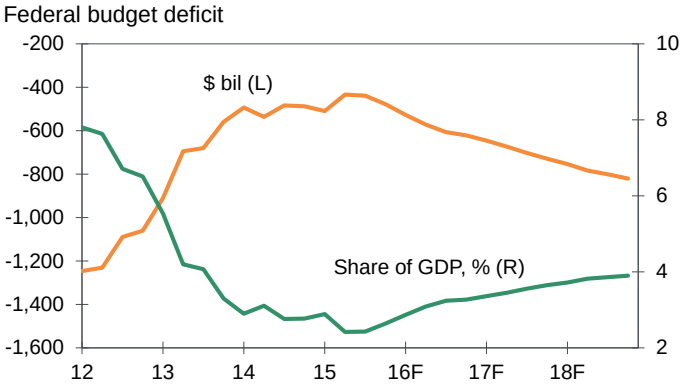
The federal government's situation continues to improve. Lawmakers recently reached a budget deal that sets tax and spending policy into early 2017. The Treasury debt limit was also increased sufficiently so

Chart 1: Monetary Policy



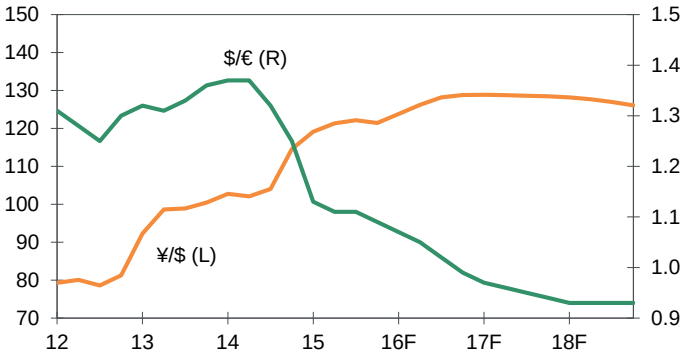
Sources: Federal Reserve, Moody's Analytics

Chart 2: Fiscal Policy



Sources: BEA, Moody's Analytics

Chart 3: U.S. Dollar



Sources: Federal Reserve, Moody's Analytics

that it will not be an issue until the second half of 2017. Political brinkmanship over the budget will thus not be a threat until well after the presidential election.

Based on the budget deal and the economic outlook, the federal budget deficit is expected to come in near $450 billion this fiscal year, equal to 2.5% of GDP. This will be the lowest deficit since fiscal 2007, prior to the recession. For context, the deficit hit a record near $1.5 trillion, equal to 10% of GDP, in the wake of the Great Recession (see Chart 2).

Given the budget deal, fiscal policy will be a small positive for growth in 2016, adding about 0.2 percentage point to real GDP growth. This comes after years of fiscal austerity, which reduced real GDP by a substantial close to 1.5 percentage points in 2013, and 0.4 percentage point in 2014.

Under current fiscal policy, Washington will come close to the goal of achieving fiscal sustainability—future budget deficits that are small enough (near 3% of GDP) that the nation's debt-to-GDP ratio stabilizes, at least through the remainder of the decade. This will be enough to satisfy financial markets and allow the recovery to gain traction as anticipated in the Moody's Analytics baseline outlook.

Deficits and debt will begin to mount again early in the next decade given prospects for large increases in entitlement spending. While healthcare inflation has slowed in recent years, it is prudent not to expect this to continue, at least not to the same extent. Medicare and Medicaid spending is thus likely to increase significantly. Further policy changes will need to be made and are assumed in the outlook.

U.S. dollar

The value of the U.S. dollar has increased substantially against nearly all other currencies, rising almost 20% on a real broad trade-weighted basis since summer 2014. Even China gave up the yuan's peg to the U.S. dollar last summer; the yuan has since fallen more than 6% against the dollar.

The strong U.S. dollar reflects stronger U.S. economic growth and prospects for monetary policy normalization, and disappointing growth and further monetary easing in much of the rest of the world. Further dollar appreciation is likely, particularly vis-à-vis the euro. Behind this outlook is the expectation that the Federal Reserve will normalize U.S. monetary policy by mid-2018, but the European Central Bank will continue with its extraordinary policy actions, including QE and negative interest rates, until near decade's end. While the long-run fair value euro/dollar exchange rate is an estimated $1.25, the euro is expected to fall briefly below parity with the dollar by this time next year (see Chart 3).

The dollar will also appreciate further against the Japanese yen, which has fallen sharply in value to around ¥120 per dollar since Abenomics began in late 2012. Further yen depreciation is expected through mid-decade given Japan's economic struggles, with the yen/dollar rate peaking at close to ¥135. The pace of depreciation will vary depending on the level of complaints from Japan's competitors such as Korea, Germany, and even the U.S.

The British pound should hold its own against the dollar over the next several years. The U.K. economy is expected to perform similarly to the U.S. economy, and the Bank of England should thus normalize British monetary policy along a path similar to that of the Federal Reserve.

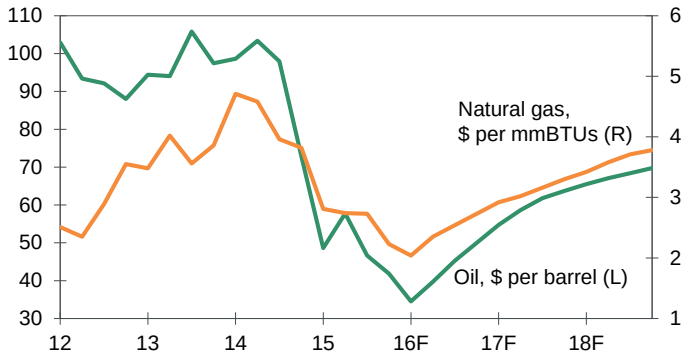
The dollar is also expected to remain strong against the currencies of most emerging economies as the Fed normalizes monetary policy, but to depreciate slowly and unevenly against these currencies over the long run. The dollar's near-term strength against emerging market currencies will be most evident vis-à-vis the Chinese yuan, which was delinked from the U.S. dollar this past summer; Brazilian real; Russian ruble; and Turkish lira.

Despite the recent surge in the value of the dollar, on a real broad trade-weighted basis, the dollar is still not too much above its average value since it began to freely float in the early 1970s. The dollar's resilience will ensure that it will remain the global economy's principal reserve currency for the foreseeable future.

Energy prices

Oil prices have declined from more than $100 per barrel in summer 2014 to near $30 per barrel recently. U.S. gasoline prices have fallen to less than $2 per gallon of regular unleaded. Gas prices are the lowest they have been on a sustained basis in more than a decade.

Chart 4: Energy Prices



Sources: Federal Reserve, EIA, Moody's Analytics

Behind the slump in oil prices was the previous ramp-up in global oil production, particularly among U.S. and Canadian shale oil producers, and the decision by Saudi Arabia not to curtail its production to accommodate the greater North American production. Softer global economic growth—and slower gains in oil demand—and the appreciating value of the U.S. dollar have also contributed.

Oil prices are thought to be near their bottom and are expected to slowly make their way back (see Chart 4). Underlying this outlook is the already-apparent sharp pullback in investment in North American shale oil production. Rig counts have been cut by more than half and production has begun to decline. Break-even prices for U.S. shale production are an estimated just over $60 per barrel. Other higher-cost non-OPEC producers in the North Sea and Arctic are also curtailing investment plans.

Global oil demand should also receive a lift from the lower prices. This is illustrated by the recent strength of vehicle sales in the U.S., particularly for gas-guzzling large sport-utility vehicles and light trucks. Nonetheless, Moody's Analytics does not expect oil prices to top $100 per barrel for another decade.

Brent oil prices should also continue to narrow relative to West Texas Intermediate, given the reversal in the Seaway oil pipeline and other projects, allowing WTI to flow from the interior of the U.S.—where it is plentiful given increased production in North Dakota—to the Gulf Coast.

Natural gas prices will remain low, particularly compared with oil prices, for the next decade. There is a substantial glut of natural gas as demand has not fully recovered from the recession and supply has increased given the surge in shale gas production.

	Units	16Q1	16Q2	16Q3	16Q4	17Q1	17Q2	17Q3	17Q4	2016	2017	2018	2019	2020
NIPA														
Gross domestic product	%AR	2.1	2.6	3.3	3.0	3.2	3.1	2.9	2.8	2.3	3.1	2.6	1.9	1.6
Consumption	%AR	3.2	3.1	3.7	3.3	3.8	3.5	3.3	3.2	3.0	3.5	3.0	2.2	1.9
Durables	%AR	5.1	1.0	3.2	0.6	3.8	2.5	2.4	2.4	3.8	2.4	2.0	0.4	0.7
Motor vehicles	%AR	2.9	-4.3	3.9	-5.4	4.7	-0.3	0.3	0.5	-0.3	0.3	0.6	-1.1	-0.4
Nondurables	%AR	3.3	3.8	3.9	3.2	2.9	2.8	2.3	2.4	3.2	3.0	2.1	1.6	1.6
Services	%AR	2.8	3.3	3.8	3.9	4.0	3.9	3.7	3.7	2.9	3.8	3.5	2.7	2.2
Fixed investment	%AR	6.2	5.7	8.1	7.4	7.8	6.9	5.9	5.3	4.9	7.1	4.6	2.2	1.6
Nonresidential	%AR	5.8	4.9	5.6	4.6	4.6	4.3	3.9	4.3	3.6	4.6	3.8	2.4	1.5
Structures	%AR	3.9	2.5	3.0	3.9	5.5	6.9	7.9	8.7	0.2	5.5	7.1	3.7	2.0
Equipment	%AR	6.6	5.8	7.2	4.4	4.1	3.5	2.3	2.8	4.8	4.2	2.6	1.7	0.8
Intellectual property	%AR	5.8	5.1	5.0	5.4	4.7	3.9	4.0	3.7	4.0	4.6	3.5	2.6	2.3
Residential	%AR	7.9	8.7	18.5	18.9	20.8	16.8	13.3	9.1	10.2	16.9	7.3	1.4	1.8
Single-family	%AR	4.4	13.4	33.9	36.6	41.5	31.7	26.3	17.5	14.5	32.3	16.6	5.4	2.8
Multifamily	%AR	37.7	-1.6	21.8	14.3	10.5	8.3	9.4	8.7	16.1	11.1	-2.4	-7.8	-1.9
Other	%AR	5.8	7.5	8.4	8.3	8.8	7.3	3.8	2.0	6.4	7.2	1.0	-1.0	1.2
Exports	%AR	-0.4	2.8	4.1	5.1	5.6	5.9	6.1	5.6	1.1	5.3	5.7	6.0	5.8
Merchandise	%AR	-1.7	2.6	4.1	5.4	6.1	6.5	6.7	5.9	0.0	5.6	5.9	6.1	5.8
Services	%AR	2.4	3.1	4.3	4.6	4.7	4.8	4.9	4.9	3.3	4.6	5.1	5.7	5.6
Imports	%AR	4.2	4.4	5.8	6.3	7.0	7.1	7.0	6.8	3.3	6.6	6.3	4.6	4.5
Merchandise	%AR	3.5	3.6	5.3	6.0	6.9	7.0	7.2	7.0	2.7	6.4	6.5	4.5	4.3
Services	%AR	7.5	7.8	8.0	7.3	7.3	7.6	6.5	6.0	6.1	7.3	5.6	4.9	5.0
Government	%AR	1.0	-1.9	-2.2	-0.9	-0.8	-0.3	-0.2	-0.3	-0.1	-0.8	-0.2	-0.2	0.1
Defense	%AR	-2.7	-3.3	-2.6	-1.4	-1.4	-1.1	-1.6	-1.5	-1.4	-1.6	-1.5	-1.0	-0.7
Nondefense	%AR	-3.0	-2.7	-1.1	-0.7	-0.8	-0.8	-0.6	-0.6	-0.9	-0.9	-0.6	-0.3	0.0
State and local	%AR	3.4	-1.2	-2.4	-0.8	-0.5	0.2	0.5	0.3	0.6	-0.5	0.3	0.1	0.4
Final sales	%AR	2.9	2.4	3.1	3.1	3.4	3.2	2.9	2.7	2.6	3.1	2.6	1.9	1.6
Final domestic sales	%AR	3.4	2.7	3.4	3.3	3.7	3.4	3.2	3.0	2.8	3.4	2.8	1.8	1.6
Consumers														
Personal saving rate	%	5.2	5.2	4.8	4.7	4.6	4.7	4.8	5.0	5.0	4.8	5.1	5.0	4.6
Retail sales & food services	$ tril	5.42	5.48	5.57	5.64	5.73	5.81	5.89	5.96	5.53	5.85	6.15	6.38	6.59
Change	%AR	*3.2*	*4.6*	*6.5*	*5.4*	*6.2*	*6.1*	*5.4*	*4.7*	*4.0*	*5.8*	*5.1*	*3.9*	*3.3*
Total vehicle sales	mil	17.66	17.70	17.78	17.63	17.41	17.29	17.14	17.11	17.69	17.24	17.01	16.58	16.34
Housing starts	mil	1.16	1.39	1.45	1.53	1.63	1.74	1.82	1.87	1.38	1.76	1.85	1.73	1.69
Median house sales price	$ ths	233.65	236.13	238.43	240.34	242.23	243.57	244.71	245.68	237.14	244.05	247.65	254.30	264.71
Change	%AR	*12.9*	*4.3*	*3.9*	*3.2*	*3.2*	*2.2*	*1.9*	*1.6*	*7.1*	*2.9*	*1.5*	*2.7*	*4.1*
Producers														
Industrial production	2007=100	107.1	107.4	108.2	108.8	109.2	109.7	110.1	110.5	107.9	109.9	111.4	112.6	113.6
Change	%AR	*1.7*	*1.3*	*2.9*	*2.1*	*1.8*	*1.6*	*1.7*	*1.4*	*0.7*	*1.9*	*1.4*	*1.1*	*0.9*
Capacity utilization	%	76.7	76.6	76.6	76.6	76.6	76.5	76.4	76.3	76.6	76.5	76.1	75.9	75.9
Labor Markets														
Total employment	mil	143.5	144.1	144.6	145.3	145.9	146.5	147.1	147.7	144.4	146.8	149.1	150.7	151.3
Change	%AR	*1.7*	*1.7*	*1.6*	*1.8*	*1.8*	*1.7*	*1.6*	*1.6*	*1.8*	*1.7*	*1.5*	*1.1*	*0.4*
Avg monthly change	ths	*188*	*203*	*198*	*214*	*209*	*209*	*198*	*198*	*201*	*203*	*171*	*92*	*35*
Unemployment rate	%	4.9	4.9	4.8	4.7	4.7	4.7	4.6	4.5	4.8	4.6	4.6	4.8	5.0
Prices														
Consumer price index	1982=100	238.2	239.5	241.1	243.0	244.9	246.8	248.6	250.4	240.4	247.6	255.0	262.2	268.5
Change	%AR	*0.1*	*2.2*	*2.8*	*3.1*	*3.1*	*3.1*	*3.0*	*2.9*	*1.5*	*3.0*	*3.0*	*2.8*	*2.4*
Producer price index	1982=100	182.4	183.9	186.3	189.2	192.2	195.0	197.1	199.0	185.4	195.8	203.8	209.5	213.9
Change	%AR	*-7.0*	*3.1*	*5.3*	*6.4*	*6.7*	*5.9*	*4.3*	*3.9*	*-2.7*	*5.6*	*4.1*	*2.8*	*2.1*
West Texas Intermediate	$/Bbl	31.9	36.1	41.6	46.4	51.1	55.0	58.2	60.1	39.0	56.1	65.0	69.6	73.3
Financial Markets														
Federal funds	%	0.37	0.53	0.69	0.85	1.30	1.75	2.24	2.80	0.61	2.02	3.62	3.72	3.59
Prime rate	%	3.50	3.66	3.81	3.97	4.43	4.88	5.37	5.93	3.73	5.15	6.74	6.85	6.72
10-yr Treasury	%	1.91	2.28	2.53	2.83	3.27	3.59	3.77	3.89	2.39	3.63	4.02	3.98	3.98
FRB 10-country index	Jan97=100	125.0	126.2	127.0	127.6	127.9	127.3	126.2	124.3	126.4	126.4	118.4	116.7	118.5
Change	%AR	*14.2*	*3.9*	*2.7*	*1.7*	*1.0*	*-1.7*	*-3.3*	*-6.0*	*7.8*	*-0.0*	*-6.3*	*-1.4*	*1.5*
Government Balance														
NIPA basis	$ bil	-616.9	-646.7	-653.0	-689.5	-734.3	-752.8	-764.3	-779.6	-651.5	-757.8	-832.4	-903.0	-931.3
Unified budget	$ bil	-313.3	77.2	-157.8	-231.5	-337.4	50.2	-186.7	-256.3	-625.4	-730.3	-825.0	-894.8	-942.8

NONFARM EMPLOYMENT, ANNUALIZED % CHANGE

	16Q1	16Q2	16Q3	16Q4	17Q1	17Q2	17Q3	17Q4	2017	2018	2019	2020	2021
New England													
Connecticut	1.1	1.1	1.2	1.3	1.3	1.3	1.3	1.2	1.3	1.2	0.8	0.3	0.3
Maine	1.1	1.5	1.6	1.7	1.6	1.6	1.5	1.4	1.6	1.3	0.9	0.3	0.2
Massachusetts	1.2	1.1	1.2	1.3	1.4	1.4	1.4	1.3	1.3	1.3	0.9	0.4	0.4
New Hampshire	0.9	1.1	1.2	1.3	1.6	1.7	1.8	1.8	1.5	1.8	1.3	0.6	0.5
Rhode Island	1.2	1.2	1.3	1.4	1.5	1.4	1.3	1.2	1.4	1.2	0.9	0.3	0.3
Vermont	1.4	1.5	1.5	1.6	1.7	1.7	1.5	1.4	1.6	1.4	1.0	0.4	0.3
Middle Atlantic													
New Jersey	1.5	1.5	1.6	1.6	1.7	1.6	1.5	1.4	1.6	1.3	0.9	0.3	0.3
New York	0.9	0.9	1.0	1.1	1.1	1.2	1.4	1.1	1.1	1.1	0.7	0.3	0.2
Pennsylvania	1.5	1.5	1.6	1.6	1.6	1.6	1.5	1.4	1.6	1.3	0.9	0.3	0.3
South Atlantic													
Delaware	2.1	2.1	2.3	2.4	2.4	2.4	2.2	2.0	2.3	1.9	1.3	0.5	0.4
District of Columbia	0.5	0.6	0.6	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.7	0.4	0.3
Florida	2.4	2.4	2.6	2.7	2.8	2.8	2.7	2.5	2.7	2.5	1.8	0.9	0.7
Georgia	2.3	2.3	2.5	2.6	2.6	2.6	2.4	2.3	2.5	2.2	1.6	0.7	0.6
Maryland	1.8	1.4	1.6	1.6	1.5	1.5	1.3	1.2	1.5	1.2	0.9	0.4	0.4
North Carolina	1.6	1.6	1.8	1.9	2.1	2.1	2.1	1.9	2.0	1.9	1.5	0.8	0.6
South Carolina	1.9	1.9	2.1	2.2	2.2	2.2	2.1	2.0	2.2	1.9	1.4	0.6	0.6
Virginia	1.8	1.7	2.1	2.1	2.2	2.1	2.0	1.9	2.1	1.8	1.3	0.5	0.4
West Virginia	0.7	0.7	1.0	1.1	1.4	1.6	1.4	1.5	1.3	1.5	1.5	0.9	0.5
East North Central													
Illinois	0.9	0.9	1.0	1.0	1.1	1.0	1.0	0.9	1.0	0.9	0.6	0.3	0.3
Indiana	2.7	2.5	2.3	2.3	2.2	2.1	1.9	1.7	2.2	1.7	1.2	0.5	0.4
Michigan	1.3	1.2	1.4	1.4	1.4	1.7	1.6	1.5	1.5	1.5	1.0	0.4	0.3
Ohio	1.6	1.7	1.9	1.9	2.0	2.0	1.9	1.7	1.9	1.7	1.1	0.4	0.4
Wisconsin	1.2	1.1	1.2	1.3	1.5	1.4	1.4	1.4	1.4	1.4	1.1	0.4	0.4
East South Central													
Alabama	2.7	1.9	1.8	1.8	1.9	1.9	1.8	1.6	1.8	1.7	1.3	0.6	0.5
Kentucky	1.7	1.8	1.9	2.0	2.1	2.1	1.9	1.8	2.0	1.7	1.2	0.5	0.5
Mississippi	2.1	1.5	1.6	1.6	1.8	1.8	1.7	1.5	1.7	1.5	1.0	0.4	0.4
Tennessee	2.0	2.0	2.1	2.2	2.2	2.2	2.1	1.9	2.2	1.9	1.3	0.5	0.4
West North Central													
Iowa	1.2	1.2	1.3	1.3	1.4	1.4	1.4	1.2	1.4	1.2	0.9	0.4	0.3
Kansas	2.1	2.1	2.2	2.3	2.3	2.2	2.0	1.9	2.2	1.8	1.2	0.5	0.4
Minnesota	1.4	1.5	1.5	1.7	1.8	1.8	1.8	1.6	1.7	1.6	1.1	0.4	0.4
Missouri	1.2	1.2	1.4	1.5	1.7	1.7	1.7	1.6	1.6	1.5	1.0	0.4	0.4
Nebraska	1.6	1.7	1.7	1.8	1.8	1.8	1.7	1.5	1.7	1.5	1.0	0.5	0.4
North Dakota	0.1	0.3	0.9	1.0	1.6	1.9	1.8	1.8	1.4	1.6	1.1	0.6	0.6
South Dakota	1.3	1.4	1.5	1.6	1.7	1.7	1.6	1.6	1.6	1.5	1.1	0.6	0.5
West South Central													
Arkansas	1.2	1.2	1.4	1.5	1.6	1.6	1.5	1.4	1.5	1.3	0.9	0.4	0.3
Louisiana	0.8	1.2	1.3	1.7	1.2	1.3	1.3	1.3	1.3	1.2	0.8	0.3	0.3
Oklahoma	1.9	1.9	1.9	1.9	1.9	1.9	1.6	1.6	1.8	1.5	1.2	0.6	0.5
Texas	1.1	0.9	1.2	1.5	1.8	2.3	2.5	2.4	1.8	2.4	1.9	1.3	1.2
Mountain													
Arizona	3.4	3.5	3.7	3.8	3.8	3.7	3.4	3.2	3.7	3.1	2.2	1.0	0.9
Colorado	1.3	1.9	2.0	2.4	2.5	2.5	2.4	2.2	2.3	2.1	1.5	0.7	0.6
Idaho	2.2	2.2	2.3	2.3	2.4	2.4	2.2	2.1	2.3	2.0	1.5	0.7	0.6
Montana	1.5	1.6	1.7	1.7	1.8	1.8	1.7	1.6	1.7	1.5	1.0	0.4	0.4
Nevada	3.0	2.7	3.2	2.9	2.1	2.8	2.6	2.3	2.6	2.2	1.6	0.8	0.8
New Mexico	1.9	2.0	2.1	2.1	2.1	2.1	1.9	1.8	2.0	1.7	1.3	0.6	0.5
Utah	1.9	2.0	2.1	2.2	2.3	2.3	2.2	2.1	2.2	2.1	1.5	0.7	0.6
Wyoming	0.5	2.2	2.2	1.2	2.5	3.3	3.0	2.6	2.4	2.3	1.3	0.6	0.5
Pacific													
Alaska	3.5	3.1	2.3	1.8	1.7	1.4	1.2	1.1	1.7	1.0	0.5	0.1	0.1
California	1.8	1.7	1.9	2.0	2.0	2.1	1.9	1.8	2.0	1.8	1.3	0.6	0.5
Hawaii	1.1	1.0	1.0	1.1	1.1	1.2	1.2	1.1	1.1	1.1	0.8	0.3	0.2
Oregon	1.8	1.9	2.1	2.3	2.3	2.3	2.2	2.1	2.2	2.1	1.6	0.8	0.7
Washington	1.9	1.8	2.0	2.2	2.3	2.3	2.2	2.0	2.2	2.0	1.4	0.6	0.5
United States	**1.7**	**1.7**	**1.6**	**1.8**	**1.8**	**1.7**	**1.6**	**1.6**	**1.7**	**1.5**	**1.1**	**0.4**	**0.4**

NONFARM EMPLOYMENT, ANNUALIZED % CHANGE

	16Q1	16Q2	16Q3	16Q4	17Q1	17Q2	17Q3	17Q4	2017	2018	2019	2020	2021
New England													
Boston	1.2	1.4	1.2	1.3	1.4	1.3	1.3	1.4	1.3	1.3	0.8	0.4	0.3
Bridgeport-Stamford-Norwalk	0.2	0.3	0.4	0.3	0.6	0.4	0.6	0.8	0.5	0.7	0.4	0.1	0.1
Cambridge	1.3	1.5	1.3	1.4	1.5	1.4	1.4	1.4	1.4	1.3	0.8	0.4	0.3
Hartford	1.2	1.6	1.3	1.4	1.4	1.2	1.2	1.3	1.3	1.1	0.7	0.2	0.2
Middle Atlantic													
Albany	1.9	1.4	1.4	1.5	1.6	1.6	1.7	1.4	1.5	1.3	0.8	0.3	0.3
Camden	0.8	2.0	1.8	1.9	2.0	1.7	1.6	1.5	1.8	1.3	0.7	0.3	0.2
Nassau-Suffolk	1.0	0.9	0.9	1.0	1.0	1.2	1.4	1.2	1.1	1.1	0.7	0.3	0.2
New York	1.7	1.3	1.4	1.4	1.2	1.3	1.4	1.3	1.3	1.2	0.8	0.3	0.3
Newark	0.6	1.5	1.6	1.5	1.5	1.5	1.5	1.6	1.5	1.4	0.8	0.3	0.2
Philadelphia	2.1	2.1	2.1	2.1	2.0	1.9	1.8	1.7	2.0	1.6	0.9	0.2	0.1
Pittsburgh	1.4	1.7	1.5	1.6	1.7	1.5	1.4	1.5	1.6	1.4	0.9	0.4	0.3
Rochester	2.6	3.0	2.9	2.9	2.8	2.4	2.3	2.2	2.7	2.0	1.2	0.5	0.4
South Atlantic													
Atlanta	2.7	2.9	3.1	3.0	2.7	2.6	2.5	2.6	2.8	2.4	1.8	0.9	0.7
Baltimore	0.9	0.5	0.7	0.8	0.9	1.0	0.9	0.8	0.8	0.9	0.8	0.3	0.3
Charlotte	2.2	2.6	2.4	2.6	2.8	2.5	2.5	2.6	2.6	2.3	1.6	0.9	0.8
Fort Lauderdale	1.9	1.9	2.0	2.3	2.6	2.7	2.6	2.3	2.4	2.4	1.5	0.5	0.5
Miami	2.3	2.3	2.4	2.6	2.9	3.0	2.8	2.6	2.7	2.5	1.6	0.5	0.4
Orlando	3.0	3.0	3.2	3.5	3.8	4.0	3.9	3.6	3.7	3.6	2.7	1.6	1.5
Raleigh	3.2	3.7	3.6	3.7	3.9	3.7	3.6	3.6	3.7	3.3	2.5	1.7	1.6
Tampa	2.2	2.1	2.2	2.5	2.8	3.0	2.8	2.6	2.7	2.6	1.7	0.7	0.6
Virginia Beach	2.4	1.5	1.9	1.9	1.7	1.7	1.5	1.7	1.7	1.5	1.1	0.4	0.3
Washington DC	1.1	1.7	1.5	1.8	2.0	2.1	2.0	2.0	1.9	1.8	1.1	0.4	0.3
East North Central													
Chicago	2.0	2.3	2.1	2.2	2.2	2.0	1.9	1.8	2.1	1.7	0.9	0.4	0.3
Cincinnati	1.7	2.0	1.8	1.9	2.1	1.9	1.8	1.7	1.9	1.5	1.0	0.5	0.4
Cleveland	1.6	1.9	1.7	1.9	2.0	1.7	1.7	1.5	1.8	1.4	0.8	0.3	0.2
Columbus	2.5	2.8	2.6	2.7	2.9	2.6	2.4	2.3	2.7	2.1	1.4	0.9	0.8
Detroit	2.2	2.1	1.8	1.6	1.5	1.4	1.4	1.5	1.6	1.4	0.7	0.0	-0.0
Indianapolis	4.0	3.7	3.5	3.3	2.9	2.4	2.1	1.9	2.9	1.8	1.2	0.6	0.4
Milwaukee	1.5	1.7	1.7	2.1	1.9	2.0	1.8	1.8	1.9	1.7	1.1	0.4	0.3
Warren	2.3	2.7	2.4	2.5	2.5	2.5	2.4	2.4	2.5	2.2	1.4	0.7	0.5
East South Central													
Memphis	2.7	2.9	3.0	3.0	2.8	2.8	2.6	2.6	2.8	2.5	1.6	0.5	0.4
Nashville	2.4	2.9	2.6	2.7	2.7	2.4	2.3	2.3	2.6	2.2	1.3	0.6	0.5
West North Central													
Kansas City	2.0	1.8	1.9	2.2	2.4	2.2	2.1	1.8	2.1	1.7	1.0	0.4	0.3
Minneapolis	1.5	1.6	1.7	1.7	1.7	1.6	1.5	1.6	1.7	1.5	1.1	0.4	0.3
St. Louis	1.9	2.2	1.9	2.2	2.4	2.2	2.1	1.8	2.2	1.7	0.9	0.3	0.3
West South Central													
Austin	2.6	3.2	2.5	2.5	1.9	2.2	2.5	2.3	2.3	2.6	2.7	2.2	2.1
Dallas	3.9	2.7	3.0	2.6	2.6	2.8	2.8	2.8	2.7	3.0	2.4	1.7	1.5
Ft. Worth	2.1	2.7	2.2	2.4	2.6	3.0	3.0	3.3	2.7	3.2	2.8	1.9	1.4
Houston	-0.0	0.3	0.2	0.2	0.5	0.9	1.8	1.8	0.7	2.3	2.5	1.6	1.5
New Orleans	-3.1	-2.2	-1.8	-1.2	-1.4	-0.9	-0.8	-0.4	-1.2	-0.1	0.9	0.7	0.8
Oklahoma City	1.8	1.8	1.8	1.8	1.8	1.8	1.6	1.6	1.8	1.5	1.2	0.6	0.4
San Antonio	2.6	2.5	2.1	1.8	1.9	2.5	2.5	2.6	2.2	2.6	2.0	1.3	1.2
Mountain													
Denver	1.9	2.2	2.3	2.5	2.6	2.4	2.3	2.4	2.4	2.1	1.5	0.8	0.7
Las Vegas	0.1	3.4	3.9	3.2	2.0	2.6	2.3	2.6	2.7	2.3	1.8	1.0	0.9
Phoenix	4.0	4.2	4.1	4.1	3.8	3.7	3.7	3.8	3.9	3.4	2.2	1.0	0.8
Salt Lake City	1.7	2.1	1.8	2.2	2.7	2.6	2.5	2.3	2.4	2.2	1.3	0.6	0.5
Pacific													
Los Angeles	2.2	2.4	2.2	2.3	2.4	2.2	2.0	2.1	2.3	1.9	1.1	0.4	0.3
Oakland	2.7	3.0	2.7	2.8	2.8	2.5	2.4	2.4	2.7	2.2	1.3	0.7	0.6
Portland	1.6	1.8	1.9	2.1	1.9	2.1	2.0	2.2	2.0	2.1	1.6	0.7	0.7
Riverside	2.4	2.5	2.3	2.4	2.5	2.3	2.1	2.2	2.4	2.0	1.4	0.8	0.7
Sacramento	2.3	2.5	2.2	2.3	2.4	2.2	2.1	2.2	2.3	2.0	1.4	0.8	0.8
San Diego	2.2	2.3	2.2	2.3	2.5	2.2	2.1	2.2	2.3	2.0	1.3	0.7	0.6
San Francisco	2.4	1.9	1.8	1.5	1.6	2.1	2.1	2.2	1.8	2.1	1.6	0.7	0.6
San Jose	2.6	2.6	2.4	2.5	2.7	2.5	2.4	2.4	2.5	2.2	1.4	0.6	0.5
Santa Ana-Anaheim	1.7	1.8	1.6	1.7	2.0	1.8	1.7	1.8	1.8	1.7	1.2	0.6	0.5
Seattle	1.7	1.9	1.8	2.2	2.5	2.2	2.2	2.0	2.2	1.9	1.2	0.6	0.5

REAL GROSS DOMESTIC PRODUCT, % CHANGE YR AGO

	16Q1	16Q2	16Q3	16Q4	17Q1	17Q2	17Q3	17Q4	2015	2016	2017	2018	2019
Europe													
Austria	0.8	1.0	1.4	1.7	1.5	1.5	1.8	1.9	0.8	1.2	1.7	1.7	1.5
Belgium	1.3	1.1	1.4	1.7	2.0	2.3	2.3	2.0	1.4	1.4	2.1	1.5	1.5
Czech Republic	2.6	2.4	2.6	2.9	3.0	2.9	2.7	2.6	4.4	2.6	2.8	2.3	2.1
Denmark	1.0	1.4	2.7	3.0	2.5	2.5	2.4	2.5	1.2	2.0	2.5	2.3	2.2
Euro zone	1.4	1.4	1.5	1.6	1.8	1.9	1.9	1.9	1.5	1.5	1.9	1.8	1.7
Finland	-0.1	0.1	0.9	1.6	2.6	2.5	2.6	2.3	0.4	0.6	2.5	1.8	1.8
France	0.9	1.4	1.4	1.5	1.7	1.6	1.7	1.7	1.1	1.3	1.7	1.6	1.6
Germany	1.3	1.4	1.6	1.8	1.9	1.8	1.7	1.7	1.4	1.5	1.8	1.6	1.4
Greece	-2.0	-2.9	-1.5	-1.2	0.8	2.4	3.2	3.8	-0.3	-1.9	2.6	3.8	2.9
Hungary	2.3	2.4	2.5	2.1	2.3	2.1	2.1	2.1	3.0	2.3	2.1	2.5	3.2
Ireland	6.2	5.3	4.7	3.6	3.1	2.8	2.2	2.0	7.1	4.9	2.5	2.8	2.6
Italy	0.9	0.9	1.1	1.2	1.2	1.3	1.3	1.4	0.6	1.0	1.3	1.6	1.7
Netherlands	1.1	1.1	1.2	0.8	1.1	1.5	1.8	2.1	2.0	1.0	1.6	2.2	2.0
Norway	0.4	0.7	-0.4	1.4	2.0	2.4	2.6	2.6	1.7	0.6	2.4	2.8	2.7
Poland	3.6	3.6	3.5	3.4	3.3	3.2	3.2	3.1	3.6	3.5	3.2	3.0	2.8
Portugal	1.1	1.1	1.5	1.8	2.1	2.2	2.2	2.2	1.5	1.4	2.2	2.0	1.7
Russian Federation	-4.1	-2.0	-0.4	2.8	3.6	3.6	3.1	2.9	-3.7	-1.0	3.3	2.2	1.5
South Africa	0.9	1.7	1.8	1.7	2.0	2.5	3.0	3.5	1.4	1.5	2.8	4.1	4.1
Spain	3.2	2.8	2.6	2.4	2.5	2.7	2.6	2.5	3.2	2.8	2.6	2.1	1.8
Sweden	4.4	3.9	3.6	2.9	2.8	2.7	2.6	2.5	3.8	3.7	2.6	2.4	2.3
Switzerland	1.0	1.3	1.8	2.1	2.2	2.1	2.3	2.1	0.9	1.5	2.2	1.6	1.5
Turkey	3.5	3.4	3.1	4.7	4.4	4.2	4.2	3.9	4.0	3.7	4.2	3.5	3.5
United Kingdom	1.9	1.8	2.1	2.3	2.5	2.6	2.5	2.3	2.2	2.0	2.5	2.2	2.1
Latin America													
Argentina	0.7	0.4	0.6	1.2	2.5	3.1	3.7	4.2	1.9	0.7	3.4	4.2	4.0
Brazil	-5.8	-3.3	-2.0	-0.8	0.1	0.5	1.9	3.1	-3.9	-3.0	1.4	3.0	2.7
Chile	1.0	1.9	2.1	3.0	3.0	2.8	3.0	3.2	2.0	2.0	3.0	2.8	3.9
Colombia	2.5	2.5	2.3	3.0	3.2	3.7	3.7	3.8	3.0	2.6	3.6	4.5	4.3
Mexico	2.1	2.3	2.3	2.5	2.9	3.0	3.2	3.7	2.5	2.3	3.2	4.0	3.3
Peru	6.5	6.4	6.1	5.1	3.0	3.3	3.4	3.7	3.4	6.0	3.4	4.0	4.0
Venezuela	-9.9	-9.3	-10.3	-5.7	-2.0	-0.0	1.5	2.6	-6.5	-8.8	0.5	3.1	3.7
Asia/Pacific													
Australia	2.5	2.9	2.5	2.6	3.0	3.1	3.0	3.0	2.5	2.6	3.0	2.9	2.8
China	6.7	6.5	6.4	6.2	6.1	6.1	6.0	5.7	6.9	6.4	6.0	5.7	5.4
Hong Kong	1.7	1.8	1.9	2.2	2.3	2.2	2.1	2.0	2.4	1.9	2.1	2.0	2.0
India	7.2	7.0	5.7	10.1	9.1	7.8	7.0	6.3	7.5	7.5	7.5	7.0	7.5
Indonesia	5.2	4.9	4.9	4.9	5.0	5.2	5.1	4.6	4.8	5.0	5.0	4.6	4.3
Japan	-0.2	0.4	0.5	1.2	1.4	1.4	1.1	1.1	0.5	0.5	1.3	1.1	1.1
Malaysia	4.0	3.8	4.4	4.4	5.6	6.3	6.6	6.4	4.9	4.1	6.2	4.9	3.8
New Zealand	2.6	4.2	3.2	2.3	2.4	0.2	0.1	0.6	3.1	3.1	0.8	1.1	2.2
Philippines	7.9	7.3	7.5	6.9	4.9	4.0	3.5	3.5	5.8	7.4	4.0	5.1	5.1
Singapore	1.7	2.5	2.7	2.1	3.5	4.2	4.4	4.2	2.0	2.2	4.1	3.1	2.8
South Korea	2.6	2.8	2.1	2.2	2.5	2.7	2.9	3.0	2.6	2.4	2.8	3.0	2.8
Taiwan	-0.4	1.5	2.0	2.0	1.9	2.2	2.5	2.7	0.7	1.3	2.3	3.1	3.1
Thailand	2.7	2.9	2.7	2.7	3.2	3.5	3.5	3.3	2.8	2.8	3.4	2.7	2.7
North America													
United States	2.3	1.9	2.3	2.8	3.0	3.2	3.1	3.0	2.4	2.3	3.1	2.6	1.9
Canada	0.9	1.6	1.7	2.3	2.9	3.0	3.0	2.9	1.2	1.6	3.0	2.3	1.9

Economic Risks of Climate Change: An Overview

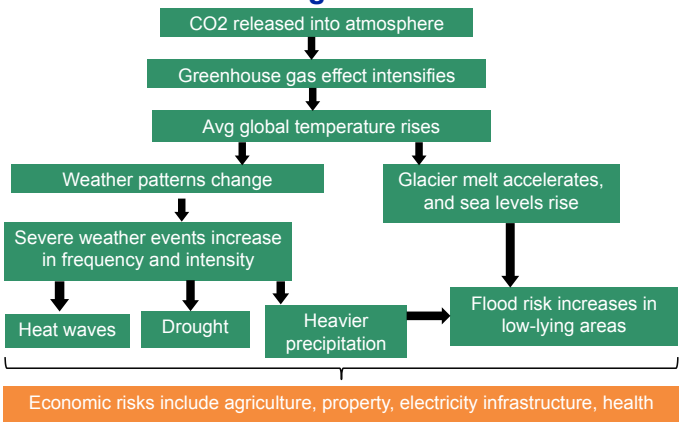
BY LAURA RATZ AND THOMAS NICHOLS

Carbon dioxide emissions and climate change have far-reaching implications for regional economies. The complex externalities and ubiquitous effects of increasing carbon dioxide concentrations in the atmosphere make the implications difficult to measure and categorize. The purpose of this article is to provide an overview and a framework for considering the economic risks of climate change and CO2 emissions regulation and to quantify regional risks.

In August, the Environmental Protection Agency announced the Clean Power Plan, a state-based approach to reducing carbon dioxide emissions nationwide. The EPA has set individual state emissions reduction targets based on each state's particular mix of energy sources and current emissions levels. While the CPP has elicited opposition in some states, the scientific research indicates that the planet is getting warmer[1] and it is mainly caused by human activity.[2] Opposition is not completely without economic basis, however. Shifting away from coal bodes ill, for example, for the approximately 60,000 coal mining jobs nationwide. Although there are tough choices to be made, there is a growing consensus that individuals, governments and businesses should take steps to alter their behavior and mitigate some of the damage that carbon emissions cause the planet. If we do not take the long view now, the implications—economic and otherwise—will be far worse for future generations.

As global temperatures rise, there are changes to weather patterns and the physical landscape.[3] These changes are disruptive and have real economic consequences (see Chart 1). The generally accepted international goal is to limit the rise of average global temperature at 2 degrees Celsius above pre-industrial levels. According to Climate Interactive and the Massachusetts Institute of Technology, the planet is on a trajectory for a 4.5-degree increase by the year 2100.[4] Current pledges of reductions bring the trajectory down to 3.5 degrees, still well above the 2 degree Celsius benchmark.

Chart 1: Climate Change Risks at a Glance



As governments take steps to curb carbon dioxide emissions, climate change risks are shifting. The CPP, state actions, and the COP 21 agreement from Paris will hopefully reduce the risks. The economic ramifications of climate change will be revisited and explained later. This paper first takes a look at the policies aimed at turning the tide.

COP 21

COP 21, or the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change, was an international negotiation held in Paris in December. COP 21 adopted the Paris Agree-

1 NOAA National Centers for Environmental Information, State of the Climate: Global Analysis for Annual 2015, January 2016. http://www.ncdc.noaa.gov/sotc/global/201513.

2 Union of Concerned Scientists, "How Do We Know That Humans Are the Major Cause of Global Warming?". http://www.ucsusa.org/global_warming/science_and_impacts/science/human-contribution-to-gw-faq.html#bf-toc-1

3 NASA. Climate change: How do we know? http://climate.nasa.gov/evidence/

4 Climate Interactive. Massachusetts Institute of Technology. Current INDCs Deliver 3.5°C; With Action 2°C is Possible https://www.climateinteractive.org/tools/scoreboard/scoreboard-science-and-data/

Table 1: State Mass-Based Goals

Total statewide CO2 emissions, short tons

State or tribal area	2012 CO2 emissions	2030 emissions goal	% change
Alabama	75,571,781	56,880,474	-25%
Arizona	40,465,035	30,170,750	-25%
Arkansas	39,746,549	30,322,632	-24%
California	46,100,664	48,410,120	5%
Colorado	41,462,042	29,900,397	-28%
Connecticut	6,659,803	6,941,523	4%
Delaware	4,809,281	4,711,825	-2%
Florida	118,395,844	105,094,704	-11%
Fort Mojave	583,530	588,519	1%
Georgia	59,444,253	46,346,846	-22%
Idaho	703,517	1,492,856	112%
Illinois	91,029,656	66,477,157	-27%
Indiana	107,299,591	76,113,835	-29%
Iowa	38,135,386	25,018,136	-34%
Kansas	34,353,105	21,990,826	-36%
Kentucky	91,372,076	63,126,121	-31%
Louisiana	43,028,425	35,427,023	-18%
Maine	1,795,630	2,073,942	15%
Maryland	20,171,027	14,347,628	-29%
Massachusetts	13,125,248	12,104,747	-8%
Michigan	69,860,454	47,544,064	-32%
Minnesotta	28,263,179	22,678,368	-20%
Mississippi	25,678,853	25,304,337	-1%
Missouri	78,039,449	55,462,884	-29%
Montana	17,924,535	11,303,107	-37%
Navajo	31,416,873	21,700,587	-31%
Nebraska	27,142,728	18,272,739	-33%
Nevada	15,536,730	13,523,584	-13%
New Hampshire	4,642,898	3,997,579	-14%
New Jersey	15,207,143	16,599,745	9%
New Mexico	17,339,683	12,412,602	-28%
New York	34,596,456	31,257,429	-10%
North Carolina	58,353,477	51,266,234	-12%
North Dakota	33,370,886	20,883,232	-37%
Ohio	99,908,710	73,769,806	-26%
Oklahoma	52,862,077	40,488,199	-23%
Oregon	7,659,775	8,118,654	6%
Pennsylvania	116,657,632	89,822,308	-23%
Rhode Island	3,735,786	3,522,225	-6%
South Carolina	35,893,265	25,998,968	-28%
South Dakota	3,184,962	3,539,481	11%
Tennessee	39,752,071	28,348,396	-29%
Texas	240,730,037	189,588,842	-21%
Utah	30,822,343	23,778,193	-23%
Ute	3,314,097	2,263,431	-32%
Virginia	27,365,439	27,433,111	0%
Washington	7,360,183	10,739,172	46%
West Virginia	72,318,917	51,325,342	-29%
Wisconsin	42,317,602	27,986,988	-34%
Wyoming	49,998,736	31,634,412	-37%

Sources: Energy Information Administration, Moody's Analytics

ment, a plan to cap global warming at 2 degrees Celsius above pre-industrial levels, with a target of 1.5 degrees Celsius. The agreement relies on individual nations crafting their own nationally determined contributions, through greenhouse gas reduction plans that run through 2030.

The international community recognizes the plan as ambitious. If adopted, it could mitigate many of the effects of climate change. The plan is open for signatures for a year, starting April 22. The treaty becomes legally binding if the 55 countries responsible for 55% of global emissions sign on in that time.[5] However, the plan has no way of forcing signatories to set an appropriate nationally determined contribution, nor can it hold signatories to their targets, although this may make it more palatable for a number of countries to ratify the plan. After signing the agreement, signatories essentially have unlimited time to go through domestic ratification.

The Clean Power Plan

The EPA's Clean Power Plan provides state-specific targets for CO2 emissions but leaves it up to each state to determine how it can best achieve its target. The plan allows states to meet either a mass-based goal measured in total CO2 emissions (see Table 1) or a rate-based goal measured in CO2 emissions per megawatt hour of energy produced. The rate-based and mass-based goals are not always consistent.

States must meet their target by 2030, along with an interim goal in 2022. The EPA crafted the unique target for each state based on the goals of increased efficiency at coal plants, a shift toward natural gas, increased renewable energy usage, and increased efficiency of consumer products.[6]

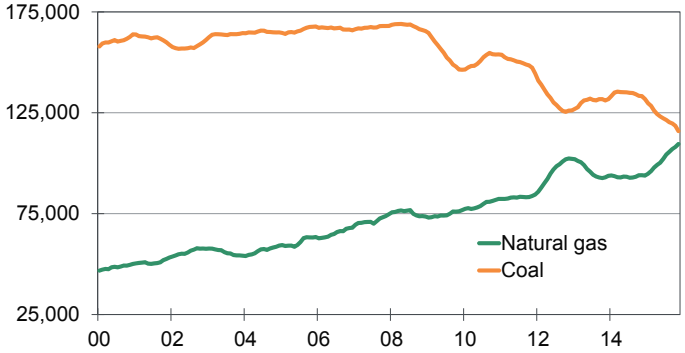
Initially, states were expected to submit either a final plan or a request for an extension by September 2016. Plans could include source-specific requirements for all plants

5 The Conference on Parties, "Adoption of the Paris Agreement." December 2015. http://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf

6 The Environmental Protection Agency. "Goal Computation Technical Support Document" June 2014. http://www.epa.gov/sites/production/files/2014-06/documents/20140602tsd-goal-computation.pdf

Chart 2: Natural Gas Narrows the Gap

Energy production by fuel source, mil kilowatt hrs



Sources: U.S. Energy Information Administration, Moody's Analytics

within a state or a mixture of state measures such as renewable energy standards and residential energy efficiency programs. States also have the option of working together to meet their goals collectively through emissions trading.

However, in February, the U.S. Supreme Court issued a stay blocking enforcement of the CPP after 27 states brought suit. The Supreme Court's action was unprecedented but reflects the questions surrounding the legality of the CPP, itself an unprecedented action. The District of Columbia Circuit Court will hear arguments in June, and the delay could seriously derail the timeline for when the states submit their plans or even request an extension. Nonetheless, some states and utility companies are moving ahead with carbon-cutting plans.

Coal vs. natural gas

The electricity infrastructure is changing for numerous reasons, and climate change is an important part of the story. For many years, coal was the main fuel for electricity production, but natural gas is moving to the fore (see Chart 2). The technological innovations that led to the shale revolution resulted in a massive jump in domestic natural gas drilling. Just as natural gas production began to take off in 2008, coal production peaked. With more available supply of natural gas, prices have plummeted to as low as $1.70 per million BTUs this year, the lowest level since September 2001. With low prices and high availability, power plants are increasingly turning to natural gas.

Natural gas is a much cleaner fuel than coal. Natural gas power plants emit around 117 pounds of CO2 per million BTU, whereas coal emits 214 to 228 pounds per million BTU.[7] As states attempt to rein in carbon emissions and the EPA places further regulations on coal-fired plants, natural gas will be an appealing alternative since coal-burning plants can transition to using natural gas.

A further shift toward natural gas will depend on many factors. Natural gas transportation is much more difficult than coal. A larger pipeline infrastructure would facilitate the widespread use of natural gas, but there is some opposition to new pipeline construction.

Questions over the economic and environmental sustainability of fracking could also reduce both supply and demand for natural gas. Since fracking is much more expensive than traditional drilling, many domestic producers are capping wells. The number of active natural gas drilling rigs in the U.S. has dropped from more than 1,600 in 2008 to around 120 today. With prices at historically low levels, natural gas extraction will be unprofitable for many producers. With such low prices, many energy companies may even default on loans they took out when prices were much higher, forcing them out of the market altogether.

Natural gas fracking also has potential to cause serious environmental damage. In a controlled environment, fracking can be safe, but rarely will conditions be perfect. Further, aging pipelines and natural gas plants frequently leak methane, the most commonly used natural gas for energy production. Methane has around 23 times the global warming potential of CO2, so any amount in the atmosphere is extremely damaging.

Non-fossil fuels

While natural gas may reduce carbon emissions, it does not eliminate them completely, as renewables can. Relative to fossil fuels, renewable sources make up a much smaller portion of U.S. power generation, about 10%. Regulations will nudge markets toward low-emissions sources. Both the Clean Power Plan and various tax benefits create incentives for renewables.

A problem with renewables is their high costs. The cheapest renewable option, onshore wind plants, are not productive in many places because of topography. Solar costs depend on the size of the project; larger facilities have lower marginal costs. At the residential level, solar power is prohibitively expensive compared with all other fuel types. Even at a low financing rate, large ground-mounted solar facilities are more costly than fossil fuel plants.[8]

Nuclear power is another viable alternative to fossil fuels. It has the advantage of being carbon emission-free. Nuclear energy has a high upfront cost, although marginal costs after the initial investment are low. The economic viability of nuclear energy therefore depends mainly on financing costs. When financing for energy projects is low, nuclear energy becomes the cheapest source of electricity generation over the life of the plant. At a 7% financing rate, nuclear energy costs are on par with coal and below natural gas.[9] Above that rate, nuclear energy is not financially sound.

Nuclear power is not without its downsides, both economically and environmentally. The issue of storing nuclear waste has not yet been solved. Currently, nuclear waste disposal facilities are decentralized. Decommissioning a nuclear plant after a meltdown is also expensive and time-consuming. Three Mile Island's decommission-

7 The U.S. Energy Information Administration, "How much carbon dioxide is produce when different fuels are burned?" June 18, 2015. https://www.eia.gov/tools/faqs/faq.cfm?id=73&t=11

8 The International Energy Agency and the Nuclear Energy Agency, "Projected Costs of Generating Electricity, 2015 Edition." August, 2015. https://www.iea.org/Textbase/npsum/ElecCost2015SUM.pdf

9 Ibid.

ing had an estimated cost of $970 million and took 14 years.[10]

Fossil fuels still account for 80% of U.S. electricity production. Overall nuclear production has remained remarkably steady since 2000, whereas renewable energy production has doubled since then. Renewables and nuclear each account for around 10% of electricity production.

Reductions of greenhouse gas emissions and changes to energy production are already taking place, but are moving slowly. Below, we address some of the specific risks from climate change, shifts in energy production, and the regulatory environment, and how they will affect different industries and regions.

Weather damage

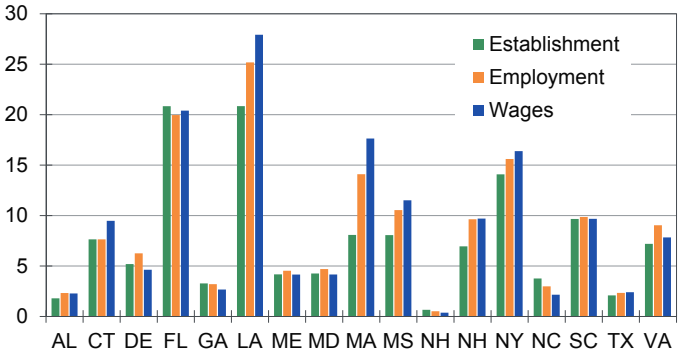
Although it is difficult to attribute any one weather event to climate change, the number of costly severe weather events is increasing.[11] According to the National Oceanic and Atmospheric Administration, in 1980 there were three severe weather events[12] in the U.S. that caused $1 billion or more in damages, adjusted for inflation. The number has risen steadily, and peaked at 16 in 2011. The number of precipitation events costing more than $1 billion has risen approximately fivefold, and the number of events associated with dry conditions (droughts and wildfires) has doubled. The prevalence of high-cost droughts and wildfires is likely lower because drought is a long-term event as opposed to a storm that may last for just several days, and wildfires tend to occur in less densely populated areas, avoiding buildings and productive capital.

An increase in extreme weather events will damage both residential and commercial property. Residential property owners in affected areas will be forced to spend more on repairs as extreme weather events become more common. This will cut into disposable income, harming consumer spending and saving.

When storms and floods damage productive capital such as factories, the supply side will experience a similar effect. Companies will be forced to reduce output in damaged office buildings and factories. This will lead to a reduction in working days at damaged facilities, bringing down overall productivity. Furthermore, these businesses will have to divert capital away from investment and toward repairs, dampening their future potential output. Spending on repairs is a less productive use of working capital and will hamper a firm's ability to expand. These problems will be most noticeable in coastal regions with high-value real estate such as New York City and Florida.

Chart 3: Rising Sea Levels Pose Economic Risk

% of total measure within coastal flood zones



Sources: BLS, Moody's Analytics

Data from the Quarterly Census of Employment and Wages show that more than 20% of all establishments in Florida and Louisiana are within a flood zone (see Chart 3). Among the 17 states for which there are data on establishments in flood zones, 10 states have more than 5% of all establishments in a flood zone.

Agriculture

Aside from the immediate damage from storms, long-term degradation of property is another concern. This can be caused by a number of subtle yet lasting changes in the climate landscape. Every state has become warmer over the past 50 years, but this is especially apparent in the Northeast (see Table 2). In warmer temperatures, precipitation that used to fall as snow can fall as rain, increasing evaporation and transpiration, and reducing the amount of water available for agricultural, residential, commercial and industrial use. As climates become warmer and drier, droughts are more common. Lower soil quality in agricultural areas will not destroy a farmer's entire crop, but will slowly reduce a farm's output. Changing rain patterns will have a similar effect. Ocean acidification will reduce productivity of fisheries, and fluctuating water levels could hamper shipping industries.

Although long-term degradation is harder to predict and quantify, it remains a real risk. Agricultural areas will see their gross output hurt proportionally more. Droughts and heat waves put stress on forestry as well as agriculture. According to NOAA, the prevalence of drought has approximately doubled over the past 30 years.[13] The western U.S. is experiencing one of the most severe droughts on record. The worst of the drought is in California, whose agricultural output is 11% of national total agricultural output and nearly twice as large as that of the next state.

Increased insect activity, driven by warmer temperatures, is also a threat to forestry and agriculture. Hotter and drier conditions put stress on trees, limiting their ability to resist attacks from insects and shifting the habitat of some insects. Warmer winters enable the insect population to expand rapidly, increasing the threats pests pose to crops and forestry. Greater numbers of insects such as mosquitos can also facilitate the spread of disease.

Mining

Policies aimed at lowering emissions will affect the mining industry. Nationally, coal mining is a small industry with only about

10 Paul A. Harden, "Decommissioning Funding Status Report for the Three Mile Island Nuclear Station, Unit 2." U.S. Nuclear Regulatory Commission and GPU Nuclear, Inc. March 28, 2014. http://pbadupws.nrc.gov/docs/ML1409/ML14090A403.pdf

11 NOAA. Billion-Dollar Weather Events: Time Series. http://www.ncdc.noaa.gov/billions/time-series

12 Winter storm, flooding, wildfire, drought, tropical cyclone, severe storm, and freeze.

13 NOAA. Billion-Dollar Weather and Climate Disasters: Time Series. http://www.ncdc.noaa.gov/billions/time-series

Table 2: State Temperature

Avg degrees Celsius

State	1910-1914	1960-1964	2010-2014	50-yr change	100-yr change
Alabama	17.4	16.7	17.3	0.6	0.0
Arizona	15.0	15.1	16.2	1.0	1.2
Arkansas	15.7	15.5	16.1	0.6	0.4
California	13.6	14.1	15.1	0.9	1.4
Colorado	6.6	7.0	7.9	0.9	1.3
Connecticut	8.6	8.7	10.4	1.7	1.7
Delaware	12.2	11.9	13.7	1.7	1.5
Florida	20.9	20.9	21.7	0.7	0.7
Georgia	17.4	16.9	17.7	0.8	0.3
Idaho	5.4	5.8	6.6	0.8	1.2
Illinois	10.9	10.6	11.4	0.8	0.5
Indiana	10.6	10.3	11.3	0.9	0.7
Iowa	8.7	8.4	9.0	0.6	0.3
Kansas	12.2	12.3	12.9	0.6	0.7
Kentucky	13.1	12.5	13.4	1.0	0.3
Louisiana	19.2	18.7	19.4	0.6	0.2
Maine	4.1	4.5	6.1	1.5	2.0
Maryland	12.0	11.7	13.1	1.4	1.2
Massachusetts	8.0	8.1	9.8	1.7	1.8
Michigan	6.1	6.4	7.5	1.0	1.3
Minnesota	4.3	4.7	5.3	0.6	1.1
Mississippi	17.6	17.1	17.7	0.6	0.0
Missouri	12.6	12.2	12.9	0.6	0.3
Montana	4.7	5.4	5.8	0.4	1.1
Nebraska	9.0	9.1	9.7	0.7	0.7
Nevada	9.2	9.7	10.6	0.9	1.4
New Hampshire	5.4	5.6	7.2	1.6	1.8
New Jersey	10.5	10.5	12.3	1.7	1.8
New Mexico	11.4	11.4	12.6	1.1	1.2
New York	6.8	6.8	8.2	1.4	1.4
North Carolina	14.7	14.2	15.2	1.1	0.5
North Dakota	3.9	4.7	4.8	0.1	0.9
Ohio	10.2	9.8	10.9	1.1	0.7
Oklahoma	15.5	15.2	15.9	0.6	0.4
Oregon	7.4	8.1	8.7	0.6	1.4
Pennsylvania	8.9	8.5	9.9	1.4	0.9
Rhode Island	8.8	9.0	10.8	1.8	2.0
South Carolina	16.8	16.3	17.3	1.0	0.5
South Dakota	6.8	7.2	7.4	0.3	0.6
Tennessee	14.4	13.7	14.6	0.9	0.2
Texas	17.9	18.0	18.9	0.9	1.0
United States	10.9	11.0	11.8	0.8	0.9
Utah	8.2	8.7	9.5	0.8	1.2
Vermont	4.9	5.1	6.7	1.6	1.8
Virginia	12.7	12.1	13.3	1.2	0.7
Washington	7.5	7.8	8.4	0.6	0.9
West Virginia	11.0	10.2	11.4	1.1	0.4
Wisconsin	5.7	5.8	6.6	0.8	0.9
Wyoming	4.5	5.0	5.7	0.7	1.3

Sources: National Climactic Data Center: Climate Division, Moody's Analytics

60,000 jobs and falling, but some states will be more severely impacted, most notably Wyoming and West Virginia. Most other states have less to fear (see Chart 4).

The risk to coal mining stems from regulation. If the CPP prevails, coal demand will fall further because of more efficient end-use technologies and the transition toward low carbon emitting energy sources.

Some segments of mining will benefit from changes in the grid composition. Natural gas demand will grow as states convert their coal-fired plants to natural gas. Development of more nuclear plants would also boost uranium mining, although this is a relatively small segment of the overall mining industry.

Although the effects of climate change can be nebulous, the exposure to agriculture and mining industries and increased incidence of weather damage are quantifiable factors. When combining the severity of such risks by geographic location, the pattern of risk of climate change to the economy becomes clearer. Quantitative measures of these risks have been combined into the Moody's Analytics climate change economic risk index.

Climate change economic risk index

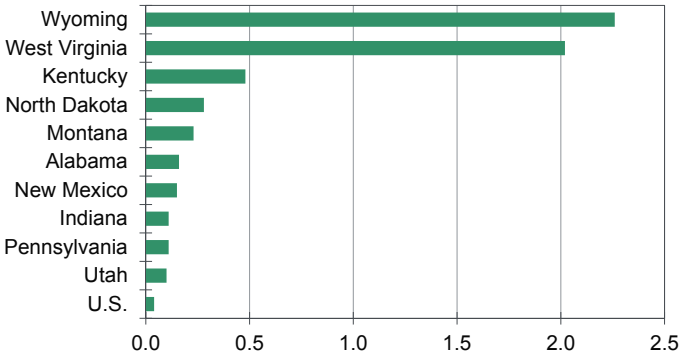
The effects of climate change are different across geographies, and the severity of those effects will also vary. To analyze the pattern of potential risk from climate change in different regions of the U.S., Moody's Analytics has developed an index to rank the exposure of states and counties to some of the economic risks of climate change. The index is composed of three parameters:

- The ratio of water area to land area. Water area includes inland, coastal, Great Lakes, and territorial sea water.
- Agriculture's share of output.
- Mining's share of output.

To determine the index weights, each component was valued equally as a starting point. The weight of the mining factor, however, was then reduced because although compliance will have economic impacts, these impacts are outweighed by those

Chart 4: Coal Mining Employment

% of overall employment, Dec 2015



Sources: BLS, Moody's Analytics

posed by climate change. The value discounted from mining was redistributed equally to agriculture and water area, as agriculture is an industry highly at risk from climate change, and because much of the risk stems from potential flood and storm damage.

Results

The index was constructed at the county level to capture as much local detail as possible. States and even metro areas can extend across a vast swath of land, but the detailed geographical characteristics of an economy are among the most important considerations in the context of climate change. Agriculture is a key component, and while this is an important economic driver, it is generally limited to non-metropolitan areas. States capture all three index components, but states are geographically large and economically diverse. To say that one corner of a state faces the same risks as the opposite corner ignores important differences. The state index broadly captures overall impacts (see Table 3), but the granularity of the counties reflects the best measure (see Tables 4 and 5).

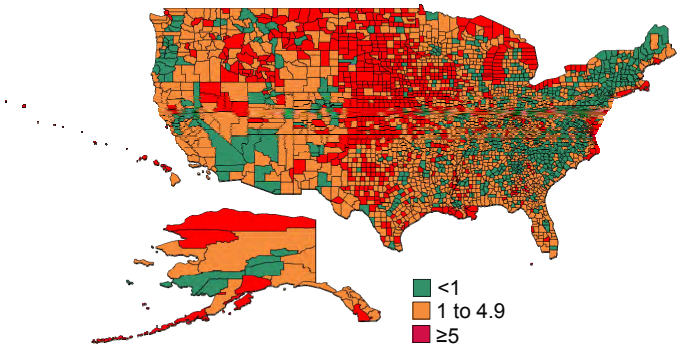
The 100 most exposed counties reflect the location of the greatest risks to climate change based on the three factors of the index. Most are rural and many of them are heavily agricultural. Fifty-seven of the top 100 counties are in South Dakota and Nebraska, the two most agriculture-dependent states in the U.S. Many of the top 100 are in the Midwest because of the high concentration of agriculture.

Counties in metropolitan areas are relatively less exposed. Of the 100 least exposed counties, only 13 are not located within metropolitan areas. Based on the index parameters, counties in some of the country's largest metro areas—New York, Philadelphia, Atlanta, Washington, Phoenix and Denver, for example—are less exposed. This overlooks the fact that with higher urban development, these areas have more to lose should the effects mount, but reflects the nature of the risks; the economic activities that occur in a metro area are not the ones that face the greatest risk from climate change (see Chart 5).

While the county index brings agricultural areas to the top, the state index provides a more general view. The most at-risk states include states that are wet, such as Hawaii and Michigan; states that are mining dependent, such as Louisiana, Wyoming and North Dakota; and states that are agricultural, such as

Chart 5: Agricultural Risks Shine Through

Climate Change Economic Exposure Index, U.S.=1



Source: Moody's Analytics

Table 3: State Exposure Index

U.S.=1

State	Index
Michigan	4.09
Hawaii	3.95
South Dakota	3.73
Wyoming	3.44
North Dakota	3.27
Nebraska	3.14
Alaska	2.92
Rhode Island	2.68
Iowa	2.55
Idaho	2.18
Louisiana	2.16
Kansas	2.05
Massachusetts	1.92
Montana	1.86
Wisconsin	1.82
Oklahoma	1.75
Delaware	1.70
West Virginia	1.64
Maryland	1.60
New Mexico	1.47
Florida	1.43
Texas	1.40
Minnesota	1.39
Arkansas	1.27
Mississippi	1.24
New Jersey	1.06
Maine	1.04
Kentucky	0.97
New York	0.92
North Carolina	0.90
Ohio	0.86
Connecticut	0.84
Washington	0.83
Colorado	0.81
Illinois	0.75
Vermont	0.73
Indiana	0.73
Alabama	0.72
Missouri	0.69
California	0.68
Virginia	0.63
Utah	0.62
South Carolina	0.57
Nevada	0.55
Georgia	0.54
Pennsylvania	0.52
Oregon	0.47
Tennessee	0.42
Arizona	0.40
New Hampshire	0.32

Source: Moody's Analytics

Table 4: Top 25 Exposed Counties

U.S.=1

County	Index value	OMB delineation
Keweenaw County MI	53.62	Houghton MI Micropolitan Area
McPherson County NE	38.00	North Platte NE Micropolitan Area
Loup County NE	35.01	Rural
Leelanau County MI	34.80	Traverse City MI Micropolitan Statistical Area
Sioux County NE	32.89	Scottsbluff NE Micropolitan Statistical Area
Keya Paha County NE	32.42	Rural
Nantucket County MA	30.72	Rural
Arthur County NE	29.03	Rural
Hayes County NE	28.19	Rural
Banner County NE	27.86	Scottsbluff NE Micropolitan Statistical Area
St. Bernard Parish LA	25.38	New Orleans-Metairie LA Metropolitan Area
Wheeler County NE	24.89	Rural
Alger County MI	24.48	Rural
Campbell County SD	23.53	Rural
Mellette County SD	23.13	Rural
Sheridan County ND	22.55	Rural
Door County WI	22.19	Rural
Ziebach County SD	22.16	Rural
Blaine County NE	21.96	Rural
Logan County NE	21.43	North Platte NE Micropolitan Area
Harding County SD	21.27	Rural
San Francisco County CA	21.06	San Francisco-Oakland-Hayward CA Metropolitan Area
Milwaukee County WI	20.97	Milwaukee-Waukesha-West Allis WI Metropolitan Area
Ozaukee County WI	20.60	Milwaukee-Waukesha-West Allis WI Metropolitan Area
Harlan County NE	20.55	Rural

Source: Moody's Analytics

Table 5: Least 25 Exposed Counties

U.S.=1

County	Index value	OMB delineation
Arlington County VA	0.019	Washington-Arlington-Alexandria Metropolitan Area
Alpine County CA	0.035	Rural
Los Alamos County NM	0.039	Los Alamos NM Micropolitan Area
El Paso County TX	0.049	El Paso Metropolitan Area
Roanoke City VA	0.052	Roanoke Metropolitan Area
Montgomery County PA	0.077	Philadelphia-Camden-Wilmington Metropolitan Area
DeKalb County GA	0.084	Atlanta-Sandy Springs-Marietta Metropolitan Area
Roanoke + Salem VA	0.089	Roanoke Metropolitan Area
Fulton County GA	0.095	Atlanta-Sandy Springs-Marietta Metropolitan Area
Bernalillo County NM	0.095	Albuquerque Metropolitan Area
Cobb County GA	0.104	Atlanta-Sandy Springs-Marietta Metropolitan Area
Montgomery County OH	0.105	Dayton Metropolitan Area
Menominee County WI	0.110	Shawano, WI Micropolitan Area
Howard County MD	0.113	Baltimore-Towson Metropolitan Area
Santa Clara County CA	0.116	San Jose-Sunnyvale-Santa Clara Metropolitan Area
San Juan County CO	0.116	Rural
Marion County IN	0.116	Indianapolis-Carmel Metropolitan Area
Richmond County GA	0.118	Augusta-Richmond County Metropolitan Area
Washington County OR	0.118	Portland-Vancouver-Hillsboro Metropolitan Area
Crawford County MI	0.122	Rural
Hamilton County OH	0.123	Cincinnati-Middletown Metropolitan Area
Gwinnett County GA	0.124	Atlanta-Sandy Springs-Marietta Metropolitan Area
Somerset County NJ	0.126	New York-Northern New Jersey-Long Island Metropolitan
Clayton County GA	0.128	Atlanta-Sandy Springs-Marietta Metropolitan Area
Mercer County NJ	0.131	Trenton-Ewing Metropolitan Area

Source: Moody's Analytics

South Dakota and Nebraska. Indeed, many of the top 12 have a mix of two components. Louisiana and Alaska are both wet and mining dependent. North Dakota is both agricultural and mining dependent. The state index paints the entire state with a broad brush. Although this approach loses the granularity of the county-level index, it makes up for it by capturing areas where all three index components are high. Although the Gulf Coast, Great Plains, and small Mid-Atlantic states are the most exposed, each region is represented across the spectrum (see Chart 6). Most states contain counties that are highly exposed, even if the state as a whole is less exposed than the nation. This indicates that when all the risks to climate change are taken in aggregate, each region of the country is exposed to the economic threats posed by climate change.

Limitations

Data limitations prevent us from constructing a measure that fully encompasses all of the consequences of climate change. The index goes down to the county level, and to obtain data for all U.S. counties and states, a gauge of all economic consequences is not possible at this time. Moreover, if there was a gauge of every potential economic impact, the index would become cluttered, and it would be difficult to identify which elements drive an area's overall risk.

Elevation data would have been a meaningful addition, capturing the fact that areas at lower elevations are at higher risk of increased flooding and coastline erosion than areas at higher elevation.

Inclusion of risks to tourism and manufacturing would also have been valuable. Many types of tourism are susceptible to climate change, but it is difficult to separate environmental tourism from other types. Manufacturing's susceptibility to high energy prices makes it an at-risk industry. The next two sections review the risks that these two industries may face.

Tourism

Economies heavily reliant on tourism face some risk. As discussed above, the most dramatic warming trends in the U.S. are evident

Table 6: BTUs Consumed Per Dollar of Output, 2010

Total manufacturing=100

Description	Total	Net electricity	Residual fuel oil	Distillate fuel oil	Natural gas	LPG and NGL	Coal	Coke and breeze	Other*	Shipments of energy sources produced on-site
Petroleum and coal products	604.19	121.63	185.25	343.06	297.05	24.32	171.58	203.09	1241.38	284.46
Primary metals	406.47	780.73	27.98	317.11	470.26	6.94	1275.12	3993.52	59.29	802.83
Paper	383.06	288.91	703.66	151.90	239.39	6.65	532.74	0.00	578.81	0.00
Wood products	214.72	182.26	0.00	1518.55	52.22	12.46	6.43	0.00	413.15	0.00
Nonmetallic mineral products	185.98	222.62	28.75	832.71	233.07	4.75	798.66	104.55	52.98	0.00
Chemicals	146.66	102.02	315.24	32.74	217.71	534.22	89.45	13.30	37.28	369.49
Textile mills	110.61	404.57	257.76	0.00	118.64	10.65	131.99	0.00	20.78	0.00
Food	56.47	96.44	64.56	155.81	93.13	3.56	125.33	4.89	11.89	0.00
Plastics and rubber products	40.83	178.85	0.00	41.39	50.75	6.79	0.00	0.00	0.00	0.00
Textile product mills	26.79	82.75	0.00	0.00	39.63	0.00	0.00	0.00	0.00	0.00
Beverage and tobacco products	24.44	64.38	31.82	40.07	35.91	2.63	40.74	0.00	3.66	0.00
Fabricated metal products	22.67	73.60	0.00	31.39	40.21	3.43	0.00	0.00	0.00	0.00
Printing and related support	20.52	88.65	0.00	0.00	27.30	2.23	0.00	0.00	0.00	0.00
Electrical equip., appliances and components	17.78	52.57	0.00	26.36	22.38	1.73	0.00	0.00	0.00	0.00
Furniture and related products	15.43	54.75	0.00	0.00	17.82	3.82	0.00	0.00	5.32	0.00
Transportation equipment	12.77	46.64	10.13	19.14	19.40	1.26	1.95	0.00	0.70	0.00
Leather and allied products	11.55	44.58	0.00	0.00	18.98	0.00	0.00	0.00	0.00	0.00
Machinery	11.31	41.04	0.00	31.75	17.97	1.39	0.00	0.00	0.19	0.00
Apparel	6.37	32.80	0.00	0.00	6.98	0.00	0.00	0.00	0.00	0.00
Computer and electronic products	5.50	29.58	0.00	0.00	5.24	0.00	0.00	0.00	0.10	0.00
Miscellaneous	5.09	23.78	0.00	16.51	6.23	0.00	0.00	0.00	0.00	0.00

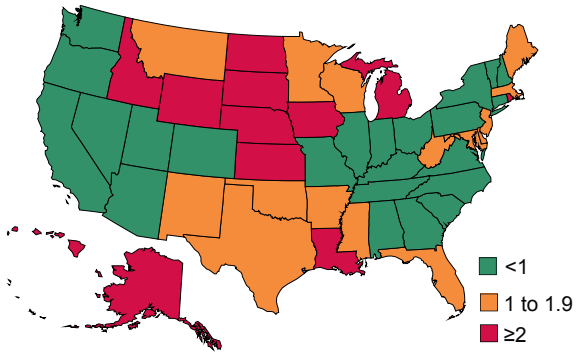
* 'Other' includes net steam (the sum of purchases, generation from renewables, and net transfers), and other energy that respondents indicated was used to produce heat and power or as feedstock/raw material inputs.

Sources: EIA, BEA, Moody's Analytics

in the Northeast, with Vermont rising by a whopping 3 degrees Fahrenheit in the past 50 years. Leisure/hospitality, the industry that captures most tourism-related employment, accounts for 5.5% of gross state product in Vermont, compared with 3.8% nationally. Warmer temperatures will result in shorter ski seasons and lost revenue for the industries dependent on the sport.

Chart 6: Plains and Gulf Coast Feel the Heat

Climate Change Economic Exposure Index, U.S.=1



Source: Moody's Analytics

Many coastal areas are dependent on tourism. A coastal location is an asset in many ways, but when considering climate change risks, it can mean increased vulnerability to storm damage, erosion, and high insurance premiums. Moreover, slow reduction in the population and diversity of flora and fauna will also keep tourists from traveling to areas that were once known for attractive biological diversity.

Manufacturing

Manufacturing is energy intensive, so changes in energy prices affect goods-producing industries. Although some studies indicate that the CPP will actually result in cheaper energy costs in the long term, this is hard to predict and depends on how each state achieves its emissions reduction target. The most energy-intensive industries would feel the greatest impact of changes in energy prices (see Table 6). As of October, 29 states already have renewable portfolio standards and eight more have goals to reduce carbon emissions (see Chart 7). Renewable portfolio standards are policies that encourage pro-

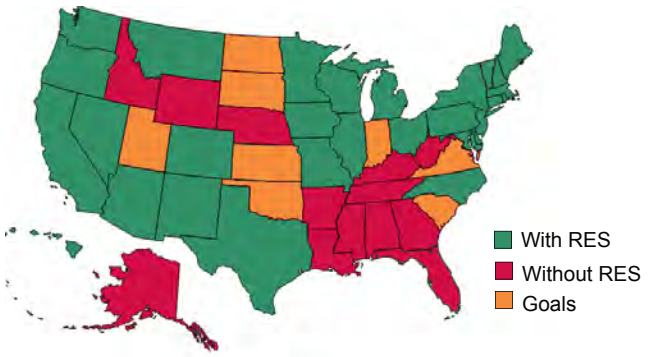
ducers to supply a certain portion of electricity from renewable sources.

In the Moody's Analytics baseline forecast, most manufacturing sectors already are expected to decline as a share of total GDP or, at best, level off. There are state-specific exceptions, but the outlook is generally downbeat. Only three of the 21 three-digit NAICS industries are projected to continue to grow in importance as a share of total GDP: transportation equipment, computers/electronics, and nonmetallic mineral products. Of those, nonmetallic mineral products is the only one that is of above-average energy intensity, relative to total manufacturing. Although set to grow as a share of the economy, this is a small industry, accounting for about 0.25% of GDP and total employment nationwide. The largest component of this industry is cement and concrete manufacturing, which generally needs to be local because of its weight and high transportation costs. The costs of transportation would limit the risk for any given area of losing the industry, which is already spread out fairly evenly across the country to mitigate the high transportation costs.

Transportation equipment manufacturing will grow tepidly nationwide. Production is generally growing as a share of output in states that already offer low energy and labor costs. Shifts in the energy supply could impact that competitive cost advantage, but transportation equipment manufacturing is actually less energy intensive relative to other manufacturing industries.

Computer and electronic manufacturing is one of the least energy intensive of all manufacturing sectors. More than 60% of the industry is in just five states, as measured by state output as a share of U.S. output. Of those five states—California, Oregon, Texas, Massachusetts and New York—only Oregon and Texas have below-average energy costs. Moreover, each of those five states already has a renewable portfolio standard or goals to reduce carbon emissions.

Chart 7: States With Renewable Energy Standards



Sources: DSIRE, Moody's Analytics

Policies aimed at addressing climate change will also create some upside potential for manufacturing. As climate change alters demand for certain products—electric versus gasoline-powered cars, wind turbines versus drilling rigs—manufacturers will need to pivot their operations to match demand. Allocating resources to develop more energy-efficient production processes best serves the economy, especially when considering the future effects of climate change on the economic landscape.

Many of the high-value-added sectors of manufacturing such as transportation equipment, computers, electronics and machinery could potentially gain as technology evolves to use energy more efficiently. Moreover, if all states are operating on the same playing field—that is, complying with the Clean Power Plan—there will be little erosion of competitive advantages. The most energy-intensive industries are most at risk from changing costs, but in the long run, more efficient energy production will prove an advantage.

Conclusion

The economic effects of climate change are vast, and this article highlights just some of the largest and most immediate factors of concern. This is not an exhaustive discussion of the economics of climate change, but an introduction to the issues with some regional context. By measuring the size of those factors of concern for regional economies, we can assess how vulnerable the economy is relative to the nation as a whole. A low index value does not imply that a particular state or county has nothing to fear from climate change, but rather that its industrial structure and geography are less exposed. The most exposed areas are spread out all over the country; the risks are not isolated to specific places. Without taking steps to prepare for and mitigate climate change, regional economies could suffer. Agricultural areas and coastal locations have the greatest risk.

Benchmarking Consumer Credit Performance With Bureau Data

BY CRISTIAN DERITIS

Benchmarking is a natural exercise for comparing relative performance. We benchmark the performance of different computers, cars and smartphones to one another as well as students and their teachers. It is natural to extend the benchmarking exercise to consumer credit portfolios.

Why might we want to benchmark a portfolio of credit cards or mortgages? The obvious answer is to put observed performance into context. A 10% default rate may sound high for higher-income borrowers with pristine credit histories, but it may be well below the average for lower-income borrowers who are seeking to rebuild their credit after a foreclosure. Benchmarking provides the quantitative context for understanding when to worry about poor performance and when we might consider expanding credit given superior performance.

In a regulatory context, benchmarking is an effective exercise for understanding the risk of a bank or portfolio relative to its peers. A benchmark based on market trends and forecasts provides us with a basis for comparison. Given a projection for how loans are expected to perform based on their characteristics, we can then overlay the realized performance to determine if and to what degree a lender is performing better or worse than its market peers.

Another practical use of benchmark data is to address deficiencies in a lender's own loan performance history. Many firms are challenged with not having enough history or having inconsistent detail to effectively inform their projections. Using a benchmark model based on monthly forecasts of volume and performance by line of business, geography, vintage, and credit score from leading consumer credit bureaus can help mitigate this issue. By considering forecasts based on a richer database, lenders can improve the predictive power of their own internal models.

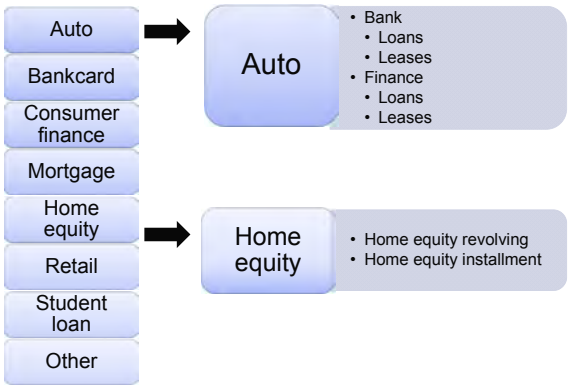
The key to any benchmarking exercise is the selection of a comparison group. We want to select a sample that is reasonably close to the reference portfolio without replicating it. Selecting too broad a sample gives us too many factors to which to attribute performance variations; at the other extreme, a sample identical to the one we already have is unlikely to provide us with much insight. The "Goldilocks" benchmark sample controls for just enough of the important factors to allow us to detect significant differences between the reference and comparison samples. The comparison sample should come from a broader pool of loans to overcome the small sample bias that may be inherent in the reference portfolio.

Consumer credit report data are an ideal source for conducting these exercises. They contain the widest breadth of performance information available—with payment performance on nearly every credit card, mortgage, auto loan, and other consumer credit lines being reported by servicers to the consumer credit bureaus every month.

Through a long-standing partnership with Moody's Analytics, Equifax provides monthly volume and performance information on every account in its database from June 2005 onward.

The data are aggregated by product type (see Chart 1) as well as geography, origination date, and consumer credit score (see Chart 2) to protect the identities of individual consumers and create relevant benchmark cohorts. This provides a complete view of the consumer credit market broken down to a

Chart 1: Product Categories in CreditForecast



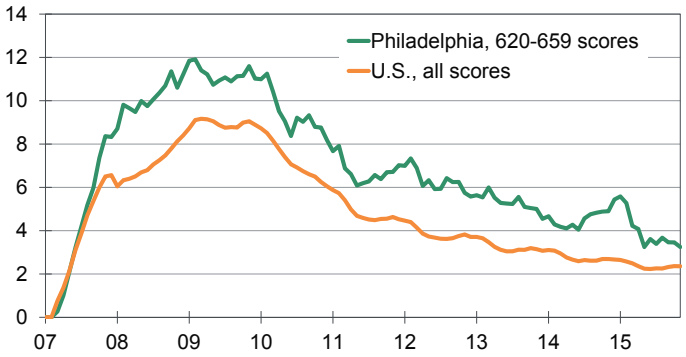
Source: Moody's Analytics

Chart 2: Fully Interacted Segmentation

Source: Moody's Analytics

Chart 3: Granular Data Highlight Differences

30-day+ delinquency rate for 2007Q1 originations, % of $



Sources: Equifax, Moody's Analytics

fine degree of granularity. For example, using these data we can examine the delinquency performance of bank credit cards issued in the first quarter of 2007 to individuals with a credit score of 620 to 659 living in the Philadelphia metropolitan area (see Chart 3) compared with the nation as a whole. By linking these credit performance and origination quality metrics with underlying local economic drivers, Moody's Analytics has produced econometric models and forecasts of monthly volume and performance by line of business, geography, vintage, and credit score quality. As the models are linked directly to the state of the economy, projections of new loan origination are made available for the purposes of business planning and pre-provision net revenue calculations.

Motivation

As a motivating example, consider the case of a bank in the Southeast with a portfolio of home equity lines of credit issued to consumers across the country. As it is a national portfolio, we may be led to believe that the diversification may be sufficient to mimic aggregate national performance. However, a quick comparison of the distribution of HELOC balances across the country (see Chart 4) with the bank's own portfolio (see Chart 5) reveals high concentrations closer to bank headquarters.

Although the differences in the relative weights may appear to be small, even a relatively small difference can have an impact on overall performance given the disparity in delinquency rates across states, ranging from 1.3% in North Dakota to 3.3% in Mississippi.

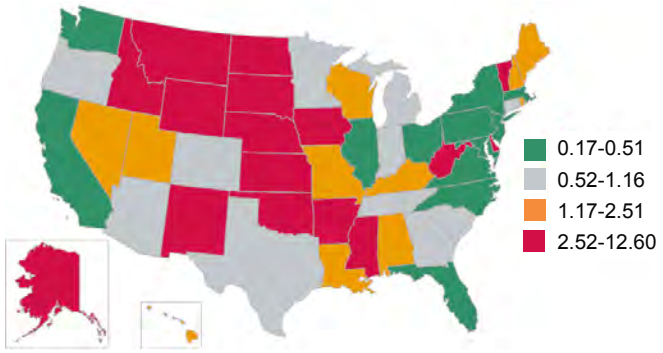
This difference alone suggests the need to control for geography in comparing performance. The variation in unemployment rates across geographies shows the need for a narrower analysis as shown in Chart 6. In an extreme case, a portfolio concentrated in El Centro CA will be expected to have significantly worse performance than one concentrated in Lincoln NE given local economic conditions.

Controlling for geographic footprint can already explain some of the gap between the national and portfolio-level performances (see Chart 7). But it is not enough. Digging deeper into the data we observe differences between the distribution of credit scores in the bank's portfolio and the national average. Specifically we find that the bank portfolio is more heavily weighted toward lower credit score borrowers than the market average even after controlling for geography.

Once we control for credit score as well as account for age and geography we find that the portfolio actually has outperformed its market peers considerably (see Chart 8). Instead of fearing the performance of this

Chart 4: U.S. Balances Track Population

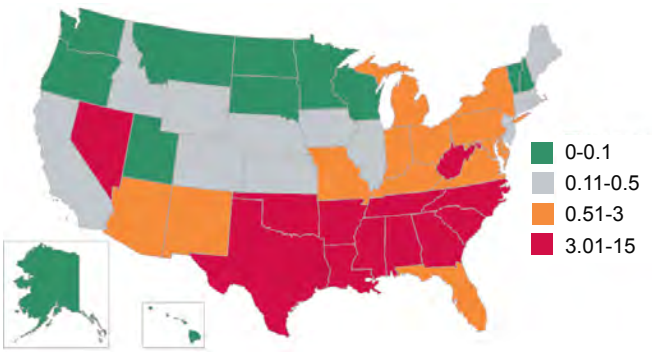
Distribution of HELOC balances by state, % of total $



Sources: Equifax, Moody's Analytics

Chart 5: Example of a Concentrated Portfolio

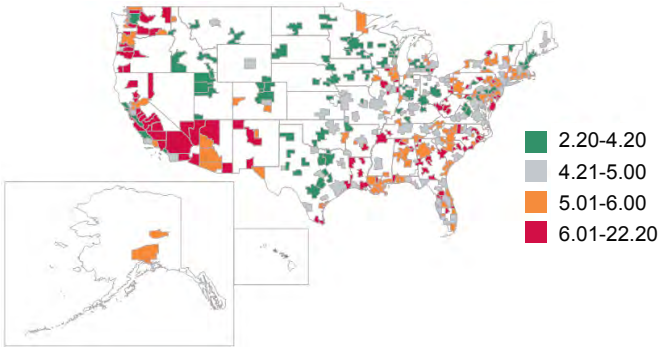
Distribution of portfolio balances by state, % of total $



Source: Moody's Analytics

Chart 6: Unemployment Rates Vary Widely

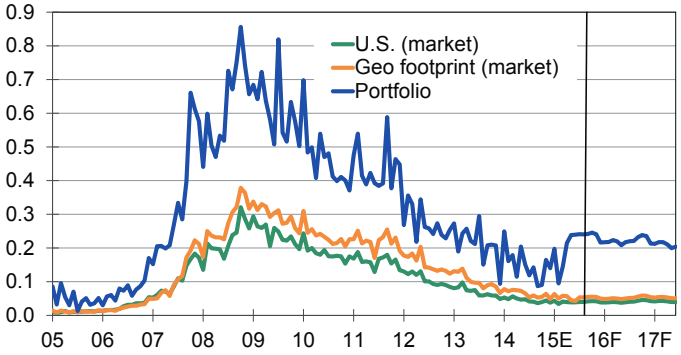
Unemployment rate by MSA, %



Sources: BLS, Moody's Analytics

Chart 7: Portfolio Performance Looks Bad…

Conditional loss rates for HELOCs, % of balance



Source: Moody's Analytics

portfolio, it actually represents a case study in best practices.

Beyond history

Comparing realized performance is informative, but even more beneficial may be an understanding of relative future performance. Projections of loan performance under varying economic scenarios can reveal key risks and sensitivities that a portfolio manager or credit officer may want to address and prepare for in advance of their occurrence and a regulatory exam.

The Moody's Analytics econometric models of loan volume growth and performance based on the historical market-level data provided by Equifax consider a variety of factors, including loan age, credit score, and geography-specific economic drivers such as house prices and the local unemployment rate for forecasting each of the product-vintage-geography-credit score cohorts. In addition, models have been developed to forecast origination volumes and outstanding balances by tying historical growth trends to economic indicators such as lending standards, output, interest rates and employment. As a result, it is possible to generate forecasts under varying economic conditions for both an existing portfolio and a hypothetical set of new originations.

The models lend themselves naturally to the benchmarking exercise, as they are built on a large, robust set of historical data and capture market-level trends and correlations as a result.

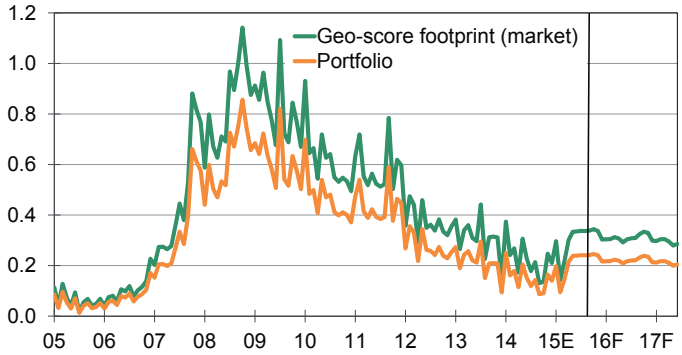
Using information on the outstanding number and dollar volume of loans in each product-vintage-geography-credit score cohort, these models are able to produce forecasts that reflect expected performance within the portfolio's customized footprint. In other words, these models answer the question: "What would be the expected performance of a group of loans under a given economic scenario if they were to perform just like all other loans in their footprint?"

Results from our example are presented in Chart 9. Using the Moody's CreditCycle™ platform, we can quickly generate forecasts under a variety of economic scenarios for an existing portfolio. The economic scenarios may include those generated by Moody's Analytics on a monthly basis (for example, Baseline, Upside Scenario 1, Downside Scenario 2, etc.), regulatory scenarios released by agencies such as the Federal Reserve under its Comprehensive Capital Analysis and Review/Dodd-Frank Annual Stress-Testing program, or custom idiosyncratic scenarios Moody's Analytics has developed in collaboration with its clients.

In addition, users have the option to generate forecasts under their own economic scenario assumptions by either inputting them directly into the Moody's CreditCycle™

Chart 8: …But Is Better Than Its Peers

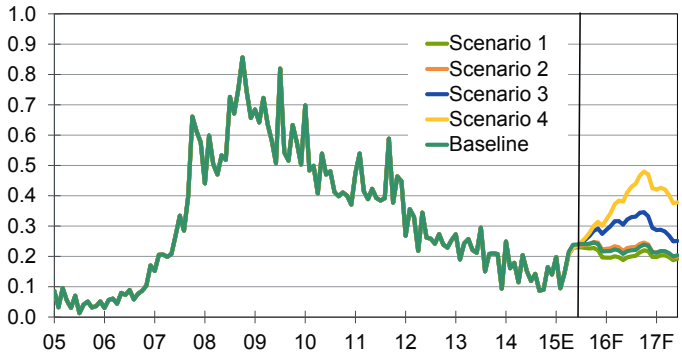
Conditional loss rates for HELOCs, % of balance, annualized



Source: Moody's Analytics

Chart 9: Forecasting Under Different Scenarios

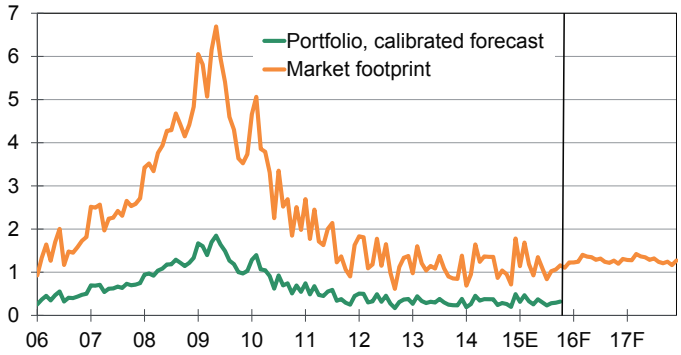
Conditional loss rates for HELOCs, % of balance, annualized



Source: Moody's Analytics

Chart 10: Addressing Portfolio Differences…

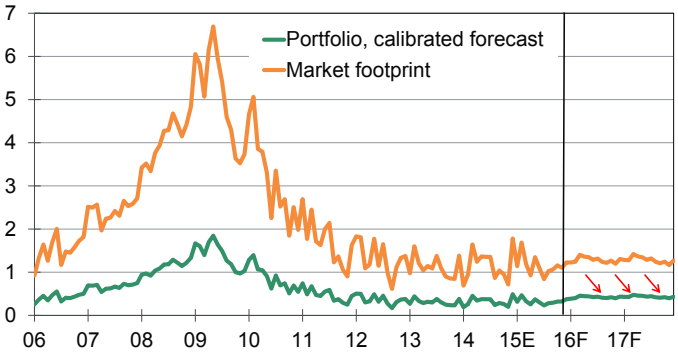
Conditional loss rates for bankcard, % of balance, annualized



Source: Moody's Analytics

Chart 11: …Through Forecast Calibration

Conditional loss rates for bankcard, % of balance, annualized



Source: Moody's Analytics

interface or through the Moody's Analytics Economic Model platform. Analysts can enter assumptions around expected originations, including volume by geographic location and credit score band, if they would like the forecast to consider the future performance of these loans in addition to the existing book.

For example, we may assume that origination volumes will increase by 10% in the first year of the forecast with the same distribution of credit scores and geographies observed in the prior year. Alternatively, a risk manager may input a lender's production targets to assess what impact that would have on the projected performance of the portfolio in both the short and long term.

Idiosyncratic differences

Forecasting benchmark performance based on total market trends is informative and provides useful context. However, in some cases we may wish to consider explicitly the idiosyncratic differences within a portfolio or a lender.

If a servicer has been particularly adept in reducing default rates by calling borrowers early and often, we may want to develop a benchmark projection that assumes that this favorable trend will continue into the future. Conversely, a risk analyst or investor may wish to assume that a servicer that has consistently underperformed the market will continue to do so in the future.

This is analogous to the Beta concept used by stock market analysts in assessing the price per share movements of an individual stock. A Beta value of 1 is indicative of portfolio performance that is in line with the broader market. A value less than 1 indicates better performance while a value above 1 is worse.

Chart 10 provides an example of a portfolio of bank credit cards that has consistently outperformed its market benchmark (controlling for origination vintage, geography, and credit score distribution). Given these data, we can compare the historical performance to realized history within the same footprint to calculate adjustment factors for our benchmark forecast.

One approach might estimate the intercept (α) and slope (β) differences in the relationship between the individual portfolio and the market through a regression analysis for each geography-origination vintage-credit score combination:

$$\text{Portfolio Default Rate} = \alpha + \beta * \text{Industry Default Rate} + \varepsilon$$

By applying the estimated parameters to our benchmark forecast we can generate a calibrated view of the future (see Chart 11).

For smaller portfolios with limited performance history, this can provide a quick and easy loss-forecasting and stress-testing tool for risk managers. This process takes advantage of the rich, robust market data to estimate the relationship between economic variables and market performance while leveraging portfolio-specific information.

For larger portfolios, the results from this simple benchmarking exercise can be compared with a customized champion model to provide a point of reference. If forecasts between these models should differ substantially, it could point to issues with model specification or may be attributable to other factors.

Other benchmark applications

While benchmarking has been largely focused on risk management, it is increasingly being used to identify areas of opportunity or expansion. Broader market data can help lenders overcome the myopia due to focusing on performance within their own portfolios. Lenders looking to expand into new products, new geographies, or new parts of the credit spectrum can leverage historical market data and forecasts to develop their expectations for future performance before making strategic investments.

Benchmarking exercises are beneficial for investors and institutions looking to acquire individual portfolios or banks. The amount of data provided to potential buyers is often limited to a snapshot of the volume of loans within a given portfolio or institution. It is not uncommon for investors to be given a limited number of hours or days to place a bid for assets.

Here too benchmark models can be extremely useful in providing a quick turnaround. Investors can feed the provided data through benchmark models to come up with a quick estimate of expected performance as they look to put together a bid. Large deviations between expected and realized performance may be red flags

indicating deeper issues in underwriting or servicing that an acquirer will want to take into consideration.

Benchmarking the future

Benchmarking continues to evolve and expand as enhanced data become available. While the results from any benchmarking analysis need to be examined in context, market data and performance trends can help risk managers to concentrate on anomalies and identify opportunities for growth or expansion.

Traditionally benchmarking has focused on comparisons with historical or current performance. With the advent of large-scale, historical databases such as CreditForecast.com, it is now possible to create robust forecasting models of industry-wide performance.

Comparisons of internal projections to market-level forecasts can provide new insights and identify potential risks well in advance of their fruition. By incorporating forecasts into their lending strategies and origination processes, banks and other lenders are better-positioned to manage the risks in their portfolio at the best possible time: before loans are either originated or acquired.

The Topsy-Turvy World of Negative Interest Rates

BY RYAN SWEET

Negative interest rates are all the rage among major central banks, but the jury is still out on their economic efficacy and they are not likely to come to the U.S. soon. A number of central banks have already adopted a negative interest rate policy: those of Japan, Switzerland, Sweden, Denmark, and the euro zone. These countries account for about 32% of real global GDP, highlighting the magnitude of this policy experiment (see Chart 1). These central banks have adopted the policy to limit capital inflows, stem an appreciating currency, generate an increase in inflation, or all three.

A negative interest rate policy suggests that the zero lower bound is not as binding as once considered, although many of the concerns about the policy have yet to play out in those countries that have adopted it. However, the assumption that the policy does not carry potential serious consequences would be misguided, and some distortions and disruptions are beginning to be more visible in those countries, driving rates further negative. Therefore, weighing the costs and benefits of a negative interest rate policy is critical and we believe the Federal Reserve will explore other options before turning to it to ward off a recession.

This article discusses how central banks are implementing negative interest rates, the costs and benefits of negative interest rates, and whether or not negative interest rates are working. Further, this article examines the potential for negative interest rates in the U.S. and how such a policy might be implemented.

Topsy-turvy world

In theory, setting nominal interest rates negative is similar to the traditional easing—in which a central bank lowers its main policy rate. Lower nominal rates normally mean lower real interest rates, which should stimulate the economy via a number of channels, including the credit and exchange rate. With central banks putting deposit rates negative, interest rates across the yield curve should decline, spurring investment and boosting other asset prices, including equities.

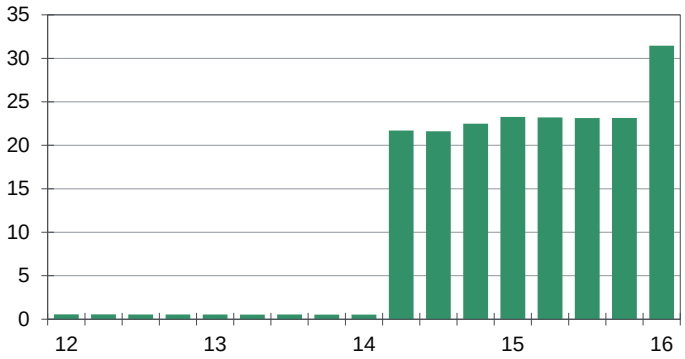
A negative interest rate policy is adopted when additional easing is needed but the central bank policy rate is constrained by the zero lower bound.[1] When implementing the negative rate policy, central banks have typically set the rate for overnight deposits negative; thus banks are charged a fee to park funds at the central bank.

In theory, the negative interest rate policy creates an incentive for banks to pull their excess reserves from the central bank and earn a positive rate of return by lending them out to businesses and consumers. Most central banks that have adopted negative rates do not apply those rates to required reserves but only to all or some of the deposits at the central bank.

The negative interest rate policy presents banks with choices. For example, banks could withdraw their excess reserves, but there are storage costs, making this less attractive unless interest rates are deeply negative. Alternatively, banks could try to pass these negative interest rates on to consumers. They may do so not by explicitly charging a negative interest rate, but by paying no interest and charging a fee for account maintenance.

Chart 1: Global Economy Under Negative Rates

% of global real GDP with central banks using negative rates



Source: Moody's Analytics

1 This occurs when the short-term nominal interest rate is at or near zero, causing a liquidity trap and limiting the central bank's capacity to stimulate economic growth.

Table 1: Timeline for When Central Banks First Went Negative

Central bank	Date	Action
Sweden's Riksbank	7/2/09	Cuts deposit rate on one-wk deposit facility to -0.25%
Danmarks Nationalbank	7/5/12	Cuts certificate deposit rate by 25 bps to -0.2%
European Central Bank	6/11/14	Cuts deposit rate to -0.1%
Danmarks Nationalbank	9/5/14	Lowers rate on certificate deposit 10 bps to -0.05%
Swiss National Bank	12/18/14	Announces that sight deposits exceeding a certain threshold would earn -0.25% effective in early 2015
Sweden's Riksbank	2/18/15	Lowers repo rate to -0.1%
Bank of Japan	1/29/16	Sets rate on excess reserves at -0.1%

Source: Moody's Analytics

Magnitude matters. If the interest rates are barely negative, banks may eat the loss, but this comes at the expense of profitability. With many central banks setting their policy rates slightly negative, the costs of the policy may not be visible yet.

Also, a negative interest rate policy can create an incentive to lend, but it cannot force banks to follow through. Borrowing is a two-way street and if there is no demand, the economic benefits of the policy will be limited.

Different approaches for different folks

Central banks' motivations for using negative interest rates have varied, leading to differences in how rates have been implemented (see Table 1). For instance, the ECB and Sweden's Riksbank used negative interest rates in an effort to help anchor medium- to long-term inflation expectations. The Swiss National Bank adopted negative interest rates in response to actions by the European Central Bank to discourage capital inflows and offset some of the economic costs of the appreciation in the Swiss franc. Similarly, Denmark's central bank used negative interest rates as a tool to intervene in currency markets. The motivation for the Bank of Japan was to end deflation.

A common theme among the central banks with negative rates is the use of some combination of exemption thresholds. Generally, the central banks have attempted to apply negative rates to the bulk of the accounts on their balance sheet in an effort to reduce the potential for arbitrage.

The ECB currently has its Main Refinancing Operations rate, the interest earned by required reserves, at 0%, while excess reserves yield -0.4%. The ECB was very creative with its negative interest rate policy at its March meeting, announcing a new longer-term bank lending program—called Targeted Long-Term Refinancing Operations II—that would allow the euro zone to lend money to banks at a rate as low as the -0.4% deposit rate. The maturity of each targeted TLTRO would be four years, starting in June. This means that if banks fulfill certain conditions, such as having net lending that exceeds the benchmark, the ECB would actually pay banks to lend them money.

This is good news, as the negative rates on targeted lending operations would partially compensate the extra costs related to the reductions in deposit rates, easing worries about negative interest rates cutting into banks' profitability and potentially hurting the banking system.

Meanwhile, the SNB is charging a negative interest rate of -0.75% on the sight deposits of commercial banks and other financial market participants that are held at the SNB. Only deposit account balances that are more than 20 times greater than the minimum required reserves are charged a penalty rate.

In Denmark, the central bank offers one-week certificates of deposit funds with a yield currently at -0.65%. In contrast, overnight demand deposits in the current account earn 0%. Denmark has frequently changed the account limits. Another unique feature of Denmark's approach is its attempt to protect domestic banks by creating a tiered system of deposit rates, with some deposits carrying a higher current-account rate.

Sweden's Riksbank issues one-week debt certificates, which yield -0.5%. The central bank also uses daily fine-tuning operations to drain any remaining reserves, which earn -0.6%, but banks hold very little of these.

The BoJ's interest rate on excess reserves is -0.1% and is applied to financial institutions' current accounts held at the BoJ. These accounts have been divided into three tiers, a system similar to the ECB's negative rates. To maintain financial institution profitability, positive and zero interest rates will be applied up to a certain threshold. Excess balances above these thresholds will be subject to the negative rate.

In all instances, retail deposit rates did not go negative, in part because of tiered central bank deposit rates or other schemes to limit the total impact on the banking system.

The share of central bank reserves subject to negative interest rates differs significantly, ranging from less than 1% in Japan to around 3.5% in Switzerland.

Has it worked?

The evidence from the five central banks that have set negative interest rates shows that the costs so far do not appear significant. However, the benefits have not been overly impressive either. It is still early, so the jury is still out on the policy's effectiveness.

The policy has not been overly successful in stemming currencies' appreciation. For example, the Swiss franc is higher than before the central bank adopted negative interest rates in December 2014. The Japanese yen has appreciated vis-à-vis the dollar since the BoJ set rates negative in late January. This is not necessarily a failure of the negative interest rate policy but a reminder that numerous factors beyond a central bank's control can influence its country's exchange rate. The absence of a significant impact on

exchange rates would imply that the policy's impact on inflation via higher imported prices has been limited.

Bank lending is also mixed. Negative interest rates in the euro zone appear to have provided some boost to nonfinancial and household lending, which is up slightly on a year-ago basis. Sweden's and Denmark's experiences are different. Credit growth in Denmark improved, while in Sweden, both nonfinancial and household credit growth has moderated since the implementation of negative interest rates. Sweden is an interesting case study, as it has adopted negative rates twice, the first time in July 2009. Again, there was not a noticeable increase in bank lending after negative interest rates, but there was a slight acceleration in underlying inflation. In the case of Sweden, though it appeared to be the first to adopt negative rates it kept its overnight deposit rate positive, which is the more potent rate. Therefore, the impact on lending and the economy from a negative one-week deposit rate was limited, but it still raised awareness in financial markets that nominal interest rates were constrained by the zero lower bound; therefore, this was a symbolic move.

It is too early to determine how negative interest rates in Japan are affecting bank lending, but the evidence so far is not overly convincing that the policy provides a significant shot in the arm to lending.

Mixed implications on lending are not surprising, as credit is a two-way street. Although it is reasonable to assume that negative interest rates would create an incentive for banks to loan, business and consumer willingness and ability to borrow also are key factors. Negative interest rates will lower bank lending rates and thus expand the pool of potential borrowers, as some would have been priced out when nominal rates were higher. While the pool expands, however, the quality of these borrowers is likely not ideal because they may be riskier.

Negative interest rates will not likely cause banks to loosen their lending standards significantly, particularly given regulatory requirements for banks to be adequately capitalized, particularly in the U.S. and the euro zone. Therefore, banks may view the costs of lending to riskier borrowers, which would require more capital to support them, as outweighing the benefits. The creditworthiness of these borrowers would also be in question when nominal interest rates eventually rise. Therefore, the regulatory environment in some countries could mitigate the economic benefits of negative interest rates.

The negative interest rate policy has been successful in lowering rates along the entire yield curve. This has occurred as government securities pay positive interest rates while central banks' deposit rates are negative, making this trade for banks a no-brainer. Therefore, banks are using excess reserves to purchase government securities, driving prices higher and yields lower. The 10-year yield on Japan's government debt has fallen 20 basis points since the BoJ adopted negative rates, and that instrument is trading above 0%. The Swiss 10-year government bond is yielding -0.28%.

There is some spillover to other interest rates. For example, interest rates on investment grade corporate debt will decline, but they are unlikely to turn negative. Even investment-grade companies are perceived to be riskier than governments, so negative rates on corporate debt are unlikely but not impossible.

Event study

Event studies can be used to assess the immediate impact of policy actions on financial markets. Event-study analysis implicitly assumes that markets are efficient so that the effect of a policy announcement on financial variables occurs not when the action takes place, but rather when it is announced. Finally, event-study analysis assumes that the selected response windows are wide enough to capture the macroeconomic effects of the announcements, but narrow enough to minimize the arrival of nonmonetary policy information that would affect financial asset prices.

The first step in conducting an event study analysis is to identify when central banks announced their intentions or implemented negative interest rates. For the ECB, it alluded to the use of negative interest rates as a policy option roughly one year ahead of its implementation. Given that length of time, the initial discussion is excluded from the event study. Similarly, stronger hints of negative rates in April 2014 were also omitted given the tendency for the ECB to overpromise and underdeliver. Also, while there was discussion of possibly implementing negative interest rates, policymakers discussed other options. This makes this event study more difficult than the one we conducted for the Fed's quantitative easing, as communication was clearly targeted at changes to this program.

This event analysis focuses on the actual announcements. It is important to define the adjustment interval in which market participants "price in" the announcement or adjust asset prices based on new information—in this case information released by central banks. Some event studies use intraday prices to determine response windows, but given the novelty of negative interest rates, market participants may respond more slowly to negative interest rates announcements than to conventional monetary policy. For this reason, this study considered one- and two-day response windows, in line with the prevailing research. For the one-day window, the change in the asset price between the last value prior to a negative interest rate announcement and the last closing value on the day of the announcement was recorded. The measurement period was extended by a day for the two-day window to account for the potential for delayed responses to negative interest rate announcements.

The event study included policy decisions after central banks adopted negative rates as well. There is a caveat to this approach. Many central banks announced other easing measures, including expanding quantitative easing or altered forward guidance in conjunction with negative interest rates. Therefore, the impact on financial markets would also reflect these actions and is not isolated to negative rates.

The results of the event study showed that interest rates across the yield curve generally declined when central banks adopted negative rates or cut them even further. The one exception was the ECB's decision on December 3, when German yields rose (see

Table 2: Event Study Analysis, 1-Day Change

					Domestic exchange rate, % change vis-à-vis…	
		3-mo, bps	2-yr, bps	10-year, bps	Dollar	Euro
European Central Bank*	6/11/14		-3		-0.1	NA
Danmarks Nationalbank	9/5/14	0	1	-4	0.1	-0.0
Swiss National Bank	12/18/14	NA	-8	0	-0.7	-0.3
Swiss National Bank	1/15/15	NA	-26	-10	21.4	23.1
Danmarks Nationalbank	1/19/15	-12	-10	-7	0.4	0.0
Danmarks Nationalbank	1/22/15	0	-3	-7	-2.2	-0.1
Danmarks Nationalbank	1/29/15	-2	-2	-2	0.3	0.0
Danmarks Nationalbank	2/5/15		-11	-5	1.2	0.0
Sweden's Riksbank	2/18/15	-2	-2	5	-0.5	-0.4
European Central Bank*	12/3/15	5	13	20	3.1	NA
Bank of Japan	1/29/16	0	-4	-12	-1.9	-0.9

*German yields used as proxy

Sources: Bloomberg LP, Moody's Analytics

Table 3: Event Study Analysis, 2-Day Change

					Domestic exchange rate, % change vis-à-vis…	
		3-mo, bps	2-yr, bps	10-year, bps	Dollar	Euro
European Central Bank*	6/11/14		-3-2		0.0	NA
Danmarks Nationalbank	9/5/14	0	2	0	-0.4	0.0
Swiss National Bank	12/18/14	NA			-1.1	-0.2
Swiss National Bank	1/15/15	NA	-36	-32	18.6	20.8
Danmarks Nationalbank	1/19/15	-24	-14	-12	-0.1	0.0
Danmarks Nationalbank	1/22/15	-10	-14	-17	-3.6	-0.1
Danmarks Nationalbank	1/29/15	-17	-13	-13	0.1	0.1
Danmarks Nationalbank	2/5/15		-6	-4	-0.2	0.1
Sweden's Riksbank	2/18/15	-2		9	-1.2	-0.8
European Central Bank*	12/3/15	4	14	21	2.5	NA
Bank of Japan	1/29/16	0	-13	-17	-1.8	-1.3

*German yields used as proxy

Sources: Bloomberg LP, Moody's Analytics

Table 2). The response was attributable to the ECB's overpromising and underdelivering. The central bank cut rates but failed to expand its quantitative easing program. It is clear the ECB did not manage expectations well by signaling a more aggressive easing leading up to the December meeting than it delivered. This was a missed opportunity; it is not often the central bank has an opportunity to strengthen its credibility and surprise financial markets.

The December ECB meeting is useful in the event study because it suggests that quantitative easing may be more significant in affecting government yields than negative interest rates via the portfolio balance effect.

Both the one- and two-day window event studies show that government yields are lower than they would have been if central banks had not eased monetary policy, which included negative interest rates (see Table 3).

The one-day window event study showed the central banks' implementation of negative rates generally flattened the yield curve. On the short end of the curve, the SNB's action on January 15, 2015 led to the largest drop in two-year government yields. The BoJ's adoption of negative rates led to a 12-basis point decline in the 10-year government yield.

The impact on exchange rates was mixed. Generally negative interest rates should cause the country's currency to depreciate. A standout is the 20% gain in the Swiss franc vis-à-vis both the dollar and euro on January 15, 2015, but that had more to do with the decision to drop the currency peg than negative interest rates. The event study highlights the difficulty in isolating the impact of policy announcements surrounding negative rates on financial markets.

Negative on negative rates

Negative interest rates are still uncharted waters and all the potential costs are unknown. Some of the biggest concerns are the health of the banking system and the potential for credit conditions to tighten. Negative interest rates could eat into bank profits, as banks' traditional model of borrowing short

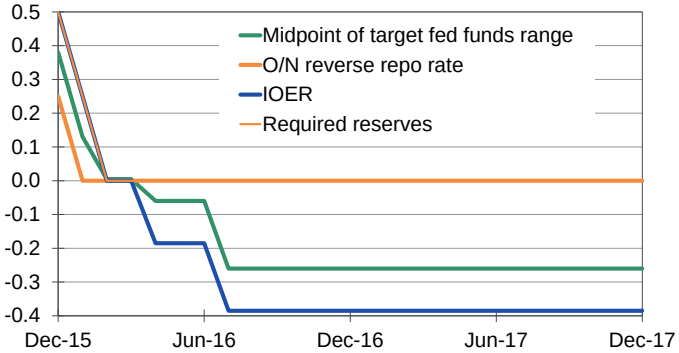
Chart 2: Excess Reserves Have Piled Up

Excess reserves held at the Federal Reserve, $ tril

Sources: Federal Reserve, Moody's Analytics

Chart 3: How Fed Could Go Negative

Hypothetical scenario for U.S. interest rate, %



Source: Moody's Analytics

and lending long would be hindered. The narrower the curve, the more difficult it is for the banking system to lend at a profit, as its cost of funds is tied to short-term rates and its lending rates are tied to long-term rates.

If banks charged clients for deposits, consumers would have the incentive to stockpile cash. A mattress can hide only so much, and costs are associated with holding cash. Therefore, consumers could opt to prepay credit card debt, accounts payable, or tax bills to reduce or manage their cash holdings.

It should not be surprising that global bank stocks have been hammered since the ECB cut its deposit rate and the BoJ adopted a negative interest rate policy. Credit default swaps on major European central banks have also widened. Another issue is the perception that negative interest rates are a central bank's final tool in its kit.

Because the exchange rate channel is critical, a negative interest rate policy could create currency wars and lead to policy errors. Central banks could engage in a race to the bottom in an effort to boost their currencies. If central banks are too aggressive with negative rates, banks would be forced to charge clients to hold deposits, causing consumers to hoard cash, causing a deleveraging of the banking system.

Negative interest rates, particularly in the U.S., would cause issues for money market mutual funds, insurance companies, and pension funds. A concern is that the net asset value of money market mutual funds would fall below $1, known as breaking the buck, and those funds would close in large numbers, affecting liquidity in the short-term funding market.

The potential for asset bubbles is a concern but not a serious one. In theory, if a large amount of excess reserves flowed into the economy, asset bubbles could be created. There was a similar concern with quantitative easing, but this did not happen. QE may have boosted valuations, but it did not create any significant asset bubbles. Also, negative interest rates are being phased in slowly by many central banks, reducing the odds that the floodgates open.

How would it work in the U.S.?

The Fed would utilize a tiered interest rate system if it adopted a negative interest rate policy. The central bank would set a target range for the fed funds rate below zero. The interest on excess reserves would be set at the bottom of the range. The negative IOER would subject around $2.5 trillion to the penalty rate, significantly more than in the five countries with negative interest rates (see Chart 2). We assume the Fed would set the interest rate on required reserves at 0% to avoid taxing these holdings.

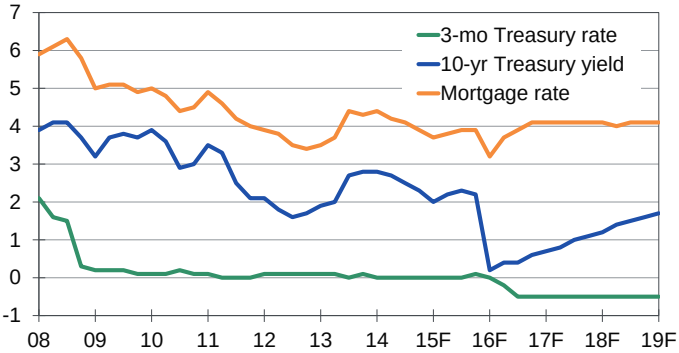
The Fed would have two options with the overnight reverse repo rate. First, it could set it negative in an effort to put additional downward pressure on money market rates. Second, it could suspend the facility, removing the backstop for money market funds and government-sponsored enterprises. Odds are the Fed would likely suspend this program (see Chart 3).

From theory to reality

To assess how the negative interest rates in the U.S. could affect lending and the broader economy, we ran the Fed's severely adverse scenario from the Comprehensive Capital Analysis and Review through our U.S. macro model (see Chart 4). According to the Fed, the catalyst for the U.S. economic downturn in the severely adverse scenario comes from overseas. The scenario assumes the Fed adopts a negative interest rate policy, evident from the -0.5% three-month Treasury bill rate throughout the entire scenario. The scenario does not appear to assume any fiscal stimulus, putting the burden entirely on the Fed.

Chart 4: Fed Scenario for Negative Rates

Fed's severe adverse scenario, %



Sources: Freddie Mac, Federal Reserve, Moody's Analytics

There is not a counterfactual, but the Fed's adverse scenario is generally in line with the Great Recession. Therefore, to gauge the effect of the negative interest rate policy, we compared the performance of various metrics with the Great Recession. For example, growth in the currency held outside of banks is remarkably stable relative to the Great Recession. Similarly, the drop in lending to individuals that occurred during the Great Recession is absent in the adverse scenario. Though commercial and industrial loans decline, they bounce back more quickly. This cannot be explained entirely by negative interest rates, as the catalyst for the adverse scenario is recessions abroad rather than a financial crisis.

Unlike in the Great Recession, demand deposits decline and remain depressed for a couple of years. Lending standards do not tighten as much as during the Great Recession, save for commercial and industrial loans, and recover more quickly as banks are more willing to make consumer installment loans.

One issue with the adverse scenario is that rates would likely have to be set even lower. During the Great Recession estimates of the real equilibrium fed funds rate were -4% to -8%. Given that the adverse scenario does not appear to have a fiscal response beyond the automatic stabilizers, a negative nominal fed funds rate of -0.5% to -2.5%, assuming inflation expectations remained anchored at 2%, does not seem aggressive enough.

Other options for the Fed

Negative interest rates are unlikely to be the Fed's first response to a recession. However, the Fed's options are far from ideal and it lacks the firepower it had heading into past recessions, making any recession scare more troubling. Normally the Fed is the first line of defense, as policy time lags are shorter than those of fiscal policy. However, the Fed's options are not optimal, given that rates are already near zero.

If the U.S. were to slip into recession soon, the Fed would have limited firepower via traditional easing—lowering of the fed funds rate. This would imply that the Fed would have to restart quantitative easing. To assess how much QE would be required, we can equate the amount needed to the reduction in the fed funds rate if nominal rates were again constrained by the zero lower bound.

Under an approach similar to that of former Fed Chairman Ben Bernanke, we used a simple regression to estimate the change in the 10-year Treasury yield based on fluctuations in the fed funds rate. Because the relationship between short- and long-term rates is not constant, the regression was estimated over different time horizons. We used the average coefficient on the fed funds rate, which was slightly more than 0.25. This implies that a 100-basis point reduction in the fed funds rate would reduce the 10-year yield by 25 basis points.

Given the difficulty of characterizing monetary policy using QE, it is natural to want to equate a given quantity of assets purchased with a reduction in the federal funds rate target in an environment when the FOMC could reduce the target. Research by the Federal Reserve Bank of San Francisco estimates that $600 billion in QE reduced long-term rates by upwards of 20 basis points. This is a touch more than our two-day event study[2] and would be consistent with a 75-basis point reduction in the fed funds rate. In other words, $200 billion in QE is equivalent to a 25-basis point rate cut.

For argument sake, assume the Fed follows through with its plan of 100 basis points of tightening this year, putting the fed funds rate at 1.38% by year's end. Then the next recession hits in early 2017 and the accompanying easing cycle is on par with the average reduction in the fed funds rate during the easing cycles since the 1950s (see Table 4). If that happens, the nominal fed funds rate would have to be -1.56%, which would require $1.2 trillion in QE.

The Fed could opt to adopt negative interest rates, which would reduce but not eliminate the need for QE. Therefore, if the next recession were to hit in the next couple of years, the Fed will have to rely on QE, raising the prospect that QE will become a permanent complement to traditional monetary policy.

Before implementing negative interest rates, the Fed could implement funding for lending[3], raising the inflation target, and pegging interest rates on securities with maturities of two years or less. The latter would be a commitment to keep rates low for at least two years, but the balance sheet would increase substantially. Adopting a nominal GDP or price level target would also be on the table.

As we have learned from the past recession, when monetary policy is at the zero lower bound, everything is on the table, including a negative interest rate policy. However, we believe the bar is high for a negative rate policy in the U.S. because the benefits do not appear to overwhelmingly exceed the costs.

Table 4: History of Fed Easing Cycles

Start	End	Easing cycle, duration, mo	Cumulative reduction in fed funds rate, ppt
Nov 1957	May 1958	6	175
Jun 1960	Sep 1960	3	100
Nov 1970	Jan 1971	3	150
Dec 1974	Nov 1976	24	275
May 1980	Jul 1980	3	300
Nov 1981	Dec 1982	14	550
Nov 1984	Aug 1986	21	350
Oct 1987	Feb 1988	4	75
Jun 1989	Sep 1992	40	675
Jul 1995	Jan 1996	7	75
Sep 1998	Nov 1998	2	75
Jan 2001	Jun 2003	30	500
Sep 2007	Jan 2016	101	525
Avg		20	294
Median		7	275

Sources: Federal Reserve, Moody's Analytics

2 C. Lafakis and R. Sweet, "The Federal Reserve's Quantitative Easing: Weighing the Cost-Benefit Trade-Off," Regional Financial Review (May 2013).

3 Central bank uses incentives to get banks to increase lending. The Bank of England created a funding for lending program in 2012, allowing participants to borrow U.K. Treasury bills in exchange for eligible collateral, which consists of all collateral eligible in the bank's Discount Window Facility.

MACRO, INFLATION

Is the recent acceleration in U.S. core inflation a fluke?

Moody's Analytics believes the turn in core inflation is convincing. To come to this conclusion, Moody's Analytics looked at the primary catalysts behind the recent acceleration in both the core consumer price index and core personal consumption expenditure deflators. Rising medical costs, higher rents, and less drag from lower core goods prices are behind the acceleration in inflation, and medical and rents will prove sticky. The path forward for core goods prices will depend on the U.S. dollar and Chinese producer prices. Still, core goods prices are not expected to be as big a weight on core inflation this year as last.

Medical care inflation had been depressed by the Affordable Care Act, but this is now behind us. However, medical inflation is being boosted for reasons outside of policy, including an acceleration in wages in the industry. Considering the job market continues to tighten, wage growth is expected to accelerate in healthcare, and this will drive prices higher. This will have a bigger impact on core PCE than CPI given medical's respective weight in each.

The rental housing market is tight. Vacancy rates are among the lowest since the early 1990s. That will keep upward pressure on rents until additional supply comes on the market. Rising rents will boost core CPI more than core PCE. Rents account for more than 40% of core CPI and less than 20% of core PCE.

Core goods prices are a wild card. Further appreciation in the U.S. dollar will clamp down on these prices, but odds are that the dollar will not be able to duplicate the gains seen last year, therefore its impact on measures of core inflation should ease some. All told, the turn in core inflation is convincing and Moody's Analytics expects it to stick.

—RYAN SWEET

MACRO, LABOR MARKETS

Is there any validity to claims to the so-called bartender recovery in the job market?

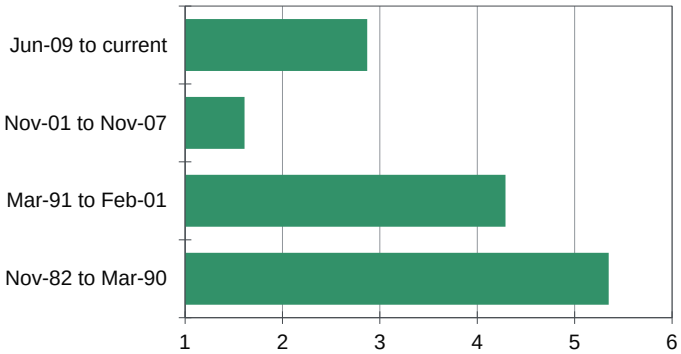
It is true that for a good chunk of the expansion, the composition of job growth was heavily weighted toward low-wage, low-value-added industries. Though this was the case for longer than anticipated, it was not unusual because low-productivity jobs, which are in many industries other than retail and leisure/hospitality, are normally those that recover first. As the expansion has aged, mid- and high-paying job growth has accelerated and 2015 was its best year. According to our estimate, mid-wage jobs rose by 1.09 million and high-wage employment added 637,000. This is the third time in the past four years that the combined number of mid- and high-wage jobs rose more than low-wage jobs, and the gap has widened.

Even labeling this entire business cycle as the "bartender recovery" based on the view that retail and leisure/hospitality have accounted for the lion's share of the increase in employment is overdone. Since the recession ended in June 2009, total employment has risen by 12.54 million, but retail and leisure/hospitality have accounted for only 2.9% of these gains, or 3.7 million jobs (see Chart 1). This share is indeed more than the 1.6% share during the business cycle between late 2001 and late 2007, but it is noticeably smaller than in each of the preceding two cycles.

More specifically, employment at restaurants and other eating places, which includes waitstaff and bartenders, has risen by 1.7 million since June 2009, accounting for 13.7% of the increase in total employment. This is less than the 17.7% contribution in the last expansion but more than the 6.7% in the cycle between early 1991 and early 2001. Restaurants' share of total employment has increased this expansion, but that is a continuing secular trend that began in 2000. Therefore, this is not unique to the current business cycle.

Chart 1: More to This Recovery

Retail+leisure/hospitality, share of total job gains by expansion, %



Sources: BLS, Moody's Analytics

—RYAN SWEET

MACRO

How does the BEA account for petroleum inventories in its calculation of U.S. GDP?

Petroleum stockpiles are counted as part of the government's aggregate estimate of mining, utilities and construction private inventories. Similar to other components of GDP, the source data differ between the government's advance, second and third estimates of GDP because of changing source data availability.

The Bureau of Economic Analysis noted that oil quantities for energy use within utilities are extrapolated from the Department of Energy Short Term Energy Outlook until the DoE publishes its Monthly Energy Review. Quantity data for mining are extrapolated from BEA-calculated industry mining wages for the advance estimate. The second estimate uses unpublished preliminary industry balance sheet data from the Census Bureau's Quarterly Financial Report. The third estimate uses the published Quarterly Financial Report data.

—RYAN SWEET

MACRO, FINANCIAL MARKETS

How low can the 10-year U.S. Treasury yield go?

It will be more difficult for U.S. long-term rates to rise this year, and they could have more room to fall. Consider the 10-year government bond yields of -0.046% for Japan, 0.164% for Germany, 1.11% for Canada, and 1.39% for the U.K. The 10-year U.S. Treasury yield is 1.71%, down nearly 30 basis points since the Bank of Japan adopted a negative interest rate in late January.

A number of central banks have adopted a negative interest rate policy, including those of Japan, Switzerland, Sweden, Denmark, and the euro zone. This is affecting interest rates across the yield curve globally, and we expect further easing by the European Central Bank and the BoJ. This could put additional downward pressure on the 10-year U.S. Treasury yield. How low can it drop?

To assess this, we decomposed the 10-year into three components: expected inflation over the term of the security, the expected path of short-term real interest rates, and a residual component known as the term premium. The bulk of the 30-basis point decline in the 10-year yield since late January is attributable to lower inflation expectations and a decline in the term premium.

Inflation expectations have been strongly correlated with global oil prices. A soft bottom in oil prices appears to be forming and with U.S. core consumer prices accelerating, it is difficult though not impossible for inflation expectations to decline further. Therefore, a move lower in the 10-year would have to come via the term premium or the expected path of short-term rates.

The term premium is currently -32 basis points, compared with its historical average of 84 basis points and worse than that during the teeth of the Great Recession in 2012. The term premium bottomed at -62 basis points during the European debt crisis. All else being equal, aggressive actions by the ECB and the BoJ could push the U.S. term premium toward its prior nadir, which would put the 10-year at 1.41%.

A move even lower would require markets to re-evaluate the path of short-term rates. If markets push out the next rate hike into 2017, it could lower the 10-year below 1.4%. For the 10-year yield to close below 1.5% is rare historically, but given the move to negative interest rates by major central banks, anything may be possible.

—RYAN SWEET

MACRO, MONETARY POLICY

Is QE a permanent complement to traditional Fed policy?

If the U.S. were to slip into recession soon, the Federal Reserve would have limited firepower via traditional easing—lowering of the fed funds rate. This would imply that the Fed would have to restart quantitative easing. To assess how much QE would be required we can equate the amount needed to the reduction in the fed funds rate if nominal rates were again constrained by the zero lower bound.

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Jun-60	Sep-60	3	100
Nov-70	Jan-71	3	150
Dec-74	Nov-76	24	275
May-80	Jul-80	3	300
Nov-81	Dec-82	14	550
Nov-84	Aug-86	21	350
Oct-87	Feb-88	4	75
Jun-89	Sep-92	40	675
Jul-95	Jan-96	7	75
Sep-98	Nov-98	2	75
Jan-01	Jun-03	30	500
Sep-07	Jan-16	101	525
Avg		20	294
Median		7	275

Sources: Federal Reserve, Moody's Analytics

The Fed could opt to adopt negative interest rates, which would reduce but not eliminate the need for QE. Therefore, if the next recession were to hit in the next couple of years, the Fed will have to rely on QE, raising the prospect that QE will become a permanent complement to traditional monetary policy.

—RYAN SWEET

European Macro Outlook

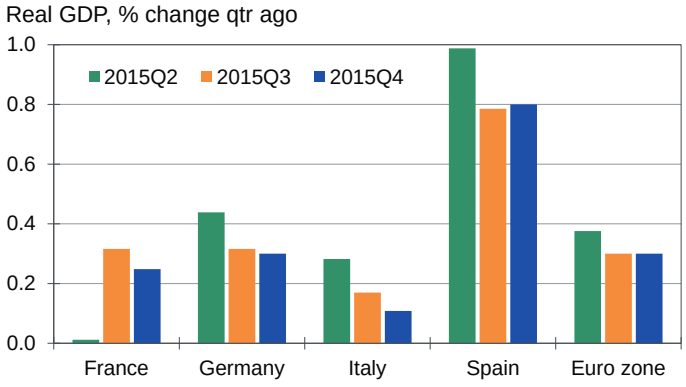
BY TU PACKARD AND THE EUROPEAN RESEARCH STAFF

The recovery of the European economies is proceeding at a modest pace in the face of headwinds from financial market volatility. Concerns about the health of European banks and the European Union's extremely weak institutional response to the refugee crisis are the primary causes of uncertainty. Despite exceptional monetary stimulus from the European Central Bank, demand is still low. This not only contributes to low inflation but also keeps inflation expectations well below the ECB's target inflation rate of just below 2% over the medium term. Absent fiscal stimulus, the outlook for measurably stronger demand growth does not look promising as wage growth has slowed and employment growth remains subdued.

The ECB will likely mount a significant monetary easing very soon as the governing council has become more worried about downside risks to growth and inflation. Possible measures include expanding the ECB's monthly purchase of assets from €60 billion to perhaps around €80 billion and lowering further the deposit rate, which is already negative. The minutes of the January 2016 ECB monetary policy meeting observed that financial market conditions in the euro area had clearly deteriorated. It also noted the increased risks of second-round effects from weaker than expected inflation, persistently subdued underlying price pressures, and weaker than expected wage growth. The ECB's inflation forecast has been revised down several times in prior months, and ECB policymakers still await to see the impact of persistently low headline inflation on underlying inflation. They also want to know if the protracted period of low headline inflation in the euro area could alter wage dynamics.

European monetary authorities have shouldered most of the heavy lifting to provide economic stimulus to the euro area. The ECB minutes note with some frustration that national authorities are not making enough use of their available fiscal space to increase public investment, and that the results of the European Commission's Investment Plan for Europe, also known as the Juncker Plan, have thus far been disappointing. ECB President Mario Draghi told the European parliament that contributions from all policy areas are needed to make the euro area more resilient, and while the ECB is ready to do its part, he implied that the fiscal authorities had failed to do their part to support economic recovery through public investment and lower taxation. The former has a high multiplier and spending on public infrastructure would support productivity growth in the long run.

Chart 1: Euro Zone Growth Lacks Vigor…



Sources: Eurostat, Moody's Analytics

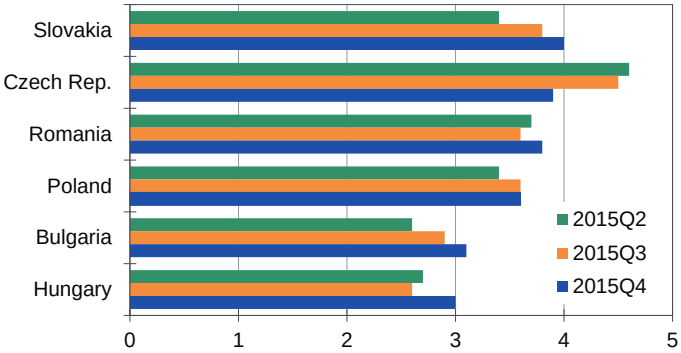
Recent Performance

The euro area economy is growing, but at a disappointing pace given the ECB's exceptional stimulus, a more competitive euro, and low energy prices. Real GDP in the fourth quarter rose only 0.3% on a quarterly basis and 1.5% in year-ago terms. Germany's pace of growth is tracking that of the euro zone, but Italy's has slipped (see Chart 1). Spain continues to perform well, as have some of the EU's Eastern European members, notably Slovakia, the Czech Republic, Romania, Poland, Bulgaria, and Hungary, which grew at a relatively more vibrant pace of between 3% and 4% (see Chart 2).

For the region as a whole, domestic demand has yet to show a robust trend. After a weak November the volume of retail trade in the euro area rose 0.3% on a monthly basis in December, for a year-ago rise of 1.4%. This is similar to euro area wage growth, which slowed to 0.2% on a quarterly basis in

Chart 2: …But CEE Countries Performed Well

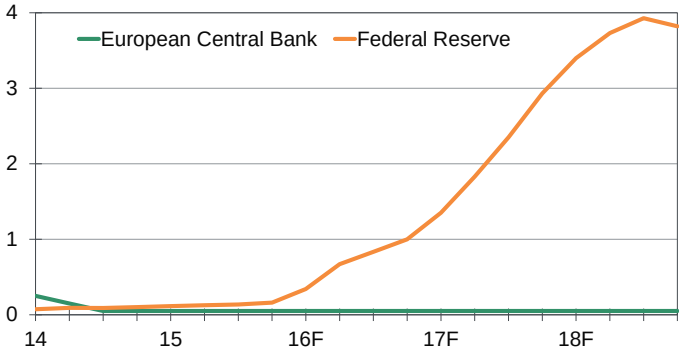
Real GDP, % change yr ago



Sources: National statistical offices, Moody's Analytics

Chart 3: Monetary Policies Diverge

Main monetary policy rate, %



Sources: ECB, Federal Reserve, Moody's Analytics

the third quarter of 2015 from 0.4% in the prior two quarters.

The near-term outlook does not look promising. Investor confidence worsened again in Germany in February, with the ZEW indicator of economic sentiment sinking to 1 from 10.2 in January, dropping further below its historical average of 24.7. At the same time, the ZEW expectations measure for the euro zone fell from 22.7 to 13.6.

Deflation pressures intensified as output prices declined at the steepest rate in a year, in line with falling inflation expectations. The ECB's January quarterly report showed that analysts expect 0.7% inflation this year—slower than the 1% reported in October's survey—and 1.4% for 2017, down from 1.5% predicted in October. Both remain below the ECB's target. Their expectations are supported by recent price trends. Euro zone annual inflation rose to 0.2% in December, a slight improvement from the prior two months, but still a far cry from the ECB's target. Further, the domestic producer price index has been falling over the past several years and will likely continue to do so for quite some time as weaker growth in the large emerging market economies weighs on industrial commodity prices. Euro zone producer prices fell 3% year on year in December due in large part to the steep 9% fall in oil prices.

Unemployment in the euro area is only slowly declining. The unemployment rate eased to 10.4% in December, down from 10.5% in the previous month and from 11.4% a year earlier. Across the region there is wide divergence, from 4.5% in Germany to 20.8% in Spain and 24.5% in Greece. The youth unemployment rate ticked down to 22% from 23% in November. The highest rates were in Greece at 48.6%, Spain at 46%, and Italy at 37.9%, while the lowest were in Germany at 7%, Austria at 11.2%, and the Netherlands at 11.2%.

Credit conditions are improving, however. The annual growth rate of loans to euro area nonfinancial corporations has increased to 0.9% in November 2015, up from 0.6% in the prior month, while loans to households are up by 1.4%, ahead of the 1.2% rate in October. The euro area bank lending survey for the fourth quarter of 2015 indicates an increase in net demand for bank loans, and credit standards eased further on loans to enterprises. The ECB's highly expansionary monetary policy is lowering borrowing costs for firms and households and improving credit flows across the euro area. Still, credit growth will be constrained by ongoing balance sheet adjustments in the private and public sectors.

Baseline forecast

The Moody's Analytics baseline forecast anticipates that the pace of economic activity in the euro zone will be about the same in 2016 as it was last year, with real GDP growing by 1.5% in both years. Financial market volatility, concerns over slower growth in the emerging market economies, especially in China, and uncertainty about a possible U.K. exit from the European Union are important factors that weigh on business confidence and consumer sentiment, affecting private investment and household consumption spending. Further, the growth slowdown in China and other major emerging market economies have lowered export demand for developed economy exports including exports from Europe.

The main support for the recovery will be domestic private consumption. Low energy prices will support growth in real disposable income initially. Later, as unemployment gradually declines and the labor market improves, wage growth should firm in 2017 when real GDP growth is expected to pick up slightly to 1.8%. The forecast assumes that business investment spending will remain low because of uncertainty about the global growth outlook and inadequate fiscal stimulus in the form of public investment spending on infrastructure.

The euro is projected to depreciate further against the U.S. dollar. It is currently trading at around $1.10 per euro, but the expectation of monetary policy divergence, caused by the Federal Reserve's normalization of interest rates while the ECB continues its extraordinary policy actions (see Chart 3), will cause the euro to fall briefly below parity with the dollar by this time next year. A weaker euro will make the region's exports more cost competitive, but euro area exporters must contend with the headwinds of weaker global demand, especially from the major emerging market economies.

The U.K. economy will outperform most of its Western European peers. Consumer

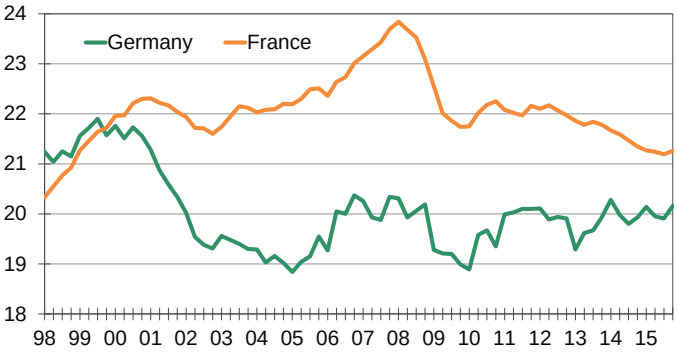
spending has been the driving force behind Britain's economic growth in recent years, supported by the strengthening labor market, low energy prices, and wealth effects. The U.K.'s pace of expansion will moderate slightly as rising interest rates and tighter credit temper housing market activity and consumer spending growth. Real GDP growth this year is expected to match the 2.2% rate of 2015, and accelerate to 2.5% in 2017. Private consumption will remain the primary growth driver, supported by low unemployment and stronger nominal wage growth. Exports are likely to remain under pressure from the strong pound and the subpar recovery of the euro zone, which contains key trading partners. Fiscal policy will drag on growth, including cuts to spending on welfare.

The German economy is projected to expand by 1.6% this year following a mediocre showing of 1.4% in 2015. The global slowdown and weak investor sentiment have hindered Germany's momentum. Consumption spending has been the primary growth driver while investment spending has disappointed. Gross capital formation as a share of GDP has fallen from nearly 22% of GDP in early 2000 to just under 20% in the third quarter of 2015 (see Chart 4). The German government is considering an increase in public investment this year after it balanced the federal budget a year ahead of schedule. The government's unwillingness to increase spending is puzzling given the extraordinarily low government borrowing costs, the sizeable investment gap, and the need to improve infrastructure.

France's economy is growing at a slower pace relative to Germany's economy. Real GDP expanded by only 1.1% in 2015 and is expected to grow by 1.3% this year, supported by lower oil prices, less fiscal contraction, and improving credit conditions thanks to the ECB's monetary easing. Economic measures to improve labor market flexibility, a tax credit for businesses, and a major government-financed green investment project should also start to bear fruit. The weaker euro will support export growth and encourage households to buy more domestically produced goods. A gradually stabilizing rate of unemployment will support wage growth and strengthen domestic demand. This, along with business-friendly fiscal measures and structural reforms, should help boost corporate profits and encourage more business investment.

Chart 4: Germany Could Increase Investment

Real gross fixed capital formation, % of GDP



Sources: National statistical offices, Moody's Analytics

Italy's growth has lagged the other large euro zone countries. The economy is projected to grow by 1% this year from a stagnant 0.6% in 2015. Domestic demand will get a boost from fiscal policy as Prime Minister Matteo Renzi plans to abolish the property tax and local-services tax on households' first homes in 2016 and increase wages to state employees for the first time since 2010. His intent is to boost growth with about €35 billion in tax cuts over the next three years, while keeping the deficit below 3% of GDP. Italy's recovery will gradually gain speed. The economy is expected to accelerate to 1.3% in 2017 and 1.6% in 2018 as the labor market firms up and the labor force participation rate rises. The unemployment rate is projected to decline to 10.6% in 2018 from 11.4% in December 2015.

Spain continues to be the best performing of the euro zone's larger economies, with real GDP up by an impressive 3.2% in 2015, supported by robust domestic demand. Fixed investment spending increased by 6.2% and is expected to rise by close to 5% this year, thanks to lower borrowing costs and the improved credit conditions. At the same time, declining consumer prices and an improving labor market are driving consumer spending. The jobless rate, at 20.9% in the fourth quarter of 2015, has declined by 5.4 percentage points from the recession peak and is driving growth in labor compensation.

The worst performing economy in the euro area is still Greece. Its economy fell back into recession in the second half of 2015 amid a standoff with creditors that accelerated the outflow of deposits from the banking system. To avoid debt default and a disorderly exit from the euro zone, the government was forced to accept a tough bailout program. The additional austerity imposed on Greece will lead to a deeper downturn, and real GDP is expected to contract by 2.3% this year following a 0.6% decline in 2015.

Apart from Russia and Ukraine, which are still mired in a deep downturn, Central and Eastern Europe outperformed most of their peers in the West during the second half of 2015. Supported by robust domestic demand, Slovakia grew by 4% year on year in the fourth quarter of 2015, the Czech Republic, Poland, Bulgaria and Hungary all grew by between 3% and 3.9%. Because exports to the EU represent a large share of their GDP, lackluster intra-EU trade due to tepid growth in the euro area will moderate the CEE's economic expansion this year.

Key assumptions

The steadily growing U.S. economy and the weak euro will provide some support to European exports, but net exports will still slow due to weaker demand from China and the U.S. Spillover from the financial market turmoil is expected to shave approximately one-half percentage point from U.S. economic growth in 2016, which is now projected to be 2.3%. China's growth also has been marked down to 6.4%. The Moody's Analytics forecast for global growth also has been revised down to 2.5% in 2016 from our earlier forecast of 2.9%.

Monetary policy in the euro zone will remain highly accommodative for an extended

period. The policy rate will be kept at 0.05% until the end of 2017. In early December the ECB announced its intention to add a significant amount of liquidity to the banking system by extending the monthly net asset purchases of €60 billion to at least the end of March 2017 and to reinvest the principal payments on maturing securities for as long as necessary.

Poorly anchored inflation expectations and weaker euro area growth will prompt the ECB to take more aggressive easing measures. It will likely cut the deposit rate further into negative territory, arguably to -0.5% from the current -0.3%, and expand its bond-buying program. Further monetary stimulus, however, may not boost growth because banks may opt to park their money at the ECB. Ballooning bank deposits and reserves at the central bank are signs of a broken transmission mechanism.

Fiscal policy in the euro zone will remain neutral: Although fiscal austerity's drag is waning, stimulative policies will be absent.

The U.S. Federal Reserve began normalizing interest rates in mid-December, raising short-term rates by 0.25 percentage point from the effective zero lower bound that had prevailed since the financial crisis. U.S. rate normalization will be a lengthy process, with short-term interest rates not expected to normalize until early 2018. However, slowly rising U.S. policy rates will widen the yield between dollar- and euro-denominated assets, causing the euro to drop to below parity with the dollar, further supporting euro zone exports.

The Bank of England is maintaining an accommodative monetary policy. The BoE has kept its repurchase rate target at 0.5% since March 2009 and is not expected to start raising the benchmark policy rate until early 2017.

Oil prices will remain low for the next several years. The global oil surplus in 2015 averaged 2 million barrels per day, and it is unlikely that the glut will disappear before mid-2016. The global market will become more balanced in the second half of the year and oil prices will start to increase. The price of West Texas Intermediate will average $40 per barrel in 2016, possibly topping $50 by year's end. Lower oil prices will support European growth since the region, except for Russia and Norway, is a net consumer of energy.

Risks

If EU governments and institutions cannot come up with a coherent and effective response to the refugee crisis, and if they fail to mount a strong coordinated policy response to strengthen domestic demand through public investments aimed at enhancing long-term growth potential, then public confidence in the EU's policymaking capacity and in the future of the European project would be further eroded. Households and businesses would feel less optimistic, and that would derail the recovery in private sector investment.

Global shocks also could derail the euro area's fragile recovery. Greater distress in large emerging market economies and deepening geopolitical conflicts could increase turbulence in global financial markets. The heightened risk aversion could cause credit spreads to widen sharply, especially in fragile economies with high levels of sovereign, household and corporate debt, giving rise to a liquidity squeeze and credit crunch. That in turn could cause a sharp deceleration in world trade flows and slash demand for European exports. For example, a meltdown in China's real estate market could cause an even sharper slowdown in that country's economic growth and further dampen world import demand.

Real GDP, local currency units, % change

	2009	2010	2011	2012	2013	2014
Germany	-5.6	3.9	3.7	0.6	0.4	1.6
France	-2.9	1.9	2.1	0.2	0.8	0.2
Euro zone	-4.5	2.0	1.6	-0.8	-0.2	0.9
Italy	-5.5	1.7	0.6	-2.9	-1.8	-0.3
Spain	-3.6	0.0	-1.0	-2.6	-1.7	1.4
U.K.	-4.2	1.5	2.0	1.2	2.2	2.9
Sweden	-5.1	5.7	2.7	0.1	1.2	2.4
Greece	-4.3	-5.5	-9.2	-7.3	-3.1	0.7
Portugal	-3.0	1.9	-1.8	-4.0	-1.1	0.9
Ireland	-5.7	0.4	2.6	0.2	1.4	5.2
Poland	2.4	3.7	5.0	1.8	1.3	3.4
Russia	-7.1	4.1	4.3	3.4	1.3	0.5

Total employment, % change

	2009	2010	2011	2012	2013	2014
Germany	0.1	0.3	1.4	1.2	0.6	0.9
France	-1.3	0.3	0.3	0.1	-0.2	0.2
Euro zone	-1.9	-0.6	0.1	-0.5	-0.7	0.6
Italy	-1.5	-0.9	0.4	-0.2	-1.7	0.4
Spain	-6.7	-2.0	-1.6	-4.3	-2.8	1.2
U.K.	-1.6	0.3	0.5	1.1	1.2	2.3
Sweden	-2.1	0.5	2.3	0.6	1.1	1.4
Greece	-1.2	-3.7	-7.6	-8.9	-4.9	0.6
Portugal	-2.8	-1.5	-1.3	-4.2	-4.4	1.6
Ireland	-7.9	-4.0	-1.8	-0.6	2.4	1.8
Poland	0.4	1.9	0.6	0.2	-0.2	1.9
Russia	-2.2	0.8	1.3	1.0	-0.2	0.2

European Metro Area Outlook

The **London** metropolitan area is expanding, with the January regional PMI solidly in positive territory despite a dip to a four-month low. The metro area's unemployment rate was 6.3% in December, holding steady throughout 2015 following the downward trend back toward full employment in 2013 and 2014. Further, according to the February survey of homeowner sentiment about the direction of house prices, the net margin of Londoners who believe that house prices will rise remains among the highest across the U.K.

However, the decline in the PMI reflects the uncertainty building up ahead of the June 23 referendum as to whether the U.K. should remain in the European Union. London is the leading financial center in Europe and a departure from the EU could result in its banks losing substantial business. Moreover, the loss of banking jobs would affect the entire metro area economy because of the industry's high concentration. Other industries such as professional services, distribution and travel would also suffer, as London's role as the gateway to European business would diminish.

Dublin is recovering rapidly. The unemployment rate has declined more than 5 percentage points over the past four years to 8% in the third quarter of 2015. This is consistent with the booming 7% growth in Ireland's GDP over the past year since the metro area represents one-third of the entire Irish economy. Traffic through the airport is up at a double-digit pace year over year and apartment rents are at a post-recession high.

Paris is recovering, though the overall pace is slow. Joblessness did not decline measurably in 2015 and actually rose modestly at the end of the year following the terrorist attacks which dampened tourism (see Chart 5). On the positive side, the commercial property market is strengthening, led by rising office demand. Investment increased substantially in 2015, and 2016 began with the sale of France's highest skyscraper—Tour First—for €800 million. However, apartment prices are still soft, though the volume of transactions has increased at a double-digit pace.

Included in this issue

- London
- Dublin
- Paris
- Lyon
- Berlin
- Munich
- Stuttgart
- Amsterdam
- Brussels
- Copenhagen
- Milan
- Naples
- Madrid
- Barcelona
- Warsaw
- Moscow

Tourism will get a boost this summer as Paris hosts a number of the games in the European Football Championship in June. Longer term, the French capital is now officially a candidate city for the 2024 Olympic summer games. The games should cost about €6.5 billion—far lower than the €10.7 billion in London 2012 and €30 billion in Beijing 2008—as the city will repurpose its existing sport and transport infrastructure. The funds will be secured by the City of Paris, Ile-de-France region, and the national government. A successful bid against Rome, Budapest and Los Angeles—to be decided by the International Olympic Committee in September 2017—would bring the Olympics to the French capital exactly 100 years after the first time in 1924.

Lyon, the capital of Rhône-Alpes, is also recovering at a moderate rate. The unemployment rate remains elevated at 9.2%, but industrial production in Rhône-Alpes was up 0.5% year over year, important for a region that accounts for more than 12.5% of the French industrial value-added.

According to the latest numbers from Airports Council International Europe, the number of passengers at the Lyon-Saint Exupéry Airport continues to climb. For all of 2015, the number of passengers rose by 2.8%, driven mostly by an increase in international traffic. Freight cargo also expanded, by 4%, underlining the industrial importance of the metro area.

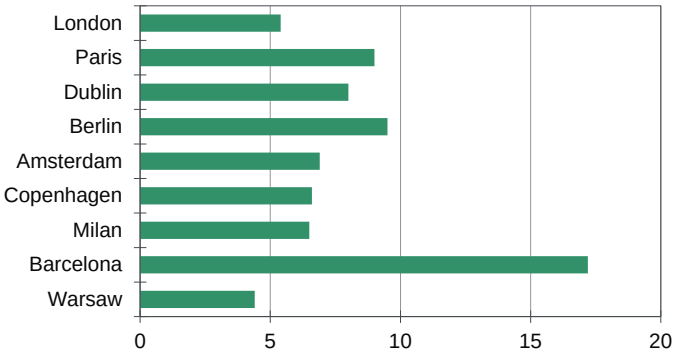
As in Paris, tourism is expected to get a boost by the upcoming June European Football Championship. Lyon will host six matches in total, one of which will be a semi-final. The event will attract far more tourists than in a regular season— the expected attendance of the six matches combined is 300,000—and is expected to create 500 jobs directly linked to the organization of the championship and several thousand in the tourism industry.

In contrast with the decline in national business sentiment, comparable indicators for **Berlin** are still rising. Unemployment, though elevated, is at a multidecade low. Further, the population is growing as a result of in-migration of young job seekers, many of whom are well-educated. Besides job opportunities, the low cost of living has been a magnet. So far, these factors are offsetting the uncertainties posed by border closures due to the refugee crisis and the continuation of sanctions against Russia.

Munich's economy performed well in 2015, led by the auto industry. Exports from the Bavarian region, of which Munich is a part, rose to a record high. The U.S. and U.K.

Chart 5: Jobless Rates Still Vary Widely

Unemployment rate, %, 2015Q4



Sources: National statistical offices, Moody's Analytics

were the largest buyers and the sources of most of the growth. In contrast, exports to China, Russia and Brazil fell.

Besides motor vehicles, information and communication technology has the potential to lead the regional economy. Employment in this industry has steadily climbed for the last 20 years.

As the local economy grows, Munich will need to expand its airport. Although the airport has the approval of the court to build a third runway, an ongoing dispute with environmentalists and private individuals may stall progress. The third runway would improve the link to all regions in coming years for the Bavarian population and the metro area's companies.

Stuttgart's economy has also performed well, with the unemployment rate below 5%. Local surveys of sentiment show that firms remain upbeat on job creation prospects. The metro area houses headquarters and/or regional operations of such companies as Bosch, HP, IBM, Mercedes and Porsche, attracted by the area's well-trained labor force and central location. Smaller auto- and equipment-related companies such as Behr Hella Services, Festo, and Stihl are also growing.

However, the metro area's high concentration of auto-related manufacturing also puts it at risk if China's slowdown results in a drop in demand, though the low euro and growth in demand from the U.S. should provide some offset. Moreover, the danger of a widespread introduction of border controls could hurt the area's trade prospects. Investment intentions confirm this trend, falling for the second consecutive period in the first quarter of 2016. However, the weak euro and solid growth in demand from euro zone countries should provide some offset.

Amsterdam is growing steadily, in line with the nation, whose unemployment rate declined to 6.5% in January, well below the euro zone average. Tourism is up, both intra-European and intercontinental, in part because of the low value of the euro. The residential market is especially strong. House prices on existing homes rose by more than 10% in 2015. Construction is growing, highlighted by the long-term development of the artificial archipelago of Ijburg, which will ultimately be the location of 18,000 homes.

Growth will continue throughout the medium term as the euro zone recovery proceeds. Drivers will be above-average population gains and increases in higher-paying jobs, which will attract in-migration of skilled workers.

Brussels has experienced slower growth in the past year than Amsterdam, in line with the slower overall growth in Belgium than the Netherlands. The November terror threat that locked the city down, however, had only a temporary downward impact.

As the diplomatic center of Europe, professional and government services have the highest concentrations of employment. Recent data show that employment in the EU and other international organizations comprises nearly 17% of the total. This concentration helps insulate Brussels somewhat from the business cycle, but also limits the pace of upside gains.

The metro area will benefit from its highly skilled workforce and strategic location in the heart of Europe. The slow but steady improvement in both the country and the euro zone will help elevate job growth in the short term, but growth will remain uninspiring.

Copenhagen, which accounts for more than one-quarter of the entire Danish economy, has decelerated in line with the national slowing. The jobless rate remains somewhat elevated at nearly 7%. Professional services job growth has slowed given weaker performance at biotech and pharmaceutical firms, which have a high concentration in the metro area. Large local company Novo Nordisk, for example, has experienced declining revenues.

On the positive side, residential prices have risen sharply in recent years, in part because of lower interest rates engineered by the central bank to prevent the currency from rising too much against the euro. Further, residential construction will grow, as the City of Copenhagen aims to build more than 3,000 units per year over the next decade to accommodate population gains. Also, above-average population growth will support gains in service industries.

Milan's slow recovery is ongoing. The unemployment rate is down by about one-half percentage point over the past year. However, since November and the conclusion of the Milan Expo, air traffic through Malpensa Airport has declined. For example, the Alitalia flight to Shanghai, introduced at the beginning of the exposition, ended and the frequency of the connection to Tokyo was reduced from one flight a day to four flights a week.

Problems in the large banking industry are a drag. Delinquent loans are elevated to their highest proportion of the total outstanding in 20 years, in part because of the length and depth of the second national downturn after the Great Recession. Consolidation in the form of mergers is possible, implying that so are layoffs.

The influx of migrants from the Middle East is weighing on **Naples'** economy, increasing unemployment and widening the north-south divide of the country. Disposable income was already well below average and joblessness well above average.

In recent years, only the Lazio and Trentino-Alto Adige regions, in northern and central Italy, reported increasing employment, while southern Campania, with the capital city of Naples, Calabria and Liguria, posted the largest declines. The unemployment rate of foreigners almost doubled relative to six years earlier to 16% between 2008 and 2014, compared with 12% for Italians by birth.

Although the government introduced tax reductions for southern businesses in its 2016 budget plan, firms have continued to move to northern regions, which offer better opportunities, a wider consumer base, and higher purchasing power. A deteriorating industrial base and a low fertility rate are major headwinds for Naples' economy.

Madrid's recovery is intact. Employment grew by 3.6% in 2015 after declining for six consecutive years. Swift job creation pushed the jobless rate down by 1.7 percentage points to 17.1% in 2015 from 2014, well below Spain's 22.1%. Personal bankruptcies have declined by nearly three-quarters from the recession high. Improving credit quality and still-low commodity prices have put consumers in a better position to spend.

However, there are downside risks. Spanish banks, which are concentrated in Madrid,

have a high exposure to Brazil, which is in deep recession. Further, the Spanish Socialist Workers Party, an anti-austerity group, is attempting to form a government at a time when Spain must bring its fiscal deficit into compliance with EU rules. Also, the spectre of the referendum by Catalonia to secede remains in place.

The **Barcelona** economy has matched that of Madrid in terms of recovery. Its high concentration of manufacturing has been boosted by rising export demand and lower unit labor costs. The jobless rate has declined by nearly 7 percentage points from the recession peak, more than the national average. However, the possibility of secession puts more downside economic risk on Catalonia than Madrid, because it will have a deeper downward effect on sentiment of investors considering expanding in the area.

Warsaw's economy ended 2015 on a relatively strong note. Employment was up 1% year over year in December during which time the unemployment rate declined by almost 1 percentage point. Wages rose 4.2% over the year. Further, industrial production advanced 2.1%, with construction up 8.7%.

Warsaw is still one of the fastest developing cities in Poland and will continue to attract business, people and foreign investment. One reason is that it is the political and economic capital, offering better work opportunities that generate in-migration. But a downside risk arises from recent political turmoil that could raise investors' aversion towards the country and choke the inflow of funds.

The **Moscow** economy remains in recession, and the most recent decline in oil prices implies that no quick end is in sight. National high-frequency indicators for manufacturing in December and January were negative. The decline in the ruble against the dollar is unabated, implying that consumer price inflation will remain elevated. Because oil prices are likely to remain low for a longer time, and there is little chance that sanctions will be lifted soon, the outlook remains poor. The latter especially affects Moscow, as oil revenues are the major source of funds for government spending.

Real GDP, local currency units, % change

	2009	2010	2011	2012	2013	2014
London	-5.4	3.2	3.5	2.3	2.6	3.7
Paris	-3.1	3.8	2.0	1.9	0.5	-0.7
Frankfurt	-7.7	1.8	3.0	0.5	7.6	1.2
Madrid	-1.7	0.1	0.9	-0.5	-1.7	1.7
Berlin	-2.0	3.1	3.4	0.3	3.2	1.9
Stockholm	-1.2	3.7	4.7	1.4	2.4	3.4
Athens	-2.2	-5.7	-9.6	-6.8	-3.0	-0.2
Dublin	-3.9	0.6	2.9	0.1	1.6	0.6
Warsaw	3.8	5.0	5.3	3.6	2.5	3.1
Amsterdam	-3.7	2.9	2.1	-0.1	1.1	2.5
Milan	-5.4	5.6	0.5	-1.7	-0.6	0.6

Total employment, % change

	2009	2010	2011	2012	2013	2014
London	-1.2	1.0	1.1	1.9	2.4	3.0
Paris	-0.8	-1.4	0.5	0.4	0.6	-0.2
Frankfurt	0.8	0.3	0.4	2.7	1.1	1.4
Madrid	-4.6	-1.6	-1.7	-2.5	-3.6	-0.1
Berlin	0.2	2.0	1.0	2.4	2.2	1.7
Stockholm	0.6	0.9	2.8	1.3	2.5	1.6
Athens	-1.5	-4.6	-7.9	-10.1	-5.2	1.1
Dublin	-7.5	-3.4	-1.7	-0.1	1.0	3.5
Warsaw	1.4	2.9	3.7	2.2	-1.4	9.2
Amsterdam	0.3	-1.0	0.3	1.5	-0.2	-0.2
Milan	-2.2	-1.2	0.1	0.6	2.2	0.8

Workers Re-Enter, but Consumers Are a Concern for Northeast

BY ADAM KAMINS

The Northeast is moving in the right direction after a steady 2015. While its large, mature economies and poor demographics make it nearly impossible for the region to keep up with the faster-growing West and nonoil South, numerous metrics inspire optimism. The regional unemployment rate has dipped below that of the South for second best, but the more impressive story revolves around worker re-entries. After declining through late 2013 and all of 2014, the Northeast's labor force rebounded in a big way last year, even outpacing that of the West during the fourth quarter. Gains were concentrated in the Mid-Atlantic, with New York, Pennsylvania and Maryland enjoying very strong labor force growth during the second half of 2015 despite significant demographic headwinds, particularly in the first two.

Although workers are seemingly returning en masse, questions about whether they have the right skills remain. According to the monthly Job Openings and Labor Turnover Survey, the job openings rate in the Northeast increased significantly in late 2015, helping the region to narrow its gap with the rest of the U.S. While that alone is encouraging, hiring has failed to keep up, mirroring a national trend. Since tracking began, this is unprecedented, and it points to the possibility of a skills mismatch that is especially pronounced in the region. As a result, continued upward pressure on wages is likely, but overall hiring may fail to meet expectations, keeping income gains in check despite the rising rate of job openings.

Lagging income growth will remain a weight on both consumer industries and the housing market, compounding existing weakness in much of the Northeast. Employment in retailing has barely treaded water over the past year, with the past couple of months bringing outright job losses, and leisure employment growth has been anemic relative to the rest of the U.S. Weak consumer balance sheets are playing a role in this softness; in terms of dollar volume, the overall delinquency rate exceeds the national average in all but one of the six northeastern states that have at least 3 million residents. The Mid-Atlantic is especially stricken, with New York, New Jersey and Delaware home to three of the 10 highest delinquency rates in the nation. Mortgages are the most significant culprit, with persistently high foreclosure inventories in New York and New Jersey keeping bad mortgages on the books longer. As consumers struggle to regain their footing, discretionary spending and the housing market will suffer.

Concerns are not limited to consumer industries. Manufacturing has faltered after enjoying something of a midyear renaissance in 2015. Employment is back to being flat on a year-over-year basis after a difficult second half of the year; outside of the Oil Patch, this represents the weakest manufacturing performance in the nation. Mid-Atlantic states are faring worst, highlighted by New York and Pennsylvania, which are down from year-ago levels. It is little surprise, then, that the closely watched Federal Reserve manufacturing indexes for both of those states have spent half a year in contractionary territory. Fortunately, the rest of the region has managed to keep its head above water, indicating that broader conditions may not be as dire as indicated in Fed surveys. If, however, exports—which outperformed those of the U.S. for much of 2015—lose ground as they have in recent months, the hit to manufacturing could become widespread.

Offsetting weak factory growth to some extent, the entrepreneurial environment in the Northeast is improving, mirroring the national dynamic. But there is evidence that startups are playing an even more pronounced role than they are elsewhere. The Northeast is the only region where the number of employees per establishment has fallen over the past three years, according to data from the Quarterly Census of Employment and Wages. And venture capital funding remains healthy, powered by rapid growth in high tech, particularly in New York City and Boston. As a result, New York and Massachusetts trail only California in terms of total venture capital. Although there is some risk associated with a decline in funding should the current financial market turmoil prove more severe and persistent than expected, on the whole this bodes well for continued dynamism and innovation over the long-term forecast horizon.

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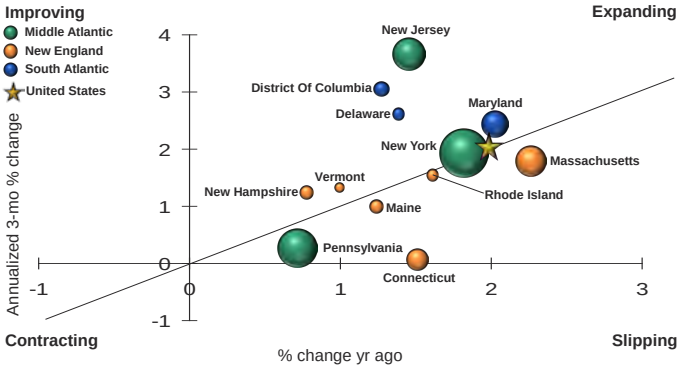
High-Frequency Indicators

Payroll Employment—Northeast States

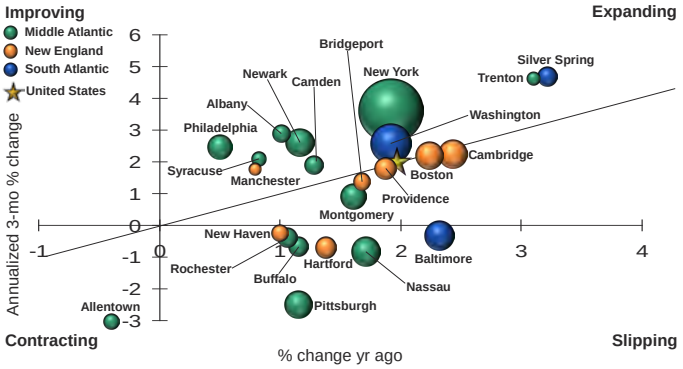
1-yr vs. 3-mo performance (3-mo MA) Dec 2015



Note: Size reflects relative total employment

Payroll Employment—Northeast MSAs

1-yr vs. 3-mo performance (3-mo MA) Dec 2015



Note: Size reflects relative total employment

Comparative Performance Indicators

3-mo MA, % change from previous 3-mo period, Feb 2016

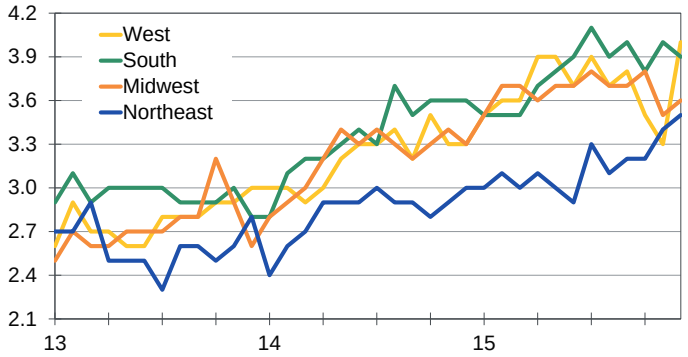
	Private service-providing employment (annualized)	Current unemployment rate	Change in unemployment rate	Residential permits	Industrial production	Overall recent performance	Change in outlook from last month
New Haven	0.9	5.6	-0.2	-39.5	-0.9	↑	↔
Rochester	-0.7	4.8	-0.4	-24.7	-1.0	↑	↔
Wilmington	4.8	5.2	0.2	-32.0	-0.3	↑	↔
Allentown	-1.2	5.0	-0.5	-43.4	-0.6	↓	↔
Baltimore	-1.0	5.4	0.0	-18.1	-0.7	↓	↔
Providence	1.6	5.5	-0.3	6.8	-0.4	↓	↔
Silver Spring	2.0	4.1	0.1	-32.3	-0.4	↓	↔
Washington	2.3	4.2	-0.3	21.7	-0.3	↓	↔
Albany	2.0	4.3	-0.4	-7.5	-0.8	↔	↔
Boston	1.5	4.4	0.1	9.6	-0.8	↔	↔
Buffalo	-1.3	5.2	-0.4	-3.7	-0.9	↔	↔
Cambridge	2.3	4.1	0.0	0.9	-0.7	↔	↔
Camden	1.1	5.5	-0.3	15.9	-0.7	↔	↔
Hartford	0.4	5.1	-0.1	27.9	-1.2	↔	↔
Nassau-Suffolk	-0.6	4.2	-0.5	34.6	-0.6	↔	↔
New York	0.7	4.9	-0.3	111.9	-0.8	↔	↔
Newark	-0.1	5.2	-0.3	51.3	-0.7	↔	↔
Philadelphia	2.6	5.9	-0.5	-19.2	-1.0	↔	↔
Pittsburgh	-1.6	5.1	-0.3	26.9	-1.2	↔	↔
Northeast	**2.1**	**4.9**	**-0.2**	**32.9**	**-0.8**	↔	↔
U.S.	**2.6**	**5.0**	**-0.1**	**10.1**	**-0.9**	↔	↔

Sources: BLS, Census Bureau, Federal Reserve, Moody's Analytics

What We're Watching

Openings in Northeast Close the Gap

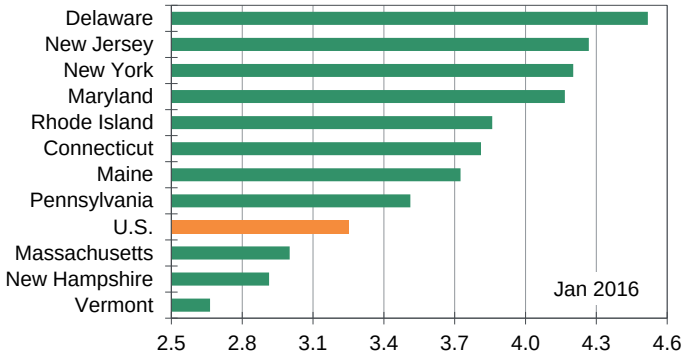
Job opening rate, %



Sources: BLS, Moody's Analytics

Consumers in Mid-Atlantic Remain Hamstrung

Consumer credit, % delinquent, all lines, by $ volume, NSA

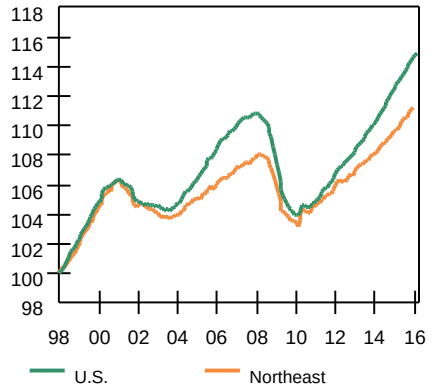


Sources: Equifax, Moody's Analytics

Cyclical Indicators

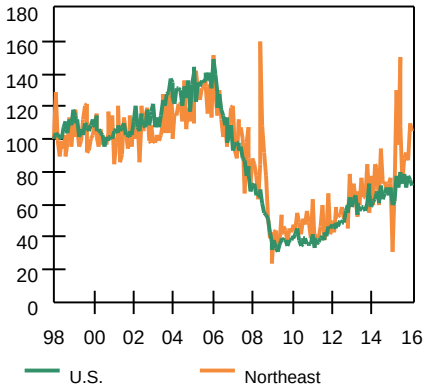
Employment

1998=100



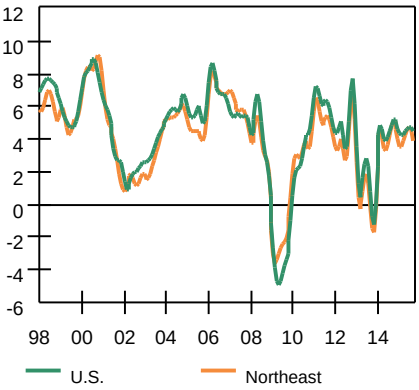
Housing Starts

3-mo MA, 1998=100



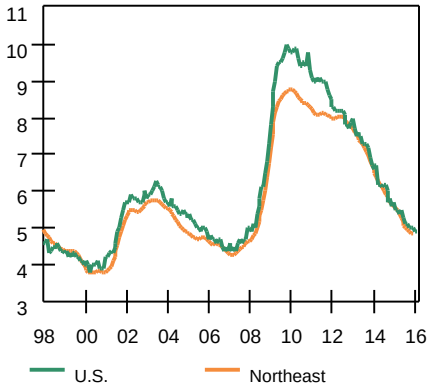
Personal Income

% change yr ago



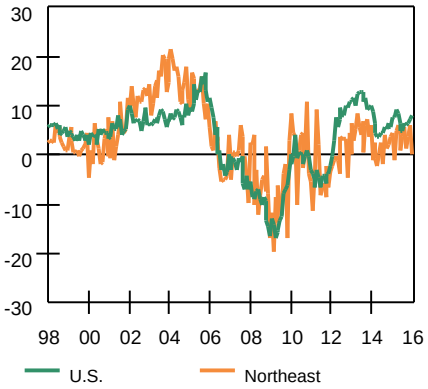
Unemployment Rate

%



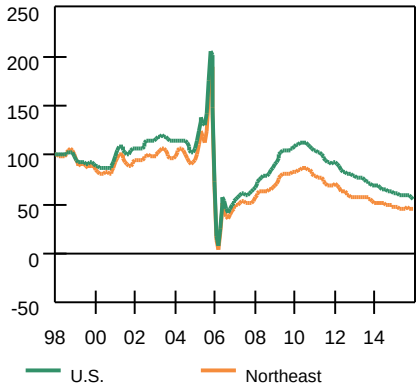
Median House Price (Existing)

3-mo MA, % change yr ago



Personal Bankruptcy Filings

1998=100



Sources: BEA, BLS, Federal District Courts, NAR, Moody's Analytics

Connecticut

Connecticut's labor market is not performing as well as current high-frequency data may indicate. The Quarterly Census of Employment and Wages suggests slower job creation during the first half of 2015, with job growth below the regional average. The QCEW data indicate the biggest potential downward revisions for Norwich and New Haven when benchmark revisions are released in mid-March, especially in retail and leisure/hospitality. Hartford and Bridgeport, the largest economies in Connecticut, are unlikely to undergo major changes, ensuring that the two metro areas lead the state in employment, output and household income growth.

The QCEW data indicate that manufacturing employment data will not be significantly revised. While manufacturing had been in a protracted slump over the past 35 years, it added jobs in 2015 for only the third time since 1998. This is encouraging for the industry, which makes up nearly a tenth of all jobs and gross output in Connecticut, keeping it slightly above the U.S. average.

The stability of the state's factories is evident in **Norwich**, where defense-related manufacturing increasingly drives the metro area economy. Manufacturing job growth turned positive and has outpaced the national rate since mid-2015. General Dynamics and Electric Boat, two top employers, had strong orders for submarines in 2015, a trend that is expected to continue in the coming years. Notably, Electric Boat will hire around 1,800 more workers in 2016, while General Dynamics recently pledged to spend about $1.5 billion across Eastern Connecticut. Given that the companies have around $21 billion worth of contract work over the next five years, there is significant upside potential for more hiring to accommodate the growth in demand. Increased manufacturing jobs would greatly boost local spending, as manufacturing employees in Connecticut boast more than 25% greater average weekly earnings than the typical worker in the state, higher than the corresponding national figure.

Hartford manufacturing will also be stable in the near term thanks to continued investment by one of the metro area's top employers, United Technologies. Notably, the aerospace manufacturer announced that its Connecticut offices will be spared from company-wide cuts; that it will keep its headquarters in Connecticut for the next five years; and that it will invest in Hartford locations. Specifically, the company is set to build a customer training center at UTC Aerospace Systems in Windsor Locks and will build new labs at the United Technologies Research Center in East Hartford. With additional state budget cuts looming, weakening the outlook for state government employment, manufacturing will be more crucial to support Hartford's economy.

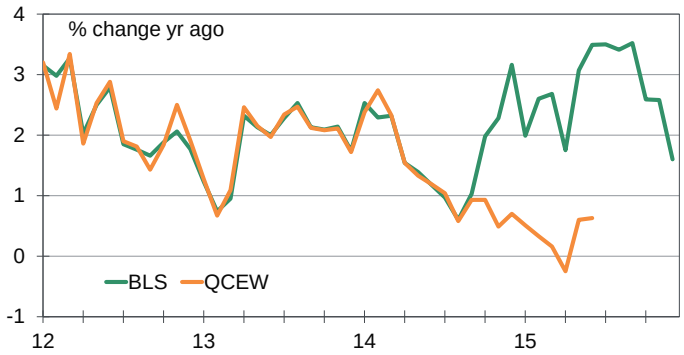
In the near term, reduced demand for helicopters produced at **Bridgeport**-based Sikorsky will aggravate the metro area's factory sector. Manufacturing employment has fallen from around one-third of jobs in the metro area workforce as of 1970 to about 7% today, as high business costs, especially energy, have made Bridgeport increasingly unattractive for goods-producing industries. Ironically, sustained low energy prices will now cut into production further, most notably at Sikorsky, the metro area's largest employer. The helicopter manufacturer expects 2016 sales will be half of its original projections because of lower demand for aircraft used for offshore oil exploration projects. The weakness has trickled through to manufacturing as a whole, as exemplified by the first yearly decline in industrial production since 2009. Bridgeport's aerospace industry will suffer as long as energy prices remain depressed.

New Haven will be supported in the near term by its two primary drivers, healthcare and education. Employment in health services, which employs nearly one in five workers, grew at its fastest rate since 2011 last year. Additionally, while Connecticut's public universities are under pressure to reduce faculty and staff because of reduced state funding, Yale has announced that it will hire 1,000 workers over the next three years, double what had been previously planned. As long as state budget cuts do not dramatically reduce funding for Yale-New Haven Hospital, New Haven's job and income growth will be on par with the state average.

—PAUL MATSIRAS

Consumer Industries Are Not Doing So Well

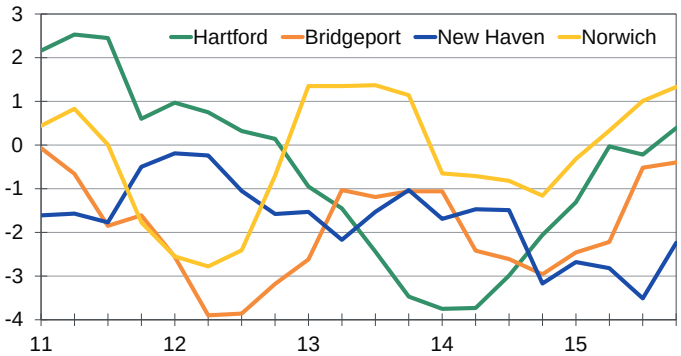
Employment, retail and leisure/hospitality, Connecticut



Sources: BLS, Moody's Analytics

Manufacturing Is Stabilizing

Manufacturing employment, % change yr ago



Sources: BLS, Moody's Analytics

Maryland

Maryland's economy is not as strong as it appears. Data from the Quarterly Census of Employment and Wages indicate that downward revisions are likely for healthcare, professional/business services, local government, and construction employment, all of which were key drivers of improving employment growth in 2015. The general business conditions index from the Richmond Federal Reserve's Maryland Survey of Business Activity has been declining over the past six months. In February, the share of firms reporting deterioration in general business conditions outweighed the share reporting improvement for the first time in two years. Moreover, respondents are reporting persistent trouble finding qualified workers. Housing continues to disappoint. Homebuilding is proceeding at a slow pace, and house price growth is markedly behind the national average.

Looking ahead, however, there are bright spots. The Port of **Baltimore** is faring better than the transportation/warehousing employment data in the monthly payroll survey suggest. While the survey numbers show transportation/warehousing employment declining while the U.S. dollar appreciates, the more comprehensive QCEW employment data show steady growth. Solid imports have helped the port weather the effects of the strong dollar. As a national leader in handling autos, the port gains from strong auto sales nationwide, and the robust pace will persist in 2016. According to an independent report by the Journal of Commerce, the port was the most efficient in the country in the first half of 2015.

The budget and debt-ceiling agreement, signed in November, provides Maryland with much needed breathing room. The budget deal will alleviate lingering fiscal uncertainty by removing the threat of a government shutdown or U.S. default for at least a year and a half, so employment growth will pick up in the coming year. The budget also eliminates sequestration cuts for 2016, while caps on both discretionary and defense spending have been lifted almost entirely. This is good news for the public sector as well as defense contractors and consumer industries, especially in Baltimore and **Silver Spring**.

Diminished fiscal uncertainty improves the outlook for the smaller metro areas as well. In **California-Lexington Park**, more than 20% of total employment is with the federal government, compared with just 2% nationwide. Relative to the population base, the concentration of military personnel is more than triple the national average. And private defense contractors account for more than 15% of employment. Federal contracts will flow more quickly this year, shoring up the already-sturdy economy.

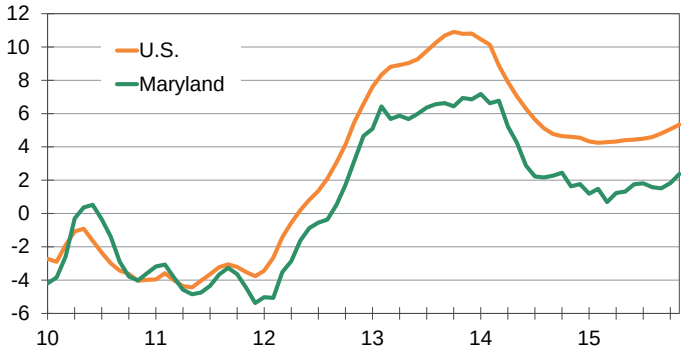
While federal government employment is edging up statewide, **Hagerstown-Martinsburg** has yet to share in those gains. Although less dependent on the federal government than the larger Maryland metro areas, the concentration of federal government employment is about twice the national average, as the metro area is home to several smaller government offices such as the Veteran's Administration and the Coast Guard. Also, statewide gains in federal government employment, Maryland's leading high-wage industry, bode well for spending in Hagerstown's outlet stores and outsize retail industry.

Even in **Cumberland**, federal spending is the best hope for the ailing manufacturing base. Allegany Ballistics Laboratory, based primarily in West Virginia but still an important employer for Cumberland residents, produces aerospace products, explosives, sensors and ammunition for the military. Although defense spending is set to decline as a share of U.S. GDP, the Pentagon is shifting some focus towards weaponry because of concerns that the U.S. military's superiority is eroding as other countries develop more advanced weapons. Defense manufacturing is one of the few industries in Cumberland that has proved relatively stable over the past several years, even if it is not actually growing. Defense also injects some upside risk into an otherwise gloomy manufacturing outlook. Defense manufacturing is less vulnerable to overseas competition than Cumberland's traditional manufacturing industries, furniture, wood and paper. The metro area's location, reasonably close to the Pentagon but still relatively rural by East Coast standards, is also an asset, as its isolation could prove an asset for testing and security.

—LAURA RATZ

House Prices Are Stuck in Neutral

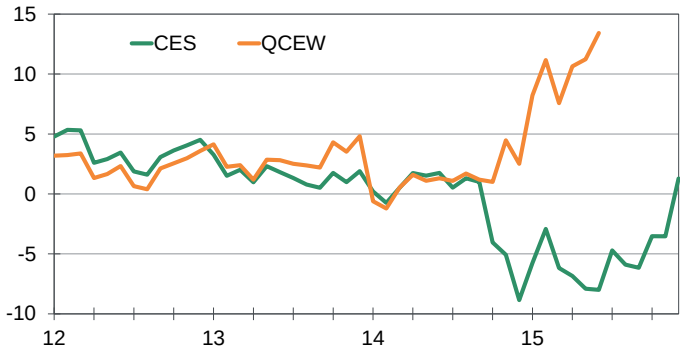
Case-Shiller® Single-Family Aggregate, % change yr ago



Sources: CoreLogic, Moody's Analytics

Full Speed Ahead for the Port of Baltimore

Transportation/warehousing employment, % change yr ago



Sources: BLS, Moody's Analytics

Massachusetts

The Massachusetts economy looks strong as it nears the end of the first quarter. Year-over-year employment growth through the end of 2015 placed the Bay State 11th in the nation and tops among the Northeast and Midwest states. The latter is perhaps a better comparison since those states share common characteristics of slow population growth, a colder climate, and a generally higher cost of doing business than much of the South and West. Further, benchmark revisions expected in mid-March should raise the estimated level of employment in 2014. This may not cause much change for the current rate of growth, but it does mean the level of employment at the end of last year would be higher than currently estimated.

One factor leading to the resilience of the state's economy is exports. Though they have been volatile, the nominal value of exports of goods and commodities from Massachusetts (no service exports data are available at the state level) during the fourth quarter was down by less than 3% from year-ago levels, compared with a national decline of just over 10%. While exports to Massachusetts's largest trading partner—Canada—have been falling consistently over the past two years, trade with Mexico has been rising. Indeed, Mexico is now the state's second largest trading partner, overtaking China, the U.K. and Japan over the past five years.

Computer and electronic equipment exports last year amounted to about $7.3 billion, accounting for 29% of total exports from the state. They are by far the largest export item to Mexico with a value of $1.5 billion. Chemicals, electrical equipment and machinery follow and together add up to an additional $540 million in trade with Mexico. Computer exports to Mexico are nearly 300% above where they were in 2008 prior to the Great Recession, accounting for most of the growth of trade with Mexico. But nearly all components of trade to Mexico, large and small, have steadily climbed over the years. As in most states, total exports of goods and commodities are a relatively small component of the economy—less than 6% of nominal GDP in Massachusetts last year. And this figure is down slightly from more than 7% in 2008. The rapid gain in trade with Mexico has helped offset declines in prior years, supporting some of the critical driving industries of the state.

High-tech manufacturing supports growth in the **Boston** and **Cambridge** metro divisions, but especially Cambridge, which has more than twice the exposure to manufacturing as measured by share of GDP or employment as does Boston. Rising employment in financial services in last year's second half complements gains in manufacturing throughout the Boston metro division. But these gains may not provide the usual multiplier effect via income and spending in the coming year as one might expect. Bonus payments on Wall Street, and in financial centers around the country, are paltry this year compared with past years. This could be one reason why state income tax revenue has lagged behind budget since late last year despite the strong labor market.

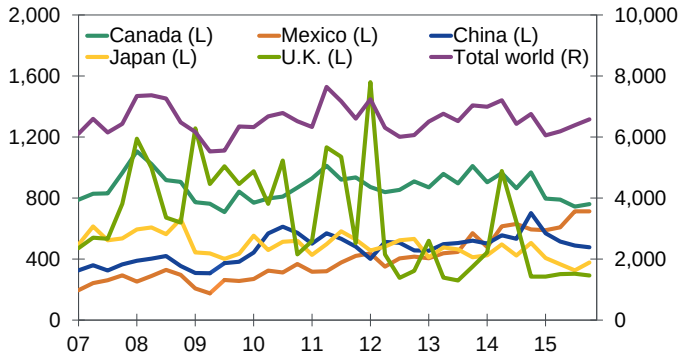
This could also be the reason that house price appreciation has stalled of late, according to the FHFA all-transactions index, not only in eastern Massachusetts but throughout the state. A rising supply of new units may also be to blame. Permit issuance in **Pittsfield**, **Springfield** and **Worcester** fell last year, but the number of units permitted for construction in Boston and Cambridge has continued to rise throughout 2015. Thus, the outlook for further price appreciation in Greater Boston carries some downside risk if employment does not continue to rise at its current pace and income growth does not accelerate.

The assumptions for the near-term outlook have not changed in recent months, and risks to the outlook remain generally weighted to the upside for the state and its metro areas. But one factor to be watched is venture capital and IPO valuations. Recent pessimism regarding the value of a number of tech firms that have gone public may indicate an increasingly limited amount of capital that is available to tech startups. This would hinder both the near- and long-term outlooks, particularly for Boston and Cambridge.

—STEVEN G. COCHRANE

Exports to Mexico Keep Total Exports Stable

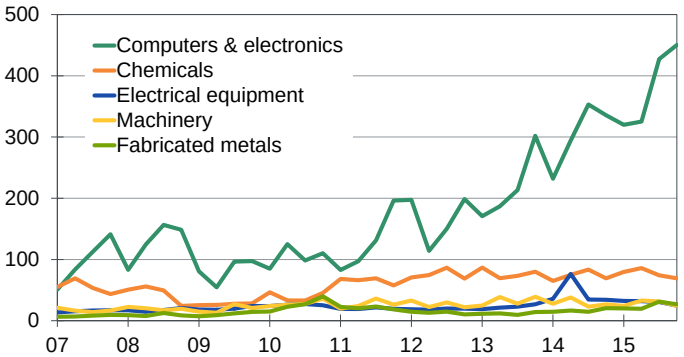
Exports from Massachusetts, by destination, $ mil



Sources: Census Bureau, Moody's Analytics

Technology Drives Massachusetts Exports

Exports, five largest by commodity, $ mil



Sources: Census Bureau, Moody's Analytics

New Jersey

New Jersey's labor market is moving in the right direction. Employment growth on a year-ago basis now matches its cycle peak and pulled ahead of that in the Mid-Atlantic in the fourth quarter for the first time in more than two years. As a result, wage income growth has surpassed that of Pennsylvania and nearly caught up to New York's on a year-ago basis. The unemployment rate stands at 5.1%, almost at par with the national average. This has occurred even as the labor force increased over the last quarter, providing evidence of a healthy labor market. While the state's key financial services sector has struggled to gain traction because of ongoing restructuring, recent job gains have been fueled by construction, leisure/hospitality and education/healthcare.

Despite the strengthening labor market, housing weakness persists because of excess supply. According to the Case-Shiller index, single-family house prices are rising at less than half the national rate on a year-ago basis. This is largely because of the state's foreclosure problem, which is easily the worst in the nation. All of New Jersey's foreclosures must be processed through the courts and the backlog is rising again after trending lower for much of 2015. As this shadow inventory is processed, distress sales will put downward pressure on single-family prices and reduce the incentive to build. Fortunately, there is record demand for multifamily housing as people who work in New York City seek out more affordable options. In Jersey City alone, 3,000 new multifamily units are expected to become available by the end of 2016, with another 3,000 expected to break ground by year's end.

Job growth in **Trenton** has been strong over the last two quarters, outpacing that in the rest of the state. Most major industries are adding to payrolls, led by double-digit increases in business/professional services over the last two quarters. Technology is the primary driver of this industry and its outlook is positive. Trenton is 50% more reliant than the rest of the nation on high-tech jobs, making them a significant source of income. High-tech firms benefit from a wealth of highly skilled individuals graduating from, or affiliated with, Princeton University, as well as from direct links with the university and nearby medical facilities. As a result of these synergies, major biopharmaceutical firms are expanding in the metro area. Bristol-Myers Squibb will add 2,500 jobs when its research and development facility opens later in 2016. In contrast, fiscal pressures stemming from the state's huge unfunded pension and health liabilities have stalled state government job growth over the past quarter.

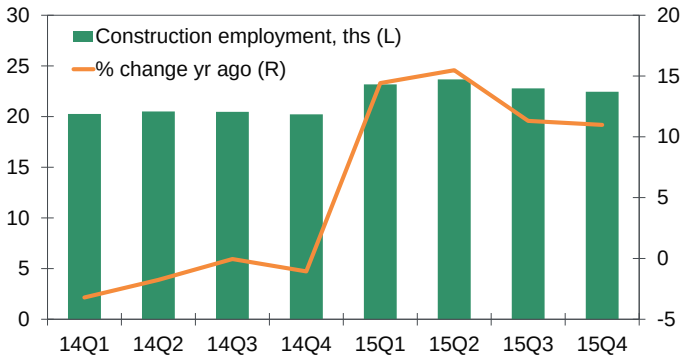
Camden is enjoying a building boom that has created more than 2,000 construction jobs since the end of 2014 but has pulled back since the second half of 2015. An optimistic near-term outlook is supported by Liberty Property Trusts' plans to build a $1 billion mixed commercial/residential complex along Camden's waterfront, beginning later this year. This represents the largest private sector investment in Camden's history. Holtec International is also constructing a major manufacturing technology campus and corporate engineering building, which could lead to 1,000 new positions over five years.

While **Newark** has recovered only about 60% of the jobs lost during the Great Recession, net hiring has accelerated in recent months. The metro area has shared in the state's construction boom, while a strong U.S. dollar and softening global demand have not restrained port activity in Newark, which is the primary container ship facility for the New York metro area. The Port Authority of New York and New Jersey set a second consecutive record for cargo volume in 2015, adding 855 dockworkers over the past two years in response.

Atlantic City continues to wrestle with lost tax revenue and jobs following mass casino closings in 2014. Leisure/hospitality payrolls, which make up almost a third of employment, have been mostly flat over the last year because of gaming weakness, and the pace of total employment growth on a year-ago basis is among the slowest in New Jersey. To reduce costs, 400 local government jobs were recently eliminated, representing about 2.5% of the municipal government total. Without financial assistance, the metro area will likely be insolvent within months. State lawmakers are currently negotiating the terms of a takeover of Atlantic City's finances, and job losses should continue in the near term until fiscal conditions begin to improve.

—STEPHEN CICCARELLA

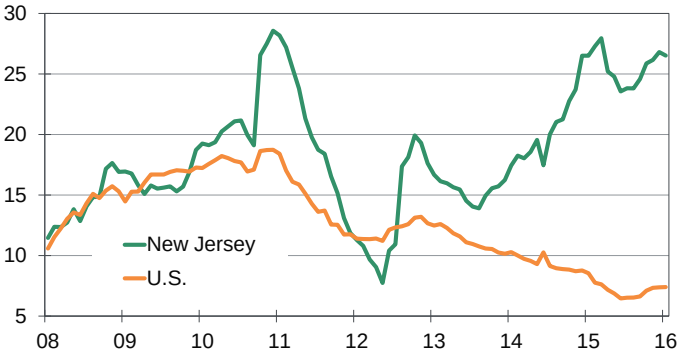
Camden Construction Boom Levels Off



Sources: BLS, Moody's Analytics

Foreclosure Inventories Continue to Diverge

Foreclosures, # per 1,000 households



Sources: RealtyTrac, Moody's Analytics

New York

New York entered 2016 on a high note, but risks are tilting to the downside. Job creation maintained its strong pace through the end of last year, and benchmark revisions should prove favorable, but more nuance is likely in the 2015 revisions than in those from last year. Information and retail, key industries in the state, are poised to shift lower, which is a concern. Meanwhile, construction and finance appear poised for some of the largest upward revisions of the first half of 2015, but these may prove deceptive. Seemingly explosive second half growth for builders last year means that the revisions will likely bring more balance to the 2015 data but leave recent figures relatively unchanged. And finance has begun to tail off as equity markets soften, meaning that first half improvements may be given back.

The drop-off in finance is, of course, most worrisome in **New York City**. New York Stock Exchange member firms experienced their first net loss in four years during the fourth quarter of 2015. Worry about energy companies' ability to repay loans and weaker trading revenue are behind the hard times on Wall Street. Bonuses are likely to disappoint, major employers Morgan Stanley and Bank of America are looking to cut costs, and Goldman Sachs' fourth quarter revenue and profits declined sharply.

While the impacts are most pronounced in the Big Apple, weakness in financial services will reverberate more broadly. State coffers depend heavily on income tax revenue, so poor earnings and bonuses could have an outsize impact on **Albany**. About one-fifth of workers in **Nassau-Suffolk** commute to New York City, so income losses are likely to spill into Long Island as well.

Although not affected nearly as directly by global financial markets, western New York banks also face hurdles. **Rochester** was hurt last year when reduced demand for mortgage refinancing led JPMorgan Chase to lay off 300 workers locally. And in **Buffalo**, the proposed acquisition of First Niagara by KeyBank could result in consolidation and branch closures; despite efforts by Governor Andrew Cuomo and others to block the deal, this injects risk into the metro area's outlook.

Threats to Buffalo are not limited to finance, as the much ballyhooed SolarCity panel factory is hitting early speed bumps. Opening of the facility, which is expected to create nearly 1,500 manufacturing jobs, has been delayed and state funding issues are now causing construction layoffs. In addition, a weak financial outlook has prompted concern about the company's viability, leading to public reassurances that the state's massive investment in the plant will pay off. Compounded with uncertainty about demand and the company's lack of production experience, this could lead the forecast to be downgraded.

There are other trouble signs for factories as well. Respondents to the monthly Empire State Manufacturing Survey have indicated deteriorating conditions in state factories for more than half a year. Weak international demand is a lingering concern, as exports are down from year-ago levels, driven by a sharp decline in shipments to Canada.

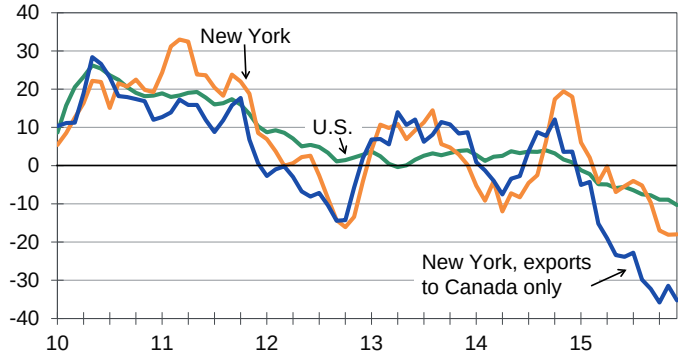
There are encouraging developments for goods producers, however. Emerging industries are driving investment in numerous metro areas that sorely need it. The federally funded AIM Photonics Institute is reshaping downtown Rochester, with work under way to develop the required physical infrastructure in Eastman Park, giving a short-term boost to construction and injecting significant optimism into the long-term manufacturing outlook. Similarly, **Utica** is following the template of the Capital Region, and hoping to benefit from a pair of computer chip plants; with this in mind, the forecast for electronics manufacturing in the metro area has been revised higher. And **Syracuse** is planning to leverage $500 million in state funding to create a research center for unmanned drones, among other uses.

While more modernized manufacturing benefits upstate, and with firms like Google and Facebook expanding in New York City, the startup environment for tech companies keeps improving. According to data from Gust LLC, New York has surpassed California in requests for startup funding. A healthy entrepreneurial environment appears to have taken hold in recent years; a falling number of employees per establishment relative to regional and national figures indicates that startups are playing an increasingly important role.

—ADAM KAMINS

NY Exporters Crippled by Canadian Weakness

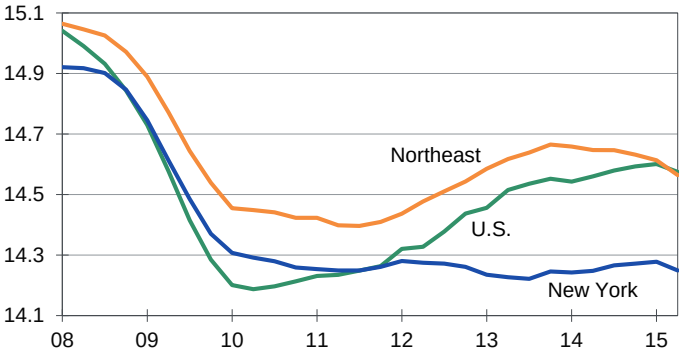
Exports of commodities and goods, 3-mo MA, % change yr ago



Sources: Census Bureau, Moody's Analytics

Smaller Firms Point to More Entrepreneurship

Employees per establishment, 4-qtr MA



Sources: BLS, Moody's Analytics

Pennsylvania

Pennsylvania has fallen further behind the Northeast in job growth, but its economy is still growing nonetheless. Goods-producing industries are the source of recent weakness, with manufacturing and natural resource/mining shedding jobs under the pressure of a weakening global economy and a strong dollar. These losses have been offset by broad-based gains in private services, helping to push the unemployment rate below 5%.

A gradually tightening labor market has boosted wage growth; the resulting pickup in disposable income is helping the state add leisure/hospitality jobs at nearly twice the rate of overall employment growth. Broader, secular trends are also at play, as the industry has increased more rapidly than the rest of the economy for most of the last decade across the U.S. as consumer preferences shift toward more eating out.

The surge in leisure/hospitality is a factor in the rapid job growth taking place in the central Pennsylvania metro areas of **Lancaster** and **Harrisburg-Carlisle**. Both boast strong tourism draws, including Amish tours, a revitalized downtown in Lancaster, and Hershey Park in Harrisburg. This has helped push employment growth comfortably above that of the state and the region. Above-average population growth for the Northeast is also helping, with new residents attracted by a low cost of living, availability of urban and rural amenities, and proximity to **Philadelphia** and Baltimore. As demographics and higher incomes support consumer spending, both metro areas will outperform the state over the next three years.

Philadelphia's economy continues to improve, but at a far more modest pace than last year at this time. While government remains a drag and goods-producing industries are shedding jobs on a year-ago basis, gains in private services have helped to drive unemployment to its lowest level since 2008. The slowdown in job growth, however, has not held back investment in the downtown area. Construction of offices, retail, medical facilities and hotels is booming. For example, a second Comcast skyscraper is under construction and nearly $1 billion is being spent redeveloping the Market East neighborhood. Residential real estate is also hot, with quality-adjusted single-family prices up 6.3% year over year in Center City and up double digits in University City, according to estimates from Drexel University. While construction jobs have slipped recently, ongoing investment in commercial and residential real estate will support significant construction growth over the next few years.

The suburbs of Philadelphia are doing better than the city, with net hiring in **Montgomery-Bucks-Chester** outpacing the state and the region. Healthcare is a consistent source of growth. Hospitals are adding jobs more quickly than in the rest of the state thanks to the metro division's high incomes and a large share of private insurance coverage that has softened the blow of costly Affordable Care Act changes to Medicaid and Medicare. Additionally, a fast-growing senior population is driving demand for nursing and residential care facilities.

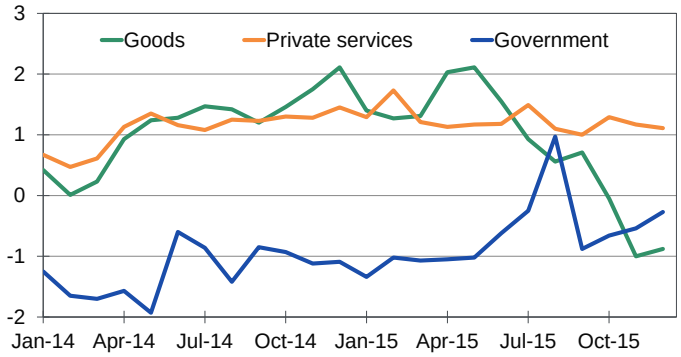
Pittsburgh is on the mend, but the breakneck pace of job growth reported earlier in the year was likely exaggerated. Instead, a less timely but more complete count of jobs shows that the labor market has improved steadily, with gains in healthcare, business/professional services, and high tech more than making up for weakness in manufacturing and energy. Job creation has been strong enough to drive unemployment to its lowest since 2008. Pittsburgh is also benefiting from a downtown investment boom, but the housing market is not contributing as much as in Philadelphia. As in many metro areas across the U.S., multifamily demand is strong, but the single-family market remains depressed as long-lasting scars from the Great Recession have left residents hesitant to purchase homes.

Across the state, the structural decline in local government employment continues. This has been a consistent drag ever since sharp state budget cuts in 2011. While Governor Tom Wolf is pushing to boost school funding significantly, state cuts are not the only thing holding local government back, as school districts and municipalities are paying the price for years of severely underfunding pension systems. Over the last year local government has underperformed the forecast, and it is unlikely to make up very much lost ground.

—ADAM OZIMEK

Goods and Government Are Drags in PA

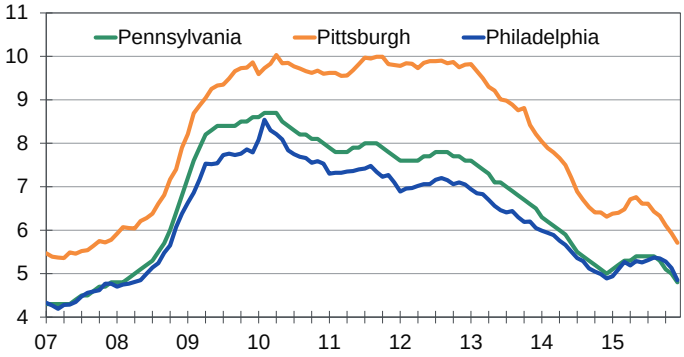
Employment, % change yr ago



Sources: BLS, Moody's Analytics

Labor Market Nears Prerecession Conditions

Unemployment rate, %



Sources: BLS, Moody's Analytics

Vermont

Vermont's economy is struggling to make headway, as employment growth drifts further below the Northeast and national averages. Manufacturing is a noticeable drag on the labor market. Factories have surrendered all of the approximately 2,000 jobs gained in the first three years of the recovery, with manufacturing employment ending 2015 at a multidecade low. With the exception of healthcare, private service job growth has also weakened, especially in the past year. The unemployment rate remains well below the national average, but a shrinking labor force is a big reason why. Weak income growth, meanwhile, is weighing on housing demand, keeping single-family home sales below the U.S. average over the past two years.

Relatively weak job and income growth has also discouraged migration to the Green Mountain State. Vermont's population contracted for the third time in four years in 2015, falling by 0.12%, according to Census Bureau data. This was the weakest figure among Northeast states and the third-lowest nationally. As a result, the population forecast has been lowered since last summer, weakening the outlook for population-dependent industries, including retail and leisure/hospitality.

The state's factory sector is backpedaling because of softness in semiconductor manufacturing. Unfavorable exchange rates and lackluster international demand have hurt sales at GlobalFoundries, which responded by cutting jobs in **Burlington** last year. The weakness will persist over the next year. GlobalFoundries recently lowered its growth outlook, increasing the odds of more downsizing. Its Essex Junction facility is more vulnerable to cuts than elsewhere. GlobalFoundries finished a state-of-the-art semiconductor manufacturing facility in Albany NY less than four years ago, whereas the Essex Junction facility is more than 50 years old and expensive to maintain. Some downsizing is baked into the baseline forecast, but job losses may be greater than expected if the firms' sales disappoint further.

As computer chip manufacturing falters, food manufacturing is well-positioned to pick up some of the slack. The 2009 Farm to Plate Investment Program provides local food entrepreneurs with easier access to venture capital by easing government regulation of loans. The law has helped to create more than 350 food businesses, with high-end coffee, dairy and meat products faring especially well. As a result, food and beverage manufacturing payrolls in Vermont have grown by around 30% since 2008, compared with a 3% rise nationally. Manufacturing will have trouble adding jobs in coming years, but gains in food processing could brighten the outlook.

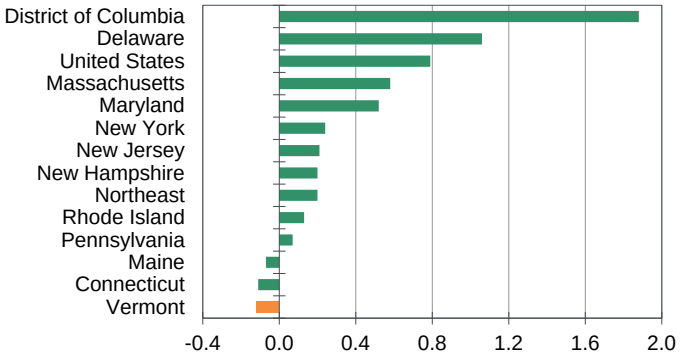
Healthcare is not adding jobs as quickly as the current payroll data indicate, but strong demand portends a favorable industry outlook. The Quarterly Census of Employment and Wages, a near complete count of jobs that is the basis of annual benchmark revisions, indicates that healthcare payrolls will be adjusted lower from mid-2014 to mid-2015. The revised data ought to show a more stable pattern of industry job growth and not the acceleration signaled in the establishment survey. Strong demand for medical services suggests that healthcare will be a reliable source of job creation. Local health providers are expanding to accommodate more patient visits, spurred by a larger pool of insured individuals and an elderly population that is growing faster than the national average. With this in mind, Rutland Regional Medical Center is expanding its in- and outpatient facilities, paving the way for job gains later this year.

Favorable domestic fundamentals bode well for tourism, despite uncooperative weather this ski season. Warm temperatures and little snow have decreased traffic at ski resorts, including Stowe Mountain Resort, where visitor totals are 15% lower than expected. Despite the subpar winter season, the industry is expected to add jobs over the remainder of the year. More households are planning vacations, including those in neighboring states and other parts of the Northeast. Low gasoline prices will encourage day trips, and stronger income growth will boost discretionary spending. While the rising value of the U.S. dollar is discouraging Canadian visitors, strong domestic traffic will more than make up for this. Leisure/hospitality job growth will pick up and exceed the national average over the next year.

—CHRISTOPHER VELARIDES

Demographics Hold Back Vermont's Economy

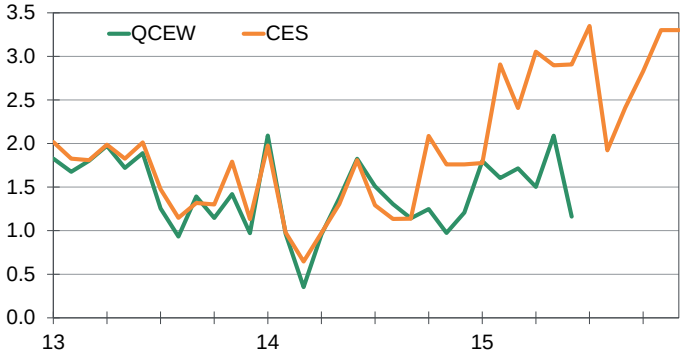
Population, % change yr ago



Sources: Census Bureau, Moody's Analytics

Complete Count Shows Fewer Healthcare Jobs

Education and healthcare employment, % change yr ago, NSA



Sources: BLS, Moody's Analytics

The Midwest Is Down, but Not Out

BY SARAH CRANE

Despite the challenges of slowing population growth, weak factory conditions, and soft energy and agricultural commodity prices, the Midwest managed to add more jobs last year than in 2014. Though not as broad-based as elsewhere in the country, job growth across the region is becoming more diffuse across industries. Lackluster manufacturing conditions are in turn pulling down professional and business services growth. On the positive side, transportation/warehousing is gaining ground, with employment growth accelerating, especially in the Great Lakes states. Healthcare is also showing signs of life, expanding twice as fast as total employment. The region's labor market is extremely tight, particularly in the Plains: Among the 20 U.S. metro areas with the lowest jobless rates, more than half are located in Plains states. Wage pressures are building as a result, with average hourly earnings in Iowa and Nebraska growing at twice the national pace.

Aside from the job market, however, residential construction remains depressed. Housing starts are furthest below peak and closest to cycle lows than in any other region. Even with housing inventory very low across much of the region, demand is not keeping pace with supply. A slowdown in population growth and household formations is responsible for the slow housing recovery. It is unlikely that consumer balance sheets play a role; in terms of trade and dollar volume, delinquency rates are below average in nearly all Midwest states.

The near-term forecast has been lowered since last month's update, in line with weaker expectations for the national economy in the second half of the year. The outlook calls for the Midwest to underperform the U.S. in job and income growth in 2016. Total payroll employment will grow at 1.3% versus 1.8% nationally. Likewise, at 4.4%, personal income growth will be slower than in other regions. Lagging income growth will remain a weight on both consumer industries and the housing market, compounding existing weakness in much of the region. Retail and leisure/hospitality employment growth has been anemic relative to the rest of the U.S.

Strong domestic vehicle demand illustrates a near-term engine of growth. Despite its decline, manufacturing is outperforming that of the nation thanks to robust auto production. National new-vehicle sales benefit from strong replacement demand, cheap credit, and low gasoline prices. With its high concentration in auto-related production, the Great Lakes states have enjoyed the bulk of the region's gains. Much of the production ramp-up for autos is already complete, however, so the impact will be smaller in the coming year.

While demand for autos is stable, production related to energy, agriculture and mining is on uneven ground. Low energy and commodity prices have triggered a pullback in capital investment. Farmers are reducing investment and spending as a result of low agricultural prices. Meanwhile, downward pressure on oil prices is depressing demand for industrial equipment from energy producers. Cutbacks among drillers have also hurt producers of steel goods used in up-stream and midstream energy production.

Sluggish global growth will make 2016 another tough year for some of the region's most important manufacturing industries. The Midwest's goods producers are more exposed to the weak Canadian economy than other U.S. regions. Total exports as a share of GDP are higher in the Midwest than in most other regions, and shipments to Canada account for more than one-third of total exports, the largest share nationwide. Historically low oil prices have drastically reduced demand from Canada's mining industry, causing demand for industrial equipment to weaken substantially.

Midwestern exports to Canada were down more than 13% last year, compared with a 3% drop to other trading partners. Factories in export-dependent states with a high concentration in industrial goods production, such as Illinois—and even Iowa and North Dakota—have been hit the hardest. Canada's resource-dependent economy will be a headwind until oil prices bounce back or its currency surges against the U.S. dollar.

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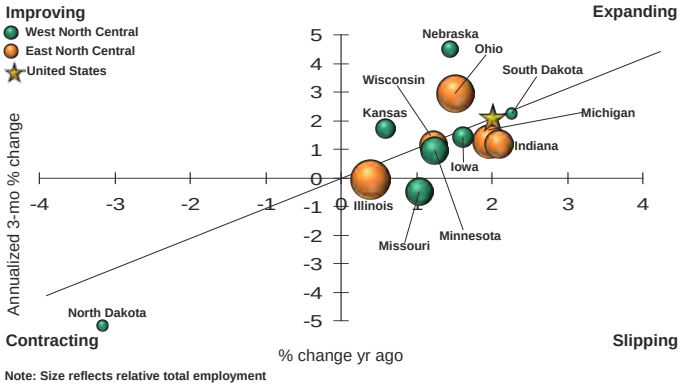
High-Frequency Indicators

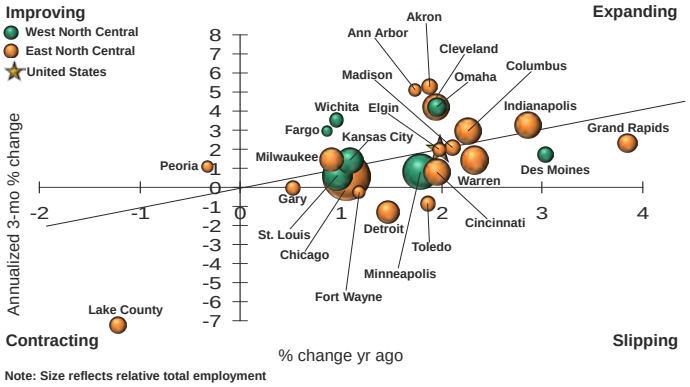
Payroll Employment—Midwest States

1-yr vs. 3-mo performance (3-mo MA) Dec 2015



Payroll Employment—Midwest MSAs

1-yr vs. 3-mo performance (3-mo MA) Dec 2015



Comparative Performance Indicators

3-mo MA, % change from previous 3-mo period, Feb 2016

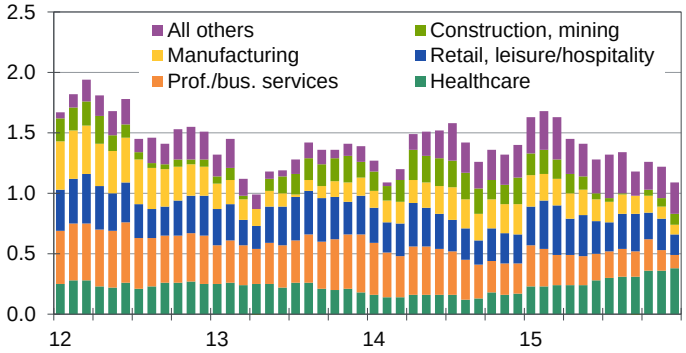
	Private service-providing employment (annualized)	Current unemployment rate	Change in unemployment rate	Residential permits	Industrial production	Overall recent performance	Change in outlook from last month
Dayton	4.1	4.4	-0.1	22.1	-1.6	↑	↔
Grand Rapids	0.8	3.4	-0.2	21.2	-0.8	↑	↔
Indianapolis	4.3	4.1	-0.2	21.0	-1.1	↑	↔
Lake County	-9.1	5.3	0.2	-7.3	-0.8	↓	↔
Toledo	-1.7	4.7	0.1	-11.6	-1.1	↓	↔
Akron	6.8	4.6	-0.0	-2.3	-1.1	↔	↔
Chicago	0.8	5.5	-0.1	50.7	-1.1	↔	↔
Cincinnati	0.7	4.0	-0.2	6.4	-1.3	↔	↔
Cleveland	5.3	4.5	-0.8	6.2	-1.3	↔	↔
Columbus	2.0	3.8	-0.1	11.5	-1.2	↔	↔
Des Moines	2.3	3.1	-0.3	-3.0	-0.8	↔	↔
Detroit	-0.7	7.0	0.4	58.4	-2.8	↔	↔
Kansas City	0.4	4.4	-0.8	36.5	-1.5	↔	↔
Madison	3.4	3.1	-0.1	-6.1	-0.8	↔	↔
Milwaukee	0.1	4.6	-0.2	28.4	-1.2	↔	↔
Minneapolis	2.1	3.3	-0.4	2.8	-0.7	↔	↔
Omaha	4.6	3.2	0.1	40.0	-0.8	↔	↔
St. Louis	-0.1	4.8	-0.6	8.8	-1.3	↔	↔
Warren	1.2	5.3	0.2	-3.2	-2.1	↔	↔
Wichita	3.3	4.5	-0.5	-13.1	-1.3	↔	↔
Midwest	**1.6**	**4.6**	**-0.0**	**7.1**	**-1.1**	↔	↔
U.S.	**2.6**	**5.0**	**-0.1**	**10.1**	**-0.9**	↔	↔

Sources: BLS, Census Bureau, Federal Reserve, Moody's Analytics

What We're Watching

Healthcare a Rare Exception to Downtrend

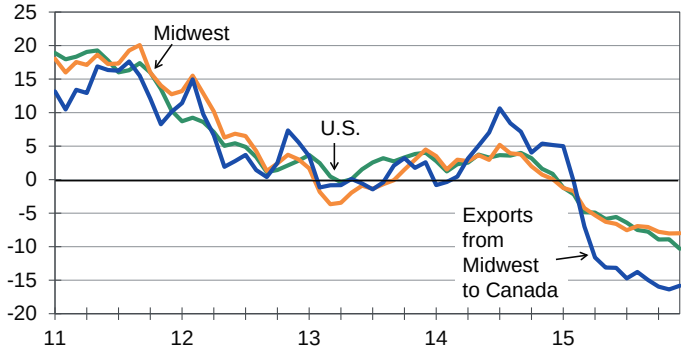
Contributions to % change yr ago employment, Midwest, ppts



Sources: BLS, Moody's Analytics

Canadian Retreat Weighs on Midwest Exports

Exports of goods and commodities, % change yr ago, 3-mo MA

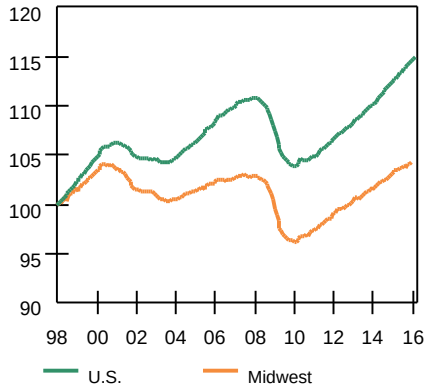


Sources: Census Bureau, Moody's Analytics

Cyclical Indicators

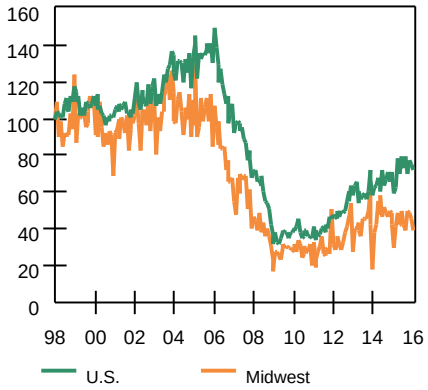
Employment

1998=100



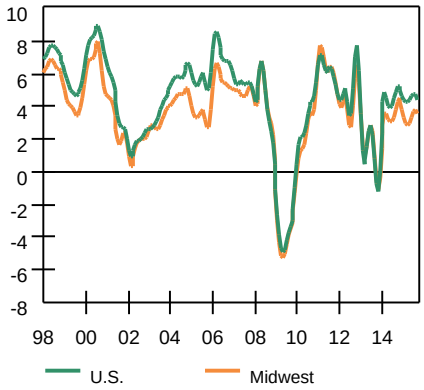
Housing Starts

3-mo MA, 1998=100



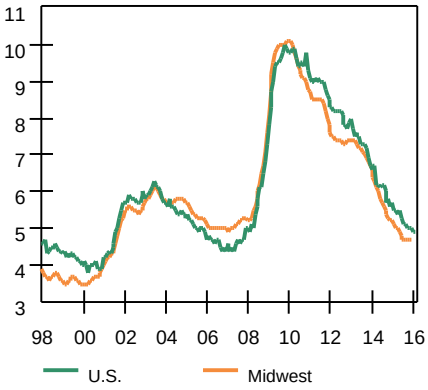
Personal Income

% change yr ago



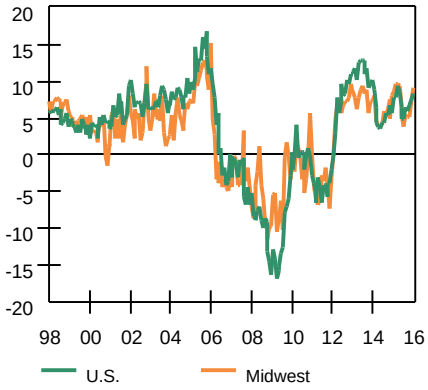
Unemployment Rate

%



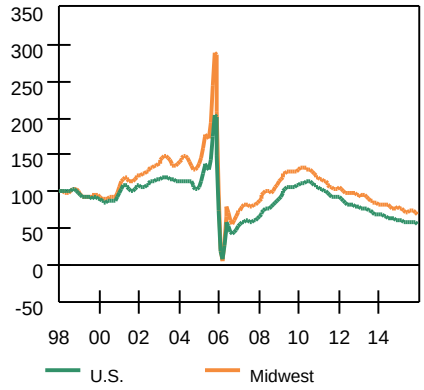
Median House Price (Existing)

3-mo MA, % change yr ago



Personal Bankruptcy Filings

1998=100



Sources: BEA, BLS, Federal District Courts, NAR, Moody's Analytics

Illinois

Illinois' economy is on thin ice. Job growth last quarter was easily the slowest among the Great Lakes states and second slowest in the Midwest. December was an especially bad month, with a 16,300 decline in payroll employment erasing the year's modest job gains and damping the state's trajectory. Although Illinois' labor force has increased modestly over the last few months, it is roughly unchanged over the last year and has trended lower since the recession. Some of the drop results from a combination of demographic factors, mainly the aging of the population, and other causes associated with the weak economy, especially downstate.

More than seven months into fiscal 2016, the State of Illinois remains in a stalemate over the year's spending plan. The state is plunging further into debt because it is spending based on revenue levels from 2014, when the individual income tax rate was 5%, not the current rate of 3.75%. The rollback of a temporary tax hike is taking a bite out of revenues. Fiscal 2015 tax revenue fell 2% year over year, versus a 4% increase in the Midwest, and receipts were down 8% in the first quarter of fiscal 2016. Without additional funding or decreased spending, there will be greater pressure to reduce headcount.

Although the largest of the temporary tax increases were partially reduced in 2014, as a share of state GDP state tax revenues remain higher than average. Illinois' overall tax burden is higher than those of neighboring states, except for Michigan and Wisconsin. In the absence of increased services, higher taxes could continue to diminish the appeal of investing and living in the state. Making it even more difficult for lawmakers to overcome the state's massive structural deficit, the Illinois Supreme Court ruled as unconstitutional a pension reform bill that had been approved by the General Assembly in 2013. Reduced potential for growth is reflected in the latest forecast, which projects slower job gains over the next several years than previous outlooks.

Persistent low energy prices and a strong U.S. dollar will cause machinery manufacturers to struggle over the near term. Historically low oil prices have drastically reduced demand from the mining industry in Canada, Illinois' largest trading partner. Demand for industrial equipment has weakened substantially, weighing on total exports. Illinois' exports to Canada were down more than 20% last year, compared with a 7% drop overall. Factories in export-dependent metro areas with a high concentration in industrial goods production, such as **Decatur**, **Peoria**, and the **Quad Cities**, have been hit the hardest. Canada's resource-dependent economy will be a headwind until oil prices bounce back or its currency surges against the U.S. dollar.

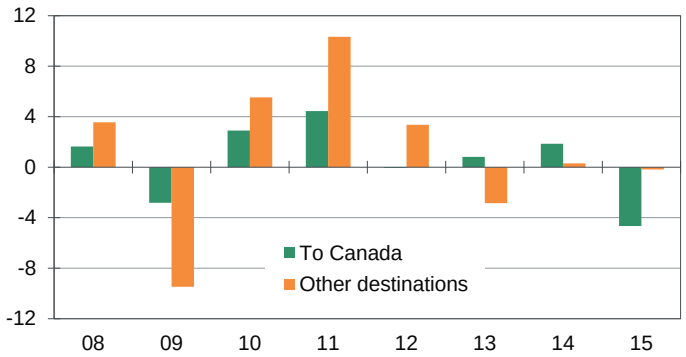
Chicago's economy may be carrying the state's load, but it too is underperforming in important gauges such as jobs and income. The city's distressed Southwest Side is losing an important source of mid-wage employment. Deerfield-based Mondelez International announced in the summer plans to slash the Nabisco factory's 1,200-employee workforce by half. The company began handing out pink slips in January and will soon move part of its operations to Mexico. Many jobs at the plant pay quite well, so job losses are indicative of factors that will impede wage growth and hurt the performance of consumer-driven industries such as retail as well as the housing market.

Considerable progress was made clearing the supply of distressed housing in the state last year, as investors scooped up properties in large numbers. The vast majority of Illinois' distress supply is located in Chicago, **Lake County** and **Rockford**. Foreclosure inventories in the three metro areas fell by 20% last year after dropping by one-third in 2014 and are now below 2007 levels. Even with housing inventory very low across much of the state, demand is not keeping pace with supply. The ripple effects from factory slowing have hurt job and income growth, and with the state also struggling to retain residents, the rate of household formation has languished. Consequently, opportunities for builders have been few and far between and house prices have been slower to rebound. House price growth has strengthened in most metro areas in the past year but in no metro area are house prices climbing in line with the national rate.

—SARAH CRANE

Blame Canada for Softer Shipments Abroad

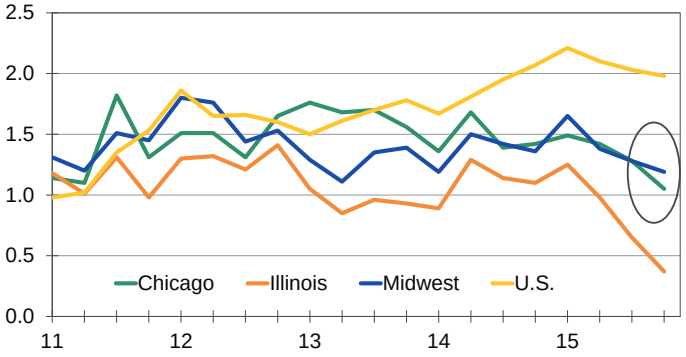
Illinois exports of goods and commodities, change yr ago, $ bil



Sources: Census Bureau, Moody's Analytics

Windy City Job Growth Falls Behind Midwest's

Employment, % change yr ago



Sources: BLS, Moody's Analytics

Indiana

Indiana's expansion is stalwart, with **Indianapolis**, **Columbus** and **Elkhart** the state's growth leaders. The downshift in manufacturing is a drag, but private services have more than picked up the slack, with their contribution to year-over-year job growth climbing to the highest level in more than two decades. Consumer industries and healthcare are the primary drivers. Indiana's above-average share of disposable income devoted to gasoline expenditures means cheap oil is a potent boost to Hoosiers' collective spending power. Even with the jobless rate below its prerecession low, the increasing strength of low-paying industries such as retail and leisure/hospitality relative to manufacturing is keeping average hourly earnings growth subdued.

The underlying drivers of job growth point to another year of sturdy labor market conditions. Indiana's economy will outperform the nation's in 2016 and handily outdo those of other midwestern states. The outlook for job growth has changed only slightly since last month. Employment will rise by 2.3% this year versus 2.4% in the prior update. Consumer industries have another strong year ahead of them. A diversified Indianapolis will retain its edge over the rest of the state's metro areas, while Columbus and Elkhart, which are overly reliant on the auto industry, will decelerate markedly this year as vehicle sales come off their peak and a strong dollar applies downward pressure.

All the pieces are in place for Indianapolis' tech sector to stay in high gear. The area's tech ecosystem features a prodigious breadth of local knowhow, its urban amenities help to retain and attract such talent, and business costs are low. These factors, along with generous state incentives, are drawing in outside tech companies such as Emarsys, an Austrian marketing software firm. Though office vacancy is falling in Indianapolis, it is a far cry from the rapacious land grab that Silicon Valley's tech expansion has fueled in the Bay Area, which could cause more tech firms to consider relocating to Indianapolis.

U.S. auto sales are running hot in 2016, with falling gasoline prices skewing purchases toward light trucks. This augurs well for General Motors' truck plant in **Fort Wayne**, which assembles the Chevrolet Silverado and GMC Sierra. There are risks, namely weaker than expected housing, agricultural and energy markets that could depress demand for these two lines of pickups. Yet GM is focusing on the growing retail demand of millennials, who make up 20% of the automaker's sales. Toward this end, GM is ratcheting up production of midsize pickups and investing in better fuel economy. This spring, it is testing the water with limited sales of its next-generation mild-hybrid electric propulsion system for the Silverado and Sierra before scaling up production in 2017.

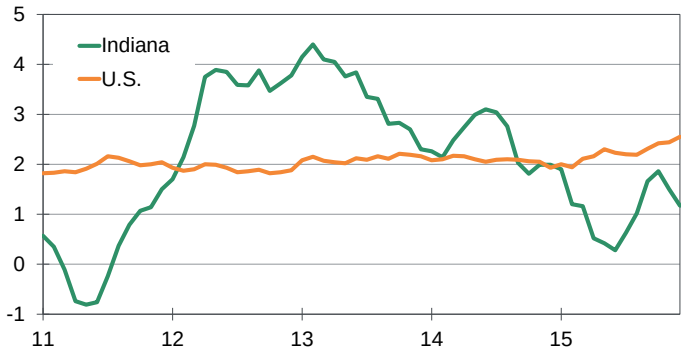
Indiana's distribution sector is taking off, with growth far outstripping the national pace. The state is strategically located for domestic supply chains, with much of the U.S. and Canada within a day's drive. It also boasts an ample network of freight railroads, airport facilities, ports and highways, including an interstate. U.S. personal consumption spending is expected to accelerate into 2017, which will create extra demand for material handling, warehousing, order fulfillment and logistics management. Amazon has added staff at fulfillment centers in Indianapolis and southern Indiana to keep up with the growth of e-commerce. Indiana Rail Road is partnering with electricity provider Hoosier Energy and Bear Run, a surface mine, to build a distribution facility in **Terre Haute** that will store and transfer cargo from rail cars to semi-trucks.

Existing strains on the logistics networks in Indiana will lead to more transportation infrastructure spending. **Gary** is home to a busy rail corridor that is burdened by commuter traffic to and from Chicago. Three high-speed crossovers will be installed in the area's South Shore commuter rail line to allow express trains to bypass others with more frequent stops. Gary's rail network also plays host to eastbound oil trains from North Dakota and rail cars carrying iron, steel, grain, limestone and coal that pass through the Port of Indiana-Burns Harbor. The commodity bust has hurt Gary's steelmakers and the Midwest's agricultural industries, which use Burns Harbor Port. Yet this did not dent activity at the port, which handled its second highest cargo volume in more than two decades in 2015.

—BERNARD YAROS

Low-Paying Industries Subdue Earnings Growth

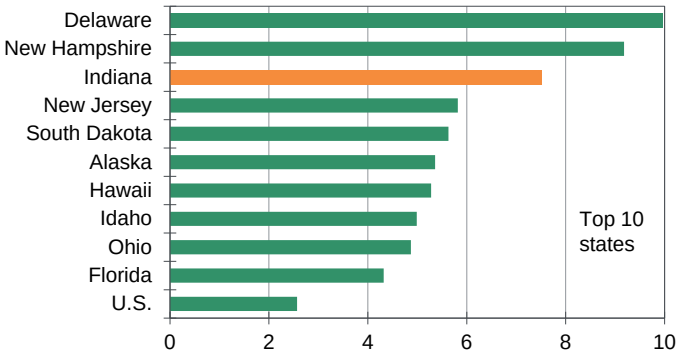
Avg hourly earnings, % change yr ago, 3-mo MA



Sources: BLS, Moody's Analytics

Indiana's Status as Distribution Hub Pays Off

Transport & warehousing employment, % change yr ago, 2015Q4



Sources: BLS, Moody's Analytics

Michigan

Michigan's economy has cooled in recent months but remains a regional standout. The breadth of hiring has been fairly narrow, with healthcare providers and the automotive industry generating the most momentum. Job growth in high- and mid-wage industries is double the regional average, which has showered Michigan with above-average income gains. The unemployment rate remained unchanged at 5.1% in December, but the good news is that the labor force has expanded in the past few months as increased opportunities encourage people to enter the job market.

Still, Michigan's growth is unmistakably decelerating. Although the payroll survey indicates that employment raced higher last year, the more accurate Quarterly Census of Employment and Wages suggests job growth was much weaker in the first half of 2015. Significant downward revisions are likely when the new benchmarked figures are released in March. Professional/business services powered much of the state's early recovery, but industry growth slowed considerably in 2015. Moreover, a slowdown in population growth indicates lower upside potential for housing and consumer industries. The forecast has been softened to incorporate weaker employment gains and foretells a slower pace of recovery in 2016.

Recent economic growth among metro areas has been lopsided. Based on payroll employment, larger metro areas such as **Grand Rapids** and **Warren** have maintained their expansions. Grand Rapids has been the best-performing metro area over the past year, according to the Moody's Analytics business cycle tracker, with the pace of year-over-year employment growth exceeding that of the state and the nation. Similarly, Warren's labor market has strengthened in 2015. On the other hand, **Detroit** is recovering more slowly as momentum builds in both the auto industry and healthcare.

Michigan's outsize concentration of auto-related production is paying dividends. Last year was the best year for U.S. auto sales since 2006, thanks to a strengthening labor market, improving credit quality, and better credit availability. Robust auto production is helping Michigan's goods-producing industries outperform those of the nation and the Midwest. Vehicle sales started the year on a strong note: Sales were up 5% from a year earlier, despite a major snowstorm that shut down many dealerships for one weekend. Auto strength is reflected in the latest Southeast Michigan purchasing managers' survey. The purchasing managers' index for this part of the state, which covers Detroit, Warren and **Ann Arbor**, bounced back in January, with stronger readings for employment and production. However, much of the production ramp-up for autos is already complete, so the impact will be smaller in the coming years. Also, the expectation of increased automation in the long term may temper enthusiasm among prospective migrants.

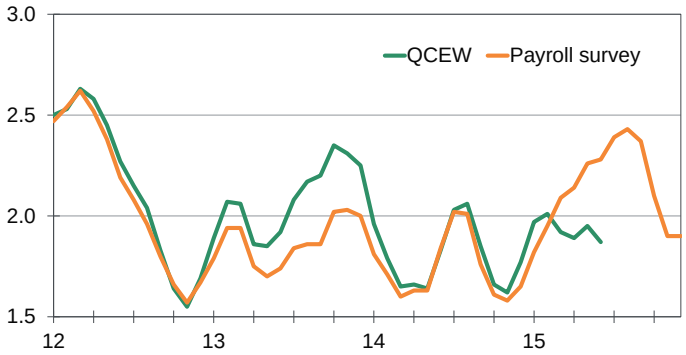
Aside from the auto industry, Michigan's fast-growing and larger than average retiree population is driving stronger demand for healthcare. Industry job additions have picked up over the year and are now surpassing the Midwest average. In addition, nearly 350,000 people enrolled in insurance plans in 2016 under the Affordable Care Act. Meanwhile, infrastructure projects will contribute more to the state's economy in the near term. Michigan will receive a $57 million U.S. Department of Transportation grant to fund the state's second bus rapid transit system—a 13-mile route that will link downtown Grand Rapids with Grand Valley State University.

In a sign that state finances are improving, Michigan ended fiscal 2015 with a budget surplus. Better fiscal conditions will help stabilize public sector payrolls, which have been shrinking for more than a decade. Governor Rick Snyder's $54.9 billion fiscal 2016-2017 budget proposal is 0.8% higher than the current year's. Snyder's budget would spend more on K-12 education, Detroit public schools, and infrastructure improvements and devotes additional funding to help mitigate **Flint's** water crisis. It would also provide a 4.3% increase in funding for public universities. It is important to remember, however, that this budget proposal is only a first step in the budget process.

—ABHILASHA SINGH

Job Revisions Will Be Unfavorable for Michigan

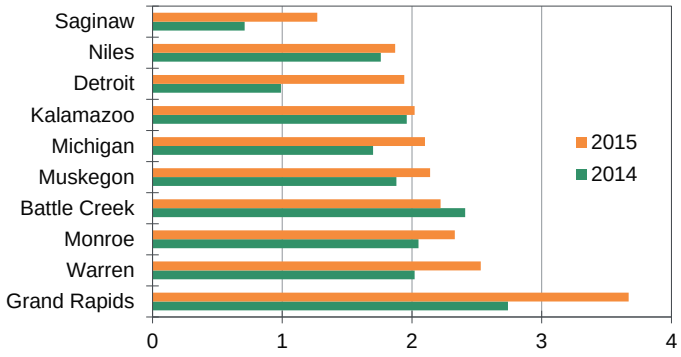
Michigan employment, % change yr ago, 3-mo MA, NSA



Sources: BLS, Moody's Analytics

Grand Rapids Is the State's Standout

Nonfarm employment, % change yr ago



Sources: BLS, Moody's Analytics

Minnesota

Minnesota is improving faster than the rest of the Midwest but at a pace that trails the national average. The state's unemployment rate is trending down and, at 3.7%, is more than a percentage point below the Midwest and national averages. The labor force is expanding in all metro areas, but the tight job market and a mismatch of skills are keeping a lid on employment growth.

Minnesota nonfarm employment is up 1.5% from a year ago, which is above the Midwest average. Professional/business services, leisure/hospitality and healthcare constituted the bulk of the job gains in last year's fourth quarter. Manufacturing is also showing promise, with industrial production holding up better than in the rest of the Midwest and factory payrolls at an eight-month high. Minnesota will pull ahead of the Midwest in the long run thanks to its diverse jobs base and above-average demographics. While the state's population growth decelerated slightly from the previous year to 0.6% in 2015, it is three times stronger than the Midwest average. Strong population additions indicate upside potential for housing and consumer industries throughout the state.

Positive population trends and steady job growth have begun to increase demand for housing, evidenced by the double-digit growth of home sales from a year ago. House prices are rising, as properties spend less time on the market. Limited supply will spur more homebuilding throughout 2016. This is particularly true in **Rochester**, where multifamily permits surged last year and total permits will rise further this year thanks to stronger in-migration.

Median household income is well above national and regional averages thanks especially to the high concentration of well-paying jobs in **Minneapolis-St. Paul** and Rochester. However, state personal income growth fell below that of the nation in the second half of 2015 as job creation in low-wage industries rose more than twice as fast as that in high-paying positions. Minneapolis accounts for two-thirds of the state's population and economic activity. Cumulative gains in Minneapolis' low-paying jobs such as administration, social services and leisure/hospitality are outpacing better-paying professional services additions, despite the fact that the latter is up 4% from a year ago. Job creation concentrated at the lower end of the pay scale will keep wage and salary income growth below average in the short term.

Signs point toward advancement in manufacturing. The Creighton University Minnesota Business Conditions Index improved in January for the first time in five months, with increased sales, new orders and inventories. State training programs and the postponement of the Affordable Care Act's tax on medical devices brighten prospects for some producers. As a result of automation of production processes replacing low-skill production line jobs with high-skill technical positions, companies are struggling to find qualified workers. The Minnesota Jobs Skills Partnership Program has allocated funds to train up to 45,000 workers, about 15% of the current manufacturing job base. For example, **Duluth's** Sappi Fine Paper is training more than 500 workers so that it can operate at full capacity. Job training programs could potentially stem the tide of out-migration from the metro area.

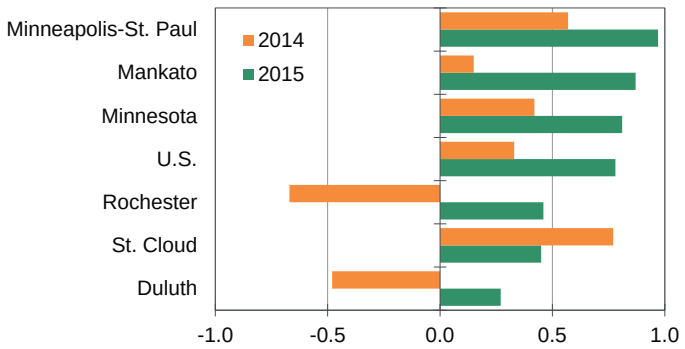
Congress' decision to postpone implementation of the Affordable Care Act's 2.3% excise tax on medical devices is a positive for large medical device companies such as Medtronic and St. Jude Medical. The companies make up 8% of manufacturing employment in the Twin Cities. The two-year tax postponement will allow medical device makers to invest more on research, extend workers' hours, and increase output in the near term.

Agriculture will be a drag on the state economy this year because of persistently low farm commodity prices. According to the Minneapolis Federal Reserve's Agriculture Credit Survey, farm income and capital spending fell in the fourth quarter of 2015. Alongside the strengthening U.S. dollar, agricultural exports have slowed, falling more than 7% in 2015. The dollar is expected to appreciate further this year, which will make Minnesota crops even less competitive abroad. The metro areas with the greatest exposure to weak farm income are **St. Cloud** and **Mankato**, which are struggling to keep their recoveries afloat.

—SHANNON BROBST

Workforce Swells in All Minnesota Metro Areas

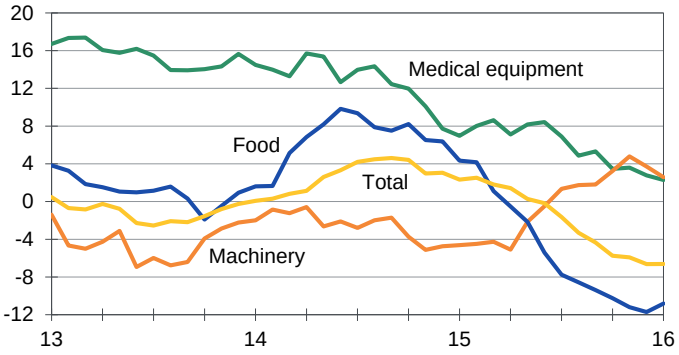
Labor force, % change yr ago



Sources: BLS, Moody's Analytics

Minnesota Food Exports Flop

Nominal exports, % change yr ago, 12-mo MA, NSA



Sources: Census Bureau, Moody's Analytics

Missouri

Missouri is improving at a tepid pace, with job growth underperforming the regional and national averages. Although hiring across industries has been relatively broad-based in recent months, wage growth has yet to meaningfully accelerate, suggesting that slack remains in the labor market. Initial claims for unemployment insurance edged higher in December and January, but they are still safely below the levels prior to the Great Recession. Additionally, the unemployment rate is holding below 5%, even as the labor force is expanding at a healthy clip. Thus, although the recovery is still sluggish by historical standards, most indicators suggest it is on a firm footing.

The outlook for 2016 is largely unchanged from the prior update. Job additions are forecast to accelerate in the second half of the year, and will end 2016 up 1.3%, slightly lower than the Midwest average. Income growth is also expected to improve as the labor market gradually tightens, ending the year up 5.2%, better than the national average of 5%. Wage and salary increases will account for the lion's share of the improvement, as a tightening labor market leads employers to raise wages to attract new employees and retain talent. **Kansas City** and **St. Louis** will drive most of the state's recovery over the next year. Both metro areas have relatively low costs of doing business and high levels of educational attainment, which will help attract investment in professional/business services as the national expansion heats up.

Although oil and gasoline prices have crept higher over the past month, they are expected to remain low by historical standards over the next two years. Low energy prices are increasing consumers' purchasing power, and residents are well-positioned to increase spending in the coming months. Lower gasoline prices have an outsize effect on households in Missouri, which ranks in the top 10 nationally in gasoline consumption per person. Consumers in metro areas with a dearth of public transit systems are benefiting the most. Job growth in retail and leisure/hospitality has soared in **Springfield**, as a tonic of cheap gasoline and healthy wage growth supports consumer spending. The metro area is forecast to transition from recovery to expansion in the second half of the year, and will be one of the state's best performers in 2016.

The outlook is less optimistic for both **Columbia** and **Jefferson City**. The state legislature is debating the state budget, which could spell trouble for the University of Missouri in Columbia. House budget writers have proposed cuts in the range of 5% to 8% for fiscal 2017. The cuts come as the projected number of incoming freshman declined by 900, with total enrollment expected to decline by approximately 1,400 students in the coming academic year. The proposed appropriation bill also excludes the university from a $9.9 million contingent increase if revenue growth exceeds expectations. The budget cuts would weigh on state government hiring and income increases in the metro area, and the diminished student population would curtail spending slightly at restaurants, bars and retailers.

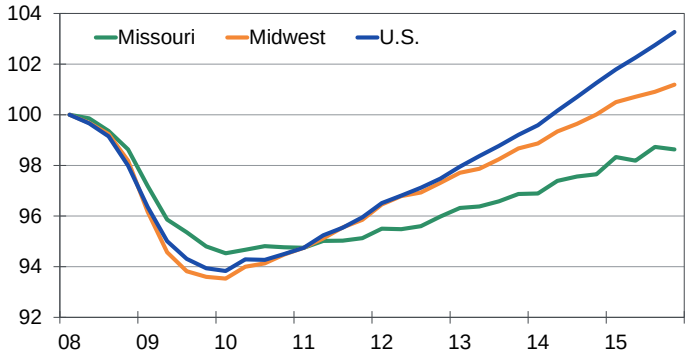
Despite improving tax collections, state government will not be a significant growth engine for Jefferson City in the near term. Higher-priority spending elsewhere in the state and policymakers' commitment to a leaner government will weigh on payroll expansion in the state capital over the next year at least. Instead, the onus will fall on the private sector to drive job and income gains in the near term. The prospect for this is limited by the lack of dynamic growth drivers in the metro area.

One of the upside risks that has emerged in the crafting of the state budget is a proposed increase in the state gasoline tax. The revenue from such an increase would be funneled to the Department of Transportation. The current tax is not generating the revenue needed to maintain and repair the Show Me State's roads and infrastructure. A temporary sales tax for transportation was proposed in 2014 but ultimately voted down. The current proposal provides some upside risk that infrastructure investment could pick up in fiscal 2017, which would boost construction employment and make the state more appealing to businesses.

—MICHAEL MCGRANE

Missouri Job Growth Underperforms…

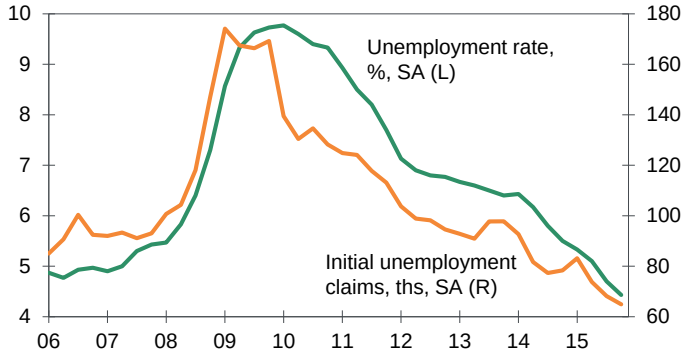
Employment, SA, 2008Q1=100



Sources: BLS, Moody's Analytics

…But Labor Market Is on Stable Footing

Missouri



Sources: BLS, ETA, Moody's Analytics

North Dakota

The weight of the historic drop in oil prices has finally become too much for the North Dakota economy to bear, and the state has fallen into full-blown recession. Prolonged price weakness in energy markets has pushed drilling activity to levels not hit since 2009, and the rest of the economy has not been able to absorb workers fast enough to curtail job losses. Total employment fell by 4% in 2015, and the lagged but more complete Quarterly Census of Employment and Wages shows that declines may be slightly worse than first estimated. However, the jobs picture is more nuanced than the statewide data would otherwise suggest. The state's three metro areas actually added 3,500 jobs on net in 2015, while nonmetro employment fell by an astonishing 22,300 positions. Despite its proximity to the busting oil region, **Bismarck** has been the stoutest North Dakota metro area in recent months. It also shows the potential to suffer the largest downward employment revisions based on the QCEW data. If so, then **Fargo** would regain its title as the state's most dynamic economy. In addition to resilient gains in private services, demographic gains following the oil boom and prudent fiscal policy have supported extraordinarily strong increases in local government over the past two school years.

The QCEW data indicate that the metro area jobs data may be revised lower next month, but some resilience is apparent in other economic measures. Statewide average hourly earnings, for example, are accelerating and remain above the national average. This is indicative of a flight to quality in the oil patch, as only the best and most essential personnel are likely to remain at current drilling levels. What is more, the labor force appears to have hit bottom and more workers were added in the fourth quarter for the first time in a year. All of these additions came in the state's metro areas. House prices have also increased further, though more slowly than the national average for the first time in nine years. Homebuilding has fallen to a six-year low as a result, but the fact that house prices continue to rise is encouraging evidence that the North Dakota construction industry was not in a bubble.

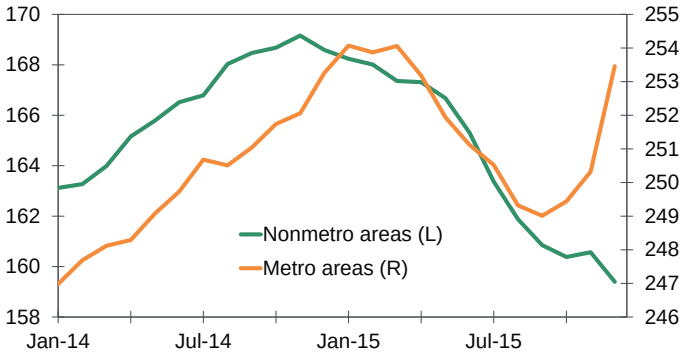
Construction activity, especially commercial and public projects, has continued in many cases unfettered, and construction employment in the state's metro areas has held up relatively well. In a construction bubble, projects are typically undertaken on speculation to serve populations or businesses that are expected to be there in the future. The majority of projects under way in North Dakota are intended to serve the existing population. One of the key points of strain during the oil boom was the state's low level of existing infrastructure, and in many ways the expansion could have been even faster had North Dakota had sufficient road, utility and housing capacity to facilitate the influx of workers and material used in the Oil Patch. Since 2009 the state has been playing catch-up to help support future expansion in the energy industry, and it is possible that the current downturn represents a much-needed pause for the state to prepare itself for expansion. Should energy prices rebound in line with the baseline forecast, back above $45 per barrel by the end of this year, then energy investment will gradually come back on line and the recession will be short-lived. However, if by the second half of 2016 prices remain materially below $40 per barrel, construction will fall off more sharply along with overall employment growth.

Even with oil prices rebounding through the end of this year, the decline has dealt the state budget a major blow that would have thrown most states into crisis. North Dakota lawmakers, however, have dealt with the decline in revenues incredibly well thanks to prudent planning and foresight. The state's revenue forecast was recently downgraded by about $1 billion, but its large reserves and revenue structure helped stave off substantial budget cuts. The governor instructed agencies to reduce current biennial budgets by just over 4%, a move that is not expected to result in layoffs. Thanks to its dedicated reserve fund, primary education will be spared budget cuts under the new revenue projection. This will help add stability to a state already grappling with massive commodity market uncertainty.

—DAN WHITE

Metro Area Workforces Finding a Bottom

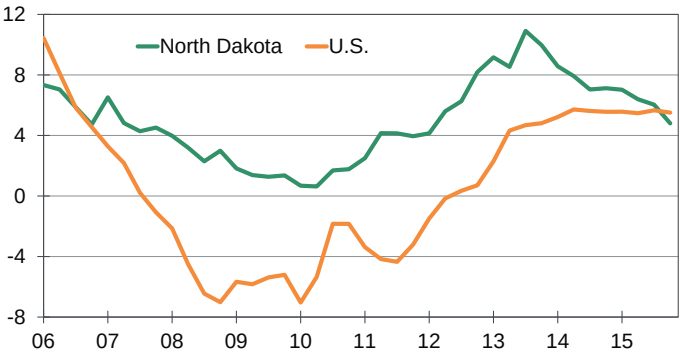
North Dakota labor force, ths



Sources: BLS, Moody's Analytics

It Was a Good Decade

FHFA all transactions house price index, % change yr ago



Sources: FHFA, Moody's Analytics

Ohio

Ohio's economy is advancing at a solid clip and is now outpacing its peers in the Great Lakes and the Midwest. Private payroll employment reached its highest level since 2001 in December, led by a mix of jobs in private services and nondurable goods manufacturing. The state-level diffusion index, which measures the breadth of job gains across industries, also reached its highest level since the mid-1990s. High-paying professional and technical services, healthcare, and transportation, along with lower-paying consumer industries, have been the most important contributors to private services job growth in recent months.

Discouraged workers are coming back into the market as wage growth accelerates and more positions become available. The U-6 unemployment rate, which accounts for unemployed, underemployed and discouraged workers, averaged 10.1% in 2015, just below the 10.4% national rate. Although Ohio's labor force has increased modestly over the last few months, it is roughly unchanged over the last year and has trended lower since the recession. Recent demographic data highlight how difficult it will be to break out of this historical pattern. Population growth in Ohio slowed to 0.1% in 2015, the third-lowest in the Midwest and well below the U.S. rate.

Nondurable goods production has been the engine of recent manufacturing growth. In particular, food, paper product and miscellaneous manufacturing has outperformed in recent months. In contrast, the Buckeye State's key durable goods producers have reduced hiring. Automakers are adjusting to a leveling off in domestic vehicle demand, while weaker foreign demand for industrial machinery has hampered growth among machinery manufacturers.

Economic growth is widening across the state's metro areas. According to the Moody's Analytics business cycle status tracker, every metro area with the exception of **Mansfield**, which remains at risk of another recession, ended 2015 in either the recovery or expansion phase of the business cycle. Only two years ago, at the start of 2014, **Canton**, **Cleveland**, **Dayton**, Mansfield, **Weirton** and **Youngstown** were at risk of another downturn, and **Lima** and **Springfield** were still in the throes of recession. Although **Columbus** is the only metro area in the expansion phase of the business cycle, others will likely join its ranks over the next several months. In particular, payroll employment in **Cincinnati** has already surpassed its prerecession peak.

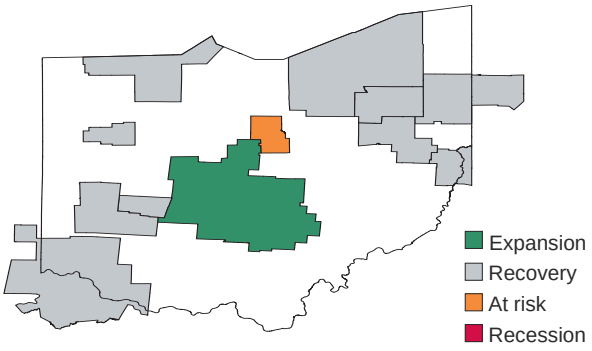
Ohio's 2016 outlook has been revised down slightly, in line with more tempered expectations for the U.S. economy, while expectations for 2017 are a bit higher. The state will add jobs faster than the Midwest and in step with the U.S. It will be another year until the pace of income growth catches up to regional and national averages. Driven by higher wages, dividend payments and rental rates, income growth in Ohio accelerated in the third quarter. Average weekly earnings are growing rapidly in Columbus, Cincinnati and Akron, three large metro areas where payrolls are at or near post-recession highs. Further, household wealth has sharply rebounded as house prices reach nominal all-time highs statewide. This has spurred an increase in household spending and credit growth; according to CreditForecast.com, home equity loan originations in the state are up 9% over the previous year. The recent gains in real estate values have helped offset the negative impact on wealth from volatile equity prices.

Nonetheless, a stronger U.S. dollar will be a key downside risk to the outlook in 2016. The greenback is at its highest against other major currencies since 2002, and is up 11% compared with January 2015. Machinery equipment manufacturers and steel producers will be the most vulnerable to an appreciating domestic currency. Machinery equipment manufacturers are significantly reliant on overseas demand, specifically emerging markets. The steel industry faces other challenges from an appreciating U.S. dollar, namely the increasing competitiveness of already-inexpensive Chinese steel imports. Cleveland has been particularly hard-hit by competition from steel imports from Asia. For example, Republic Steel, which specializes in products for the energy industry, recently laid off 200 workers from its steel rolling mill in Lorain.

—BRENT CAMPBELL

Nearly Every Ohio Metro Area Now in Recovery

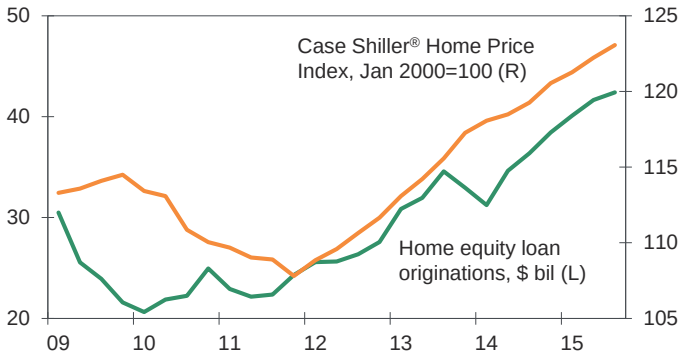
Moody's Analytics Business Cycle Status, Dec 2015



Source: Moody's Analytics

House Price Gains Propel Home Equity Lending

Ohio



Sources: CoreLogic, Equifax, Moody's Analytics

Wisconsin

Wisconsin is lagging the Midwest for the first time since 2014. Because of tepid overseas demand and low commodity prices, factories are cutting production and delaying hiring. As a result, job creation is underperforming that in the region and the nation on a year-ago basis. Consumer industries such as leisure/hospitality and retail have been hemorrhaging jobs for the past several months and financial activities hiring has stalled. Most job gains have been in healthcare, especially outpatient facilities. Slow additions in higher-paying manufacturing and insurance jobs coupled with steady gains in lower-paying service work have tempered wage and income increases, leaving average hourly earnings growth among the slowest in the Midwest. At 4.3%, the state unemployment rate is below the regional and U.S. rates. The labor force is down from a year ago, but some discouraged workers are returning to the labor market.

The forecast for near-term employment and income gains has been revised down in line with more tempered expectations for the U.S. economy and disappointing performance in Wisconsin's private-service industries. The strong U.S. dollar and lackluster foreign demand, especially from Canada, Wisconsin's largest trade partner, suggest a weak landscape for manufacturing over the coming months. Canada's resource-driven economy has struggled under the weight of low oil prices for the past year. Statewide exports to Canada were down 8% in 2015, versus a 4% drop in total exports. The sustained drop in energy prices has especially tempered demand for drilling equipment and other industrial goods that make up Wisconsin's largest export industry. Industrial machinery hubs such as **Milwaukee**, **Racine** and **Appleton** have been hurt the most by the slowdown, although factories in other metro areas are not faring much better.

Food production is also expected to decline given that processed foods account for an above-average share of exports to Canada and are Wisconsin's third largest export industry. Metro areas with a high concentration of food processors, including **Green Bay**, **Sheboygan**, Appleton, and **Fond du Lac**, will feel downward pressure soon. The increasing automation of production processes combined with growing global competition further diminishes food processors' long-term prospects. A favorable outlook for transportation equipment and expansion at Fond du Lac's largest employer, Mercury Marine, should help offset weakness coming from food production. However, Appleton will be unable to lean on its fading paper producers given that local paper manufacturing has not mounted a significant recovery since the Great Recession.

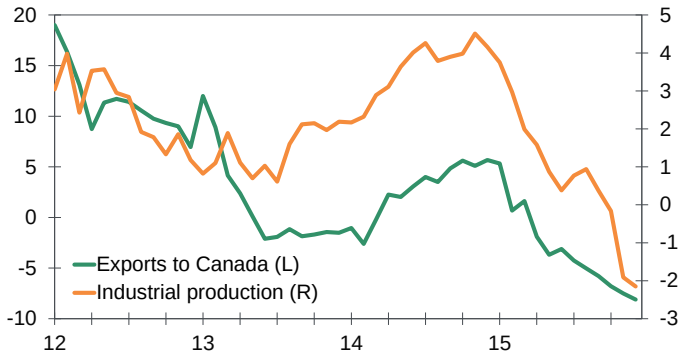
The January update of the Milwaukee-area Purchasing Managers' Index indicated growth for the first time since March, but the headline index is likely to indicate contraction again next month. January's reading barely edged above the neutral threshold of 50, and numerous headwinds suggest that any resurgence will be short-lived. Furthermore, the majority of the uptick was driven by growth in less important inventories and imports, with new orders, employment and exports declining. All told, manufacturing will not likely bounce back in any meaningful way until oil prices rise or the Canadian dollar appreciates against the U.S. dollar.

Upcoming benchmark revisions by the Bureau of Labor Statistics will bring more bad news for Wisconsin's labor market. The near-complete count of jobs in the Quarterly Census of Employment and Wages suggests that the payroll survey has overstated the strength of the state's economy. QCEW figures indicate slower job creation in the first half of 2015, bringing job additions below the regional average. Wisconsin experienced less job growth than the Midwest average in the aftermath of the recession, a pattern that appears to have persisted last year. Among metro areas, Appleton, **Janesville**, Fond du Lac, and Green Bay will have the biggest downward revisions, especially in food-related manufacturing. Milwaukee, arguably hit the hardest by the downturn so far, will experience modest upward revisions at best, keeping the state's biggest economy on uneven ground. **Madison** is also unlikely to undergo major changes, ensuring the metro area continues to lead the state in employment, output and wage growth.

—JOHN WEIS

Ailing Canadian Markets Drag on Output

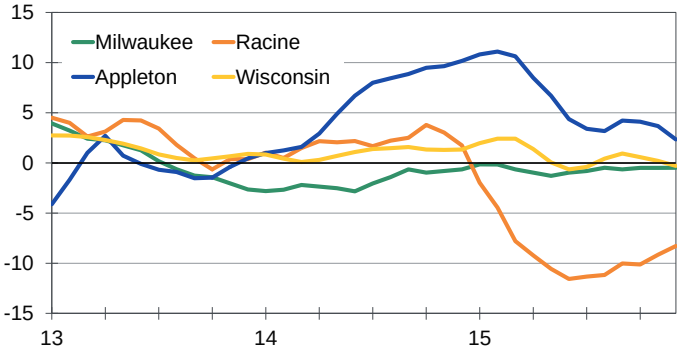
Wisconsin, % change yr ago



Sources: Census Bureau, Moody's Analytics

Machinery Producers Spinning Their Wheels

Machinery manufacturing employment, % chg yr ago, 3-mo MA



Sources: BLS, Moody's Analytics

South Still Slower Than Average

BY EDWARD A. FRIEDMAN

The South has firmed some in terms of job gains in recent months, but 2015 as a whole was subpar. Total employment growth over the year was slower than the national average, and much below the leading West. Further, the loss of high-paying jobs in the energy industry and relative increases in lower-paying jobs resulted in lagging income. Specifically, personal income growth in the third quarter was the slowest among all four regions. However, as has been the case over most of the past year, economic performance across the major subregions has varied greatly.

The early stages of the recovery from the 2009 recession in the Oil Patch—Louisiana, Texas and Oklahoma—far outstripped the nation and the rest of the region, but the severe drop in oil prices in 2015 brought about a dramatic turnaround that has persisted. The year-over-year gain for the sum of total employment in the three states was just 0.9%, less than half the national average. All three experienced deep declines in mining employment and moderate declines in manufacturing, much of which is energy-related. Construction was also hurt, since it includes the fabrication of rigs and pipelines, and distribution. Louisiana's distribution industry experienced the deepest decline, contributing to weakness in New Orleans.

Within the Oil Patch states, Texas has done the best overall, with total employment up 1.4% year over year, and that slow growth should persist in 2016. Solid gains in IT, professional services, and a variety of personal services will offset the energy-related declines. This strength shows up most clearly in Dallas, Austin, San Antonio and, to a lesser extent, Fort Worth. All of these metro areas have less exposure to the energy industry than Houston, which faces worse prospects until oil prices bottom out.

However, Louisiana and Oklahoma, and West Virginia for that matter, will be more damaged because of their low non-energy industrial diversity. These states will face another year of turmoil, and global energy prices have recently descended to new lows as concerns about Chinese economic weakness have spread.

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The Southeast has performed far better, with employment growth above the national average in the largest states: Florida, South Carolina, Georgia and North Carolina. A major driver is population growth. Recently published data from the Census Bureau show that in 2015 all four recorded gains above the national average. Florida has done especially well, with population growth accelerating to 1.84%, the fastest in nine years, from just 0.7% at the depth of the recession. The evidence is building that a familiar driver of Florida growth, the relocation of retirees to take advantage of the climate and amenities, is returning. Florida also benefits from low gasoline prices, which have boosted discretionary income available for tourism. The combination of growing tourism and in-migration has boosted nonresidential construction in Miami and Orlando.

Much the same is true of South Carolina, but another driver there will be heavy industry. Although manufacturing employment paused in 2015, the prospects for a rebound are good. Boeing's order book is long, the company is building a new paint shop at its Dreamliner facility, and construction of a new fabrication plant by Volvo should be complete by 2018.

In Georgia, Atlanta will be leading the way, with total employment up at double the national pace recently. The metro area makes up more than half the Georgia economy, and as the national economy has expanded, the concentration of corporate headquarters has led to cumulative growth in core professional services of more than 10% since the beginning of 2014.

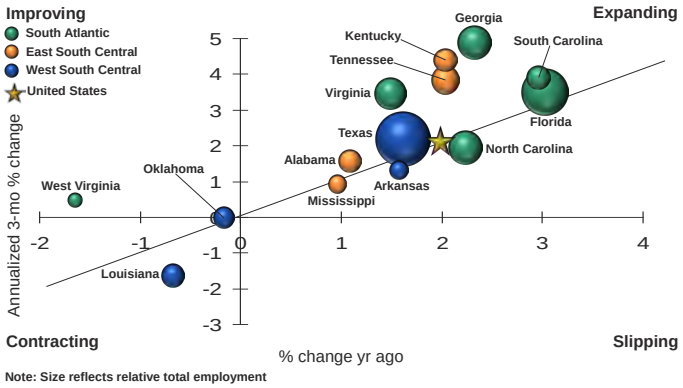
States in the region's midsection—Kentucky, Tennessee and Alabama—still benefit from strong auto sales, with total employment growth in the first two above the national average. Nashville is doing especially well. However, as auto sales slow back toward trend, Kentucky and Alabama will once again have to confront weak demographics.

Virginia's economy has finally begun to improve measurably, led by growth in professional services and stabilization in the federal government sector. However, uncertainty will remain high until after the 2016 presidential election.

High-Frequency Indicators

Payroll Employment—South States

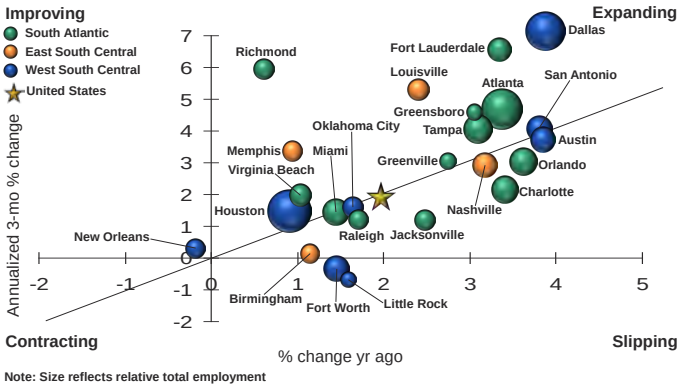
1-yr vs. 3-mo performance (3-mo MA) Dec 2015



Note: Size reflects relative total employment

Payroll Employment—South MSAs

1-yr vs. 3-mo performance (3-mo MA) Dec 2015



Note: Size reflects relative total employment

Comparative Performance Indicators

3-mo MA, % change from previous 3-mo period, Feb 2016

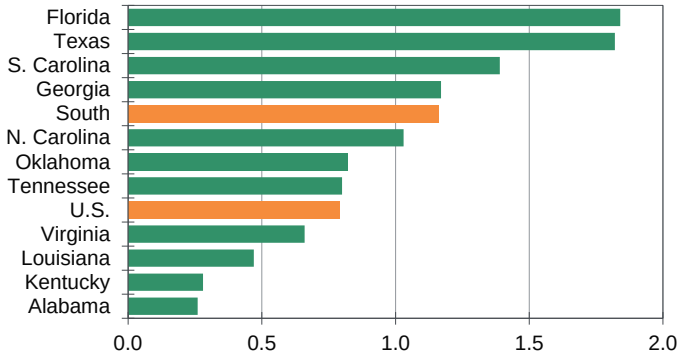
	Private service-providing employment (annualized)	Current unemployment rate	Change in unemployment rate	Residential permits	Industrial production	Overall recent performance	Change in outlook from last month
Atlanta	4.7	5.3	-0.3	31.1	-0.7	↑	↔
Charlotte	2.5	5.4	-0.2	20.8	-0.8	↑	↔
Ft. Lauderdale	6.3	4.7	-0.3	33.8	-0.4	↑	↔
Louisville	5.5	4.3	-0.2	17.8	-1.4	↑	↔
Tampa	5.5	4.8	-0.3	33.8	-0.5	↑	↔
Virginia Beach	3.2	4.7	-0.3	-15.0	0.2	↑	↔
West Palm Beach	3.8	4.9	-0.2	34.2	-0.4	↑	↔
Austin	3.9	3.3	0.3	22.7	-0.3	↔	↔
Dallas	7.3	3.9	0.2	-7.4	-0.9	↔	↔
Fort Worth	-0.3	4.2	0.3	38.9	-1.2	↔	↔
Houston	1.1	4.8	0.5	4.2	-1.2	↔	↓
Jacksonville	1.4	4.9	-0.4	11.5	-0.5	↔	↔
Memphis	2.8	6.2	-0.2	-7.3	-0.8	↔	↔
Miami	1.3	6.0	0.1	73.8	-0.5	↔	↔
Nashville	3.0	4.5	0.0	40.8	-1.4	↔	↔
New Orleans	0.7	5.9	0.1	9.9	-0.7	↔	↔
Oklahoma City	2.4	3.6	-0.4	3.6	-0.9	↔	↔
Orlando	2.7	4.7	-0.3	-8.7	-0.5	↔	↔
Richmond	7.6	4.4	-0.4	8.5	-0.8	↔	↔
San Antonio	4.3	3.8	0.3	35.3	-1.2	↔	↔
South	**3.2**	**5.2**	**0.0**	**9.2**	**-0.8**	↔	↔
U.S.	**2.6**	**5.0**	**-0.1**	**10.1**	**-0.9**	↔	↔

Sources: BLS, Census Bureau, Federal Reserve, Moody's Analytics

What We're Watching

Demographics Boost Southeast

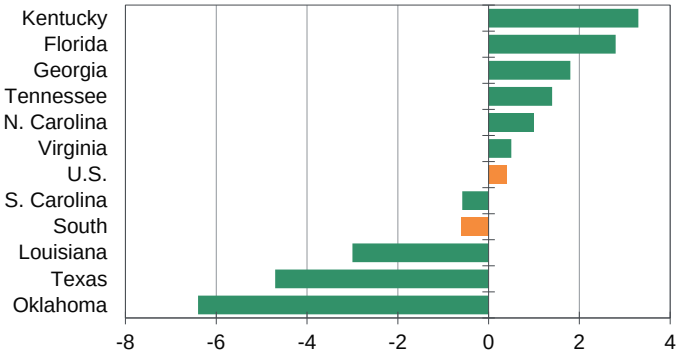
Population, % change, 2015



Sources: Census Bureau, Moody's Analytics

Manufacturing: Autos Help, Energy Is a Drag

Manufacturing employment, % change yr ago, Dec 2015

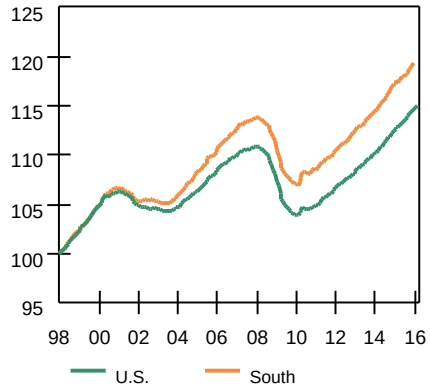


Sources: BLS, Moody's Analytics

Cyclical Indicators

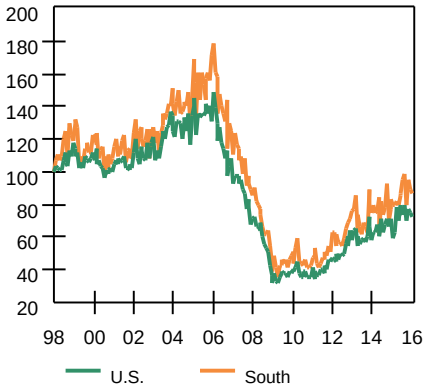
Employment

1998=100



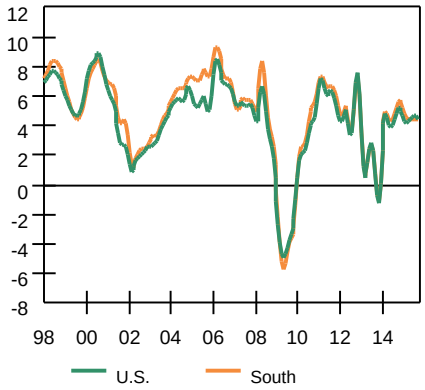
Housing Starts

3-mo MA, 1998=100



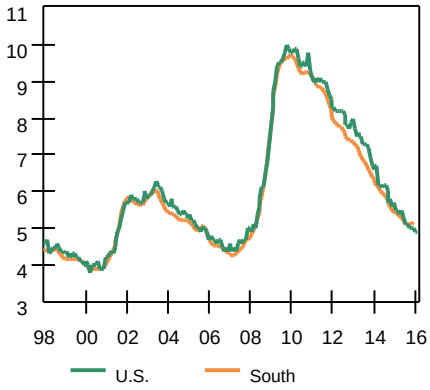
Personal Income

% change yr ago



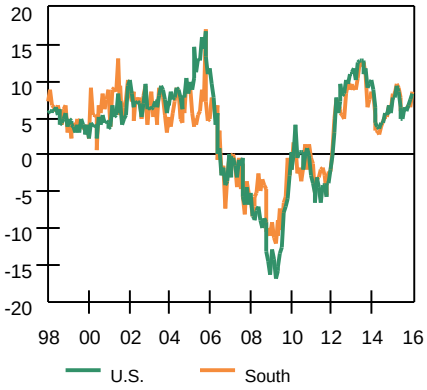
Unemployment Rate

%



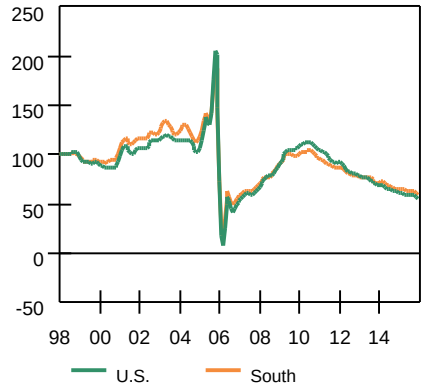
Median House Price (Existing)

3-mo MA, % change yr ago



Personal Bankruptcy Filings

1998=100



Sources: BEA, BLS, Federal District Courts, NAR, Moody's Analytics

Arkansas

Arkansas has regained its strength and is advancing past its peers in the West South Central division; the state is even in terms of job growth with the broader South. Payroll employment hit a record high in December led by booming private services industries and to a lesser extent nondurable goods manufacturing. Likewise, income growth clocked in at 5.5% in the third quarter of 2015 thanks to an increasingly tight labor market boosting wages and salaries; incomes in the Natural State are now advancing more rapidly than the national average. On the downside, state exports have dropped in recent months on the back of an increasingly strong U.S. dollar. Exports to major trading partners including Canada, France and China are now down on a year-ago basis as of December. Nonetheless, the jobless rate declined to 4.8% in December, settling slightly below the national rate, and unemployment insurance claims reached a fresh multidecade low.

The outlook for the state is relatively unchanged from the prior update. Employment growth will be around 1.3% in 2016, before accelerating to approximately 1.5% in 2017. Arkansas will underperform the national average as it has the past several years, but it will come in roughly in line with the rest of the West South Central division because of its lower reliance on the still-struggling energy industry than neighboring states such as Louisiana and Texas. Private services will account for the lion's share of the job gains as goods producers cope with low commodity prices as well as automation necessitating the addition of fewer labor inputs. The Census Bureau estimates that population growth accelerated to around 0.4% in 2015, still well below the regional and national averages but above prior expectations, which in turn lends upside potential to the services outlook.

Growth in **Fayetteville** is roaring ahead driven by a diverse array of private services and output gains in food manufacturing. In particular, chicken manufacturers have outperformed as the drop in global wheat, corn and soybean prices has translated into lower feed costs for chicken farmers, bolstering profit margins. Although not yet translating into significant job gains, the rise in profitability is being felt in increased capital spending. For example, top employer and chicken processor Tyson Foods is expanding its facilities in downtown Springdale that will add to its corporate headquarters. Elsewhere, population growth more than twice the national average supports robust gains in health services; job growth in the segment is handily above that of the South and nation.

After outpacing the state in the early half of 2015, **Little Rock's** economy has cooled as hiring in both private services and goods production decelerates. Further, the Fayetteville Shale, which is partially located near the state's capital, has succumbed to the same energy-related weakness as the rest of the nation because of lower natural gas prices. Active rotary rigs in the shale dropped to zero in January, a far cry from their peak of around 60 during late 2008 when natural gas prices were averaging $8.86 per mmBTUs. Further clouding the outlook, population growth slipped to its lowest since the late 1980s driven by slower natural population gains and fewer migrants.

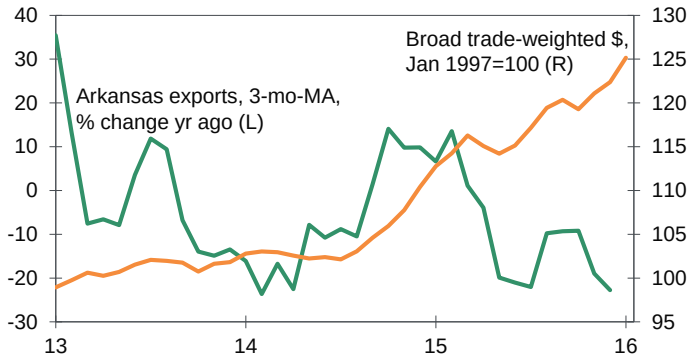
On the upside, **Jonesboro's** economy is still on the upswing led by private services and its stalwart farming segment. Farm commodities production in the metro area continue to rise despite lower prices received because national demand for foodstuffs is increasing. An increasingly tight labor market has also put upward pressure on wages and spending.

Fort Smith remains at risk of recession, and payroll employment is flat from its level six years ago. Outsourcing of household appliance production and other durable-goods manufacturing has hobbled growth prospects. In addition, energy-related goods producers have also been stung by the steep decline in energy prices.

In addition, **Pine Bluff** is still in the throes of recession and employment is close to a multidecade low. Outsourcing and a lack of capital investment has sent goods-producing employment to its lowest level in recent memory and private services are also struggling.

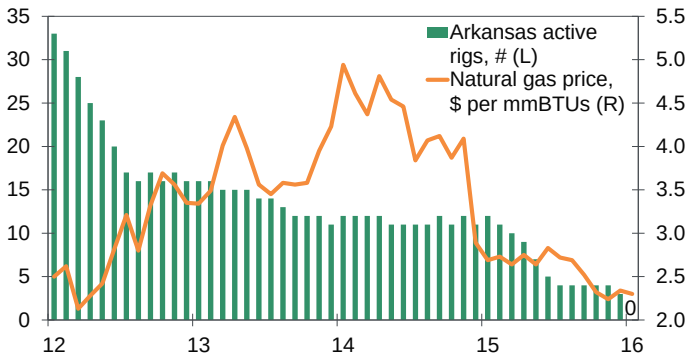
—BRENT CAMPBELL

Stronger Dollar Weighs on Natural State Exports



Sources: Federal Reserve, Census Bureau, Moody's Analytics

Active Rotary Rigs Hit Zero as Gas Prices Drop



Sources: Baker Hughes, Moody's Analytics

Florida

Florida's pace of economic growth has pulled ahead of the nation's. Jobless claims have fallen to their prerecession level, the unemployment rate is falling faster than the nation's, and average weekly earnings are rising faster than those of the U.S. Consumers are becoming more confident and construction is ramping up to meet fast-growing demand for housing. Since many of these statistics extend long-established trends, Florida's outlook has not changed.

According to estimates recently released by the Census Bureau, Florida's population grew by an average of 1,000 residents per day last year. The state's population increased by 1.8% in 2015, which was its fastest rate since 2006 and the speediest pace in the South. Despite this rapid rise, Florida's population additions will accelerate because growth in the state remains historically weak. In the 50 years prior the Great Recession, the state's annual growth rate exceeded last year's pace 47 times. Florida should also expect faster expansion because its cities are especially attractive to retiring baby boomers—the fastest-growing age group in the U.S.—and Hispanics—the nation's fastest-growing ethnic group.

Speedy population gains are crucial for Florida's full recovery. An expanding population boosts demand for jobs that serve the local population such as retailers, repairmen and medical providers. New residents are also good for the state's tax base because Florida does not levy an income tax. The state derives the South's largest percentage of its general revenue from sales taxes, and sales-tax collections precipitously rise with an increase in residents. Florida's lagging housing market benefits the most from a rising population. Since the end of the Great Recession, only homeowners in Nevada are further away from regaining the equity that they lost in the housing bust; with last year's speedy population growth, house prices in Florida increased at the South's second fastest pace in 2015.

Miami's economy has stalled as job additions in the area struggle to keep pace with the expanding workforce. The unemployment rate at end of 2015, 6.1%, is the same as it was at the start of the year, and joblessness in Miami is 1.1 percentage points higher than in the rest of state, which is the widest gap in seven years. Businesses are responding to the area's limp growth. The developer of the massive Miami Worldcenter, which is under construction, scaled down the retail component of the project, and CVS Health recently announced plans to shutter its local distribution center "based on a review of the distribution needs" of stores in South Florida.

Tampa is moving closer to expansion. The area's unemployment rate has dipped to its lowest level since 2007, and its housing market has been the primary beneficiary of the economic recovery. House prices have reached their highest level since 2008 and the area issued its largest number of permits since 2007. Despite reaching post-recession highs, Tampa's housing market has much more room to expand before returning to average prerecession levels. Developers recently broke ground on a 41-story condo tower in downtown St. Petersburg, which will be the tallest residential building in the Tampa metro area once it is completed.

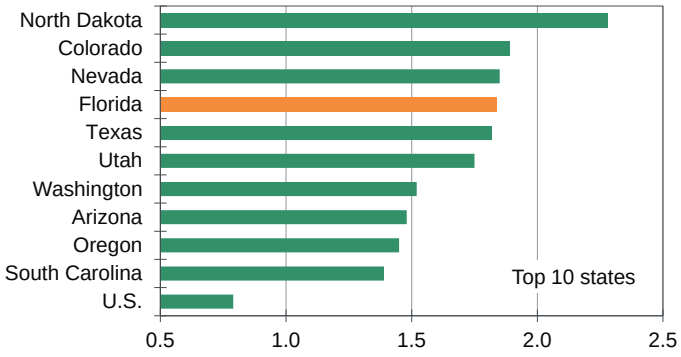
Economic expansion in **Orlando** is advancing steadily as the unemployment rate has dropped to 4.6%, the lowest in eight years. Despite this growth, the area's construction industry is weak. After adding more than 5,300 jobs for two consecutive years, employment for contractors and builders increased by just 2,600 in 2015. Robust gains in construction will resume this year along with a raft of infrastructure projects, including the $2.3 billion renovation to I-4, a billion-dollar airport expansion, and a $155 million soccer stadium. Fueled by a booming population, housing construction will also contribute to growth; the area issued more building permits in the last six months of 2015 than during any six-month period since 2007.

Brightline, the privately funded high-speed passenger rail line with stops in Orlando, West Palm Beach, Fort Lauderdale, and Miami, is set to begin service in 2017. Once complete, the $3.1 billion project will shuttle riders between Florida's most visited cities in less than three hours. Officials in Brevard County, which is along the train's route, have proposed a fifth stop.

—KWAME DONALDSON

Florida's Fast-Growing Population…

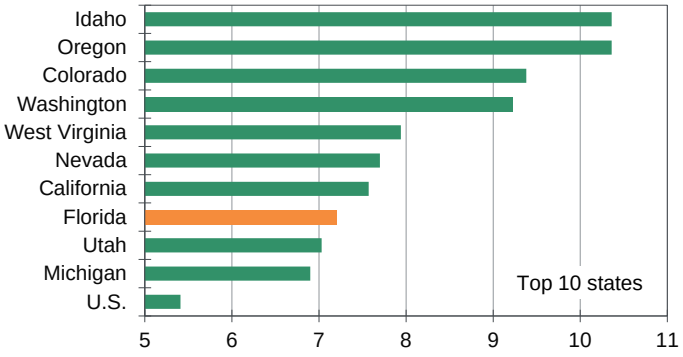
Total population, % change, 2015



Sources: Census Bureau, Moody's Analytics

…Fuels Rapid House Price Gains

House price index, % change yr ago, Dec 2015



Sources: CoreLogic Inc., Moody's Analytics

Georgia

Georgia remains a leader among southern states. Broad-based hiring has resulted in job gains of nearly twice the pace for the South, leading the region in the last quarter of 2015. Professional services, logistics, hospitality and construction are providing the bulk of the support, but the public sector is improving as well. A stronger labor market is also helping state coffers, which are now in their best shape in nearly a decade. Both individual income and corporate tax collections are robust as the number of establishments grew well above the national pace since 2012. As a result, average weekly earnings are still trending up, adding to the gains of 2013 and 2014, though the current pace is lower than it is nationally.

Georgia's near-term outlook remains positive, though growth has been revised downward from last month. Financial market volatility is taking a toll on business sentiment, resulting in a less upbeat outlook for the U.S. economy and shaving half a percentage point off the earlier Georgia forecast growth this year. The fundamentals are strong, however. Concerns pertaining to the federal budget, crucial to Georgia's military installations, have abated somewhat now that a budget has been passed. A continuation of favorable demographic trends will also help. Georgia's population growth has been at or above the national and the South averages for decades. More important, tax incentives and a favorable infrastructure will help attract more businesses and a steady influx of young and educated workers to the state.

Such trends will be particularly strong for **Atlanta**, which accounts for more than half of the state's economy and is on the verge of a self-sustaining expansion. Growth is especially encouraging in high-paying core professional services, where job growth has hovered around 4% for five consecutive years. Thanks to robust demand for office space, growth there has triggered multiple new construction projects. But it has also led to the conversion of some industrial space into offices such as the loft offices conversion project on Atlanta's Upper Westside. Atlanta is riding the wave of favorable demographic trends. Although 2015 population data are not yet available for metro areas, the state's above-average growth will translate to its largest metro area. The population grew more than four times stronger than that of the rest of Georgia in 2014. Atlanta's relative importance and historical trends, especially the 1.2% growth reported for the state for 2015, suggest that the metro area's population grew at least 1.5% last year. Robust income and demographic gains are strengthening the housing market, which is in the final stretch of its recovery. Annualized house price growth hovered around the double digits in late 2015, according to the Case-Shiller house price index, and the trend will continue, supporting new residential construction projects. **Augusta**, which is benefiting immensely from the transfer of the Army Cyber Command to Fort Gordon, will gain similarly.

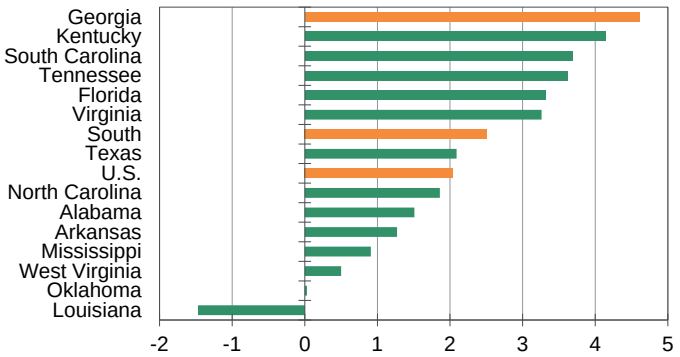
Savannah is another strong performer with above-average population growth in recent years, supported by the Port of Savannah. Although exports have fallen, the port has experienced the strongest growth of imports among all ports on the East Coast in 2015. The volume of containers rose more than 20% from 2014, according to the Baltic and International Maritime Council, supporting warehousing and transportation. A plan to deepen the harbor and allow larger ships to dock is under way and its completion will piggyback on the success of the Panama Canal widening project.

Elsewhere in the state, the outlook is less rosy. Georgia's growth could be stronger if not for **Albany** and **Valdosta** being in recession and **Brunswick** and **Hinesville** being at risk of falling into recession. The weakness is linked to either a slowdown in manufacturing or a squeeze in nondurables due to low commodity prices. Nonetheless, Georgia's economy is strong and will also support a stable state budget outlook. Thanks to higher than expected tax revenues, Governor Nathan Deal recently signed a midyear budget that adds $1.1 billion in new spending, the bulk of which will go to K-12 education and road construction. Such spending bodes well for the private and public sectors.

—ILIR HYSA

Georgia Recently Leads South in Job Gains

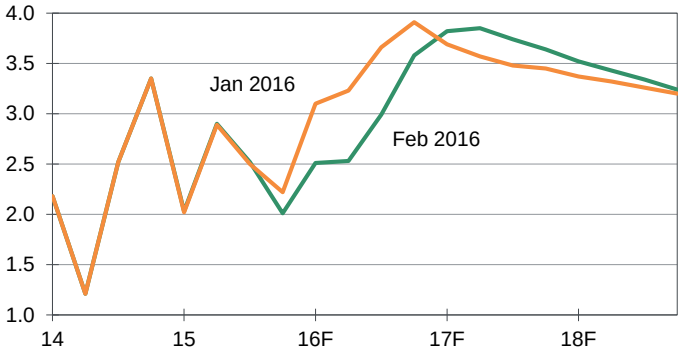
Nonfarm employment, % change, annualized, 2015Q4



Sources: BLS, Moody's Analytics

Near-Term Outlook Is Positive but Less Upbeat

Georgia GDP growth, % change yr ago



Sources: BEA, Moody's Analytics

Louisiana

Louisiana's growth has faltered again, as total employment and industrial production have declined substantially amid the decline of oil prices. Natural gas and crude oil prices are at historically low levels. The state's active rig count has plummeted, falling 18% already this year. Mining employment also dropped steeply throughout 2015. Manufacturing is contracting more rapidly than in the remainder of the nation, caused mostly by sharp declines in machinery manufacturing, which includes drilling rig components. With global commodities markets slipping, shipping employment is also falling steeply, in contrast with the growth of the U.S. economy as a whole.

Government employment is another weak spot. The state budget has deteriorated alongside the economy, and even larger spending cuts are on the horizon; corporate and income tax receipts have slid, partially caused by low energy prices. One positive factor is that some non-energy industries are performing well. A growing over-65 population is supporting healthcare expansion, although payroll growth still lags the national rate. Construction has also performed well, as commercial construction firms expand nationally and internationally.

New Orleans' economy has weakened in recent months, with flat employment and outright payroll declines in multiple industries. Now that the outlook has darkened with the most recent slide in commodity prices, the metro area's energy and export industries will contract further. The port handles about half of the state's total exports, which have dropped by around a quarter on a year-ago basis. On the positive side, the port also exports a large portion of the nation's grains, as many grain producers in the Midwest ship their products down the Mississippi. This diversity provides at least some cushion to the negative effects in the energy industry.

Fortunately, the metro area has a smaller percentage of its total employment in mining than the remainder of the state. However, the area is home to many back-office jobs and support staff for drilling companies, as well as refineries. However, the crack spread between retail gasoline and crude oil is narrowing, implying lower refinery profits. The expectation is that the slowdown in New Orleans will be temporary, but the longer commodity and energy prices remain depressed, the darker the outlook becomes.

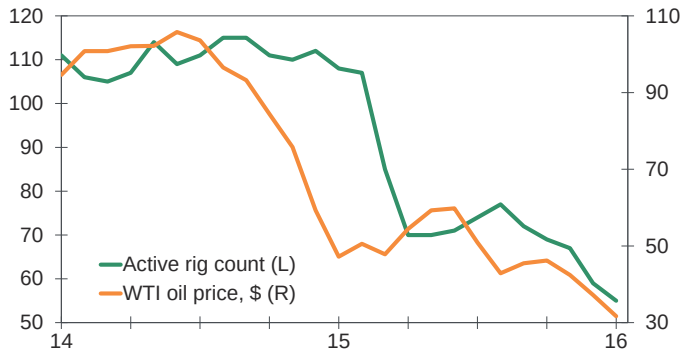
The state capital, **Baton Rouge**, is outperforming its peers thanks to strong performance in construction. Baton Rouge's commercial construction firms are expanding regionally, supporting employment within the metro area. However, growth will decelerate significantly in 2016 as state government payrolls shrink. The state budget is in dire shape; tax receipts have fallen far below initial projections, causing the downgrade in government employment expectations. Baton Rouge accounts for 43% of total state government employees in Louisiana, leaving it particularly vulnerable to fluctuations.

Low energy prices are causing **Lafayette** to contract, because more than 20% of the area's output and 9% of its employment are in mining. The industrial base is highly geared toward energy production, and declines in industrial production accelerated in late 2015 as energy prices fell. Along with the fall in mining employment, manufacturing employment is falling more quickly than in the rest of the state, since most of the manufacturing in Lafayette is drilling rig components. The recent downgrade in the oil price forecast is that it will reach only $50 by the end of 2016. The implication is that Lafayette's economy will be slower to recover. A similar story is true for Houma, whose economy depends on offshore drilling. The much lower rig count will do outsize damage, and lower oil prices will keep output and employment lower for longer than previously thought.

As in Lafayette and Houma, **Shreveport's** overreliance on energy markets darkens its outlook significantly. The economy relies heavily on natural gas drilling, since it is located in the Haynesville Shale bed. The Haynesville formation is much more difficult and costly to drill than other shale formations; production per rig is the lowest of any major U.S. shale play. Break-even prices are around $5 per million BTUs, well above the current price of $2. Gas prices are staying low, and the warm nationwide winter is exacerbating oversupply. The long-term outlook for natural gas to stay below $5 indicates that Shreveport will struggle to recover.

—THOMAS NICHOLS

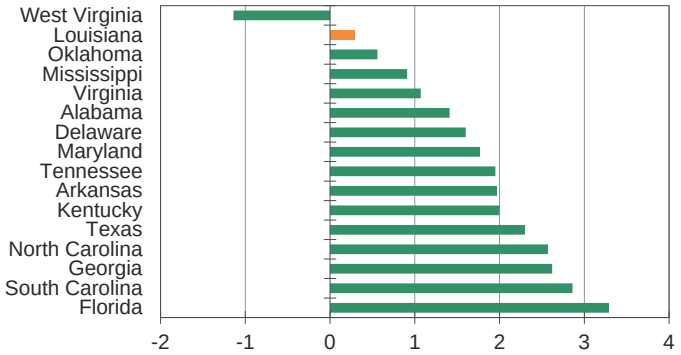
Louisiana Active Rig Count Plummets…



Sources: Baker Hughes, Energy Information Administration, Moody's Analytics

…Causing Payrolls to Fall Behind

Payroll employment, annual avg % change, 2015



Sources: BLS, Moody's Analytics

North Carolina

North Carolina's economic growth has cooled somewhat as a result of weakness in goods-producing industries, but the state still performs better than a majority of southern states. Service payrolls are expanding at a healthy pace. Notably, financial services, the second highest-paying industry in the state, is adding jobs at the fifth fastest pace in the nation. New jobs are commanding higher wages and fueling spending, and an improving job market is encouraging labor force entry.

Manufacturing remains a sore spot as an appreciating dollar dampens exports. Chemicals, plastics and transportation equipment, which account for nearly one-quarter of manufacturing payrolls, are netting job gains but not nearly enough to offset the more broad-based losses in other manufacturing industries.

The housing market's recovery will accelerate this year. Rising demand for space is bidding house prices up in more than half of metro areas including **Charlotte** and **Greensboro** and anecdotal evidence suggests that housing is in short supply in **Asheville**, a retiree magnet. Driven by pent-up demand, single-family permit issuance trended higher through 2015 and will surge in 2016 as appreciating house prices increase returns to homebuilding.

North Carolina's labor market is tightening but still has some slack. The broadest U-6 measure, defined as the proportion of marginally attached, unemployed and underemployed workers, declined by 0.8 percentage point to 11.3% in 2015 compared with the U.S. average of 10.4%. Job creation in neighboring states is boosting household employment in metro areas that lie along North Carolina's borders. Partially incentives-driven growth in the South Carolina side of Charlotte provides job opportunities for residents in North Carolina; Virginia's accelerating pace of job growth helps household employment in **Winston-Salem**, Greensboro and Durham. Household employment growth accelerated the fastest in year-to-year growth in December, mainly in metro areas that border other states.

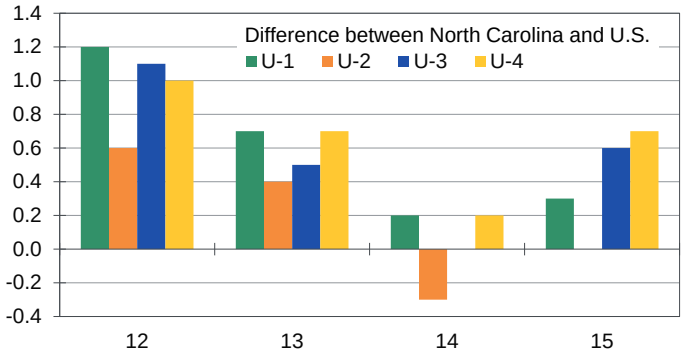
The employment outlook for the state has not changed. Having led the U.S. average for two years, job growth will again track the national average in 2016. The dollar will appreciate further, however, continuing to dampen exports and limit job growth. The outlook for other parts of the economy remains more sanguine and new incentives could spur stronger gains. After losing out on large investments to neighboring states that offered higher financial incentives, NC Competes, a new investment fund, raises the cap on awards by $5 million annually and offers higher incentives than the previous fund to firms that invest in the least economically viable areas. For example, North Carolina awarded nearly $14 million to two TV shows that will hire 2,400 residents and spend more than $57 million in the state, filming in **Wilmington** and possibly **Raleigh** and Asheville. Additionally, a 1-percentage point cut in North Carolina's corporate income tax rate to 4%, now one of the lowest in the nation, brings the cumulative corporate income tax cut to 2.9 percentage points since 2013. This should support firm expansions as well as attract new investment. However, rural areas will struggle to grow, as higher incentives may be insufficient to spur gains.

Actual payroll employment counts from the Quarterly Census of Employment and Wages through mid-2015 show that payroll employment estimates for the state were underestimated by 0.25 percentage point. This will likely result in an upward revision to the Bureau of Labor Statistics numbers. Charlotte's payroll employment is likely to be revised up the most. The outsize and growing consumer base, a large pool of skilled labor, and high industrial diversity foster strong growth. Raleigh's payroll employment is likely to be revised upward as well, because an improving investment climate is drawing firms. However, Greensboro, with the second highest concentration of manufacturing employment in the state, faces a downward revision in payroll estimates, as the strengthening dollar likely squelched growth. **Durham's** payrolls will likely be revised down as well. Layoffs in the Research Triangle Park escalated as prominent firms such as GlaxoSmithKline, Eisai and IBM streamlined their operations in 2015, and additional layoffs loom.

—EFUA AMOONUA AFFUL

Labor Market Slack Declining More Slowly in NC

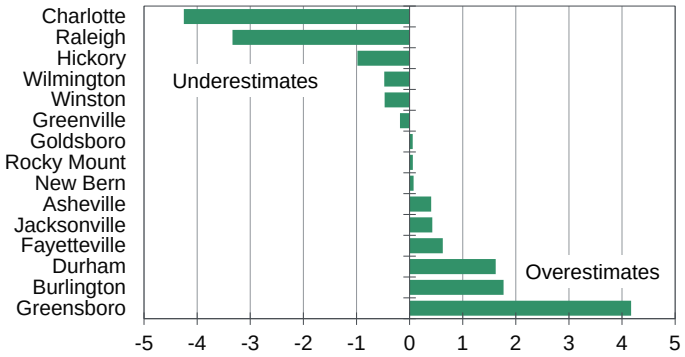
Measures of labor underutilization, ppt



Sources: BLS, Moody's Analytics

Charlotte and Raleigh Set for Upward Revision

Diff., employment, QCEW count and CES est., ths, Jun 2015



Sources: BLS, Moody's Analytics

Tennessee

Tennessee's jobs and earnings increases have moved ahead of those of most of the region. Gains are broad-based across industries and wage tiers. While high-wage positions remain a below-average contributor to total employment, they are rising at an above-average rate compared with the region, helping to push wages and salaries higher. Net hiring in manufacturing is slowing as national car sales gradually fall to more sustainable levels, but it still outpaces the national rate. House prices are rising with increasing demand and growth in permit issuance in 2015 placed Tennessee near the top among southern states. While the Tennessee Housing Development Agency reports that homeownership is at a 20-year low, mortgage lending is rising steadily and single-family permit growth is above average for the region. The forecast for permits was revised upward from last month largely because of rapid gains in Nashville and strong statewide fundamentals.

Nashville has the strongest rate of population growth in the state and diverse payroll gains support new entrants into the workforce. Rental vacancy rates in the metro area have been below average for the last five years and the pace of construction has not kept up with the swell of demand. This contributes to rising prices and encouraging new single- and multifamily housing construction. As developers and residents are priced out of the urban core, construction will increase in Nashville's suburban areas before the rapid pace of new projects drops off. According to the ARA Nashville Development Pipeline Report, growth of apartment unit inventory will remain above average for at least the next two years before tapering off. This will bring inventory closer to its historical average and slow rapidly rising rents.

Chattanooga has also experienced a sharp pickup in permit issuance. Increased construction has followed strong house price appreciation, encouraged by above-average employment growth. The "Gig City" has updated its public utility again and now offers residents internet connections almost 1,000 times faster than the U.S. average. This upgrade, combined with Tennessee's relatively low business costs, will likely attract new businesses and investment to the area.

Nearby **Cleveland** has also experienced a surprisingly strong housing market of late, with residential permits reaching a post-recession peak earlier in 2015. Demand will remain high in the next several years thanks to a rapid pace of household formation.

Memphis ended 2015 on a high note, with strong payroll growth in the last few months of the year. Gains in transportation/utilities have been especially pronounced, with several transportation and logistics service providers having expanded into the area recently. The Bluff City's location and transportation infrastructure will encourage further gains in logistics. In 2015, **Knoxville's** job growth rate was one of the fastest in the state, led by professional services. The metro area's developing entrepreneurial culture, central location, competitive business costs, and the business-friendly policies of East Tennessee make it an attractive location for new firms. This should help support above-average expansion for the next several years.

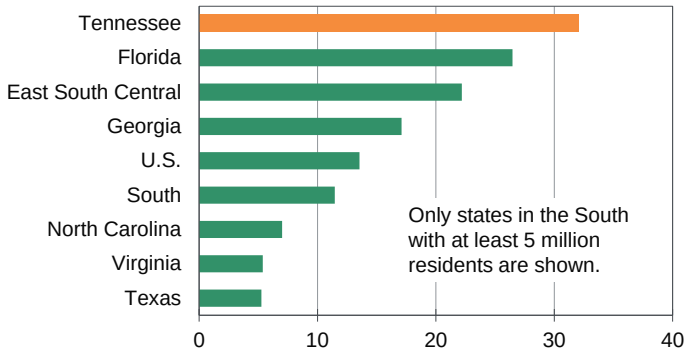
A large budget surplus built by unusually high sales and business tax revenues, combined with surpluses from the previous two years, puts the state in a strong fiscal position. The newly proposed budget for fiscal 2017 would invest in public education and various construction and maintenance projects. While the final budget may allocate the surplus elsewhere, increased government spending and sound state finances bolster the outlook.

Absent from the budget was any mention of Insure Tennessee, the governor's proposal to expand Medicaid under the Affordable Care Act that died in the state Senate in 2015. This was a major blow to hospitals in the state, as they now face reduced reimbursement rates for uncompensated care costs from uninsured patients. Metro areas with a large healthcare presence will be disproportionately affected. For example, some of **Johnson City's** largest employers are hospitals that serve all of Northeast Tennessee. A high poverty rate in the Tri Cities region suggests that expanded healthcare coverage would also have a notable impact on demand for healthcare services. This would provide a boost to a metro area that, in 2015, was one of the weakest in the state.

—EMILY FAZIO

Strong Demand Increases Homebuilding

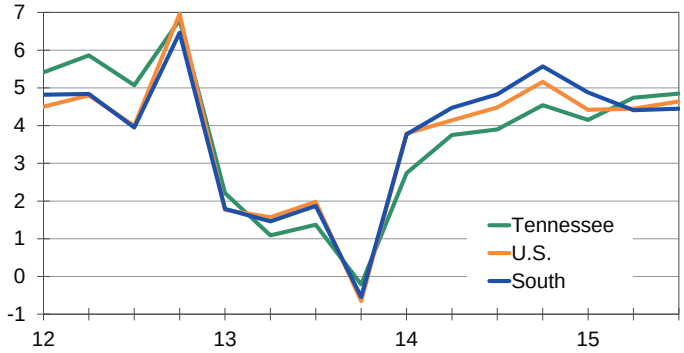
Residential construction permits, % change yr ago, 2015



Sources: Census Bureau, Moody's Analytics

Income Growth Accelerates in Tennessee

Total personal income, % change yr ago



Sources: BEA, Moody's Analytics

Texas

The Texas slowdown is by no means over. Although new claims for unemployment insurance fell in January, they had increased steadily from May through December, and the unemployment rate rose half a percentage point, in contrast with improving national performance. With oil prices struggling to rise above $30 per barrel, the number of active drill rigs statewide is the lowest since 1998, well below the trough in the Great Recession. Mining payrolls are down about 11% from the peak, and more layoffs lie ahead.

Nonetheless, the state has successfully demonstrated its oft-claimed improved industrial diversity. Total employment actually rose 1.4% over the course of 2015, a respectable outcome, though the growth rate was below the national average. Moreover, most industries outside of mining and manufacturing shared in the gains, though that reflects outsize increases in low-wage industries such as hospitality.

But the road ahead is still rough, and there is no change in the outlook for at best slow, below-average growth in 2016. OPEC's decision or lack thereof not to engage in production cuts means that oil prices will remain low in 2016 until the current excess supply is absorbed. Consequently local drilling will remain suppressed since it is higher cost. Another drag will be international trade, critical for Texas, which is still the largest exporting state in the nation. Although to some extent this outcome simply reflects the much lower price of petroleum products, nonoil cross-border shipments are also down sharply, about 20% from their 2014 peak. Major trading partners Mexico and Canada are weak, and Brazil is in a deep recession.

On the brighter side, demographics and housing will provide support. Recently published census data show population growth was 1.8% in 2015, well more than double the national average. Further, house prices are rising in all major metro areas, and multifamily construction is at a 25-year high, although new single-family permits predictably paused in 2015 as homebuilder sentiment waned.

Houston is struggling, with mining and manufacturing still shedding jobs. A number of exploration companies are in financial trouble and larger integrated energy corporations, such as Chevron, have announced layoffs. However total employment has recently risen, led by large gains in personal services, although these figures are subject to change in March when annual benchmark revisions are released. Moreover, low energy prices are still boosting downstream energy industries. Steel manufacturer Tenaris will invest $1.8 billion in a new mill to produce pipe for energy transport.

By comparison, **Dallas** is advancing rapidly, with job growth twice the national pace. One factor is a smaller exposure to the energy industry than Houston. More importantly, professional services are booming, as Liberty Mutual, Toyota Financial Services, and State Farm have led a wave of relocations and expansions. As a result, house prices continue to rise at nearly 10% year over year, and home sales are up about 7% during the same time.

Fort Worth is not keeping up with Dallas, with significantly slower employment additions and somewhat smaller house price increases. However, the outlook is positive, as GM proceeds with the expansion of its Arlington sport-utility vehicle plant and military aircraft maker Lockheed adds capacity to raise production over the next couple of years.

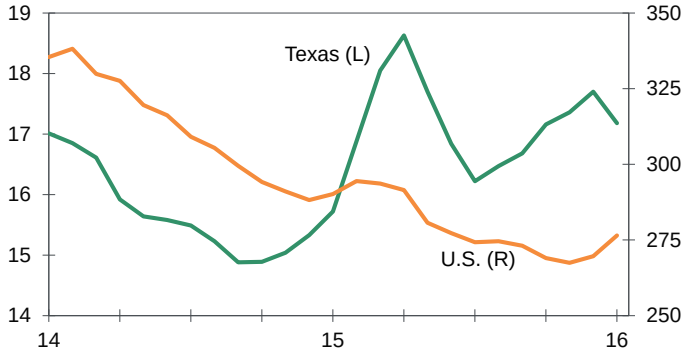
Austin competes with Dallas for the lead in Texas job growth. Expansion of IT businesses, such as Apple's new Americas Operation Center, is boosting professional services, up more than 8% year over year. The unemployment rate is down to less than 3.5% and house prices have risen 8% year over year.

San Antonio will almost keep up with Dallas and Austin. Private services have led the way, as income per household has closed the gap with that of other Texas metro areas. Housing is also benefiting; house prices have risen 7% year over year. Manufacturing will also contribute support. For example, Takata Seat Belt completed an expansion of its local plant in December.

—EDWARD FRIEDMAN

Texas Labor Market Struggles as U.S. Grows

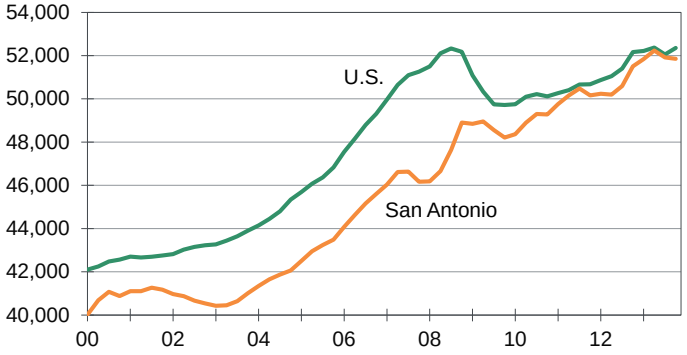
New claims for unemployment insurance, ths



Sources: BLS, Moody's Analytics

San Antonio Incomes Lift Service Industries

Median household income, $



Sources: BEA, Moody's Analytics

Virginia

The Virginia economy remains a below-average performer despite improving growth. Employment additions have been slowly accelerating and revisions are likely to enhance the gains. Some of the weights on the economy are shrinking. Federal cuts are still taking a toll, but their magnitude is shrinking. Federal government employment has leveled off after declining in 2013 and 2014. Strong employment gains and accelerating gains in wage income will support tourism and hospitality. Income growth has also accelerated modestly. The main remaining and increasing drag is the rising value of the U.S. dollar, which will weigh on manufacturing and port activity. Already, container volume through the port has nearly leveled off, as has statewide industrial production.

Northern Virginia's economy has softened over the past several months. Employment has been virtually unchanged since August, while year-over-year growth rates of average weekly hours and earnings have slowed noticeably since September. What is more, the earnings growth rate has moved below the U.S. average. On the bright side, year-over-year increases in hours worked, while tepid, compare favorably with those of the U.S., which have been flat or contracting for the past five months. Northern Virginia's still-expanding workweek, coupled with unchanged employment levels, implies modest productivity gains—on an output per worker basis—that are escaping the nation. Flat private employment is primarily responsible for the region's sluggish overall jobs picture, led by shrinking retail payrolls. But federal employment, which is three times more concentrated in Northern Virginia than nationally, has been rising at an above-average pace since the summer. Since low-paying retail jobs are being partially offset by higher-paying federal jobs, total income has held up.

The outlook remains upbeat, despite current stock market upheavals, because the U.S. economy remains strong. Healthy U.S. payroll and income gains will bring more tourists to the region, boosting flagging retail and leisure/hospitality payrolls. Furthermore, growth in the revitalized professional/business services industry should pull the local economy forward.

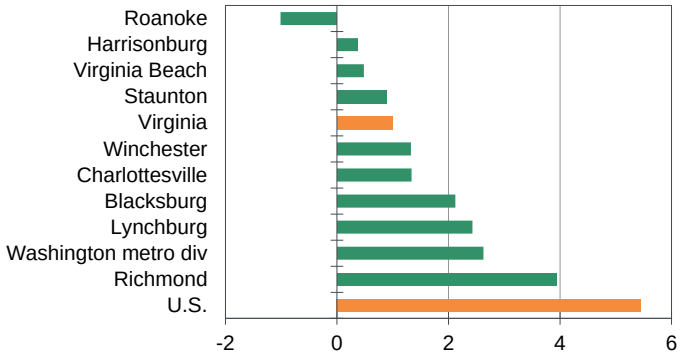
Richmond is a below-average performer. While employment growth may be revised higher, increases in house prices and industrial production lag the national average and income additions have only recently shown signs of catching up. The state's fiscal position remains weak, undermining prospects for growth. Further, there has been a steady drumbeat of discouraging headlines. Alteria Group Inc. is cutting jobs nationally, including those of 200 to 250 salaried workers. Media General Group is being bought by Nexstar Broadcasting Group, and its headquarters will be in Texas rather than Richmond, where Media General is based. The impact on local jobs is uncertain, but generates downside risk for the economy. Genworth Financial is also downsizing its Henrico County staff as it stops sales of traditional life insurance and fixed annuity policies. Positive developments have been smaller and fewer, including the arrival of Polykon Manufacturing in Henrico and AvePoint Inc. in Richmond.

The **Virginia Beach** economy continues to expand at a below-average pace. Employment and income growth are showing signs of improvement, but industrial production is falling and house price gains seem to be moderating. But there are reasons for optimism that growth will improve more broadly. The Navy is fast-tracking some maintenance work to help slow the pace of industry layoffs since a surge in work is expected beginning in 2018. Langley is getting a new cyber squadron that will add 70 jobs. Even the area's risk of flooding could provide short-term benefits; the Department of Housing and Urban Development is providing funding to combat flooding in the area and some businesses are taking action as well. Sentara Health's $199 million expansion and renovation of Sentara Norfolk General Hospital includes protective measures against floodwaters. Most recent expansion announcements are small but include a new ADP facility and the addition of 600 jobs to Target's Suffolk distribution center. On the downside, Sprint is closing its Hampton call center and Norfolk Southern cut about 4% of its workforce this year, although specific locations have not been announced.

—SCOTT HOYT

House Price Growth Sluggish in Virginia

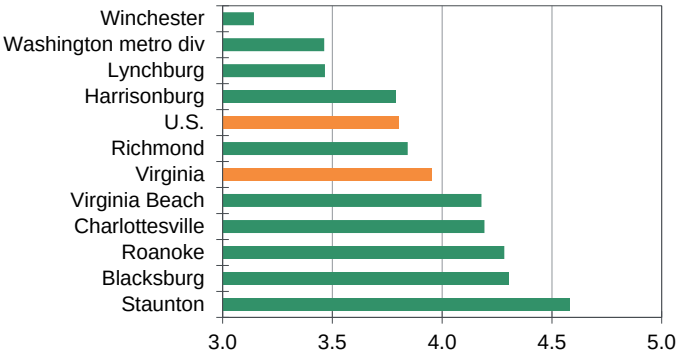
House price index, 2015Q4, % change yr ago



Sources: CoreLogic, Moody's Analytics

Income Increases Mostly Healthy in Virginia

Personal income per capita, 2015Q3, % change yr ago



Sources: BEA, Census Bureau, Moody's Analytics

Leaning on Tech for Support

BY DAN WHITE

Despite cooling a bit in the fourth quarter, the West ended 2015 well ahead of the pack and remains the fastest-growing region in the U.S. It is buoyed by both the quantity and quality of its job growth, which has been more concentrated in mid- and high-wage industries than the rest of the country. This has also fostered much faster income growth as well, especially when looking solely at wages and salaries. Nonwage incomes are also outperforming by a sizable margin, particularly in Pacific Coast states, thanks to a smaller reliance on energy and agricultural industries than the South or Midwest. The region is not entirely immune from these impacts, however. After two years on top, the West finally ceded its lead in population growth back to the South. The two leading regions each grew at just more than 1.1% in 2015, almost six times the pace of growth in the rest of the country. However, the West would have easily beat the South if not for a handful of significant laggards. Energy states Alaska, Wyoming and New Mexico each substantially underperformed the national average, and in fact the Land of Enchantment actually saw its total population decline for the second consecutive year. This is the result of more deep-seated problems than just lower energy prices, however.

Even some of the region's highest flyers are being dinged by lower commodity prices. The price of oil has now fallen 75% from its post-recession peak as global producers continue to pump and Iran adds to supply. In a little more than a year the number of active drilling rigs among the region's most shale-dependent states—New Mexico, Colorado, Wyoming, California, Utah and Montana—has declined more than 76%. Farmers and miners are also feeling the pinch from lower prices, because of higher supply, weak growth overseas, and a stronger dollar. Thus far the effects have been segregated largely to smaller metro areas, but a handful of larger areas, most notably in Colorado and Arizona, are seeing the fallout from the changing commodity cycle extend into their largest metro areas. Denver is probably the most notable example, which has seen some slowdown in professional services and other industries catering to the energy industry. The baseline forecast assumes that oil prices rebound to more than $45 per barrel by the end of 2016. This mild recovery in prices should be enough to head off a major recession in most of these energy-dependent states. Fortunately, the West's high-wage gains will persist and offset any region-wide weaknesses in energy or agriculture. This is most evident in the growing divergence between the region's two Census divisions. The Pacific division will continue to carry most of the near-term burden thanks to its higher concentration of tech and high-value-added manufacturing.

Longer term, this will remain the biggest difference in the West's outlook versus that for the rest of the county. The benefits will be rather diffuse, despite the Pacific region's larger and more established tech presence. Some of the largest gains will spill over into the Mountain West as its nascent tech centers become a force to be reckoned with. Boulder CO, Provo UT, Salt Lake City, Boise ID, and even Reno NV are coming into their own as cost-efficient alternatives to Silicon Valley and the traditional tech hubs of the Pacific Northwest. An increasing share of the region's startup capital is flowing to these inland innovation hubs, while the tech giants outbid themselves for progress on the coast. However, even more established firms are starting to branch inland as well. In just the last few years, Adobe, one of Silicon Valley's founding firms, moved its headquarters to Utah, and electric car manufacturer Tesla is in the process of building what would be the world's largest lithium-ion battery factory outside of Reno. That is not to say that the region's more established tech centers will not continue to grow. Firms such as Intel, Amazon, Facebook and Google are still expanding their coastal footprint as well. California alone is still home to more than half of the high-tech jobs in the West, ensuring its primacy among tech-producing industries for quite some time despite high costs.

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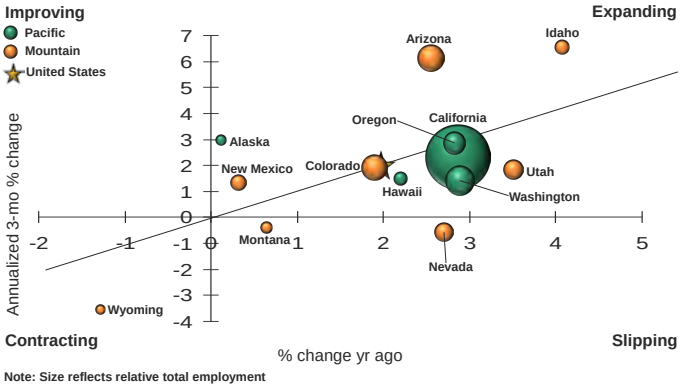
High-Frequency Indicators

Payroll Employment—West States

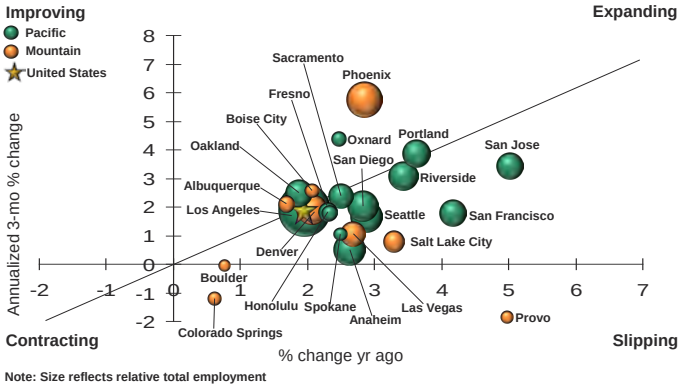
1-yr vs. 3-mo performance (3-mo MA) Dec 2015



Note: Size reflects relative total employment

Payroll Employment—West MSAs

1-yr vs. 3-mo performance (3-mo MA) Dec 2015



Note: Size reflects relative total employment

Comparative Performance Indicators

3-mo MA, % change from previous 3-mo period, Feb 2016

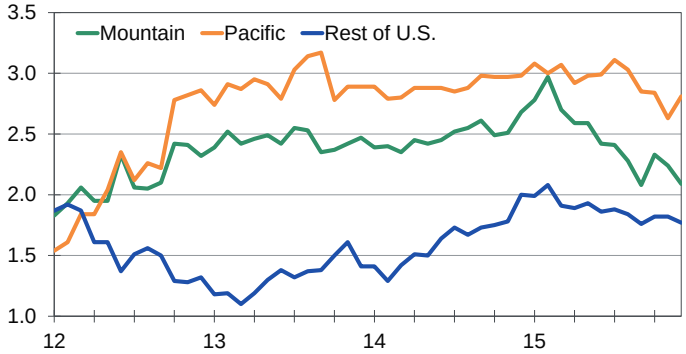
	Private service-providing employment (annualized)	Current unemployment rate	Change in unemployment rate	Residential permits	Industrial production	Overall recent performance	Change in outlook from last month
Denver	1.5	3.4	-0.6	22.6	-0.5	↑	↔
Honolulu	1.6	3.0	-0.3	33.7	-0.7	↑	↔
Las Vegas	0.4	6.5	-0.3	25.1	-0.3	↑	↔
Los Angeles	2.3	6.0	-0.9	14.8	-1.2	↑	↔
Tucson	6.2	5.5	-0.1	6.8	-0.9	↑	↔
Salt Lake City	-1.7	3.3	-0.1	-2.8	-0.5	↓	↔
Albuquerque	2.9	6.3	0.1	-1.9	-0.3	↔	↔
Anaheim	0.2	4.1	-0.1	-12.4	-0.8	↔	↓
Fresno	4.1	9.7	-0.2	22.4	-0.9	↔	↔
Oakland	2.6	4.5	-0.1	5.5	-1.0	↔	↔
Oxnard	6.3	5.3	-0.1	4.4	-0.8	↔	↔
Phoenix	5.8	5.2	-0.1	-6.8	-0.7	↔	↔
Portland	4.1	5.2	-0.3	9.6	-0.9	↔	↔
Riverside	1.5	6.2	-0.1	-1.0	-0.6	↔	↔
Sacramento	1.4	5.5	-0.1	-10.5	-0.5	↔	↔
San Diego	2.2	4.8	-0.0	103.5	-0.5	↔	↔
San Francisco	3.3	3.2	-0.1	16.1	-0.7	↔	↔
San Jose	3.9	3.9	-0.1	-31.1	-0.6	↔	↔
Seattle	2.6	4.2	0.6	-16.1	-1.1	↔	↔
Tacoma	2.9	5.9	-0.4	4.2	-0.4	↔	↔
West	**2.5**	**5.4**	**-0.2**	**4.5**	**-0.8**	↑	↔
U.S.	**2.6**	**5.0**	**-0.1**	**10.1**	**-0.9**	↔	↔

Sources: BLS, Census Bureau, Federal Reserve, Moody's Analytics

What We're Watching

Commodities Pulling Down the Mountain States

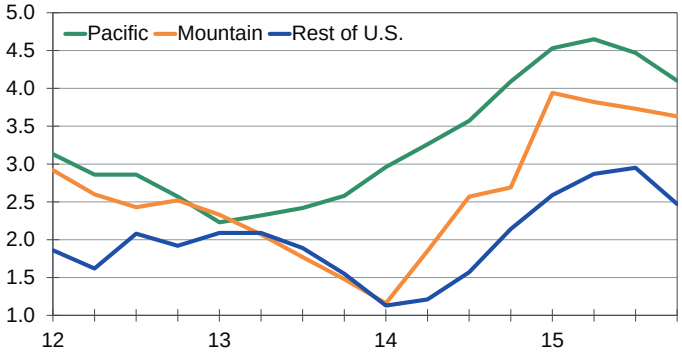
Total employment, % change yr ago



Sources: BLS, Moody's Analytics

Leaning More Heavily on Tech

High-tech employment, % change yr ago

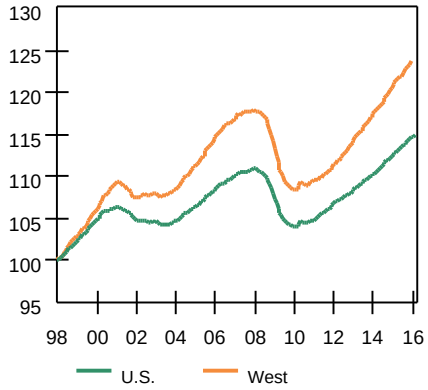


Sources: BLS, Moody's Analytics

Cyclical Indicators

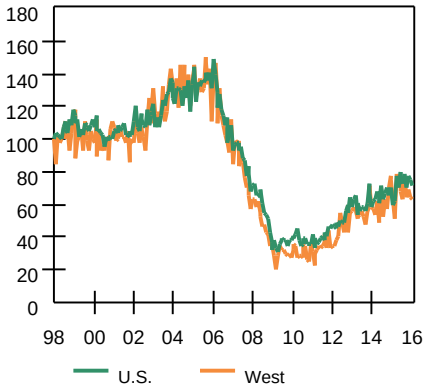
Employment

1998=100



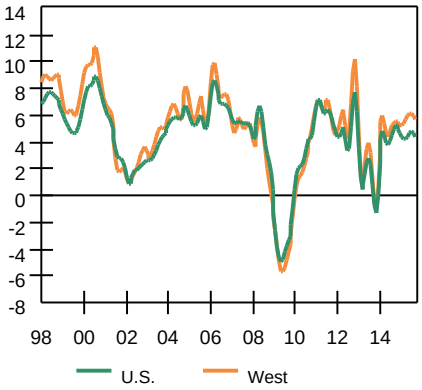
Housing Starts

3-mo MA, 1998=100



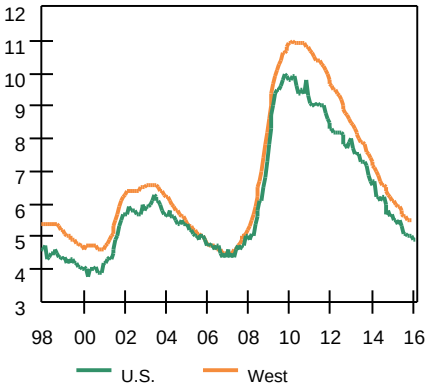
Personal Income

% change yr ago



Unemployment Rate

%

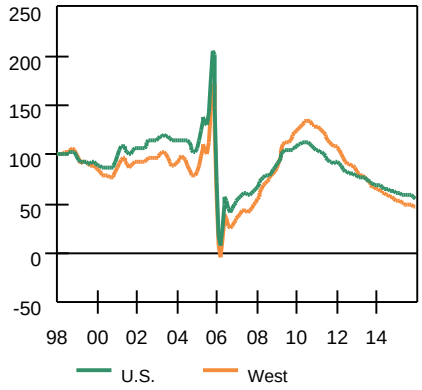


Median House Price (Existing)

3-mo MA, % change yr ago

Personal Bankruptcy Filings

1998=100



Sources: BEA, BLS, Federal District Courts, NAR, Moody's Analytics

Arizona

Arizona's recovery is gaining traction as employment rises at a steady clip, half a percentage point faster than the U.S. average. Hiring has become increasingly broad-based in recent months, with more than four-fifths of all industries expanding headcount, compared to only two-thirds nationally. Potent payroll growth in consumer-dependent industries such as education/healthcare and financial services led the way in the second half of 2015; the two accounted for almost one-quarter of the jobs added and made up for a disappointing year in manufacturing. The factory sector accounted for only 2% of new jobs last year despite making up 6% of the labor force. The unemployment rate has fallen to its lowest point since before the recession, even though the labor force has steadily risen. Housing demand from potential owner-occupiers has cooled in recent months, moving the housing market toward a healthy equilibrium and reeling in house price growth to a more sustainable pace compared with years past. The forecast for 2016 has been given a slight haircut after the most recent Census Bureau state population estimates came in flat from the prior year. Population is now projected to grow at 2% in 2016, down from the previous forecast of 2.2%. This led to a slight decrease in the overall employment, household formation and homebuilding forecasts. However, these changes are quite marginal and Arizona will remain one of the leaders in population growth among U.S. states thanks to its diverse labor market, affordable housing, and favorable climate.

Exports have been a noticeable drag on the economy for most of the past year, and a stronger dollar will help that trend continue into 2016. However, the burgeoning **Phoenix** tech scene offers some hope. Total trade on a year-ago basis dropped more than 20 percentage points in 2015. However, Arizona primarily deals with metals, electronics and other durables, so an improving semiconductor market will help right the ship. Computers and electronics manufacturers are hiring once more after they laid off nearly 7,000 workers over the past three years. Arizona exported $3.1 billion worth of semiconductors in 2015, up from a post-recession low of $2.8 billion the prior year.

Leisure/hospitality will be one of the fastest growing industries thanks to rising national disposable income. With the rise in disposable income on the national level expected to continue, households will be able to afford more vacations. Statewide travel to Arizona is on the rise, with hotel occupancy rates higher than they were a year earlier. **Sierra Vista**, Arizona's newest metro area, will see some of the largest benefits. The metro area has many unique attractions for travelers such as national parks, wildlife preserves, and Native American reservations. It is also close to both **Tucson** and the Mexican border, making it a geographical jumping-off point for travel. Given the area's natural beauty and beneficial location drawing tourists, leisure/hospitality will flourish.

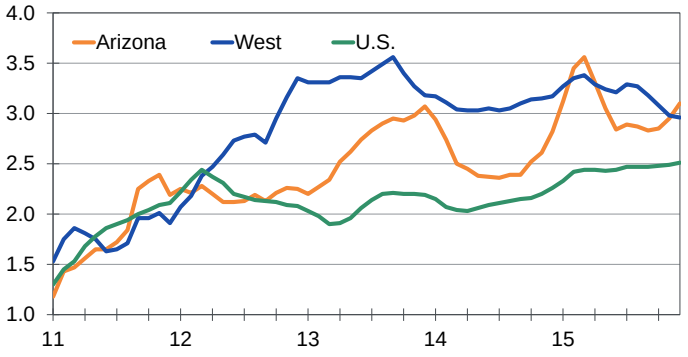
Increasing enrollment at Northern Arizona University and strength in tourism will drive a sharp increase in construction employment in **Flagstaff**. The school's student population grew by 5% over the past year, the sixth consecutive year of gains. The need for student housing will drive multifamily construction and the Arizona Board of Regents has set a goal of increasing NAU's enrollment by another 25% by 2025, injecting upside risk into the long-term forecast. House prices will soar as retiring baby boomers, more confident in the economy and their finances than just a few years ago, purchase more vacation homes—the share of the housing stock used seasonally or occasionally in Flagstaff is among the highest in the nation.

Prospects for **Prescott** are fading, however, since the metro area is more dependent on metal ore mining than all but two metro areas nationwide, and the industry will struggle in 2016. Copper prices have fallen by one-third in the last 18 months because of a stronger U.S. dollar and slowing construction activity in China, the world's largest consumer of copper. Further reduced demand from China will likely lead to more mining layoffs in Prescott, and with a dearth of other high-paying jobs, the outlook is decidedly pessimistic this year.

—JACK KITCHEN

Services Driving the Improvement Since 2013

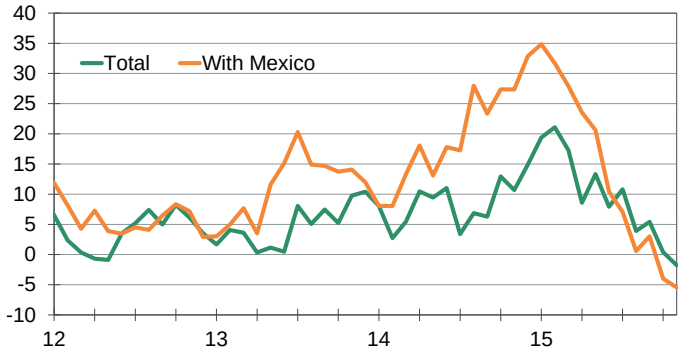
Private services employment % change yr ago, 3-mo MA



Sources: BLS, Moody's Analytics

Trade With Mexico Suffering From Strong Dollar

Trade, % change yr ago, 3-mo MA



Sources: Census Bureau, Moody's Analytics

California

Some small blemishes in California's expansion have surfaced, but there is no evidence to suggest that they are anything other than garden-variety economic volatility. Initial jobless claims figures through February show that new filings are in line with their 2015 average. The unemployment rate ticked slightly higher to 5.8% in December, but it has done so occasionally from month-to-month throughout its sustained five-year decline. Homebuilding has recovered from a slight blip last fall, and loan delinquency rates are at rock-bottom levels, revealing no signs of stress in the household sector. If financial market volatility and weak global growth are materially impairing growth in California's economy, data have yet to show how.

California's population outlook has been revised lower now that the Census Bureau has released its estimates for 2015. The new figures show that population growth was on a weaker footing heading into the second half of last year, and as such, it will take until late 2017 for population growth to reach its previous forecast mark of 0.92% per annum. California's strong labor market will be a powerful magnet for immigrants, allowing population growth to modestly outpace the national average. But living costs far exceed the national average and are a powerful deterrent. Since 2012, house prices have risen by 60% in California, dwarfing the national rate of 36%.

From the Golden Gate Bridge to Hollywood, California's metro areas are expected to outperform the nation over the next two years. Of the state's eight most notable metro areas and divisions, only **Riverside** will fail to eclipse the national rate of income growth. Although Riverside will have very strong job growth, its growth will be concentrated in low-skill, low-paying industries. A tremendous amount of transportation, logistics and warehousing jobs have been created in Riverside by companies such as Amazon, but these jobs typically do not pay well. They do still provide stable incomes for workers to buy houses, however, which is a crucial assumption in our housing forecast.

The Bay Area remains the centerpiece of the California economy. The unemployment rates in **San Francisco**, **San Rafael** and **San Jose** are 3.3%, 3.4% and 4%, respectively, and that labor market strength is reflected in solid wage and salary growth.

To be clear, however, the luster on the Bay Area's tech renaissance has faded. Tech company valuations have retreated markedly from their high water mark last year, and a number of Bay Area tech companies have announced they are scaling back operations. After Twitter, Zynga, Hewlett Packard and Qualcomm announced layoffs in 2015, GoPro, Autodesk, Zenefits and Yahoo have joined them in 2016. Much like depressed stock and housing prices dent consumer spending, there is a very real corporate wealth effect by which lower equity valuations stunt corporate hiring, investment and real estate acquisition. This negative corporate wealth effect will prevent the Bay Area from matching its lofty growth rates of the past few years.

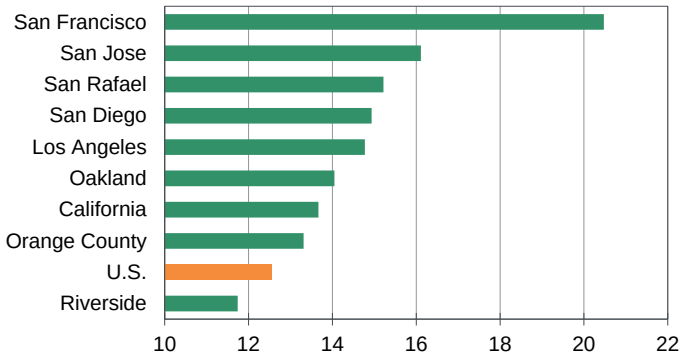
Hollywood is providing the **Los Angeles** economy with a small boost at a time when exports through the ports of Los Angeles and Long Beach are restrained by a strong U.S. dollar and weak global growth. As they have for the last few years, television and commercial shoots underpin a 3.8% rise in production shoot days from a year earlier. Feature film shoot days are down 11% from their year-ago level, however, and have declined by 13% over the past five years. At a time when Hollywood studios are reticent to endure box-office flops, the recently passed California Film & Television Tax Credit is even more important in staunching the decline in LA's film industry and propelling its burgeoning television industry.

On the fiscal front, lawmakers have filled a potential funding gap in the state Medicaid program by expanding a tax on healthcare plans, a move that will also allow California to repay transportation loans and make some headway paying down the state's retiree healthcare liability. Also, the California High-Speed Rail Authority unveiled a revised plan to bring a high-speed rail line from Silicon Valley to the Central Valley on line by 2025 for $3 billion less than previously estimated. More than 100 miles of construction is already under way in the Central Valley. The new infrastructure would be a notable component of California's long-term growth prospects.

—CHRIS LAFAKIS

All Is Still Well in California…

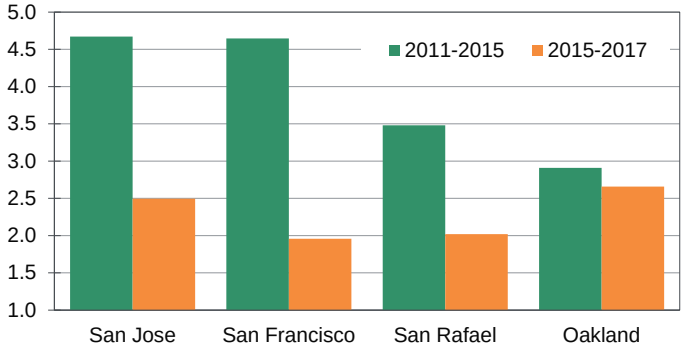
Personal income, % change, 2015-2017



Sources: BEA, Moody's Analytics

…But Negative Corporate Wealth Effect Will Bite

Total employment, compound annual growth rate, %



Sources: BLS, Moody's Analytics

Colorado

Colorado is steadily adding jobs, but at just below the pace of the U.S. Although the state's growth has slowed considerably over the past year, the economy is on a solid footing. Colorado's powerhouse industries of construction, healthcare and leisure/hospitality are maintaining the state's expansion even as energy remains a drag. Colorado is rapidly adding mid-wage jobs, which are crucial for economic stability. The unemployment rate is steadily falling and is one of the lowest in the West. Labor force participation has recently begun edging upward, and average weekly earnings are rising. The employment forecast has been shifted slightly higher to account for new Census Bureau data highlighting the state's rapid population growth. Also, March benchmark revisions to employment data are expected to be quite large, and will raise estimated 2015 job growth to 2.4%. These data have not yet been incorporated into the forecast, but increase the likelihood of a stronger forecast next month.

Energy-related industries are the only weak spots in Colorado's otherwise strong economy. Mining employment has fallen at least 4% since last year and losses are mounting. Transportation/warehousing, which includes oil and gas transport, has fallen by a similar amount, and business/professional services, which include a large number of regional energy office employees, are down 1.4%. The energy slowdown is particularly weighing on the economies of **Greeley** and **Grand Junction**, both energy-producing metro areas. Expected revisions to third quarter 2015 data will reduce Greeley's year-over-year employment growth by more than 4%, making the change in employment negative for the year. Though severe, the revisions are not unexpected considering the scale of drilling cutbacks in the metro area. In addition to cutting back operating expenditures through layoffs, companies are increasingly slashing capital expenditures as energy prices remain extremely low.

As nonenergy sectors of the economy thrive, house prices in the northern Front Range have been appreciating at near record speeds. **Denver**, **Boulder** and **Fort Collins** are among the 15 fastest appreciating metro areas in the country. Even so, there are some encouraging signs that Colorado's housing market will not overheat. The current appreciation is largely being driven by a supply constraint. The pace of new construction has been accelerating, and prices will stabilize as new housing supply comes on the market. Additionally, strong statewide population growth will sustain demand and financial indicators appear stable. The percent of mortgages past due is well below both the national average and local prerecession levels. Accordingly, the number of foreclosures coming on the market is at an all-time low. High credit quality will further increase market stability; the state delinquency rate on loans is well below the national average. Finally, these three metro areas contracted relatively little during the recession, implying that prices have historically been driven more by true demand, not speculative bubbles.

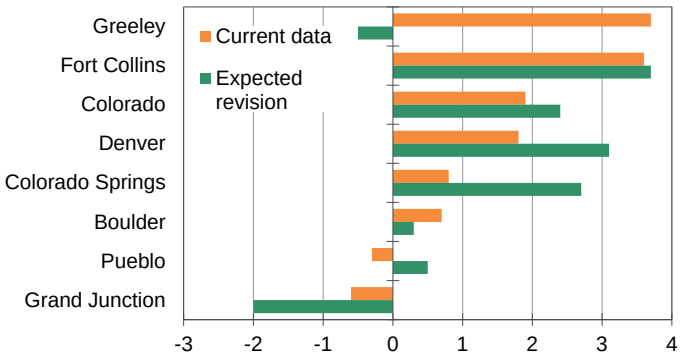
Fort Collins' house price gains are the most concerning in the state. The metro area's median single-family house price is only 7% lower than Denver's, but the average metro area income is 20% lower. Without high-income jobs moving into the area, demand would slacken, rapidly bringing down home values.

Colorado's strong housing market is also benefiting the state's banks. Strong population and wage growth is increasing demand for financial services. The state's young demographic mix raises demand for homes and cars and accompanying mortgages and loans. Despite sharply rising house prices, mortgage originations will increase through 2016, supporting banks' balance sheets. These mortgages and consumer loans make up the primary sources of revenue for many smaller regional and community banks. Additionally, Colorado's strong climate for business incubation will result in steady revenue from small-business loans. Low default rates on Colorado loans will further aid financial institutions. Job additions in financial services will outpace those nationwide before settling down to meet the U.S. average in the years that follow. Near-term growth will be especially strong in Boulder and **Colorado Springs**.

—EMILY MANDEL

Expected Revisions a Boost for Most

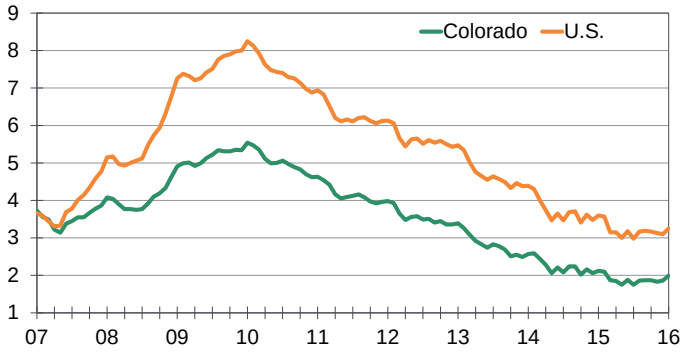
Estimated employment, Dec 2015, % change yr ago



Sources: BLS, State of Colorado, Moody's Analytics

Colorado Consumer Credit Stays Strong

Delinquency rate, total past due, % of volume



Sources: Equifax, Moody's Analytics

Montana

Montana's expansion has slowed, as the historic drop in oil prices weighs on growth. Payroll growth in the state was flat in the second half of 2015 as weakness in **Missoula** and **Great Falls** countered strong growth in **Billings**. The unemployment rate ticked up to start the year, but a slight decline in the labor force has the rate declining again despite a lack of job growth. The Moody's Analytics diffusion index indicates that a few large sectors are slowing the economy down, while the rest of the economy remains on solid ground. In Billings, goods-producing payrolls have surged above their prerecession peak, but lower-wage services such as leisure and hospitality and some segments of professional services are cutting staff. Job losses in Missoula have been focused in the public sector and in business and professional services, two sectors that are highly dependent on the energy industry. Overall employment growth in Great Falls remains elusive due to a lack of dynamic drivers. The housing markets in all three metro areas are improving at a slow but steady pace. Building intentions have slowed from their previous rapid pace, but price growth remains strong. Prices in all three metro areas are above their prerecession peaks and rising steadily.

The path of oil prices will dominate Montana's near-term outlook, particularly in Missoula. Missoula's professional services industry skews heavily towards support and logistics firms that manage drilling operations in the Bakken Shale. Payrolls in the sector declined 13% in 2015 and the continued decline of activity in the state's oil patch will further weigh on growth through the first half of the year. Moving forward, the forecast assumes that oil prices recover to the low-$50 range by the end of the year. With most estimates pegging the breakeven cost for Bakken drillers at $45, this price would be high enough to spur an increase in drilling and thus an uptick in professional service hiring.

The second channel through which oil prices will affect Missoula is via a reduction in tax revenue from the energy industry. Montana's general fund is dependent on these taxes to line its coffers, and revenues have tumbled alongside the price of oil, forcing the state to tighten its belt in a number of areas. Many large state entities, including the University of Montana, are based in Missoula and represent a larger than average share of employment in the area. Funding cuts led to a 15% reduction in state government payrolls in the second half of 2015, and the elimination of 201 jobs at UM will add to that total later this year. In addition to a reduction in state funding, UM is struggling to meet its enrollment targets. Enrollment at the university, which has been falling since 2012, is down 6.5% from last year. The forecast for state government employment has been adjusted to reflect a slower rebound in state government payrolls, but slower than expected growth in oil prices remains a downside risk.

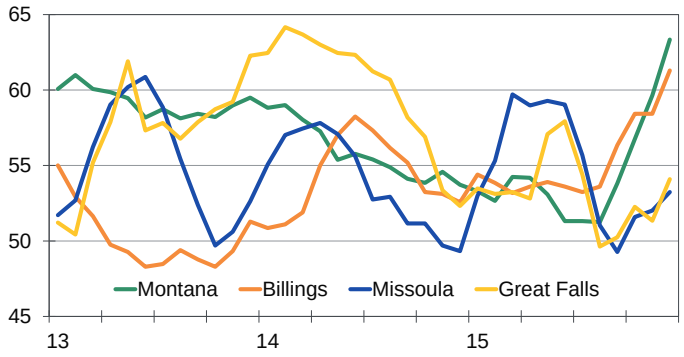
On the positive side, benchmark revisions will likely show that payroll growth was substantially stronger than initially reported, particularly in Great Falls. Great Falls has lagged Montana's other two metro areas due to its lack of dynamic drivers and a dearth of high-wage industries. The stability of Malmstrom Air Force Base means that employment tends to move within a narrow band throughout the business cycle. While this shielded the economy during the recession, it is also hampering its ability to grow. If recent job losses are revised away as expected, it would show that the area may finally be poised to break out of the stagnation that has afflicted the economy since the recession.

The centennial celebration of the National Parks Service, low travel costs, and a stronger labor market will be boons to tourism-related industries through the second half of the year. Both Glacier and Yellowstone national parks are planning large-scale celebrations for the 100th anniversary of the National Parks Service that promise to attract large numbers of tourists and will build on last year's record-setting number of visitors. Low gas prices and a strong labor market make travel to the relatively remote areas more of an option for a large number of people, adding upside risk to the economic impact of the celebrations.

—ALEX LOWY

Job Creation Is Becoming More Broad-Based

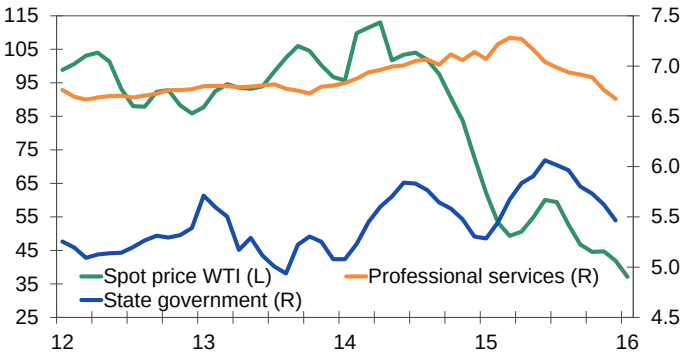
3-mo employment diffusion index, 4-digit NAICS, 6-mo MA



Sources: BLS, Moody's Analytics

But Oil Prices Are Weighing on Missoula

Missoula employment, by industry, ths, 3-mo. MA



Sources: EIA, BLS, Moody's Analytics

Nevada

Nevada's economy has lost some of its edge in recent months, but the state remains a regional and national standout. A decline in mid-wage job growth was responsible for the late-2015 employment slump. About half of Nevada's jobs are in mid-wage occupations, a larger share than in the West or the U.S., but this part of the labor market has lagged badly in the recovery. Employment in Nevada's mid-wage industries is 10 percentage points lower than before the recession, compared with the U.S. average of about 2 percentage points.

A prolonged hiatus in mid-wage job growth will limit income gains and weaken spending power among residents. The near-term forecasts for job and income growth have been marked down, but the Silver State is projected to outperform the West and the U.S. for the next few years. Nevada will remain a leader in population growth because of its strengthening labor market, below-average costs, and favorable climate.

Stronger goods production is making up for some of the softness in private services in **Las Vegas-Paradise**, and the public sector is offering more support. Tourism will help drive faster industry growth this year, and secondary drivers such as construction, healthcare and professional/business services are gaining potency. Most of the construction industry's contributions to the job market have come from commercial and industrial projects, as housing's contribution to growth has diminished in recent months. Housing starts are down over the year, and price growth has slipped below the state average.

Reno-Sparks' location along the I-80 corridor, proximity to Northern California, competitive business costs, and ballooning business investment will help the area gain ground as a transportation hub. Payroll figures indicate that transportation and warehousing job growth has slowed since early 2015, but the more accurate Quarterly Census of Employment and Wages shows growth racing higher. The metro area ranks among the top 10 nationally for its concentration of jobs in transportation and warehousing. Logistics' share of total employment in Reno has risen by more than 50% in the past decade while it has been relatively stable nationwide. Major retailers have opened or plan to open distribution centers in Reno, a tailwind for near-term payroll growth. Jet.com recently opened a warehouse in the metro area, joining other big players in e-commerce logistics and distribution Amazon and Zulily.

Carson City is making slow progress, but the job market remains marked by its failure to launch. Employment in the household survey is up 1% in the past year, but payroll employment has fallen slightly over the same period. In either case, the capital is a clear underperformer, especially in comparison with Nevada's other metro areas. State government, the cornerstone of Carson City's economy, will drag on near-term growth. While Nevada has experienced a modest uptick in state payrolls, the capital has not benefited.

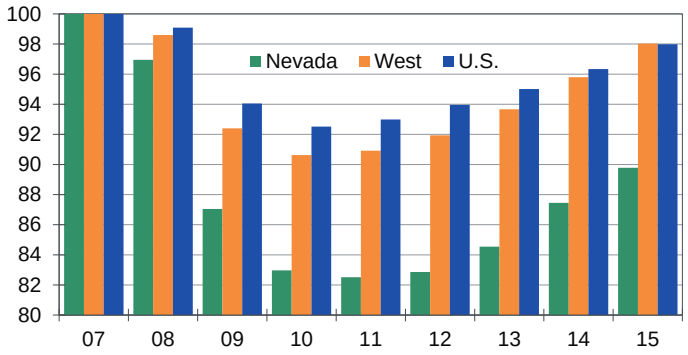
Continued improvements to the quality of Carson City's workforce could help it reap the benefits of northern Nevada's private sector jobs boom. The metro area's low educational attainment has been a barrier to attracting and retaining businesses in high-value-added industries. At just less than 23%, the share of residents with at least a bachelor's degree is well below average compared with the region and nation. However, the educational attainment of the workforce showed more improvement in 2014 than in any other metro area in the West, having increased 4 percentage points from the prior year. The capital now has a higher concentration of bachelor's degree-holders than Las Vegas. Tesla and other projects in and around neighboring Reno are expected to open the door to significant higher-skill job opportunities for Carson City residents.

Carson City's housing market has made progress, but a full recovery remains on the distant horizon. Existing-home sales through November were up by 12% over the previous year and prices are climbing faster than average. While this has encouraged builders to cautiously increase permits and add to their payrolls, homebuilding is closer to its cycle lows than pre-boom norms. Further, the metro area can support only so much additional housing. Carson City's land area is the smallest of any metro area in the nation. If demand improves, a scarcity of space could tilt the market toward multifamily building.

—SARAH CRANE

Stuck in the Middle

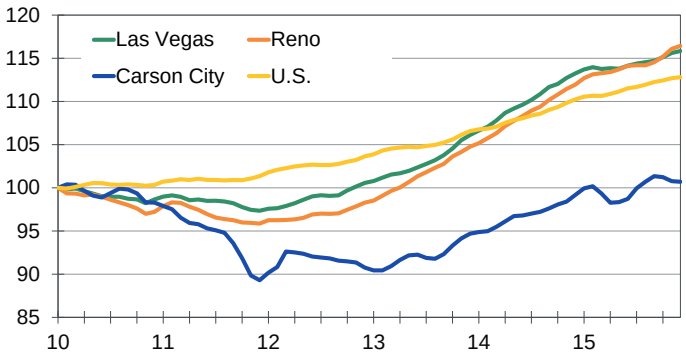
Mid-wage employment, 2007=100



Sources: BLS, Moody's Analytics

Carson City Cannot Keep Up

Regional business cycle, Jan 2010=100



Source: Moody's Analytics

Oregon

Oregon's economy is expanding at a faster pace than those of the West and the U.S. Defined by a healthy mix of job growth, the outlook for steady outperformance has not changed in recent months. High-wage job growth is outpacing total employment growth in most Oregon metro areas, whereas nationally high-wage job gains lag total employment growth. Wages have accelerated at their fastest year-over-year pace since the Great Recession. Above-average increases in manufacturing, professional and business services, and healthcare have set the state apart. Manufacturing's performance is particularly notable considering the headwinds to goods-producing industries.

Portland is one of the best performing metro areas in the country. Many industries are expanding at a healthy clip but, unlike in much of the state, high-wage job growth is not significantly outpacing total job growth. Rather, high-, medium- and low-wage job gains are all upbeat. Technology leads the way, driving wage growth, but the associated income effect is underpinning consumer-focused industries. The housing market, among the hottest in the U.S., is a prime example. House prices passed pre-Great Recession levels in 2015 and are more than 10% above year-ago levels. Robust in-migration and strong income growth have driven housing demand. However, with dwindling supply and double-digit house price appreciation, affordability is deteriorating. Homebuilders will ramp up construction over the next couple of years, making housing a significant contributor to job gains in the near term.

High-wage jobs are also outperforming in the state capital, but their downstream effects are having less of a downstream impact. Government, farming and food processing stabilize the economy, but a recent surge in healthcare and professional services is driving job growth in **Salem**. That said, there is significant risk to the outlook. The metro area is more exposed to slower growth in Asia than most in the state: 45% of metro area exports, largely agricultural goods, are destined for the region. However, the headwinds are different for Salem than for much of the U.S. Although low commodity prices due to excess supply are weighing on many U.S. farming economies, Salem's farmers are much less exposed thanks to the area's high concentration of nursery and greenhouse products versus field crops such as corn, wheat and soy, which have suffered the largest price declines.

In **Corvallis** and **Eugene**, high-wage job growth is also outpacing the broader labor market, but the bar is lower than in most of the state. In Eugene, manufacturing has underperformed the rest of the local economy but will rebound over the next two years. The metro area's manufacturers struggled in 2015 because of disappointing homebuilding and softer domestic demand for machinery. New orders for farm, construction and industrial equipment declined because domestic firms have cut investment. Through the medium term, once machinery orders from domestic buyers recover, local manufacturers will resume hiring and Eugene will regain the manufacturing jobs lost in 2015.

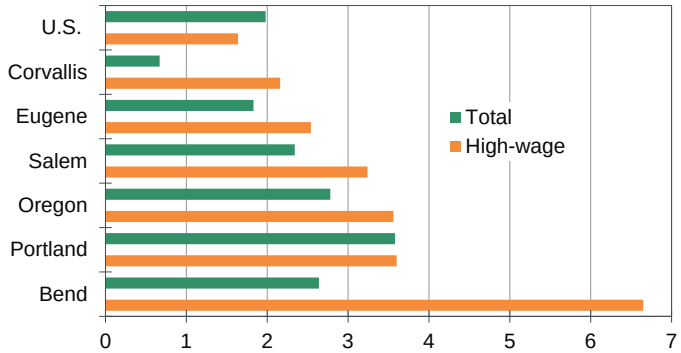
In Corvallis, tech will outpace the broader economy, but near-term risks are weighted to the downside. Oregon State University is a magnet for high-tech firms. The university supplies a highly skilled labor force and significant scientific research opportunities. The state-funded Advantage Accelerator RAIN program, which partners with universities, governments and businesses, has already fostered several startups. These forces will help ensure Corvallis' spot as a regional leader in innovation, indicated by its high patents-per-worker ratio and record research funding at OSU.

Changing consumer preferences drive risk in the outlook. Demand is shifting away from personal computers and toward mobile devices. This trend threatens the future of Hewlett Packard, the metro area's largest tech firm. The company is separating its technology divisions from its PC and printing business. Although the Corvallis facility will survive HP's latest round of cuts unscathed, the company has undergone several rounds of downsizing throughout the past decade, and declining demand for PCs and printing technology could lead to cuts down the road.

—TOM MCCARTIN

High-Wage Jobs Set Oregon Apart…

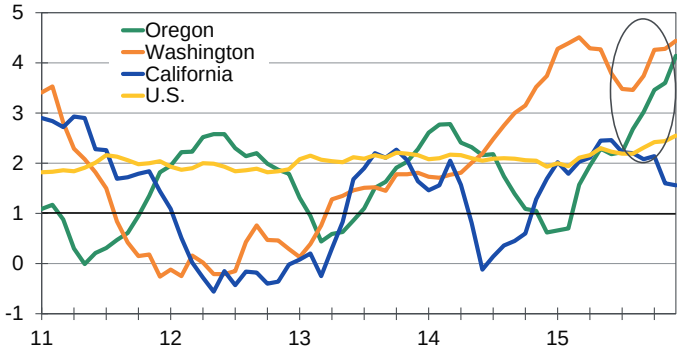
Employment, % change yr ago, 3-mo MA, Dec 2015, SA



Sources: BLS, Moody's Analytics

…And Wage Growth Is Accelerating in Turn

Avg hourly earnings, % change yr ago, 3-mo MA, SA



Sources: BLS, Moody's Analytics

Utah

Utah's economy has taken a breather in recent months, but job growth in the state remains among the strongest in the West. Utah's pace of job growth has outperformed over the last year, with most industries adding workers. Almost one-fifth of gains during this period has been new jobs in high tech, especially in **Salt Lake City** or **Provo**. Similarly, the state has extended its lead over the nation in manufacturing job growth, which extends to most metro areas. Employment in high-wage industries has risen almost twice as fast as nationally over the past year. At the same time, a tightening labor market is giving workers more bargaining power, and consequently wages and salaries are rising at an above-average rate. Strong income growth and excellent housing affordability are powering more home sales and driving up prices. A strong labor market and low living costs are encouraging people to move to the Beehive State. Utah's population increased by 1.8% between mid-2014 and mid-2015, third fastest in the West behind Colorado and Nevada. Soon-to-be-released detail for metro areas is likely to show population in all metro areas growing faster than the national average for the ninth consecutive year.

Utah's expansion will remain healthy throughout 2016, but the pace of job growth will be slower than in recent years. Recent financial market volatility will weigh on job growth, especially among high-tech firms. If capital-intensive companies have trouble accessing credit, they will be unable to invest and hire. Tighter credit conditions will be burdensome on Utah's burgeoning startup community, which has fewer financing options than more-established companies. As such, payroll growth in high-tech industries is expected to slow from an unsustainably high 8% in 2015 to a much slower but still healthy 4% in 2016.

Another high-value-added industry, aerospace manufacturing, will cool in 2016, though recently announced projects will support more jobs later in the decade. Industry payroll growth has far surpassed the national average over the past year, with the bulk of the gains occurring in Salt Lake City and **Ogden**, where 90% of the state's aerospace manufacturing jobs are located. The Air Force recently awarded a $32 billion contract to build next-generation long-range strike bombers to Northup Grumman, who plans to make them in Utah. The Salt Lake City facility develops military navigational and other high-precision tools, whereas the Ogden facility's proximity to Hill AFB makes it ideal for testing. Also, Boeing produces stabilizers for its aircraft in Utah and has been purchasing land to expand within the state as a cost-effective production alternative to its headquarters in Washington. These recently announced projects will ramp up slowly, pushing the lion's share of their hiring further out toward the end of the decade.

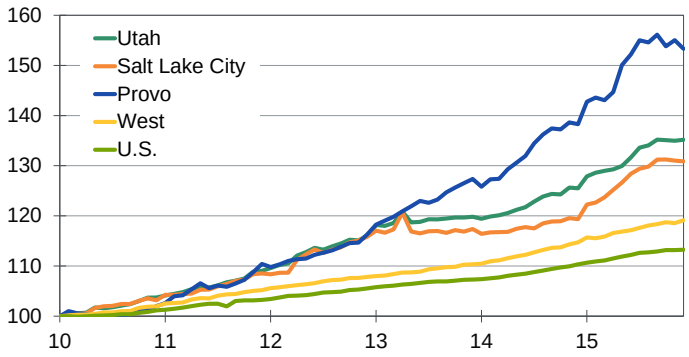
Healthcare providers in Utah may soon get a boost, as lawmakers appear close to a deal to expand Medicaid in the Beehive State. After lawmakers failed to meet a self-imposed January 1, 2016 deadline to extend Medicaid, the odds of legislation that would provide financial assistance to the 110,000 low-income residents who have fallen into the coverage gap have increased. The law would help hospital balance sheets by easing the burden of uncompensated care on hospitals in the state. For now, Medicaid expansion remains only an upside risk to the forecast, though, which already calls for above-average gains in healthcare employment due to the state's rapid population growth.

Tight federal funding dampens the outlook at the Internal Revenue Service facility in Ogden. Funding has been a persistent problem at the IRS, contributing to federal government payrolls in Ogden falling to a multidecade low. Despite receiving a minor boost in fiscal 2016 appropriations, IRS funding remains historically low. Last year, the inflation-adjusted IRS budget was the smallest since 1998. As a result, the forecast anticipates little to no change in employment at the facility, and risks are weighted toward further cutbacks. The IRS is one of the largest employers in the metro area, and staff reductions would have far-reaching effects. However, it is possible the IRS may opt to downsize at more expensive locations first, preserving job levels at Ogden over the near term.

—CHRISTOPHER VELARIDES

Utah's Top Metro Areas Lead the Way for Tech

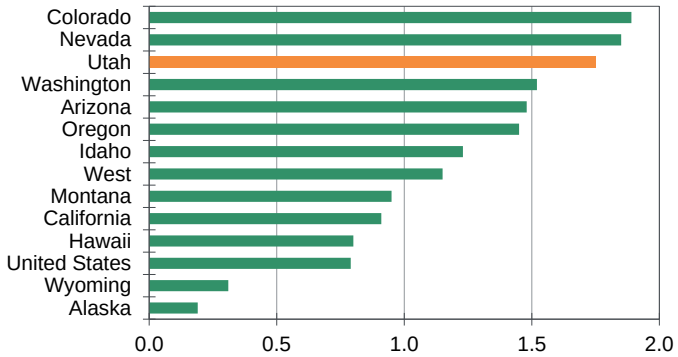
High-tech employment, Jan 2010=100



Sources: BLS, Moody's Analytics

Demographics Aid Utah's Pace of Expansion

Population, % change yr ago, 2015



Sources: Census Bureau, Moody's Analytics

Washington

Washington's expansion is in full swing. The Evergreen State added 88,000 jobs last year, the second best finish for the labor market since 1997. Robust job gains have pulled the unemployment rate lower over the course of 2015, narrowing the gap with the U.S. rate to less than 1 percentage point. Thanks to a resurgence in state aerospace exports, the factory sector is closer to full capacity. The Western Washington ISM Index, a survey of manufacturing conditions in the Pacific Northwest, has rebounded in recent months and continued its upward march through the first few months of 2016.

Washington's bright outlook remains intact, and the forecast is largely unchanged from the previous update. Strong population numbers from the Census Bureau validate the optimistic near-term forecast, which calls for the state to finish near the top of the pack in employment and personal income growth over the next two years. Washington's population grew by 1.5% in 2015, according to the Census Bureau's most recent update, in line with expectations and the seventh best finish among states. Though metro area population numbers are not due until next month, the healthy gain reflects the gravitational pull of Seattle's dynamic aerospace and IT industries.

Rising production of commercial aircraft will keep factory output in **Seattle** and **Tacoma** on a steady upward path, though recent turbulence in emerging markets bears close monitoring. Boeing's plans to ramp up output are closely tied to the expansion of air travel in developing markets: Airlines in China, East Asia, and the Middle East account for just less than half of the company's outstanding orders. A prolonged downturn in Asia or an escalation of conflict in the Middle East might yet prompt a wave of order cancellations, dealing a potential blow to manufacturing in the Puget Sound. Chinese airlines' recent purchase of 300 new Boeing jets dampens much of this risk in the near term, but recent economic data from China and East Asia are anything but promising.

Tech companies are propelling Seattle's economy to dizzying new heights. Hiring by information technology firms has outpaced that of nearly every other industry over the past two years, driving intense competition for high-paying software and computer engineering workers. Tech juggernauts Microsoft and Amazon continue to make up an outsize share of software and IT jobs, but aggressive hiring by Google, Facebook and Oracle will gradually diversify Seattle's employer base.

The biggest challenge for Seattle now stems from its own success. Rapid hiring by IT firms is bidding up labor and housing costs, and rising house prices could pose a risk to housing affordability. However, builders face fewer land constraints compared with tech capitals San Francisco and New York, and builders' ability to more easily add to supply will prevent house prices from far outpacing income gains.

Tacoma is on the brink of a self-sustaining expansion, but the sluggish pace of homebuilding remains an obstacle. Better wage growth is helping to lift home sales and house prices, but builders are hesitating to add to supply because of Tacoma's still-large inventory of bank-owned properties. It will take several quarters of strong home sales for the local housing market to work off the excess supply, paving the way for a later modest rebound in residential construction.

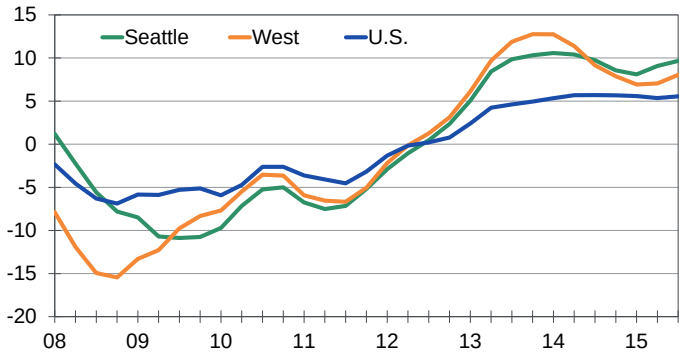
Spokane's expansion is gathering forward momentum. Faster income gains in the Inland Northwest are lifting Spokane's core financial services and healthcare industries. Growth is increasingly broad-based, with more than half of private sector industries adding jobs. Plans by the University of Washington and Washington State University to open rival medical schools in the metro area this year add upside potential to life sciences research and will further cement the metro area's status as a regional healthcare and life sciences hub.

Olympia is moving forward, but the state capital is struggling to keep pace with Washington's larger metro areas. State government payrolls are growing briskly thanks to Washington's strong fiscal position, but hiring in the private sector has slowed to a crawl. Greater exposure to hard-hit agriculture and logging has hurt farm incomes and consumer spending, keeping the metro area well behind the rest of the state in job and income gains.

—JESSE ROGERS

Seattle House Prices Leapfrog West, U.S…

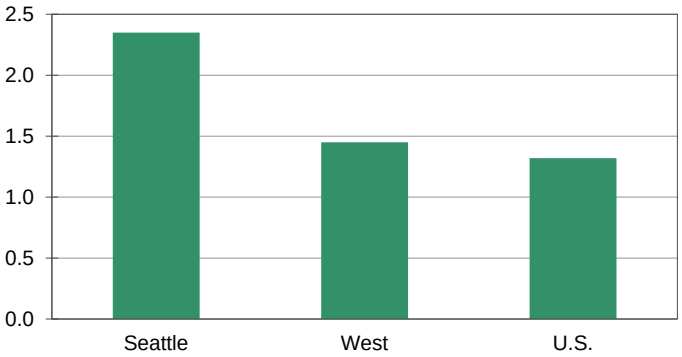
FHFA all-transactions price index, % change yr ago



Sources: FHFA, Moody's Analytics

…But Affordability Takes a Hit

Moody's Analytics affordability index, % change since 2015Q1



Sources: NAR, Census Bureau, BEA, Moody's Analytics

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Events

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Upcoming Events	Date
Moody's Analytics Economic Outlook Conference: Philadelphia	May 3 & 4, 2016
Moody's Analytics Regional Outlook Conference: West Chester, PA	November 2016

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