Local Economic Report

Winter 2016

2016
SONOMA
COUNTY

SONOMA COUNTY
EDB
ECONOMIC DEVELOPMENT BOARD

SONOMA COUNTY
WORKFORCE
INVESTMENT BOARD

Winter 2016 Local Economic Report

The Sonoma County Economic Development Board (EDB), in partnership with the Sonoma County Workforce Investment Board (WIB), is pleased to present the *Winter 2016 Local Economic Report*. Our research partner, Moody's Analytics, provided the research for this report. Highlights from this *Local Economic Report* include:

■ Moody's Analytics states that the Sonoma County economy recovered all of its Great Recession losses in the fall.

■ Hiring in healthcare and creative industries has supported weaker tourism growth and a smaller 2015 grape harvest.

■ Low living and business costs relative to San Francisco and Silicon Valley serve as a magnet for population growth and support strong construction industry growth.

■ Sonoma County's GDP growth will accelerate through 2016, with more favorable consumer fundamentals having a postive impact on area vintners and tourism.

Thank you for your interest in the Economic Development Board's research. For additional information, questions, comments, or suggestions please contact us at (707) 565-7170 or visit www.sonomaedb.org.

Sincerely,

Pamela Chanter

Pamela Chanter
Chair
Economic Development Board

Ben Stone

Ben Stone
Executive Director
Economic Development Board

MOODY'S ANALYTICS

SONOMA COUNTY CA

ECONOMIC DRIVERS

AGRICULTURE

TOURIST DESTINATION

EMPLOYMENT GROWTH RANK

2014-2016	2014-2019
94	190
2nd quintile	3rd quintile

Best=1, Worst=408

RELATIVE COSTS

LIVING	BUSINESS
124%	112%

U.S.=100%

VITALITY

RELATIVE	RANK
98%	174
U.S.=100%	Best=1, Worst=401

BUSINESS CYCLE STATUS

» EXPANSION «

- Recovery
- At Risk
- Moderating Recession
- In Recession

STRENGTHS & WEAKNESSES

STRENGTHS

» World-class wineries serve as a lucrative draw for high-income tourism.

» Living and business costs are low relative to San Francisco and Silicon Valley.

WEAKNESSES

» Limited land availability for new wineries and commercial construction hinders growth.

» Tech companies prefer Silicon Valley or lower-cost alternatives.

FORECAST RISKS

SHORT TERM	LONG TERM
↑	↑

RISK EXPOSURE 2015-2020	61	1st quintile	Highest=1 Lowest=401

UPSIDE

» Improving demand from East Asian economies boosts medical device and wine industries.

» Tech-producing industries rediscover the area's quality of life and skilled labor force.

DOWNSIDE

» Persistent drought curtails size of grape harvest and damages grape quality.

» A stronger dollar boosts bulk importing and forces discounting of lower-price wines.

MOODY'S RATING

Aa2 CITY AS OF MAY 01, 2010

ANALYSIS

Recent Performance. The Sonoma County economy recovered all of its Great Recession losses in the fall, according to the Moody's Analytics business cycle status index. A less than spectacular 2015 grape harvest is introducing some weakness, however, weighing on outsize beverage manufacturing. Tourism-related incomes remain an important driver, though industry job growth has been weak since the spring. Hiring in healthcare and in creative industries—most likely at Keysight Technologies, which unveiled new high-speed technology solutions—is a positive, however.

Meanwhile, the housing market remains undersupplied and house price appreciation is robust, triggering new construction projects.

Wine. The 2015 grape harvest fell short of the previous three years' record-setting levels, but 2016 is expected to be a good year for local winemakers. Wine consumption growth has slowed, but the outlook for consumer spending and wine demand looks favorable. A new cohort born after 1995 and coined 'Generation Z' will soon reach drinking age and has indicated a strong preference for wine, according to a survey by Wine Intelligence. This cohort will supplement the millennials, supporting stronger demand.

On the supply side, things are looking up, but the outlook is not without risks. A prolonged drought remains a headache, but farmers are optimistic that the El Niño weather pattern will bring rainfall this winter, providing sufficient soil moisture through the critical period of bud break. But even with decent rainfall, the drought will persist and tighter water conservation rules will remain in effect. Grapevine diseases such as Eutypa and Pierce's disease are becoming a greater concern and present a significant downside risk to both the quantity and quality of grapes in 2016.

Housing. Favorable net migration is an important driver for construction and bodes well for the outlook. Robust population gains since 2007 are expected to continue. California's population grew on par with that of the West but more strongly than that of the U.S. in 2015, and though data for the metro areas are not yet available, most likely the county shared in statewide gains. Lower costs of living than much of the San Francisco Bay Area serve as a magnet and support housing. As a result, house price growth has been near or above double digits since early 2013 on year-ago basis, according to the Federal Housing Finance Agency and Case-Shiller indexes. Growth in construction has brought the industry share of employment north of 6%, well above the 5% share in 2012 when industry hiring started to rebound following the Great Recession losses.

Consumer spending. Consumer-related industries will benefit immensely from better fundamentals in 2016. Income growth is picking up pace nationally and Sonoma's outsize wine retailers and other consumer industries will be among the beneficiaries. An important source of support to spending will be the easing in consumer lending standards. Delinquency rates are lower for Sonoma County than for California and the U.S., according to the credit bureau Equifax, an indication of strong credit quality and extremely low debt burdens. Income trends are favorable as well. Average weekly earnings have posted robust gains in 2014 and 2015. Consequently, consumer spending will benefit.

The Sonoma County economy will grow at a faster pace in 2016. Area vintners and tourism-related industries will take advantage of more favorable consumer fundamentals, whereas healthcare will capitalize on the growing demand. Longer term, the county's high living standard and steady in-migration will support spending, putting Sonoma ahead of the state and U.S. in output growth.

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January 2016 help@economy.com

2009	2010	2011	2012	2013	2014	INDICATORS	2015	2016	2017	2018	2019	2020
21.5	21.8	22.3	22.3	22.6	23.4	Gross metro product (C09$ bil)	23.9	24.8	25.7	26.5	27.2	27.8
-6.1	*1.2*	*2.4*	*-0.0*	*1.4*	*3.3*	*% change*	*2.2*	*3.8*	*3.6*	*3.2*	*2.5*	*2.2*
173.6	169.9	171.8	175.1	183.6	192.2	Total employment (ths)	197.2	201.3	204.1	207.0	209.3	210.7
-7.8	*-2.1*	*1.1*	*1.9*	*4.8*	*4.7*	*% change*	*2.6*	*2.1*	*1.4*	*1.4*	*1.1*	*0.7*
9.5	10.6	9.9	8.6	6.8	5.6	Unemployment rate (%)	4.4	3.8	3.5	3.6	3.7	3.9
-5.6	2.0	6.4	7.6	2.8	3.8	Personal income growth (%)	6.1	6.7	6.7	5.9	4.5	4.2
61.4	59.5	59.7	60.2	62.0	67.8	Median household income ($ ths)	71.5	73.9	76.9	79.9	82.3	84.5
479.5	484.7	487.7	490.8	495.4	500.3	Population (ths)	505.7	511.1	516.3	521.4	526.6	531.8
1.4	*1.1*	*0.6*	*0.6*	*0.9*	*1.0*	*% change*	*1.1*	*1.1*	*1.0*	*1.0*	*1.0*	*1.0*
4.1	3.5	1.6	2.0	3.2	3.6	Net migration (ths)	4.2	4.2	4.0	3.9	3.9	3.9
371	287	449	312	453	419	Single-family permits (#)	416	793	1,192	1,338	1,279	1,297
71	190	183	248	593	244	Multifamily permits (#)	220	101	334	360	334	343
201.7	194.1	180.2	180.0	208.5	239.6	FHFA house price (1995Q1=100)	261.3	274.0	285.1	295.3	305.7	319.4

ECONOMIC HEALTH CHECK

3-MO MA

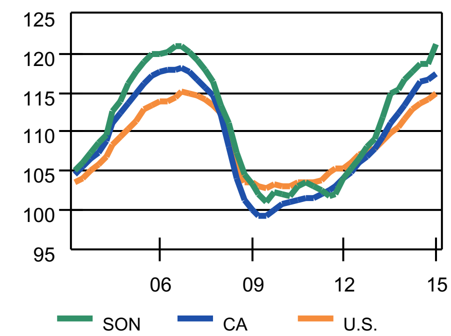
	Jun 15	Jul 15	Aug 15	Sep 15	Oct 15	Nov 15
Employment, change, ths	0.1	0.3	1.0	1.2	0.7	-0.1
Unemployment rate, %	4.3	4.4	4.4	4.3	4.2	4.1
Labor force participation rate, %	63.4	63.3	63.4	63.5	63.4	63.2
Employment-to-population ratio, %	60.6	60.6	60.7	60.8	60.7	60.6
Average weekly hours, #	33.4	33.2	33.3	33.1	33.3	ND
Industrial production, 2007=100	103.9	103.8	104.2	105.0	105.0	104.6
Residential permits, single-family, #	357	526	586	524	508	550
Residential permits, multifamily, #	608	586	606	20	20	23

Better than prior 3-mo MA | Unchanged from prior 3-mo MA | Worse than prior 3-mo MA

Sources: BLS, Census Bureau, Moody's Analytics

BUSINESS CYCLE INDEX

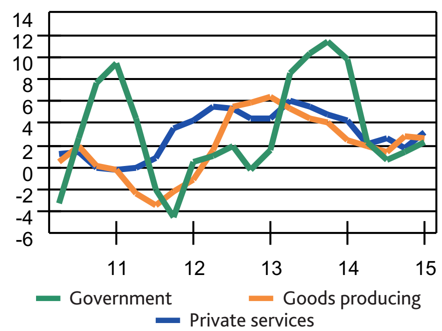
JAN 2002=100



Source: Moody's Analytics

CURRENT EMPLOYMENT TRENDS

% CHANGE YR AGO



Sources: BLS, Moody's Analytics

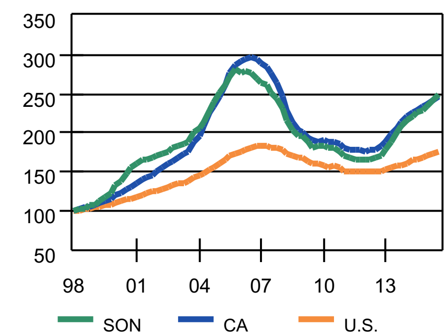
% CHANGE YR AGO, 3-MO MA

	Mar 15	Jul 15	Nov 15
Total	2.2	2.1	2.6
Construction	5.2	11.9	13.4
Manufacturing	-0.3	-1.5	-5.0
Trade	2.1	1.4	2.2
Trans/Utilities	3.5	3.1	3.0
Information	0.8	3.7	3.6
Financial Activities	1.8	2.6	1.3
Prof & Business Svcs.	3.5	3.2	5.6
Edu & Health Svcs.	1.3	2.0	4.2
Leisure & Hospitality	5.3	1.9	0.1
Other Services	2.0	2.5	2.4
Government	0.7	0.9	2.7

Sources: BLS, Moody's Analytics

HOUSE PRICE

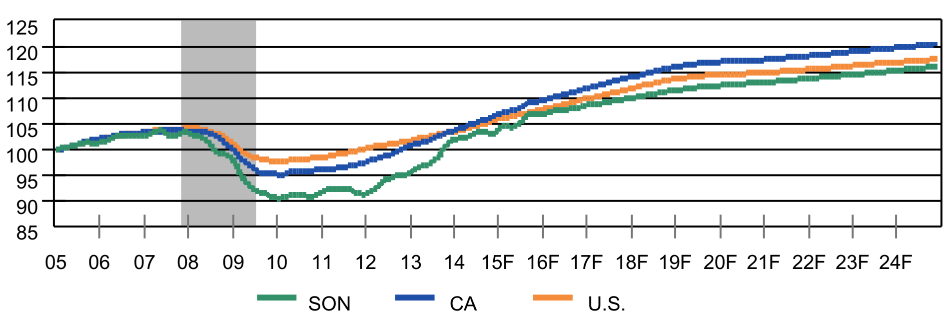
1998Q1=100, NSA



Sources: FHFA, Moody's Analytics

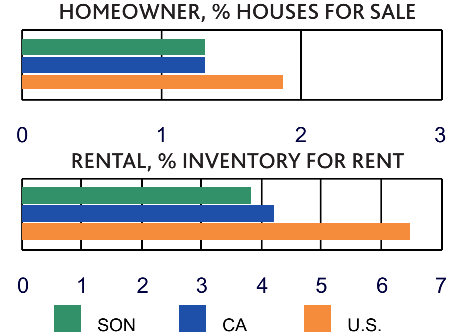
RELATIVE EMPLOYMENT PERFORMANCE

JAN 2005=100



Sources: BLS, Moody's Analytics

VACANCY RATES



Sources: Census Bureau, ACS, Moody's Analytics, 2013

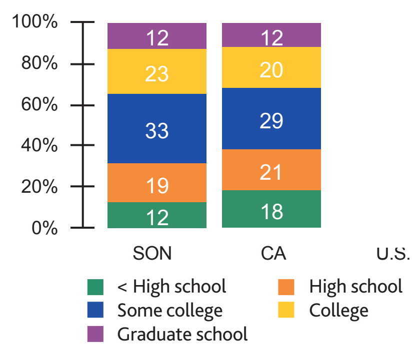
BUSINESS COSTS

U.S.=100

Source: Moody's Analytics

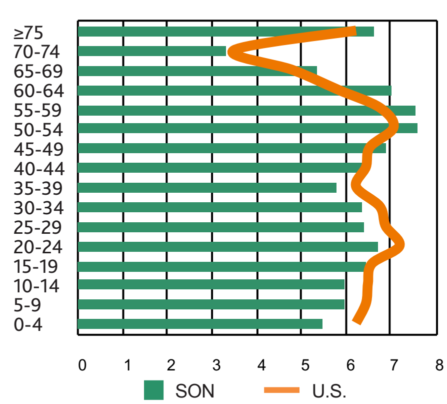
EDUCATIONAL ATTAINMENT

% OF ADULTS 25 AND OLDER



Sources: Census Bureau, Moody's Analytics, 2014

POPULATION BY AGE, %



Sources: Census Bureau, Moody's Analytics, 2014

EMPLOYMENT & INDUSTRY

TOP EMPLOYERS

Kaiser Permanente	2,555
Graton Resort & Casino	2,000
Sutter Medical Center of Santa Rosa	1,797
St. Joseph Health System	1,740
Safeway Inc.	1,200
Keysight Technologies	1,200
Amy's Kitchen	870
Medtronic CardioVascular	840
Cyan	~700
Wal-Mart Stores Inc.	650
Kendall-Jackson Wine Estates	640
Jackson Family Wine	640
AT&T	600
Hansel Auto Group	570
Lucky	550
River Rock Casino	500
Pacific Gas and Electric Co.	500
Petaluma Acquisitions	455
Ghilotti Construction Co.	425
Exchange Bank	400

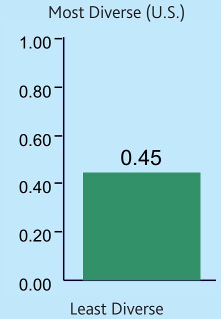
Source: North Bay Business Journal: Book of Lists, February 2015

PUBLIC

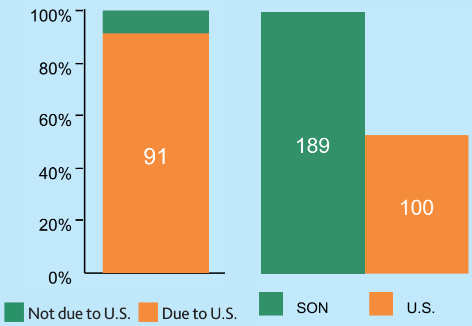
Federal	1,351
State	4,969
Local	24,959

2014

INDUSTRIAL DIVERSITY



EMPLOYMENT VOLATILITY



MIGRATION FLOWS

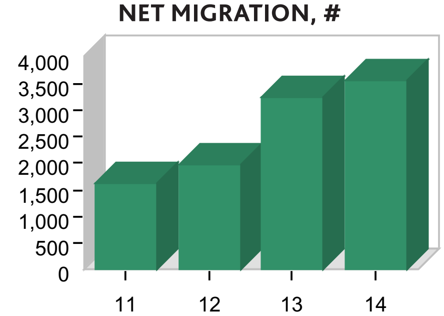
INTO SONOMA COUNTY CA

	Number of Migrants
San Rafael CA	1,476
San Francisco CA	1,056
Oakland CA	987
Sacramento CA	695
Napa CA	470
Los Angeles CA	418
San Jose CA	374
Vallejo CA	338
San Diego CA	313
Riverside CA	223
Total in-migration	*12,934*

FROM SONOMA COUNTY CA

San Rafael CA	1,042
Oakland CA	979
San Francisco CA	836
Sacramento CA	737
Vallejo CA	531
Napa CA	468
Los Angeles CA	415
San Jose CA	395
San Diego CA	316
Riverside CA	209
Total out-migration	*12,424*
Net migration	**510**

NET MIGRATION,



	2011	2012	2013	2014
Domestic	975	1,391	2,568	2,859
Foreign	651	589	678	701
Total	1,626	1,980	3,246	3,560

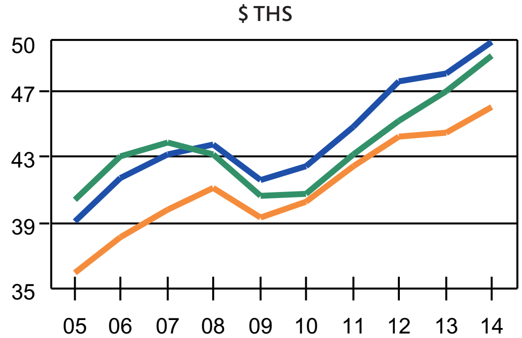
Sources: IRS (top), 2011, Census Bureau, Moody's Analytics

COMPARATIVE EMPLOYMENT AND INCOME

Sector	% of Total Employment			Average Annual Earnings		
	SON	CA	U.S.	SON	CA	U.S.
Mining	0.1%	0.2%	0.6%	$34,149	$99,523	$108,705
Construction	5.5%	4.3%	4.4%	$63,542	$65,423	$61,655
Manufacturing	10.6%	8.1%	8.8%	$76,180	$95,632	$78,447
Durable	*40.8%*	*62.5%*	*63.1%*	*nd*	*$107,474*	*$80,476*
Nondurable	*59.2%*	*37.5%*	*36.9%*	*nd*	*$76,741*	*$75,052*
Transportation/Utilities	2.2%	3.3%	3.7%	nd	$66,322	$65,427
Wholesale Trade	4.0%	4.6%	4.2%	$76,131	$82,930	$83,751
Retail Trade	12.6%	10.4%	11.1%	$36,422	$38,550	$33,494
Information	1.4%	2.9%	2.0%	$81,271	$154,835	$108,937
Financial Activities	3.9%	5.0%	5.7%	$35,341	$53,230	$54,020
Prof. and Bus. Services	10.5%	15.6%	13.7%	$45,699	$72,230	$65,204
Educ. and Health Services	16.7%	15.4%	15.4%	$52,388	$52,620	$52,501
Leisure and Hosp. Services	12.5%	11.2%	10.6%	$24,469	$30,743	$26,128
Other Services	3.5%	3.5%	4.0%	$37,930	$36,043	$35,611
Government	16.3%	15.4%	15.7%	$77,629	$93,318	$73,862

Sources: Percent of total employment — BLS, Moody's Analytics, 2014, Average annual earnings — BEA, Moody's Analytics, 2014

PER CAPITA INCOME



2014	SON $49,185	CA $49,985	U.S. $46,049

Sources: BEA, Moody's Analytics

HIGH-TECH EMPLOYMENT

HOUSING-RELATED EMPLOYMENT

	Ths	% of total
SON	21.1	11.0
U.S.	12,757.9	9.2

Source: Moody's Analytics, 2014

LEADING INDUSTRIES BY WAGE TIER

	NAICS	Industry	Location Quotient	Employees (ths)
HIGH	6221	General medical and surgical hospitals	0.6	3.9
	6214	Outpatient care centers	3.4	3.4
	6211	Offices of physicians	0.8	2.8
	5511	Management of companies and enterprises	0.6	2.0
MID	GVL	Local Government	1.3	24.8
	3121	Beverage manufacturing	25.5	7.1
	GVS	State Government	0.7	5.1
	2361	Residential building construction	2.5	2.3
LOW	7225	Restaurants and other eating places	1.2	16.0
	6241	Individual and family services	2.8	8.0
	4451	Grocery stores	1.7	6.4
	FR	Farms	1.7	6.4

Source: Moody's Analytics, 2014

The Economy Is in Gear

BY MARK ZANDI

Recent Performance

Depending on who you listen to and what economic data you look at, the U.S. economy is either struggling to kick into gear or is already in high gear.

Those down on the economy think the recent GDP weakness has less to do with inventory accumulation, which is a temporary drag, than to a widening international trade gap that will be a more persistent impediment to growth given the global economy's struggles and the strengthening U.S. dollar.

Those who are upbeat see the economy is creating lots of different kinds of jobs. Payrolls swelled by 2.7 million last year, on top of 3.1 million in 2014. This is the best consecutive two-year performance since 1998-1999 during the tech stock bubble. There are no bubbles today. Unemployment and underemployment are falling fast at the current pace of job growth.

So: is the economy performing well or not? At this point in the economic expansion the best barometer of the economy's health is jobs. The economy is performing well.

Understated GDP

Supporting this perspective is that GDP appears understated. In the Bureau of Economic Analysis' tally of GDP, the agency seems to be missing a significant amount of output in the information technology sector. This measurement problem is getting worse as this part of the economy grows bigger.

Take business investment in information processing equipment. Real investment is derived by deflating nominal investment by its price. The price depends on the power of that technology, which in the case of info processing equipment is measured in large part by the speed of semiconductors. During the late 1990s technology boom, chip speed was increasing rapidly, resulting in double-digit measured price declines (see Chart 1). Real investment thus soared.

Today, measured prices for info processing equipment are actually increasing, according to the BEA, not because chip technology is no longer advancing, but because the chip makers are less focused on chip speed and more focused on other features of the chips that are not being captured such as battery life and the versatility of those chips. Measured real investment is thus expanding slowly, which is cutting into measured GDP.

Capturing the improving power and quality of business software is very difficult. This issue has become especially important since investment in software has recently surpassed that in info processing equipment.

The upshot is that inflation has probably been weaker and real GDP growth stronger during the economic recovery than the BEA's data currently suggest.

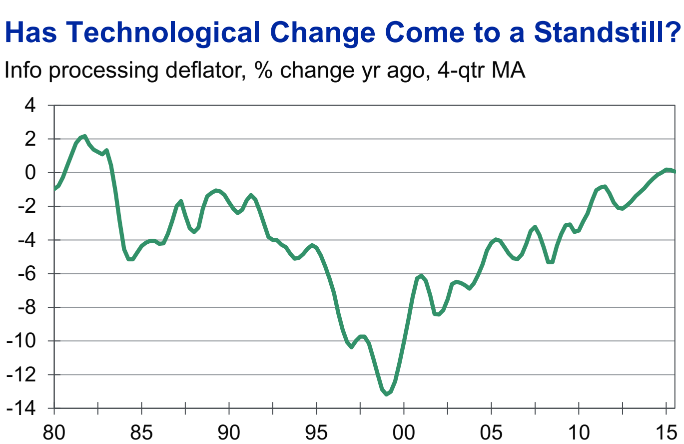
Productivity slump

Slumping productivity explains the difference between pedestrian GDP growth and strong job growth. During the current expansion, overall nonfarm business productivity has expanded at an anemic pace of about 1% per annum. This compares with productivity growth of near 2% per annum on average since World War II and is the worst productivity performance since the late 1970s. GDP growth will be constrained by the sum of the growth in the labor force and productivity. Given demographic trends, labor force growth will slow to near 0.5% per annum by the decade's end. If productivity growth remains stuck at its current 0.5% per annum, GDP growth will fall back to 1% per annum.

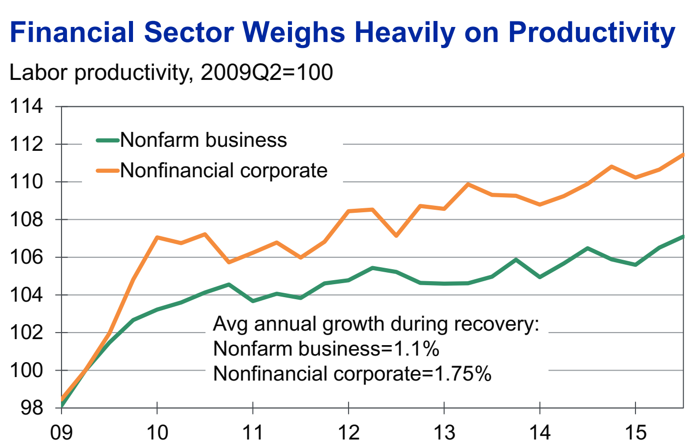
This is half the 2% per annum GDP growth that Moody's Analytics and others are assuming through decade's end. The implications of the difference between 2% and 1% per annum growth for living standards, the fiscal outlook, and asset returns and household wealth are dark. Whether the economy continues to perform well thus depends on whether productivity growth soon revives. It should. Various cyclical forces have conspired to weigh on productivity growth in recent years, and they are set to lift.

Financial regulation

Especially notable is the impact of the sea change in the regulation of the financial



Sources: BEA, Moody's Analytics



Sources: BLS, Moody's Analytics

system in the wake of the financial crisis. The Dodd-Frank regulatory reform has forced enormous changes on the system, including requiring the nation's biggest banks to hold substantially more capital and increase their liquidity. The bank stress-testing process has also fundamentally changed risk management practices in many institutions.

The regulatory changes have put the financial system on much firmer ground, but they have also undermined productivity in the financial sector. Indeed, nonfinancial corporate productivity growth has held up much better than nonfarm business productivity (see Chart 2). The financial sector's adjustment to the new tougher regulatory regime is finally winding down, suggesting that productivity gains should normalize. Our working assumption is that financial sector productivity will soon be expanding at the same pace as productivity in the nonfinancial sector. Through the end of the decade, nonfarm business productivity is thus expected to grow at 1.75% per annum.

Animal spirits

The risk-taking necessary to support the innovation so key to productivity growth had seemed undermined by the crisis. The number of new business establishments, which had been growing by close to 3% annually during the 1990s, and near 2% in the 2000s prior to the crisis, fell sharply during the downturn (see Chart 3). Entrepreneurship was sidelined by the tough economy, lack of credit, and dour sentiment.

Things have changed. Business formation has picked up, with the number of new establishments growing by close to 2% again in 2015, and accelerating as the year ended. The increase in establishments is evident across all industries but is strongest in professional services, education and healthcare, and the software industry. Entrepreneurship appears to be back. It will take time for these new businesses to have an impact on the aggregate economic statistics, including productivity. But this is the clearest sign yet that those animal spirits necessary to drive productivity are finally coming back to life.

Energy boom-bust

The plunge in oil prices and investment in the energy industry may also boost productivity. Before the bust, the fracking boom had lifted energy investment to its highest share of GDP since the early 1980s. While increased oil production has large economic benefits, it also likely diverted resources away from labor productivity-enhancing investment such as information processing equipment and research and development.

Now that substantially fewer investment dollars are headed to the energy industry, more should go into productivity-enhancing activities. Rising labor costs could further support this shift.

Mobile and smart

Productivity also should benefit from a more educated and mobile workforce. An ironic plus coming out of the recession is a more educated workforce. Many in their 20s who could not find work stayed in school or went back. The workforce is also starting to move again. The U.S. job market has historically been characterized by significant churn, with millions losing, leaving and taking jobs each month. This movement enhances productivity as workers move from jobs they do not care for to jobs that better match their preferences and skills. The willingness and ability of workers to move from job to job is a comparative advantage of the U.S. economy. Mobility, which had declined sharply as a result of the recession, is now picking up as is evident from the increased frequency of quits and hires (see Chart 4).

Secular stagnation

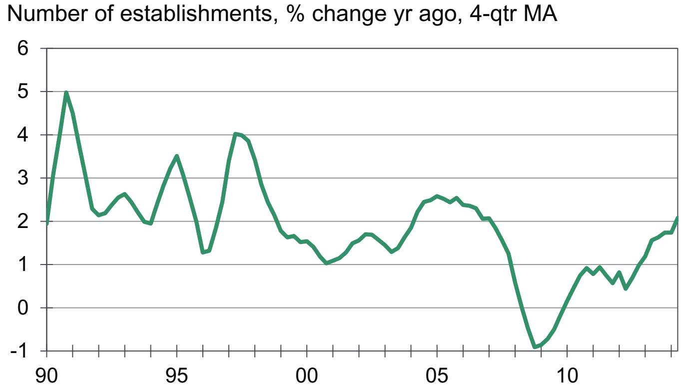
The coming productivity revival is a forecast carrying much uncertainty. A lot hinges on whether and when new technologies come to fruition. Nanotechnology, 3D manufacturing, human-genome sequencing, fracking, drones and driverless vehicles could be game-changing. But they may not be.

Moreover, some believe the economy is trapped in a secular stagnation and the productivity slump is here to stay. They argue that productivity may pick up, but not by much, and certainly not enough to get to 2% GDP growth on a sustained basis.

Perhaps, but this would run counter to a constant of U.S. economic history, namely the ingenuity and creativity of American businesses and workers.

Animal Spirits Revive

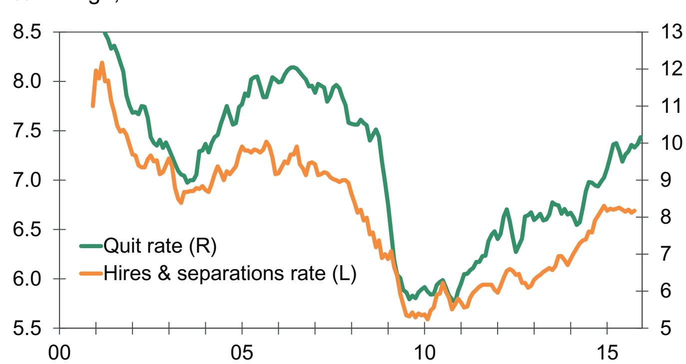
Number of establishments, % change yr ago, 4-qtr MA



Sources: BEA, Moody's Analytics

More Life in the Labor Market

% change, 3-mo MA



Sources: BLS, Moody's Analytics

Forecast Assumptions

BY MARK ZANDI

Monetary policy

The Federal Reserve began normalizing interest rates at the mid-December Federal Open Market Committee meeting. The process will be lengthy. 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, full employment will be achieved 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 has fallen since the crisis. Forecasts provided by Fed officials of the funds rate in the long run would suggest an estimated equilibrium rate of 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."

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 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.

The outlook is based on a steady but orderly rise in long-term rates, with 10-year Treasury yields rising from just over 2% now to near 4% by early 2018. 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.

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 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. 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.

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.

Deficits and debt will begin to mount again early in the next decade given prospects for large increases in entitlement spending. 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 some 15% on a real broad trade-weighted basis since summer 2014. The strong U.S. dollar reflects stronger U.S. economic growth and prospects for monetary tightening, and disappointing gains and monetary easing in much of the rest of the world. Further dollar appreciation is likely. 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 not be able to normalize policy until near decade's end.

The dollar will appreciate further against the Japanese yen, which has fallen sharply in value to around ¥120 per dollar. Further yen depreciation is expected through mid-decade with the yen peaking at close to ¥140.

The dollar will 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. On a real broad trade-weighted basis the dollar has remained remarkably stable in recent years, and will remain so in the long run. The dollar 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. 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. Oil prices are thought to be near their bottom, and are expected to slowly make their way back. 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.

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 SUVs and light trucks. Nonetheless, Moody's Analytics does not expect oil prices to top $100 per barrel for another decade.

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.

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