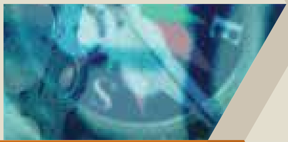


Local Economic Report

Fall 2015

2015
SONOMA
COUNTY

SONOMA COUNTY
EDB
ECONOMIC DEVELOPMENT BOARD

SONOMA COUNTY
WORKFORCE
INVESTMENT BOARD

Fall 2015 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 *Fall 2015 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 describes Sonoma County's economy as "charging forward," based on employment, housing and industrial production.
- Airport improvements and rising U.S. wine consumption have boosted Sonoma County's tourism industry, which has added 5,000 jobs since the end of the recession.
- Above-average population growth and household formation will keep the Construction industry strong in the next few years.
- Sonoma County's GDP growth will accelerate this year and peak in 2016, with wine production and hospitality remaining reliable economic drivers.

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
Chair
Economic Development Board

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
223	211
3rd quintile	3rd quintile

Best=1, Worst=408

RELATIVE COSTS

LIVING	BUSINESS
119%	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: **66** 1st quintile (*Highest=1, Lowest=401*)

UPSIDE

- Improving demand from East Asian economies boosts both 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 at the low end of the wine market.

MOODY'S RATING

Aa2 CITY AS OF MAY 01, 2010

ANALYSIS

Recent Performance. The Sonoma County economy has rebounded from the softening it experienced earlier this year and is charging forward, marking an important milestone in recent months. Job growth has strengthened, allowing total employment to reach its prerecession peak of nearly eight years ago. Manufacturing payrolls, including outsize beverage manufacturing, have declined considerably since early spring, but services have strengthened. Housing starts softened significantly through May but have been trending up since. As a result, the Moody's Analytics business cycle index, which is based on employment, housing and industrial production, is on the rise.

Meanwhile, house prices have been climbing at a robust pace since mid-2012, according to the Case-Shiller index. Vacancy rates for office, industrial and retail reached post-recession lows in the second quarter, according to Keegan & Coppin, indicating that fundamentals are sturdier now.

Wine. Sonoma vintners had another great year in 2014, and the long-term outlook remains bright, though the road forward is not without curves. Wine consumption in the U.S. has risen for 20 consecutive years, overtaking that in France in 2014 and delivering welcome news for American winemakers, including those in Sonoma County. Not all is sunshine and roses, however. Years of drought have shifted the vines' growing season earlier into the year, and vintners are concerned this year that the early harvest will lead to a low-yielding crop. Further, rising popularity of craft beer, especially among the younger age cohorts, presents another challenge. Sales of craft beer reached 7% of the U.S. adult beverage market in 2013, suggesting that a strong dollar weighing on wine exports is not the only headwind vintners must contend with.

Tourism. Visitor-dependent industries will thrive as the U.S. economy strengthens further this year. Thanks to recent efforts to make the county more accessible to vacationers and business travelers, leisure/hospitality is doing well. Three outstanding consecutive years at area wineries have been another tailwind, helping the industry add more than 5,000 jobs since the end of the recession. Accommodating a growing number of tourists has kept area hotels busy recently. The county's average hotel occupancy rate climbed to 84.4% in July, 1.3 percentage points higher than a year earlier, according to Smith Travel Research. The average daily room rate rose 7.6% for the month on a year-ago basis. Improvements made in recent years at the Charles M. Schulz-Sonoma County Airport are paying dividends. A growing influx of visitors who find it more convenient to fly into Santa Rosa will further brighten the outlook for the hospitality industry. A plausible venue for more future growth—the establishment of a west-east air traffic corridor to attract visitors from other cities—is being explored by local officials.

Construction. Construction will remain strong in the next few years in Sonoma County as the West, including California, is expected to experience above-average population growth and household formation, primarily fueled by in-migration. Thanks to such favorable demographics, Moody's Analytics forecasts that housing supply will fall short of household formation, causing above-average price appreciation.

Sonoma County's GDP growth will accelerate this year and peak in 2016, as the regional and U.S. economies serve as tailwinds to area wineries and leisure/hospitality. Drought is a concern, but the vintners, hotels and restaurants will remain reliable drivers. Longer term, the county's high living standard will support spending, but high housing costs will leave the economy an average performer.

Ilir Hysa *1-866-275-3266*
August 2015 *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	27.7
-6.1	*1.2*	*2.4*	*-0.0*	*1.4*	*3.3*	*% change*	*2.1*	*3.9*	*3.7*	*3.0*	*2.4*	*2.1*
173.6	169.9	171.8	175.1	183.6	192.2	Total employment (ths)	196.0	200.0	203.9	207.1	209.2	210.5
-7.8	*-2.1*	*1.1*	*1.9*	*4.8*	*4.7*	*% change*	*2.0*	*2.0*	*2.0*	*1.5*	*1.0*	*0.6*
9.5	10.6	9.9	8.6	6.8	5.6	Unemployment rate (%)	4.3	3.8	3.6	3.5	3.6	3.7
-5.2	1.7	6.3	7.7	3.8	3.3	Personal income growth (%)	5.1	7.3	7.1	5.9	4.4	4.2
61.6	59.7	58.9	59.5	61.0	61.7	Median household income ($ ths)	63.8	66.1	68.8	71.4	73.5	75.4
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 (#)	463	958	1,113	1,150	1,137	1,185
71	190	183	248	593	244	Multifamily permits (#)	539	639	512	379	329	325
201.7	193.8	180.3	180.1	208.7	239.8	FHFA house price (1995Q1=100)	257.6	271.9	288.4	302.4	314.8	327.1

ECONOMIC HEALTH CHECK

3-MO MA

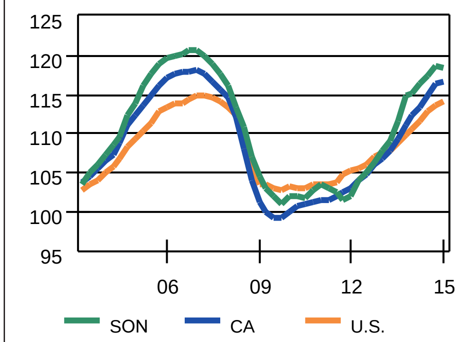
	Feb 15	Mar 15	Apr 15	May 15	Jun 15	Jul 15
Employment, change, ths	0.5	0.7	0.5	0.2	0.1	0.3
Unemployment rate, %	5.1	4.8	4.5	4.4	4.3	4.4
Labor force participation rate, %	63.4	63.5	63.5	63.4	63.4	63.4
Employment-to-population ratio, %	60.2	60.5	60.6	60.7	60.7	60.6
Average weekly hours, #	33.2	33.8	33.8	33.7	33.4	33.1
Industrial production, 2007=100	105.5	104.9	104.6	104.5	104.1	103.8
Residential permits, single-family, #	466	298	270	269	353	520
Residential permits, multifamily, #	264	242	145	22	621	599

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

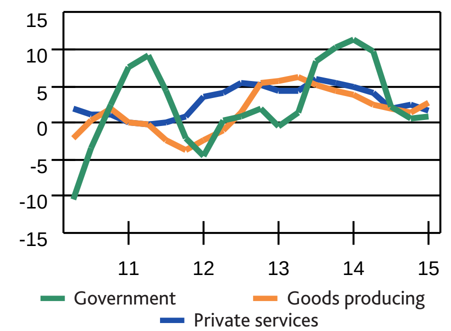
JAN 2002=100



Source: Moody's Analytics

CURRENT EMPLOYMENT TRENDS

% CHANGE YR AGO



Sources: BLS, Moody's Analytics

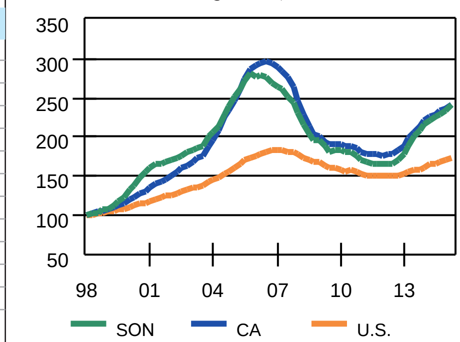
% CHANGE YR AGO, 3-MO MA

	Nov 14	Mar 15	Jul 15
Total	2.8	2.2	2.1
Construction	4.4	5.2	11.9
Manufacturing	0.9	-0.3	-1.5
Trade	2.4	2.1	1.4
Trans/Utilities	3.4	3.5	3.1
Information	2.7	0.8	3.7
Financial Activities	1.5	1.8	2.6
Prof & Business Svcs.	2.5	3.5	3.1
Edu & Health Svcs.	2.1	1.3	2.0
Leisure & Hospitality	4.4	5.3	2.0
Other Services	3.3	2.0	2.5
Government	4.2	0.7	0.9

Sources: BLS, Moody's Analytics

HOUSE PRICE

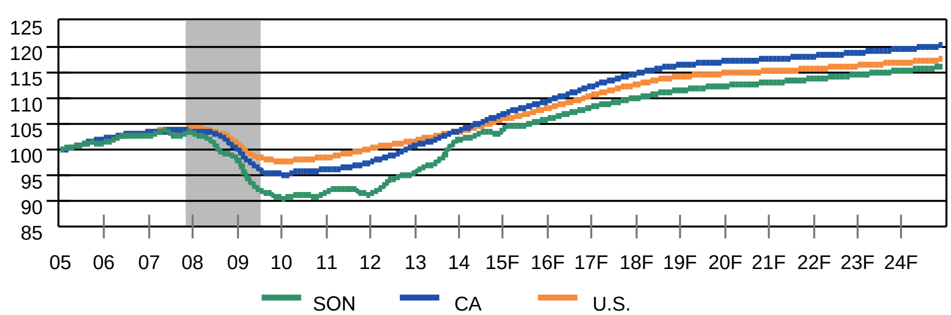
1998Q1=100, NSA



Sources: FHFA, Moody's Analytics

RELATIVE EMPLOYMENT PERFORMANCE

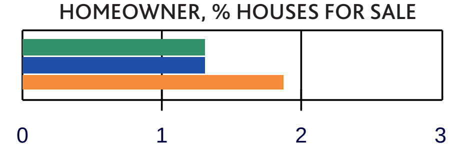
JAN 2005=100



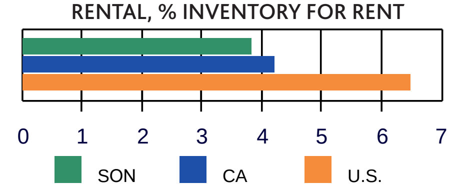
Sources: BLS, Moody's Analytics

VACANCY RATES

HOMEOWNER, % HOUSES FOR SALE



RENTAL, % INVENTORY FOR RENT



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

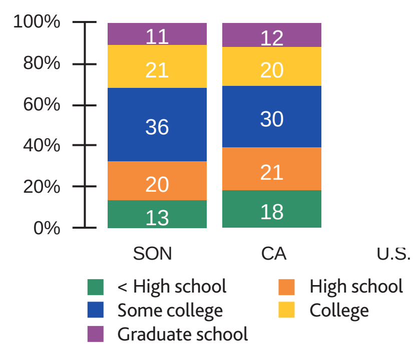
BUSINESS COSTS

U.S.=100

Source: Moody's Analytics

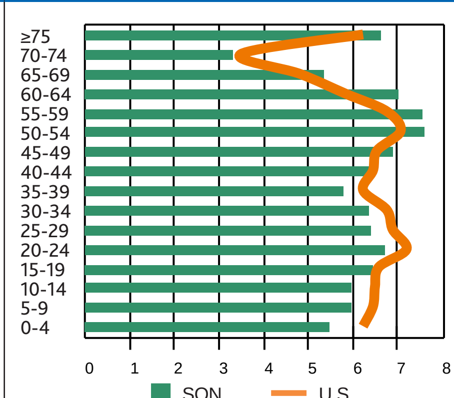
EDUCATIONAL ATTAINMENT

% OF ADULTS 25 AND OLDER



Sources: Census Bureau, Moody's Analytics, 2012

POPULATION BY AGE, %



Sources: Census Bureau, Moody's Analytics, 2013

EMPLOYMENT & INDUSTRY

TOP EMPLOYERS

Kaiser Permanente	2,827
Graton Resort & Casino	2,000
Sutter Medical Center of Santa Rosa	1,797
St. Joseph Health System	1,491
Safeway Inc.	1,200
Agilent Technologies	1,175
Amy's Kitchen	872
Medtronic CardioVascular	840
Wal-Mart Stores Inc.	650
Kendall-Jackson Wine Estates	640
AT&T	600
Lucky	550
River Rock Casino	539
Hansel Auto Group	525
Pacific Gas and Electric Co.	500
Petaluma Acquisitions	455
Exchange Bank	392
The Home Depot U.S.A. Inc.	390
Korbel	368
La Tortilla Factory	310

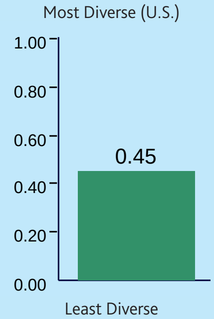
Source: North Bay Business Journal: Book of Lists, February 2014

PUBLIC

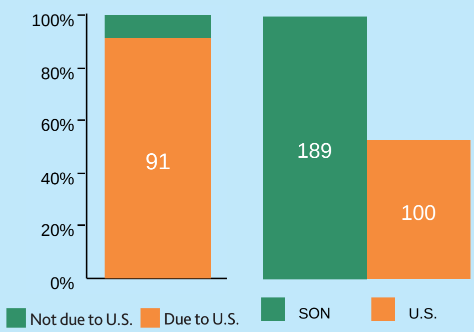
Federal	1,351
State	4,969
Local	24,959

2014

INDUSTRIAL DIVERSITY



EMPLOYMENT VOLATILITY



MIGRATION FLOWS

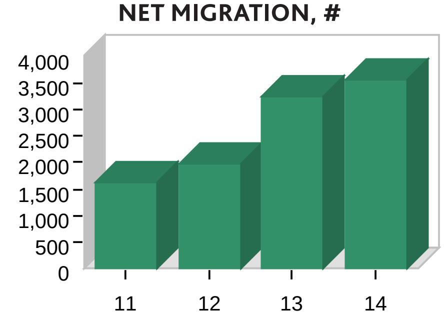
INTO SONOMA COUNTY CA

	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

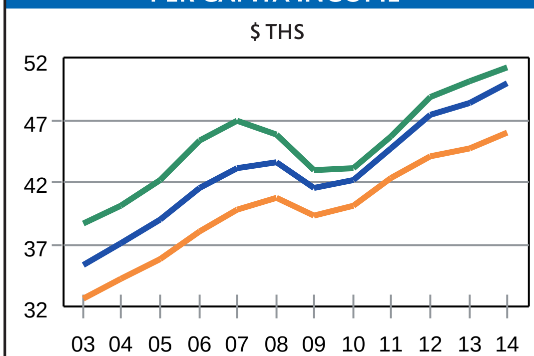
Sources: IRS (top), 2011, Census Bureau, Moody's Analytics

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%	$32,529	$96,985	$103,753
Construction	5.5%	4.3%	4.4%	$62,939	$64,232	$60,444
Manufacturing	10.6%	8.1%	8.8%	$75,408	$93,383	$77,051
Durable	*40.8%*	*62.5%*	*63.1%*	*nd*	*$104,010*	*$78,697*
Nondurable	*59.2%*	*37.5%*	*36.9%*	*nd*	*$76,479*	*$74,316*
Transportation/Utilities	2.2%	3.3%	3.7%	$70,841	$66,791	$64,339
Wholesale Trade	4.0%	4.6%	4.2%	$71,600	$80,389	$81,024
Retail Trade	12.6%	10.4%	11.1%	$36,186	$38,485	$33,130
Information	1.4%	2.9%	2.0%	$69,529	$147,348	$102,915
Financial Activities	3.9%	5.0%	5.7%	$36,361	$52,313	$52,549
Prof. and Bus. Services	10.5%	15.6%	13.7%	$45,412	$70,235	$64,145
Educ. and Health Services	16.7%	15.4%	15.4%	$52,987	$52,317	$51,580
Leisure and Hosp. Services	12.5%	11.2%	10.6%	$23,069	$29,370	$24,893
Other Services	3.5%	3.5%	4.0%	$38,755	$36,541	$35,425
Government	16.3%	15.4%	15.7%	$76,808	$89,910	$72,104

Sources: Percent of total employment — BLS, Moody's Analytics, 2014, Average annual earnings — BEA, Moody's Analytics, 2013

PER CAPITA INCOME



2014	SON $51,434	CA $50,109	U.S. $46,129

Sources: Moody's Analytics, BEA

HIGH-TECH EMPLOYMENT

	Ths	% of total
SON	8.5	4.4
U.S.	6,553.6	4.7

HOUSING-RELATED EMPLOYMENT

	Ths	% of total
SON	21.0	10.9
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	25.6	7.1
	GVS	State Government	0.7	5.1
	2361	Residential building construction	2.4	2.3
LOW	7225	Restaurants and other eating places	1.2	16.0
	6241	Individual and family services	2.8	8.0
	FR	Farms	1.7	6.6
	4451	Grocery stores	1.7	6.4

Source: Moody's Analytics, 2014

Robust Support for the Expansion

BY MARK ZANDI

Recent Performance

Notwithstanding the recent decline in stock prices and increased volatility in financial markets, the U.S. economy is performing well, and its prospects for the next several years are good. There are some threats to this optimism, the most obvious being China's mounting problems and the normalization of U.S. monetary policy. But the threats to our economy seem less threatening than they have been in years.

Help wanted

The economy's strong performance is most evident in the labor market, which is creating well over 200,000 jobs per month. This is approximately double the growth in the labor force, so the remaining slack in the labor market is quickly absorbed. The estimated underemployment gap—the percent of the labor force that is underemployed—has fallen below 1%. At the current pace of job growth, if sustained, the underemployment gap will disappear and the economy will be at full employment by summer 2016. There is no reason to believe that job growth will slow any time soon given the recent surge in job openings to a record high and the rock-bottom number of layoffs.

There is a reasonable debate regarding why wage growth remains so pedestrian, and whether this signals that the job market has more slack than thought or that the link between a tightening job market and wage growth has been impaired. More likely, businesses are doing everything to avoid bigger pay increases for their workers, which is typical coming out of a period with a slack job market. However, the rapidly increasing number of open job positions suggests this is no longer working (see Chart 1). A substantive pickup in wage growth appears imminent.

Consumer tailwinds

This does not augur well for businesses' profit margins, but these are currently about as wide as they have ever been. The stronger pace of wage growth should lift the spirits of consumers, many of whom are still skeptical about the recovery's staying power. But the tailwinds behind consumers are stronger. In addition to the better job market, consumers are benefiting from higher house prices and stock values (the recent correction notwithstanding), and very low debt burdens.

Credit is also flowing more freely. Auto credit is ample, and credit- and retail-card lending is back to normal. Even home-equity lending has come back to life, as higher house prices have increased homeowner equity and lenders are more comfortable extending loans given much-improved credit quality. Originations of household credit, excluding first mortgages, are back to prerecession levels

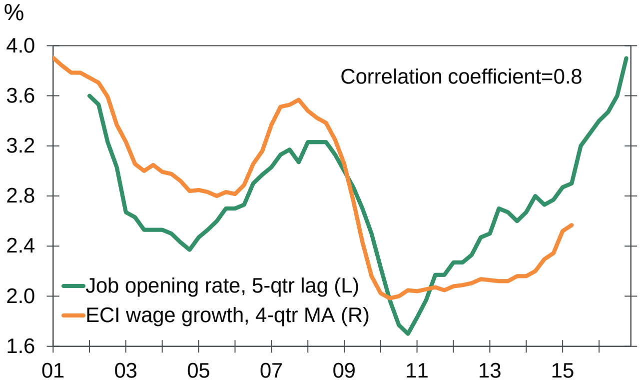
There is also evidence that it is easier to qualify for a first mortgage loan to purchase a home. The Federal Housing Administration's decision to lower its insurance premiums at the start of the year and Fannie Mae and Freddie Mac's new 97% loan-to-value ratio loan program appear to be having some effect. Lenders also appear more comfortable about selling loans to Fannie and Freddie since the mortgage giants made changes to their policies to reduce the risk that lenders will need to repurchase loans that eventually get into trouble. A normalization of mortgage credit availability is vital to the full return of the first-time homebuyer to the housing market. And first-timers are essential to getting the housing recovery back on track.

Pent-up households

Housing and the broader economy should also get a lift from substantial acceleration in household formations. Millennials in their 20s have delayed forming households given the tough economy and their student loan debt burden. This is about to change in a big way.

According to the Census Bureau, close to 3.5 million more 18- to 34-year-olds are living with their parents today than before the recession (see Chart 2). Even assuming some

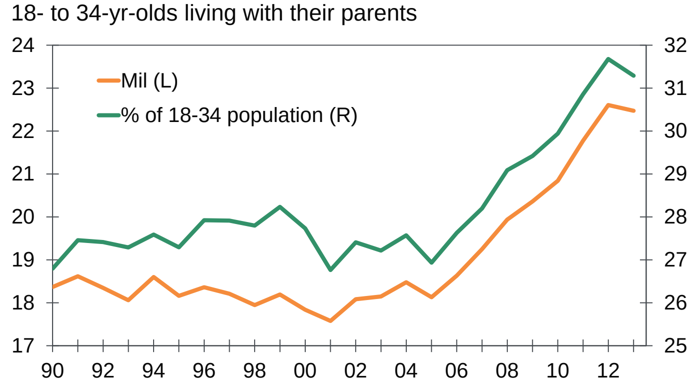
Wage Growth Is Set to Accelerate Strongly



Sources: BLS, Moody's Analytics

Lots of Pent-Up Households

18- to 34-yr-olds living with their parents



Sources: Census Bureau, Moody's Analytics doubling and even tripling up, this group represents close to 1.5 million new households set to form. Suppose these households form through the rest of the decade, creating an additional 300,000 households each year. This would be on top of the 1.25 million households that should form each year given normal demographic trends. This suggests that on average 1.55 million households (1.25 million plus 300,000) should be formed each year between now and the end of the decade. This is up from the estimated 1 million households formed last year.

So many new households will require more homes and everything that goes into them. Demand for apartments will be especially robust as twentysomethings generally rent and the millennials seem to prefer urban living. Indeed, the apartment market is booming with multifamily construction as strong as it has been since the tax-juiced boom of the mid-1980s.

Single-family housing will also enjoy stronger demand as the median age of the first-time homebuyer is about 33 years old. The heart of the millennial generation is now 26 years old. Millennials may wait longer than their parents to marry and raise a family in a single-family home, but the evidence suggests they are not waiting too much longer.

Fed vs. markets

The normalization of Federal Reserve monetary policy poses a challenge to optimism about the U.S. economy's prospects. The Fed's balance sheet is bloated with Treasury and mortgage securities after several rounds of quantitative easing, and short-term rates remain exceptionally low.

This is not consistent with an economy at full health. The Fed has plans to right-size its balance sheet over time by allowing the securities on its balance sheet to mature and prepay. Policymakers also expect to slowly but steadily raise short-term rates as the economy achieves full employment and underlying inflation returns to the Fed's target of 2%.

Forecasts of the federal funds rate by Fed members put the rate at close to 2% by the end of 2016 and 3% by the end of 2017. In the long run, when the economy is at full strength, the funds rate should settle between 3.5% and 4%.

Although this script seems reasonable, financial markets appear to have a very different one. Based on the funds rate expectations implied by the federal funds futures market, investors believe that the funds rate will be no more than 1% by the end of 2016 and 2% by the end of 2017. The funds rate in the long run is also not expected to rise above 3% (see Chart 3).

Someone is wrong. If it is the financial markets, then investors will have to adjust, potentially causing bond yields and credit spreads to spike, stock prices to fall, and commodity and foreign exchange markets to gyrate. This is what happened in summer 2013 when then-Fed Chairman Ben Bernanke voiced the possibility of ending QE. This surprised investors and the resulting so-called taper tantrum did significant damage to many emerging economies that rely on capital inflows and our own housing market as mortgage rates jumped.

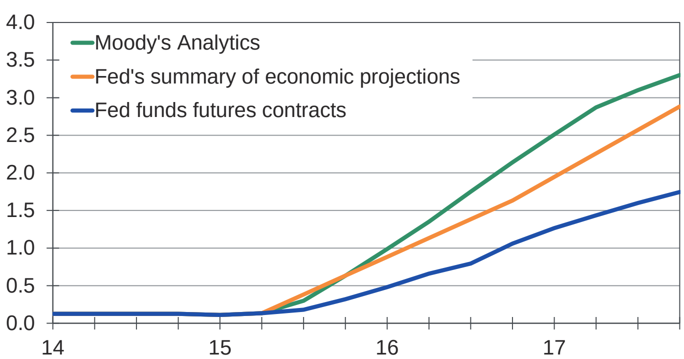
Exacerbating the threat that financial markets could suffer another bout of volatility that hurts the economy is the seeming thinness of transactional liquidity in markets. That is, it appears that trading in markets is not as deep as it was prior to the financial crisis, causing prices of financial assets to swing more widely in response to events.

It is also reasonable to worry that any adjustment in financial markets would be aggravated by high valuations for many assets. The recent correction in stock prices was surely due in part to the fact that the market was very richly valued. Before the correction, even Fed Chair Janet Yellen called out the stock market—and specifically biotechnology stocks—as being overvalued (see Chart 4). Valuations have also been seemingly high in the junk corporate bond market and some commercial real estate markets.

Normalizing monetary policy after a recession always engenders significant volatility in financial markets. This time will be no different. It is prudent to expect even more ups and downs in markets given how far from normal the Fed is starting. It is not much of a stretch to construct a scenario in which markets go badly off the rails and take the expansion with it. Yet, under most scenarios the economy should be able to weather financial market turmoil with reasonable grace.

Fed and Financial Markets Aren't on Same Page

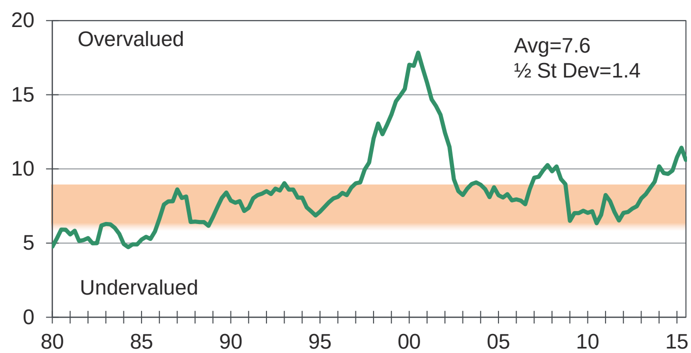
Fed funds rate, %



Sources: Federal Reserve, CME Group, Moody's Analytics

Stocks Appear Overvalued

Ratio of Wilshire 5000 and corporate profits, %



Sources: Wilshire, BEA, Moody's Analytics

Forecast Assumptions

BY MARK ZANDI

Monetary policy

The Federal Reserve has begun what is expected to be a slow normalization of monetary policy. The first step was to end its bond-buying program, which it did in October. As a result of four rounds of quantitative easing, the Fed's balance sheet has more than $4 trillion in Treasury and mortgage securities. In a well-functioning economy, the Fed's balance sheet should be closer to $1 trillion.

If the economy performs consistently with the Moody's Analytics outlook, the Fed will begin raising short-term interest rates this September. The outlook is based on a steady but orderly rise in long-term rates, with 10-year Treasury yields ending this year near 2.5%, and rising to near 4% by late 2017. This is below the estimated 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. The Fed should be able to manage the normalization of monetary policy, carefully calibrating its balance sheet and clearly explaining its actions to adjust interest rates to bond investors.

Fiscal policy

The federal government's fiscal situation continues to improve. The deficit should fall below $500 billion this fiscal year and stabilize at just over $500 billion in the next several years. The budget deal reached at the end of 2013 to keep the government open for at least two years is holding firm and government spending growth remains weak. This, combined with strong tax revenue growth, has resulted in a shrinking deficit.

As part of the deal, lawmakers agreed to increase the Treasury debt limit sufficiently that it should not be an issue until this fall. Fiscal policy is fading as a drag on growth. The drag through the remainder of the decade should be minimal.

Under current fiscal policy, Washington will come close to 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.

Deficits and debt will begin to mount again early in the next decade given prospects for large increases in entitlement spending. Medicare and Medicaid spending is likely to increase. Further policy changes will be necessary and are assumed in the outlook.

U.S. dollar

The U.S. dollar strengthened against most currencies over the past year. On a real broad trade-weighted basis, it is up nearly 15%. The dollar is even appreciating against the Chinese yuan. The strong dollar reflects better U.S. economic growth and prospects for monetary tightening, and disappointing growth and monetary easing in much of the rest of the world.

Further dollar appreciation is likely, particularly against the euro. The expectation is that the Federal Reserve will normalize U.S. monetary policy by early 2018, but the European Central Bank will not be able to normalize policy 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.

The dollar will also strengthen further against the Japanese yen, which has fallen to near ¥125 per dollar since late 2012. Further yen depreciation is expected through mid-decade given Japan's struggles, with the yen/dollar rate peaking at close to ¥140. The British pound should hold its own against the dollar over the next several years. The U.K. and U.S. economies are expected to perform similarly, and the Bank of England should normalize monetary policy similarly.

The dollar will remain strong against the currencies of most emerging economies as the Fed normalizes monetary policy, but it will 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 this relative stability is expected to prevail in the long run. The dollar will remain the global economy's principal reserve currency for the foreseeable future.

Energy prices

Oil prices have plunged below $50 per barrel. 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 will slowly make their way back. Underlying this outlook is the 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. Other higher-cost non-OPEC producers in the North Sea and Arctic are also curtailing investment plans.

Global oil demand will get 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. Still, it will be 2023 before oil prices again top $100 per barrel.

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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