



C H A P T E R 2

THE YEAR IN REVIEW AND THE YEARS AHEAD

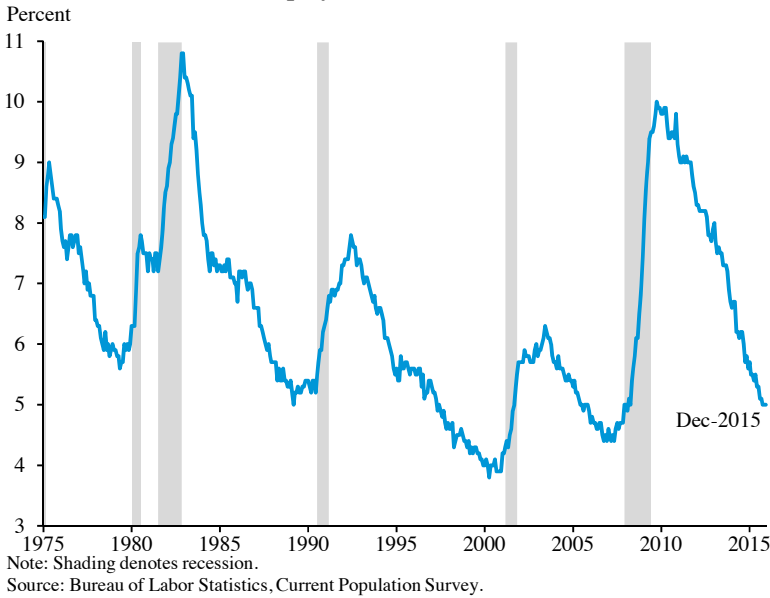
The U.S. economy continued to grow in 2015, as the recovery extended into its seventh year with widespread growth in domestic demand, strong gains in labor markets and real wages, and low inflation. Real gross domestic product (GDP) increased 1.8 percent during the four quarters of the year, down from 2.5-percent growth during 2013 and 2014. In 2015, residential investment led the growth in demand, while consumer spending again rose solidly. Business fixed investment growth slowed from earlier in the recovery and increased at about the same pace as real GDP. Weak growth among our foreign trading partners restrained exports, and government purchases increased modestly after falling for most of the preceding five years.

Over the course of 2015, the economy added 2.7 million jobs, completing the strongest two years of job growth since 1999. In December, private-sector employment had grown for 70 consecutive months, the longest stretch of uninterrupted job gains on record, with a total of 13.8 million jobs added. During 2015, nonfarm job growth averaged 228,000 a month, a somewhat more moderate pace than during 2014, but similar to the strong pace of the three preceding years. The unemployment rate fell 0.6 percentage point during the 12 months through December, after falling a percentage point a year, on average, during the three preceding years (Figure 2-1).

Inflation remained low with consumer price inflation (CPI) at only 0.7 percent during the 12 months of 2015, reflecting a sharp decline in oil prices. Core CPI, which excludes food and energy, increased 2.1 percent, above the year-earlier rate of 1.6 percent. Real average hourly earnings of production and nonsupervisory workers rose 2.3 percent over the 12 months of 2015, as nominal wage growth exceeded price inflation.

Challenges remain for 2016, including uncertain prospects for global growth, constraints posed by slowing trend growth in the labor force due to demographic shifts, and the yet incomplete labor market recovery. Turmoil

Figure 2-1
Unemployment Rate, 1975–2015



in stock markets around the world, and further sharp declines in oil prices in early 2016, underscore the risks facing the U.S. economy; in particular, in the energy-producing and export-intensive sectors. And yet, the labor market continues to recover with the unemployment rate declining to 4.9 percent in January 2016, its lowest level since February 2008.

The economic recovery in recent years has differed across labor and output measures. The labor market continued to strengthen and, by the end of 2015, the unemployment rate had fallen to half its recessionary peak, but real output growth, at 1.8 percent during the four quarters of 2015, was slower than its pace in recent years. As a consequence, labor productivity—measured as real output-per-hour—in the nonfarm sector has grown more slowly than its long-term trend thus far during this business cycle. The labor force participation rate has fallen largely due to the baby-boom cohorts moving into retirement, but some of the decline represents the continuation of the decades-long downward trend in the participation of prime-age males as well as the decline in participation of prime-age females since 2000.

While real GDP grew moderately during 2015, the quarterly pace of economic growth was uneven. First-quarter growth (0.6-percent annual rate) was held down by a labor dispute at the West coast ports and unusually

cold weather.¹ The economy rebounded in the second quarter, growing at a 3.9-percent annual rate followed by more steady growth of 2.0 percent in the third quarter. Growth slowed again in the fourth quarter to 0.7 percent at an annual rate, weighed down by declines in inventory investment and exports.

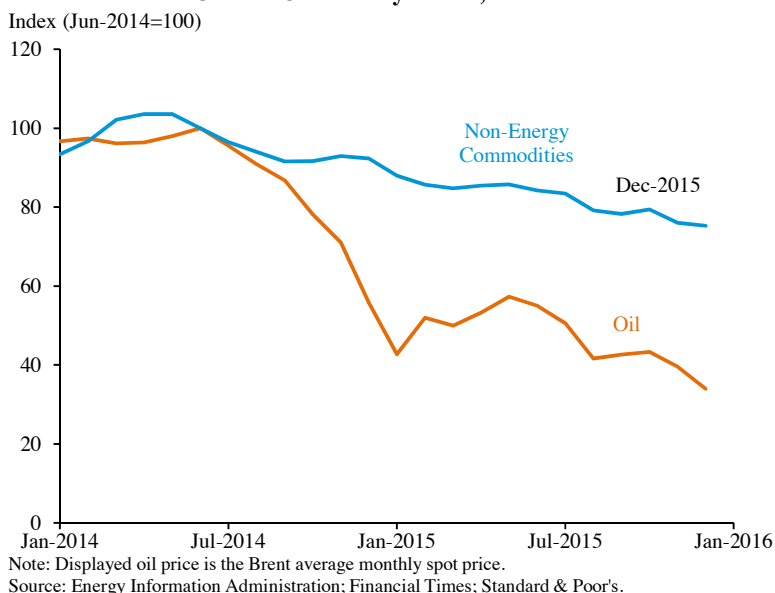
The price of oil, as measured by the spot price of European light crude oil from the North Sea (known as Brent), fell to \$37 per barrel at the end of December 2015, about a third of its level in June 2014 (Figure 2-2).

The oil-price decline from mid-2014 to the end of 2015 reflected both increased global supply of oil, including rising production in the United States, Saudi Arabia, and Iraq, and slower global economic growth. It is difficult to precisely separate the role of supply and demand, but the comparison to non-energy commodity prices highlights the mix of factors affecting oil prices. Non-energy commodity prices also declined over this period—a sign of weakening global demand. But the non-energy commodity price decline of about 25 percent was considerably less than the about 65-percent decline in oil prices, pointing to the role of oil supply in lowering prices. Lower oil prices affect the U.S. economy through numerous channels (CEA 2014). On balance, CEA estimates that lower oil prices directly boosted real GDP growth by 0.2 percentage point during 2015, despite the adverse impacts on domestic energy producers and manufacturers that sell to the energy sector (see Box 2-1). Relatedly, the decline in oil prices noticeably held down price inflation and supported real income growth in 2015. Oil and commodity prices continued to fall sharply in early 2016 and are likely to continue to affect consumers and energy producers.

Foreign growth slowed markedly in 2015, particularly in China and other emerging-market economies, with the International Monetary Fund's (IMF) October 2015 report estimating that world year-over-year growth was 3.1 percent in 2015, the slowest rate of global growth since 2009 (see Chapter 3 for more discussion). Spillovers from the slowing pace of China's growth affected many commodity-exporting countries. Slowing foreign growth sharply reduced U.S. exports, as the growth rate of our trade partners was 0.4 percentage points lower during the four quarters ending in 2015:Q3 (the latest available data) than during the year earlier period.

¹ Three snowstorms occurred during 2015:Q1 that were so severe that the National Climate Data Center rated them in the Northeast Snowfall Impact Scale (NESIS). NESIS scores are a function of the area affected by the snowstorm, the amount of snow, and the number of people living in the path of the storm (Kocin and Uccellini 2004). During the 59 years on record, 2015:Q1 was only the fourth time that a quarter was impacted by three or more NESIS-rated storms.

Figure 2-2
Oil and Commodity Prices, 2014–2015



POLICY DEVELOPMENTS

Fiscal Policy

Fiscal restraint in the United States continued in fiscal year (FY) 2015 with the Federal budget deficit falling 0.3 percentage point to 2.5 percent of GDP, the lowest level since 2007 and below the average over the last 40 years. The deficit as a share of GDP has fallen by about three-fourths since 2009, the most rapid six-year deficit reduction since the demobilization after World War II (Figure 2-3). The additional deficit reduction in 2015 was through automatic stabilizers, such as the increase in tax collections as income rises, and was much less severe than the 1.9 percentage point a year decline in the deficit-to-GDP ratio during the three preceding years when changes in tax or spending policy were the primary driver.

The two-year Bipartisan Budget Act of 2013, passed in December 2013, helped provide fiscal-policy stability during FY 2014 and FY 2015. Since that time, a series of agreements—most recently the Bipartisan Budget Act of 2015—have avoided a Federal shutdown, partly relieved automatic Federal spending cuts known as sequestration, and relaxed the Federal debt limit. Government purchases, including consumption and gross investment, at the Federal as well as State and local levels, added modestly to overall

Box 2-1: Impact of Oil Price Declines on Spending and Production

The United States is a net importer of oil, so a decline in oil prices is generally expected to boost domestic real income and lower incomes in countries that are net exporters of oil, such as Saudi Arabia and Russia. Yet, U.S. net oil imports have fallen 63 percent in the last ten years due to both greater domestic production and lower consumption, so the U.S. economy is less sensitive to oil price movements today than in the past. Moreover, the direct impact of oil price changes on energy consumers and energy producers moves in opposite directions. The overall impact of oil price changes also depends on the sources of those price changes.¹ For example, if oil prices fall due to lower demand in a weakening global economy, this is likely to also coincide with a reduction in U.S. GDP growth, but it would be incorrect to infer that the oil price decline itself hurt U.S. GDP growth. In contrast, if the price of oil falls due to an increase in oil supply, such as from technological advances in oil extraction or improving geopolitical conditions in oil producing countries, lower oil prices would tend to increase U.S. GDP. This box analyzes the direct impact of the fall in the price of oil from mid-2014 to late 2015 on the U.S. economy, an exercise that is most informative when the oil price declines are driven primarily by an increase in oil supply.

Overall, CEA estimates, as shown in Table 2-i, that the decline in oil prices had the direct impact of boosting real GDP growth by 0.1 percentage point during 2014 and 0.2 percentage point during 2015. Considerable uncertainty surrounds these estimates of the direct effects of the oil price decline, and moreover, these estimates exclude indirect effects.

The boost to output and consumption from lower oil prices is largely due to the lower cost of imported oil. U.S. net imports of petro-

Table 2-i
Estimated Impact of Oil Price Declines on Output, 2014–2015

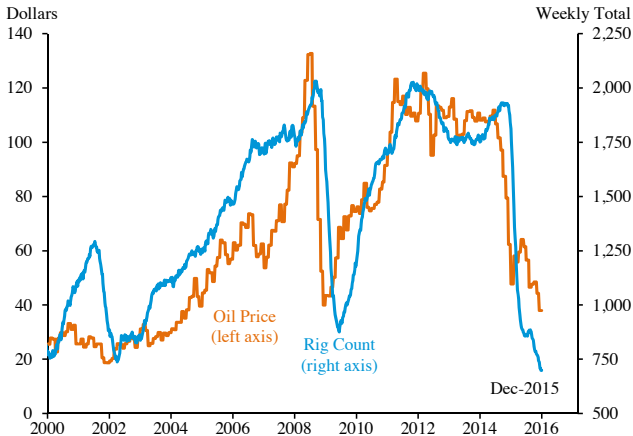
	Growth (Q4-to-Q4)		Cumulative Level
	2014	2015	
Total Impact	0.1	0.2	0.3
Contribution from:			
Consumption (via imported-oil savings)	0.1	0.5	0.6
Drilling and mining investment	0.0	-0.3	-0.3

Source: CEA calculations; Bureau of Economic Analysis; Energy Information Administration.

¹ See also Hamilton (2003) and Kilian (2014) for differing empirical assessments of the source of oil price shocks since the mid-1970s and how oil price shocks have affected the economy.

leum and products averaged 1.8 billion barrels per year in 2014 and 2015, so each \$10 per barrel decline in the price of imports saved the U.S. economy about \$18 billion per year, or about 0.1 percent of nominal GDP. In 2015 as a whole, the United States spent about \$100 billion less on net imported oil than if prices had stayed at their mid-2014 level. In total, the net transfer of income to the United States depends on how much oil prices decline and how long those low prices persist. These savings are spread across all oil-using sectors, especially consumers for whom lower gasoline prices freed up income for other purchases. It may take time for consumers to make those additional purchases, so the timing of the additional spending may lag the declines in oil prices. In fact, the personal saving rate moved up around the start of 2015 when oil prices declined rapidly, but then consumer spending grew strongly in the middle of the year. As oil prices declined sharply in late 2015, the personal saving rate moved up back up in the fourth quarter, suggesting some delay again in the consumption response. CEA estimates that assuming all the savings on imported oil were spent within the year then they would add 0.5 percentage point to GDP growth in 2015 (shown in the “Consumption” line in Table 2-i). This direct estimate does not include additional effects like the multiplier associated with additional economic activity, the boost to consumer confidence, and the potential benefits of lower inflation for monetary policy management.

Figure 2-i
North American Oil Rig Count and Oil Price, 2000–2015

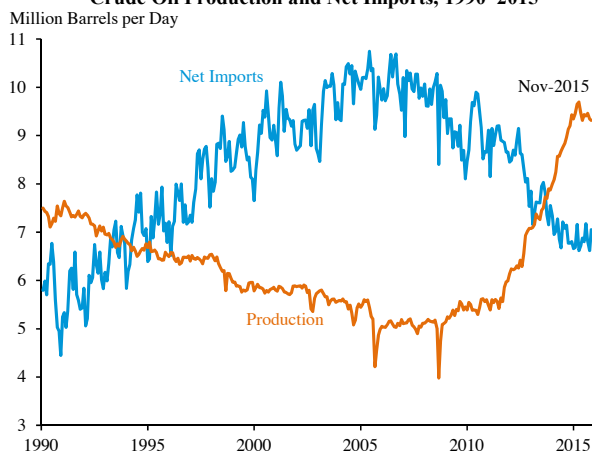


Note: Displayed oil price is the Brent average monthly spot price.
Source: Energy Information Administration; Baker Hughes Inc.

Roughly speaking, the decline in the price of domestically-produced oil sold to U.S. consumers has largely offsetting effects for American oil producers and consumers—although differences in how consumers and producers adjust to lower oil prices may differ enough for aggregate impacts from this channel to appear over shorter horizons. Thus, the primary boost to overall output comes from imported oil. However, the share of imported oil has declined as domestic production increased and domestic oil use fell, so the overall boost to the U.S. economy from this oil price decline is smaller than would have been the case historically.

Changes in oil prices also affect the amount of investment done by oil firms. Oil drilling and exploration dropped sharply in 2015 as shown in Figure 2-i, and these declines weighed down U.S. investment (and GDP) and are not reflected in the net-import savings discussed above. Oil drilling and exploration, as measured by the number of oil rigs in operation, peaked in September 2014 and dropped 62 percent by December 2015. In addition, investment in oil and mining equipment fell 40 percent during 2015. As shown in the “Drilling” line in Table 2-i, the cutback in this investment reduced real GDP growth by 0.3 percentage point in 2015, assuming that investment growth in the drilling sector would have been unchanged if the price had not fallen. In addition, this direct estimate excludes potential additional economic costs, including the multiplier effect and also spillovers from the stresses in credit markets associated with increased default risks of oil companies. On the

Figure 2-ii
Crude Oil Production and Net Imports, 1990–2015



Note: Data are not seasonally adjusted.

Source: Energy Information Administration, Petroleum Supply Monthly.

other hand, oil-using industries benefit from lower oil prices and might increase investment, an effect that is also not captured here.

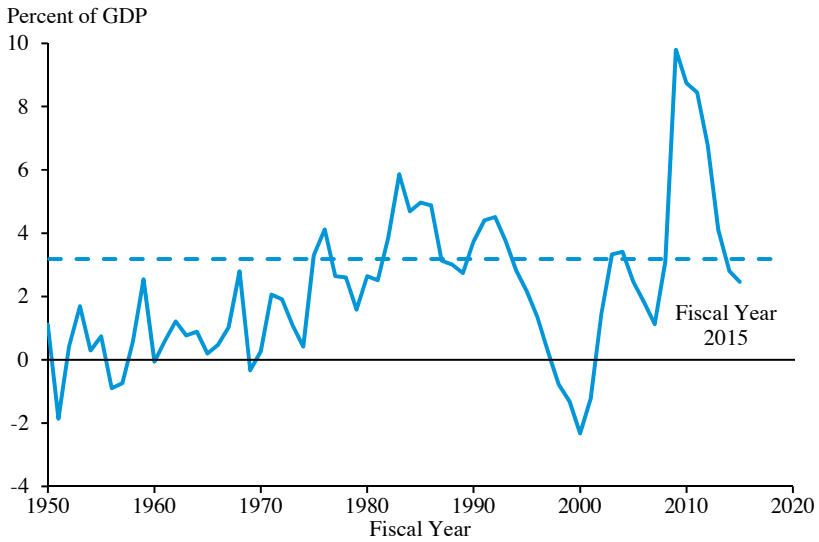
The current direct estimate of a 0.2 percentage point increase in GDP growth in 2015 is well below the 1 percentage point boost implied by the econometric model used in earlier CEA analysis (CEA 2014).² One explanation for the difference is that the econometric models, which are estimated off past oil price changes, also pick up the indirect effects on demand described above. Moreover, any model which assumes a linear relationship between oil prices and output may be less applicable when oil prices fall below production costs. Price declines large enough to cause bankruptcies or large equity price declines in the energy sector could have additional negative impacts. Thinking more broadly about previous historical episodes, another explanation for the smaller boost to GDP from this oil price decline is that the United States now consumes less oil than it did in 1997 (CEA 2015c for an extensive discussion) and produces 4 million barrels a day more than in 2005, so that net oil imports are down (see Figure 2-ii). As a result, the boost to consumption from cheaper imported oil is smaller than in the past, and the impact on oil-sector investment is larger. Moreover, new technologies, such as hydraulic fracturing (fracking), may make investment even more sensitive to oil price changes. By this same logic the U.S. economy will be more resilient to possible future increases in the price of oil.

² The vector auto-regression in the earlier CEA report showed a range of GDP impacts from a 10-percent oil price change depending on the import share of oil. The lower end of the range, cited here, is consistent with the current import share.

output growth in calendar year 2015 (0.2 percentage point), shown in Figure 2-4, after subtracting an average of 0.4 percentage point a year from growth during the four years through 2014. The contribution of Federal purchases to real GDP growth is expected to increase further in 2016, a positive change reinforced by the recent Federal budget deal.

Federal. Having contracted substantially in recent years, Federal fiscal policy was less restrictive in FY 2015. The Consolidated and Further Continuing Appropriations Act, signed into law in December 2014, made the fiscal environment through the end of FY 2015 more stable (that is, compared with a string of short-term continuing resolutions). The Temporary Debt Limit Extension Act, signed in February 2014, suspended the debt ceiling through March 2015. When the Federal debt reached its limit on March 16, 2015, the U.S. Treasury resorted to “extraordinary measures” to function through October without exceeding the debt limit. As the new fiscal year approached on October 1 and budget negotiations began in Congress,

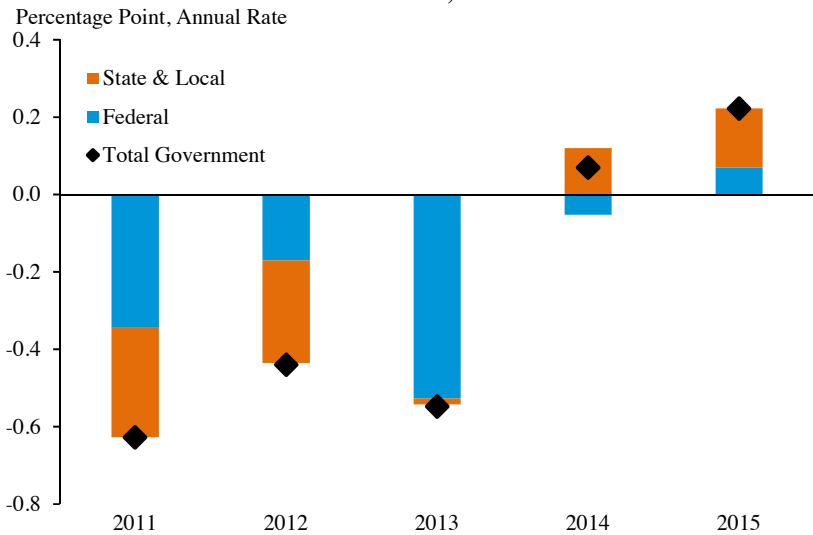
Figure 2-3
Federal Budget Deficit, 1950–2015



Note: Dashed line represents average over 1975–2014.

Source: Office of Management and Budget; Bureau of Economic Analysis, National Income and Product Accounts.

Figure 2-4
Contribution of Government Purchases to
Real GDP Growth, 2011–2015



Note: Contributions are computed using Q4-to-Q4 changes.

Source: Bureau of Economic Analysis; Haver Analytics.

there was some risk of a government shutdown, but a continuing resolution extended spending (at static levels) through December 11. Negotiations continued during the period covered by the continuing resolution, eventually resulting in the Bipartisan Budget Act of 2015 signed on November 2. That agreement suspended the debt ceiling again through March 15, 2017 and lifted sequester spending caps by \$50 billion in FY 2016 and by \$30 billion in FY 2017 (about 0.3 and 0.2 percent of GDP, respectively) split equally between defense and nondefense spending. The passage of the Consolidated Appropriations Act of 2016 in December 2015 set programmatic spending levels consistent with the new caps established by the budget agreement, including increases in investment in research and development, early education, and infrastructure. December legislation also made permanent a number of expiring tax provisions, including credits for research and development, small businesses, and low-income households. Absent any further changes in policy, the debt-to-GDP ratio is expected to rise steadily over the 10-year budget window, increasing from 76.5 percent of GDP at the end of FY 2016 to 87.6 percent at the end of FY 2026. The policies proposed in the President's Budget would stabilize the debt and put it on a declining path through 2025 when it reaches 75.2 percent of GDP.

State and Local. State and local government purchases (consumption plus gross investment) contributed positively, but weakly, to real GDP growth in 2015 for the second consecutive year following four years of negative contributions. The State and local share of nominal GDP fell from its historical peak of 13.0 percent in 2009 to 10.9 percent in 2015, a level not seen since the late 1980s as State and local governments cut their purchases in the face of budget pressures (Box 2-2).

In 2015, State and local government purchases were about 60-percent larger than Federal purchases and four times larger than Federal nondefense purchases (Figure 2-5). In a broad view of fiscal policy, changes in State and local purchases can be as important as changes in Federal purchases.

Monetary Policy

In December 2015, the Federal Open Market Committee (FOMC) increased the target range for the federal funds rate by 0.25 percentage point, ending seven years at its effective lower bound, and maintained that range in January of this year. The FOMC's decision to tighten monetary policy was based on its judgment that labor markets had improved considerably and that it was reasonably confident that inflation would move up over the medium term to its 2-percent objective. When it raised the federal funds rate—an event widely referred to as “lift off”—the FOMC stated that it “expects that economic conditions will evolve in a manner that will warrant

Figure 2-5
Government Purchases as Share of Nominal GDP, 1948–2015

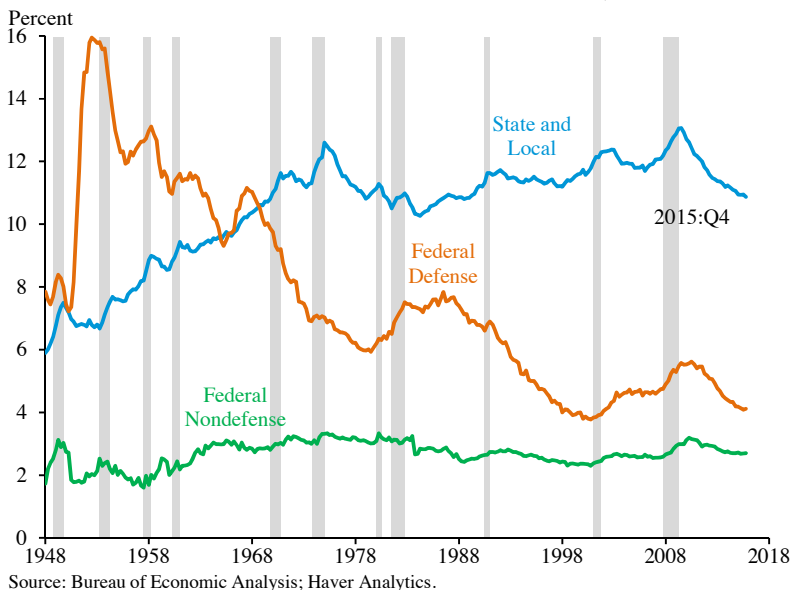
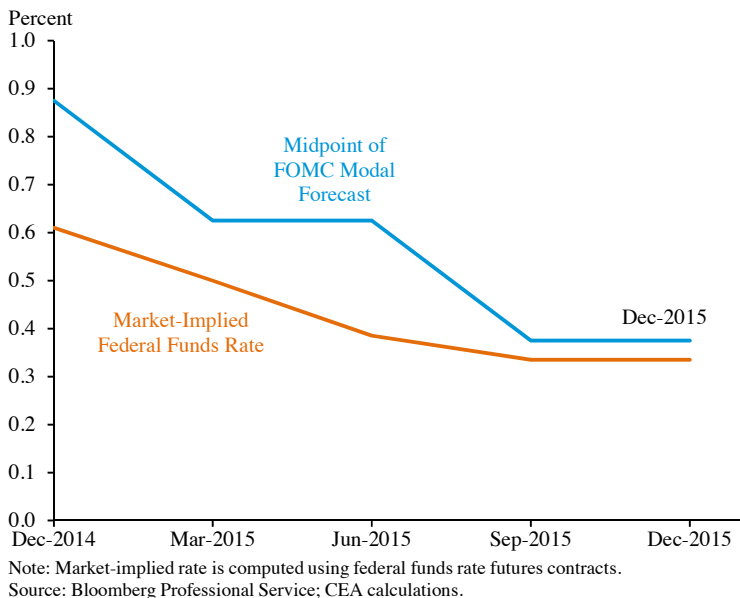
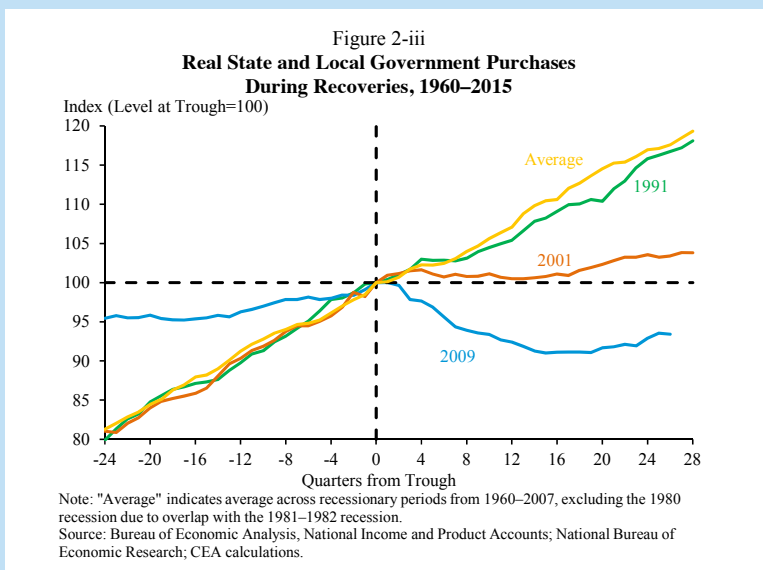


Figure 2-6
Forecast of Federal Funds Rate at Year End 2015



Box 2-2: Challenges in the State and Local Sector

During the current expansion, growth in State and local purchases has been the weakest of any business-cycle recovery in the post-World War II period (Figure 2-iii). During the four quarters of 2010, State and local purchases subtracted 0.5 percentage point from GDP growth, and then subtracted about another 0.3 percentage point in both 2011 and 2012. Spending in this sector stabilized in 2013 and added modestly to GDP growth in 2014 and 2015. State and local governments also cut jobs early in the recovery. Beginning in 2013, though, this trend began to shift. State and local governments have added 210,000 jobs since January 2013. Even so, employment in this sector remains 528,000 below its previous high in 2008, with about 40 percent of this net job loss in educational services. The 1.4-percent decline in education employment exceeded the 0.9-percent decline in the school-age population (ages 5 to 19) over the 2008-14 period. This mismatch implies a rising student-teacher ratio.

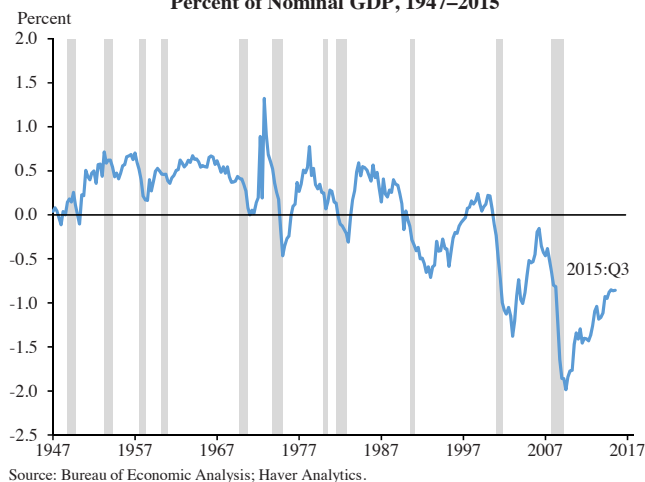


Despite some recovery in 2015, there are still factors likely to restrain State and local spending growth. State and local governments continue to spend more than they collect in revenues and their aggregate deficit during the first three quarters of 2015 amounted to nearly 1 percent of nominal GDP. This deficit has shrunk, however, during the recovery (Figure 2-iv). During 2015, State and local expenditures (including transfers and interest payments, as well as purchases) were roughly flat at about 14 percent of GDP, and revenues held at about

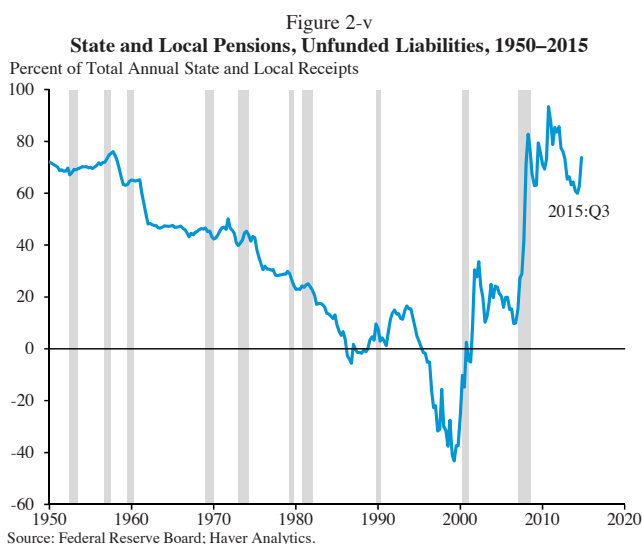
13 percent of GDP. Until 1990, State and local governments only ran deficits during recessions.¹ Since then, State and local governments have frequently run deficits.

Unfunded pension obligations place a heavy burden on State and local government finances. The size of these unfunded pension liabilities relative to State and local receipts ballooned immediately after the recession and remains elevated at a level that was about 65 percent of a year's revenue in the first three quarters of 2015 (Figure 2-v).

Figure 2-iv
State and Local Government Surplus as
Percent of Nominal GDP, 1947–2015



¹ 49 out of 50 states have constitutions or statutes mandating a balanced budget and many local governments have similar provisions. This does not prevent them from running deficits. Many of those balanced budget statutes apply only to the operating budget, while deficits may be allowed on their capital accounts. Also, spending from rainy day funds” appears as a deficit on the government balance sheet in the national income and product accounts.



only gradual increases in the federal funds rate; the federal funds rate is likely to remain, for some time, below levels that are expected to prevail in the longer run” (FOMC 2015).

Over the course of 2015, forecasts for the year-end federal funds rate from both monetary policymakers and financial markets were revised down, as shown in Figure 2-6, implying a later date of “lift off” and fewer rate increases in 2015. By the time the FOMC voted to raise rates in December, financial markets had largely anticipated the increase. Moreover, “lift off” had already largely been incorporated in many investors’ expectations about longer-term interest rates, stock prices, and the dollar. Accordingly, changes in yields on 10-year Treasury notes (Figure 2-37) and 30-year mortgage rates were small in the immediate wake of “lift off.”

The size of the Federal Reserve’s balance sheet at the end of 2015 was \$4.4 trillion—more than five times its size in 2007, reflecting several large-scale asset purchase programs (quantitative easing) from 2008 to 2014, which are estimated to have lowered long-term interest rates by about a percentage point (Engen et al. 2015 and the references therein). Moreover, the Federal Reserve believes the larger stock of Federal Reserve asset holdings has continued to influence long-term interest rates even after the end

of new purchases.² The increase in the Federal Reserve assets has coincided with a large increase in reserves held by banks. In an environment of super-abundant reserves, the Federal Reserve has had to change the way in which it raises the federal funds rate. In its communications over the course of 2014 and 2015, the FOMC indicated that the tools that the Federal Reserve intended to use during policy normalization would include interest paid on reserves and overnight reverse repurchase agreements.³

In recent years, FOMC participants have tended to lower their forecasts for the longer-run level for the federal funds rate. The revisions have been consistent with downward trends in long-term interest rates in U.S. and global financial markets.

LABOR MARKET

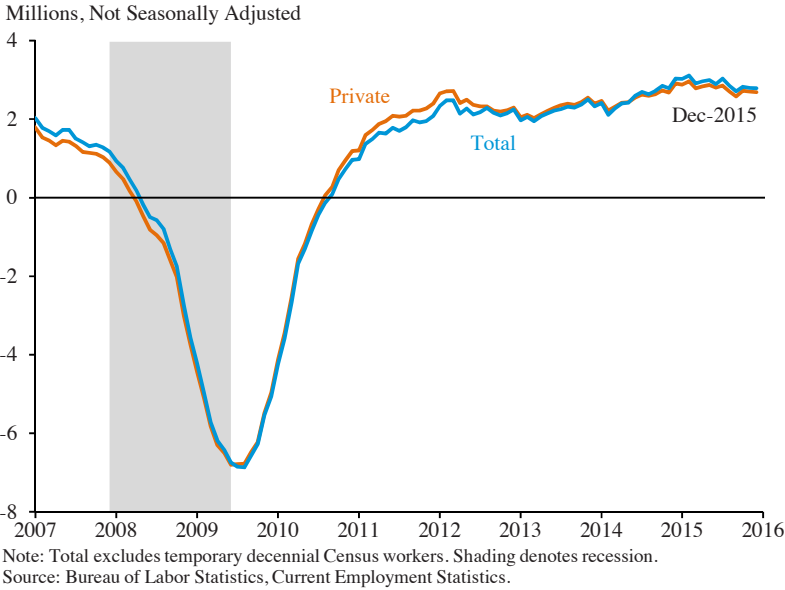
The labor market continued to improve rapidly in 2015, with many measures of labor-market performance now recovered to or near their pre-recession levels. Over the course of the year, the economy added 2.7 million jobs, completing the strongest two years of job growth since 1999. American businesses have now added 13.8 million jobs over 70 straight months through December, extending the longest streak on record. The unemployment rate had fallen by half from its peak during the recession to 5.0 percent in December, its lowest level since April 2008. The robust pace of job growth has translated into broad-based gains, but some slack remains in the labor market, including a somewhat elevated level of part-time employment and a depressed level of labor force participation. Moreover, the pace of nominal wage growth picked up only modestly during 2015.

Private employment increased by 2.6 million jobs during the 12 months of 2015, after rising by 2.8 million jobs in 2014 (Figure 2-7). About half of the jobs in 2015 came from professional and business services as well as education and health services, both of which have been major drivers of job growth in this recovery. These sectors account for a large part of growth despite the fact that they make up only about 35 percent of private-sector jobs in the economy. Education and health services added 692,000 jobs in

² Federal Reserve Chair Yellen (2011) has stated that “the underlying theory, in which asset prices are directly linked to the outstanding quantity of assets, dates back to the early 1950s ... Consequently, the term structure of interest rates can be influenced by exogenous shocks in supply and demand at specific maturities. Purchases of longer-term securities by the central bank can be viewed as a shift in supply that tends to push up the prices and drive down the yields on those securities.”

³ See Ihrig et al. (2015) for a discussion of how interest rates paid on excess reserves and overnight reverse repurchase agreements have replaced open market operations—the buying and selling of Treasury securities—as the way in which the Federal Reserve achieves its target policy rate.

Figure 2-7

12-Month Change in Nonfarm Payroll Employment, 2007–2015

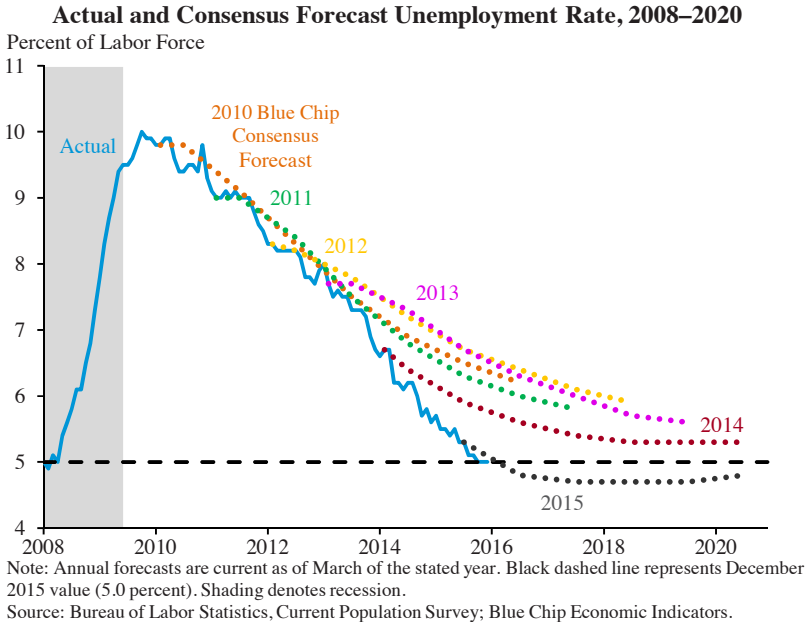
2015—its largest one-year increase on record—and professional and business services added 621,000 jobs, consistent with its growth over the course of this recovery.

Despite overall strength, particularly in the services sector, some industries faced specific headwinds that held down growth in 2015. Slower job growth in the oil-sensitive mining and logging sector and the export-sensitive manufacturing sector can more than account for the modest slowdown in job growth during 2015. Mining and logging lost 133,000 jobs in 2015, largely due to industry cutbacks in the face of the sharp fall in oil prices and has reverted to its 2011 level of employment. Manufacturing also experienced a weak year of job growth, adding only 33,000 jobs, likely reflecting the global economic slowdown dampening demand for U.S. exports. Given that exports are comprised disproportionately of goods and manufactured products, a slowdown in exports affects goods-producing jobs more than the service sector.

The labor market's improvement was also apparent in the continued rapid decline of the unemployment rate. By December 2015, the unemployment rate had fallen to 5.0 percent, falling an average of 0.8 percentage point a year from 2010 to 2015, below its pre-recession average of 5.3 percent.⁴

⁴ Throughout this section, pre-recession average refers to the average from December 2001 to December 2007.

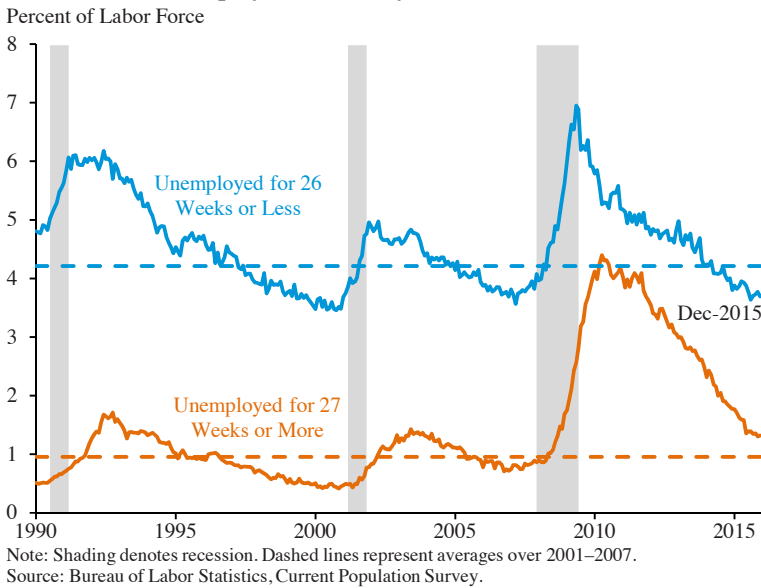
Figure 2-8



The unemployment rate reached this level before most forecasters expected. As of March 2014, economists generally expected the unemployment rate to remain above 5.0 percent at least until 2020 (Figure 2-8). The unexpectedly low level of the unemployment rate, along with little pickup in inflation, also led many economists to revise down the “natural” rate of unemployment. Still it appears that the unemployment rate is almost back to normal levels and the pace of decline is expected to moderate next year.

Although the overall unemployment rate is now below its pre-recession average and mirrors other indicators of labor market strength, some broader indicators of labor market slack remained above their pre-recession levels. For example, the long-term unemployment rate was 1.3 percent in December, the lowest it has been since 2008 but above its pre-recession average of 1.0 percent (Figure 2-9). Despite this continued elevation, the number of long-term unemployed fell faster in 2015 than the number of short-term unemployed. In 2015, the long-term unemployment rate fell by 0.5 percentage point, accounting for over 85 percent of the decline in the overall unemployment rate, though the long-term unemployed make up about one-quarter of the unemployed. If the number of long-term unemployed continues to fall at the same rate as it has over the past year, it will reach its pre-recession average in 2016.

Figure 2-9
Unemployment Rate by Duration, 1990–2015

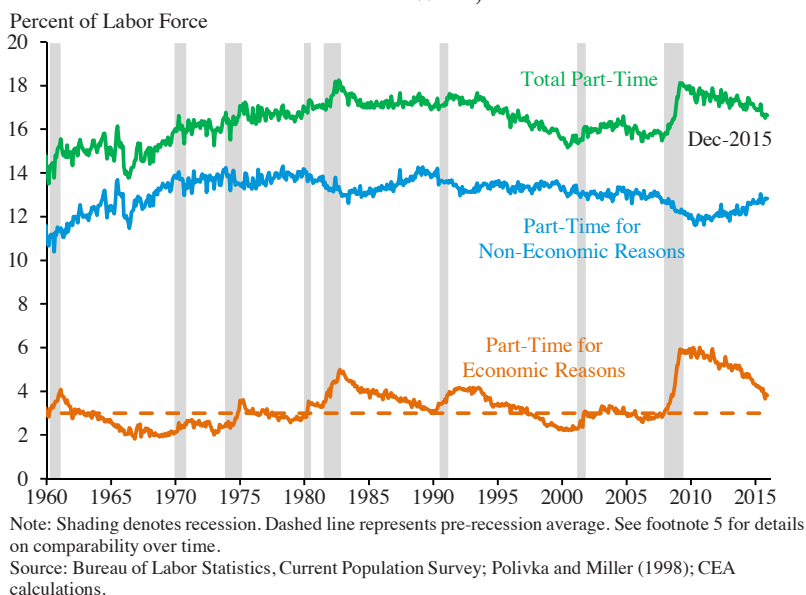


Similarly, the share of the labor force working part-time for economic reasons, while falling steadily, remains above its pre-recession average and could indicate continued underutilization of labor. Between December 2007 and December 2009, the share of the labor force usually working part-time rose from 16.1 to 17.9 percent, driven by a large rise in the share of people working part-time for economic reasons. As the recovery progressed, the share of the labor force working part-time began to recede (Figure 2-10).⁵ In 2015, the share of the labor force working part-time for economic reasons continued to fall, declining 0.5 percentage point. As of December, the rate stood at 3.8 percent, 2.2 percentage points below its peak in 2010, but still above its pre-recession average of 3.0 percent.

The persistence in the rate of part-time work for economic reasons, especially relative to other measures of slack, is largely responsible for the continued elevation of the U-6 “underemployment” rate. The

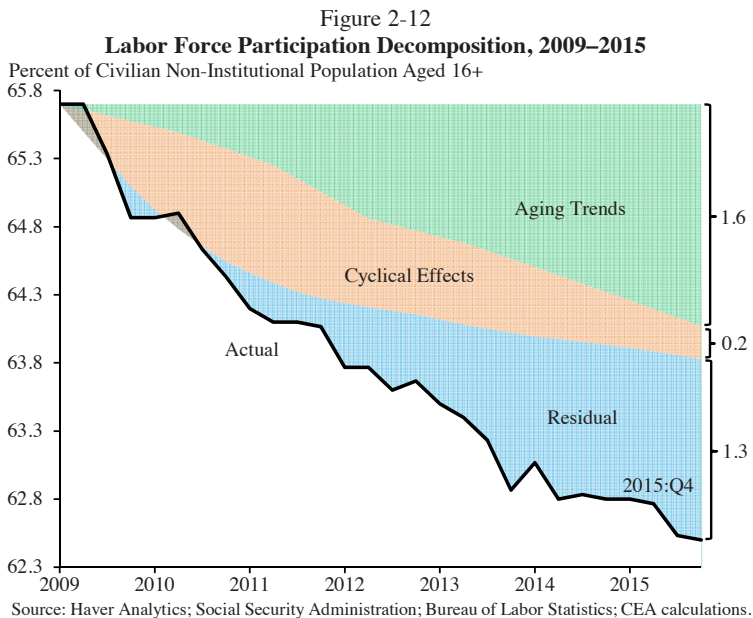
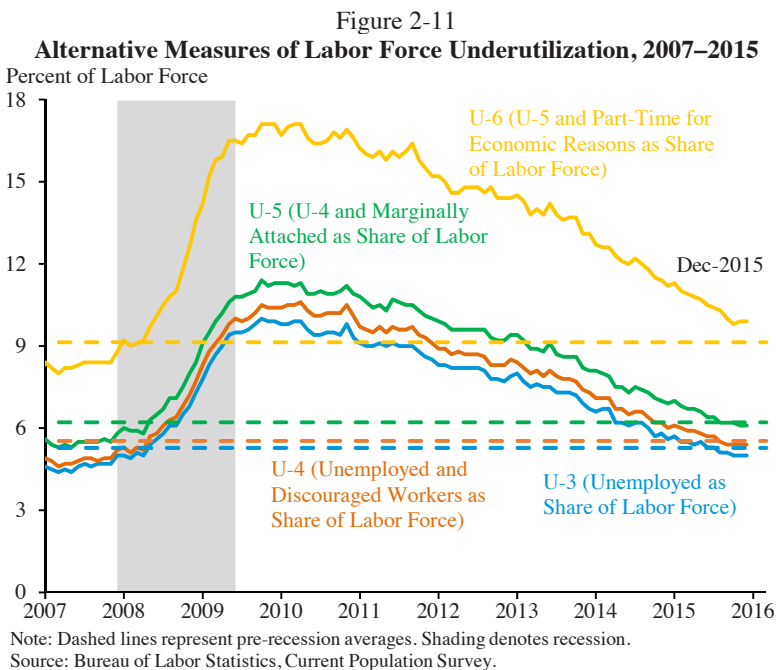
⁵ Care must be taken when comparing the share of workers who are part-time for economic reasons before and after the 1994 redesign of the Current Population Survey. CEA used the multiplicative adjustment factors reported by Polivka and Miller (1998) in order to place the pre-1994 estimates of the part-time for economic reasons rate on a comparable basis with post-redesign estimates. For the part-time series for which Polivka and Miller do not report suitable adjustment factors, the pre- and post-redesign series were spliced by multiplying the pre-1994 estimates by the ratio of the January 1994 rate to the December 1993 rate. This procedure generates similar results to the Polivka and Miller factors for series for which multiplicative factors are available.

Figure 2-10
Rates of Part-Time Work, 1960–2015



underemployment rate uses a broader concept of labor market slack than the unemployment rate, including discouraged workers who have given up on looking for a job, those marginally attached to the labor force, and those employed part-time for economic reasons. Although it has recovered 90 percent from its peak during the recession, as of December 2015, it stood at 9.9 percent. During the 12 months of 2015, the U-6 rate declined 1.5 percentage point (Figure 2-11).

The labor force participation rate (LFPR) edged down over the year, by 0.1 percentage point, roughly in line with what one would have expected based on shifting demographics. Throughout the recovery and following the longer-term trend of population aging, the decline in the working-age share of the population has pushed down the LFPR. Between the first quarter of 2009 and the fourth quarter of 2015, the LFPR fell 3.2 percentage points. CEA estimates that more than half of this decline was due to the aging of the baby-boom generation into retirement (Figure 2-12). These demographic-related declines will become steeper in the near term, as the peak of the baby-boom generation retires. Between the first quarter of 2009 and the fourth quarter of 2013, about a sixth of the participation-rate decline was due to cyclical factors indicated by the high unemployment rates that caused potential job-seekers to delay entry into the labor force or become discouraged. The cyclical contribution to the participation decline has eased in recent years to



less than a tenth of the overall decline in participation as the economy has recovered, and is likely to ease further as the unemployment rate continues to decline. The remaining 40 percent of the decline in the participation rate since 2009 is unrelated to population aging or changes in the unemployment rate. This “residual” likely reflects structural factors like the longstanding downward trend in participation among prime-age workers and other cyclical factors, such as the high levels of long-term unemployment in the Great Recession, that are not fully captured in the unemployment rate. In 2015 the additional drag from unexplained factors largely offset the boost to participation from the cyclical recovery. In light of ongoing demographic shifts and longer-term trends, the participation rate is expected to decline modestly in 2016, even as cyclical factors recede further. The Administration has proposed policies to support labor force participation through more flexible workplaces and paid leave, expanded high-quality pre-school, increased subsidies for child care, and a wage insurance system that would encourage reentry into work (Box 2-8).

As the recovery in the labor market progresses, the pace of job growth consistent with a strong overall labor market is likely to fall as the unemployment rate begins to plateau, particularly in light of demographic patterns (Box 2-3).

OUTPUT

Real GDP grew 1.8 percent over the four quarters of 2015, somewhat below its pace in recent years. GDP grew at a similar pace as gross domestic output (GDO)—a more accurate measure of output than GDP—during the four quarters through 2015:Q3, which is the most recent quarter of GDO data, (Figure 2-13). Gross domestic output, discussed more in Box 2-4, is a newly published aggregate calculated as the “average of real GDP and real gross domestic income.”

The overall composition of demand during 2015 shows that most of the growth was accounted for by the household spending sectors: consumer spending and residential investment, while contributions from the other sectors were small and generally offsetting. Residential investment was the fastest-growing major component of demand increasing 9.0 percent during the four quarters of the year, and contributing 0.3 percentage point to the four-quarter growth of GDP. Consumer spending, which comprises about two-thirds of GDP, increased 2.6 percent and can account for all the year’s output growth. In addition, sales of new cars and light trucks hit 17.4 million in 2015, the highest level on record.

Box 2-3: Expectations for Future Job Growth

Given the progress of the labor market recovery as well as ongoing population aging, “steady state” job growth—the level consistent with a stable, low unemployment rate—is lower than the robust growth seen over the past several years. As the unemployment rate reaches a low level, it is unlikely to continue declining at the same pace as earlier in the recovery and could begin to plateau. Thus, the economy would not need to add as many jobs to maintain a strong overall labor market. In fact, CEA estimates that only 78,000 jobs a month would be needed in 2016 to keep the unemployment rate unchanged at 5.0 percent (top middle cell in Table 2-ii) if labor force participation declined in line with demographics. In contrast, if job gains were 141,000 a month in 2016—still well below the pace in 2015—and participation declined with its aging trend, the unemployment rate would be expected to fall another 0.5 percentage point by 2016:Q4. In reality, the relationship between jobs and the unemployment rate could differ for a variety of reasons, including that the two series are drawn from different surveys that are subject to different measurement errors.

Both male and female labor force participation have been falling on an age-adjusted basis (For men, this has been happening since the 1950s; for women, since 2000). In the business cycle from 2000 to 2007, the labor force participation rate fell 0.15 percentage point a year, during a period when the demographics of aging exerted little downward force on the aggregate participation rate. If this were to continue, then only 51,000 jobs a month would be needed to stabilize the unemployment rate.

If instead, there were enough cyclical improvement to keep the labor force participation rate constant in 2016, offsetting any aging and other trends, then more job growth would be needed for each level of the unemployment rate. Even if the unemployment rate falls to 4.5 percent and there is a cyclical rebound in labor force participation, the economy would only need to add 190,000 jobs a month, a slower pace than during the past two years. Thus, a slower pace of job growth in 2016 would be consistent with a normalizing and strong labor market.

Table 2-ii

Job Growth Consistent with Unemployment and Participation Paths

(Thousands, Monthly Average in 2016)

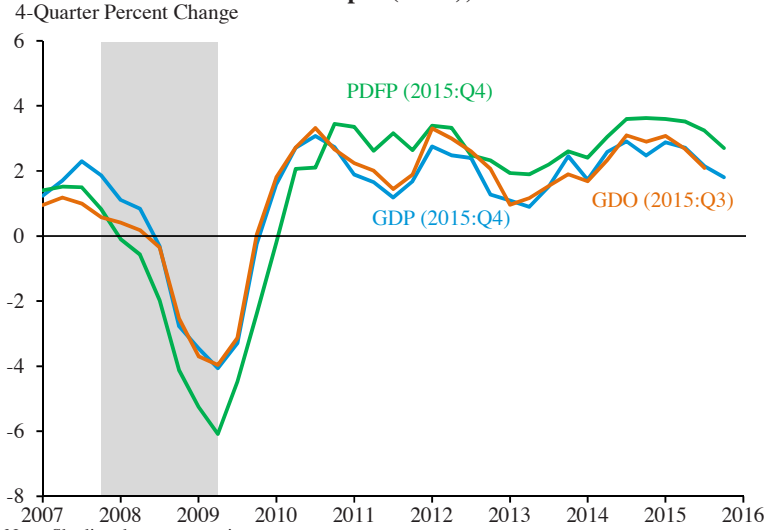
Unemployment Rate	Labor Force Participation Rate		
	Flat	Falls with Aging	Aging & Secular Declines
Flat	127	78	51
Falls 0.5 percentage point	190	141	114

Source: Bureau of Labor Statistics; Social Security Administration; CEA calculations.

Business fixed investment grew 3.1 percent, with strong growth in intellectual property, but slow growth in equipment and structures, which was held back by investment in the drilling sector amid low oil prices. Inventory investment added almost a percentage point to growth at an annual rate in the first quarter of 2015, but subtracted almost as much during the second half of the year. Manufacturing production continued to expand, but at a slower pace than in 2014. Domestic motor vehicle assemblies grew 2.5 percent during the four quarters averaging 12.1 million units in 2015, their highest level since 2003.

Growth in domestic demand was resilient in 2015, though weaker foreign growth was a headwind. The aggregate of consumption and fixed investment, known as private domestic final purchases (PDFP), also rose faster than overall output at 2.7 percent in 2015 (Figure 2-13). The solid pace of PDFP growth in 2015, which is typically a better predictor of the next quarter's future output growth than current output growth, suggests that near-term U.S. growth prospects are positive. Nevertheless, CEA expects that the components of real GDP that are not in PDFP, such as net exports, will hold back overall real GDP growth next year. In particular, weaker foreign growth likely will continue to weigh on net exports. Real exports decreased 0.8 percent in 2015, compared with 2.4-percent growth in 2014 and 5.2-percent growth in 2013.

Figure 2-13
Real Growth in GDP, Private Domestic Final Purchases (PDFP), and Gross Domestic Output (GDO), 2007–2015



Note: Shading denotes recession.
Source: Bureau of Economic Analysis.

Consumer Spending

Real consumer spending increased 2.6 percent during the four quarters of 2015, somewhat below the 3.2-percent growth last year. Moderate spending growth was accompanied by stronger growth in real disposable income, due in part to the direct impact of lower oil prices (see Box 2-1), as well as by upbeat consumer sentiment and earlier gains in household wealth. Low interest rates and improving access to credit, particularly auto loans, also supported consumer spending. Overall, the personal saving rate has largely been fairly stable at around 5 percent of disposable personal income since the beginning of 2013, implying that consumer spending growth has largely tracked real income growth (Figure 2-14).

Growth was strong for real household purchases of durable goods (5.2 percent). Growth was moderate for nondurables (2.6 percent) and services (2.2 percent). As discussed above in Box 2-1, CEA estimates that the direct impact of the decline in oil prices via its reduction in net imported oil costs since mid-2014 boosted consumer spending growth by 0.7 percentage point in 2015 following about 0.1 percentage point in 2014.⁶

Light motor vehicle sales rose to 17.4 million units in 2015, the highest level on record and the sixth consecutive yearly increase. Sales trended up during the year, near 18 million units at an annual rate in the fourth quarter. Motor vehicle assemblies also increased from the first to the second half of the year and, at year end, inventory-to-sales ratios were near their long-term averages. Between 2007 and 2014, the average age of the fleet of private light motor vehicles rose from 10.0 to 11.4 years, likely reflecting an increase in vehicle quality as well as some delay in new purchases during the recession. If so, replacement demand—in addition to ongoing recovery in labor markets and income growth—should support new vehicle sales during 2016.

Consumer sentiment improved noticeably around the start of 2015 as gasoline prices declined sharply, and remained more optimistic in 2015 than at any point in the recovery.

In 2015, the University of Michigan's Index of Consumer Sentiment moved back in line with its levels before the recession and the Conference Board Index, while still somewhat lower than before the recession, was also at its highest level in the recovery (Figure 2-15). Relatedly, the recovery in

⁶Note that the estimated boost to spending in Box 2-1 is somewhat smaller since those are contributions to GDP growth and PCE is only 68 percent of GDP. Some of the boost to consumer spending growth from lower oil prices may be missing in the official data, since BEA is unable to remove gasoline sales at non-gasoline establishments, such as Big Box retailers, in its translation of the retail sales data. Sharp declines in gasoline prices make the real outlays at these establishments, which are all treated as non-gasoline spending, look weaker than they actually are. CEA estimates that this measurement error is understating real PCE growth by about 0.1 percentage point during 2015.

Figure 2-14
Personal Saving Rate, 2000–2015

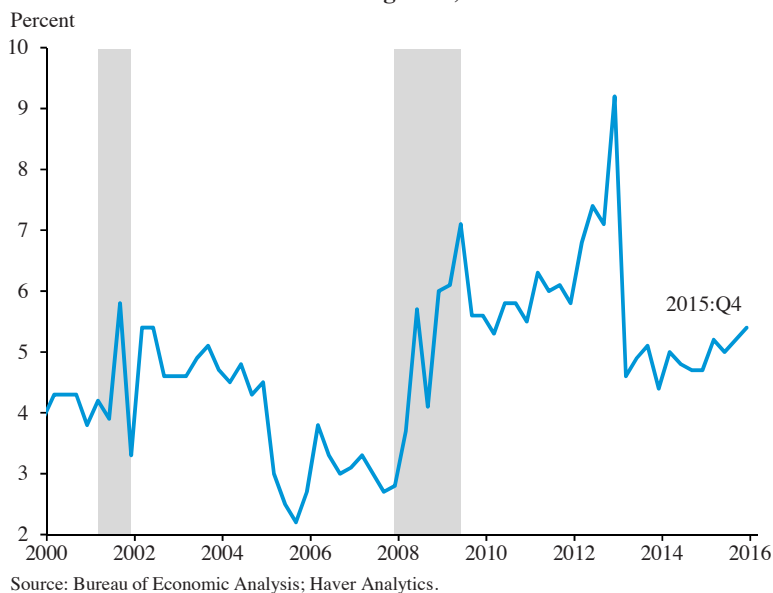
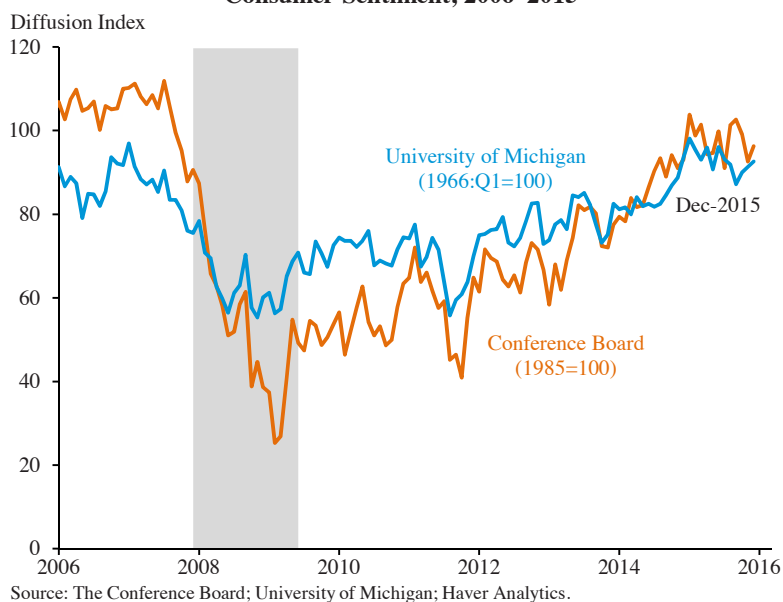


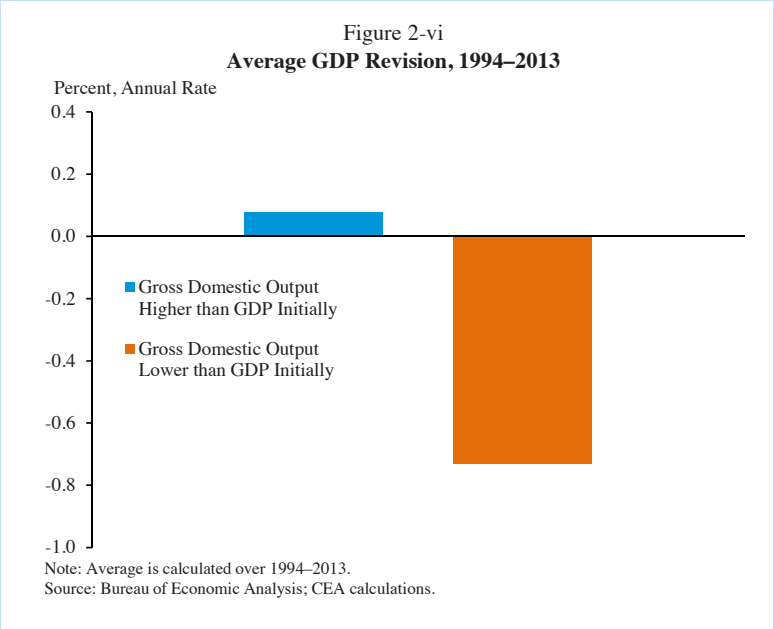
Figure 2-15
Consumer Sentiment, 2006–2015



Box 2-4: A Better Measure of Output: Gross Domestic Output (GDO)

Measuring the strength of the economy can be difficult as it depends on surveys and administrative source data that are necessarily imperfect and incomplete in their ability to capture a complex, dynamic, and large economy. Official statistics measure the total output of the economy in two distinct ways: first, gross domestic product (GDP), which cumulates various measures of production by adding consumption, investment, government spending, and net exports; and second, gross domestic income (GDI), which cumulates incomes by adding labor compensation, business profits, and other sources of income. In theory, these two measures of output should be identical; however, they differ in practice because of measurement error. For example, the level of GDP was about 1-percent less than GDI during the first three quarters of 2015, though over longer time periods neither measure is typically stronger or weaker.¹

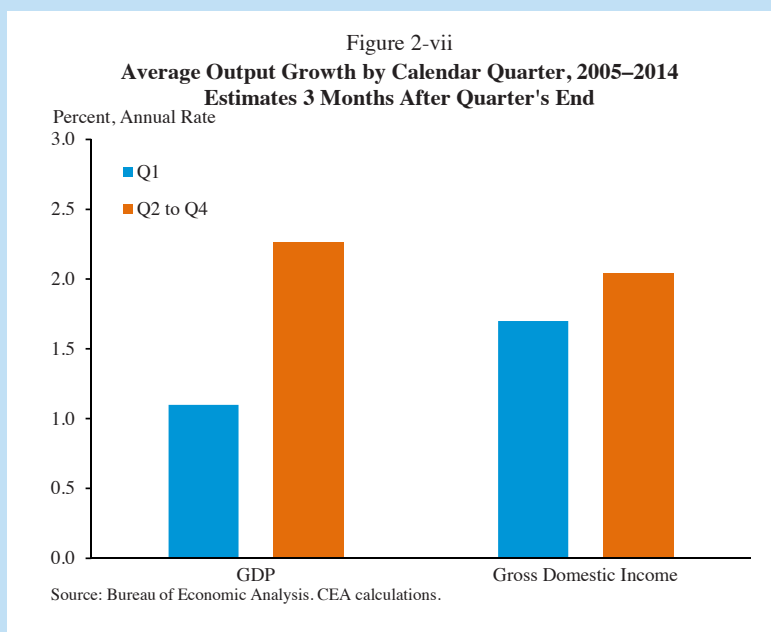
In July 2015, the Bureau of Economic Analysis (BEA) began publishing the average of GDP and GDI—which CEA refers to as gross domestic output (GDO). Real GDO growth is often close to real GDP growth, but differences can be important. For example, GDO slowed more in 2007 than GDP and gave an earlier signal of the impending severe recession.



¹ The fourth-quarter estimate of GDI was not published when this *Report* went to press.

BEA revises the official statistics on output several times because the first estimates within months of a quarter's end use incomplete and preliminary data—an unavoidable tradeoff for getting a quick read on economic activity. Research has shown that GDO can be especially helpful in predicting future revisions to GDP, and thus may improve CEA's ability to assess current economic conditions (CEA 2015a). In fact, when GDO growth is initially estimated to be faster than GDP growth, GDP growth tends to revise up and vice versa (Figure 2-vi).² Through the third quarter of 2015, GDP and GDO grew 2.2 percent and 2.0 percent, respectively, from a year earlier.

GDO also sheds light on recent economic anomalies, such as the weakness in first-quarter GDP growth in recent years. When initial estimates showed a decline in real GDP in 2015:Q1, some analysts argued first-quarter growth was being systematically understated because of incomplete adjustment for seasonal changes (referred to as “residual seasonality”). One sign of a measurement problem for the 2005-10 interval was that estimates of first-quarter GDI (and thus GDO) growth at the time were less depressed than was first-quarter GDP growth (Figure 2-vii). In 2015, the initial estimate of first-quarter GDO growth was again



² The analysis in Figure 2-vi and Figure 2-vii uses the BEA's third estimate of GDP, which is published three months after a quarter's end. This data release also includes either the first (in the fourth quarter) or second estimate of GDI.

above GDP growth. In fact, at the annual revision in July, BEA revisited its seasonal adjustment and incorporated revised source data, which led to an upward revision in 2015:Q1 GDP growth.

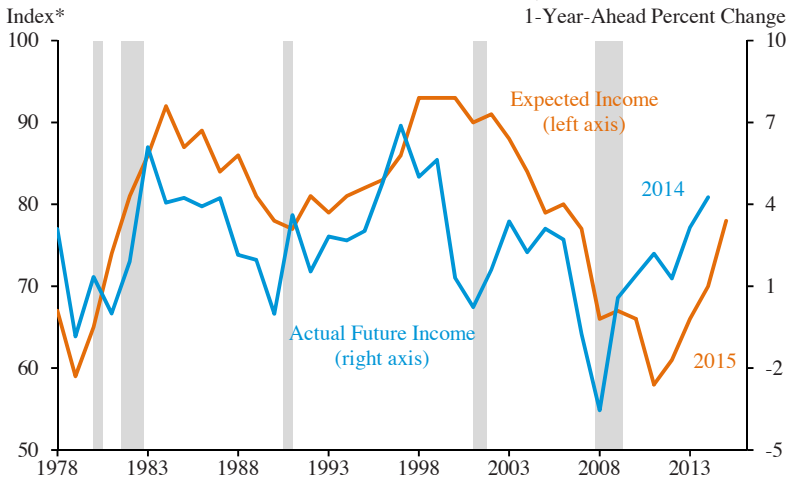
It has long been the practice in many economic analyses, including those at CEA, to combine product- and income-side measures of output as a way to reduce measurement error and gain a more accurate picture of the economy. In fact, CEA began using an average of GDP and GDI with the 1997 *Economic Report to the President*. No single measure of the economy is perfect. Measures are subject to measurement error, transitory shocks, and conceptual challenges. As a result, it is important to look at multiple measures of economic conditions and over longer periods of time to discern trends. Widening the focus from GDP to other measures of output like GDO provides a more accurate and forward-looking picture of the state of the economy.

income expectations was particularly welcome and likely supported spending growth in 2015. Expected real income growth, as measured in the Michigan Survey, fell sharply during the recession and remained depressed even after actual real income growth had begun to recover. This heightened pessimism contrasted with the past several decades—when income expectations and actual income growth tended move together reasonably well (Figure 2-16; Sahm 2013). Unusual caution about income prospects may have weighed on consumer borrowing and spending growth. The rebound in income expectations in 2015 was a sign that the extra pessimism may have begun to wane.

Meanwhile, the debt of U.S. households relative to their disposable income continued to fall (Figure 2-17). Before the financial crisis, household debt relative to income rose dramatically, largely due to net mortgage originations, and then declined sharply after the crisis, a pattern known as “deleveraging.” Charge offs of delinquent mortgage debt played an important role in lowering household debt, but the decline in new mortgage originations played a role as well (Vidangos 2015). By the end of 2015:Q2, the debt-to-income ratio was at its lowest level since 2002. The level of mortgage debt relative to income continued to decline in 2015, while consumer credit (including credit card, auto, and student loans) relative to income increased slightly.

Moreover, with historically low interest rates, the amount of income required to service these debts has fallen dramatically. Estimates based on aggregate data, could mask higher debt burdens for some families; that is, the health of personal finances varies substantially across households.

Figure 2-16
Real Income Growth Over Next Year, 1978–2015



* Index is 100 when the share of the population expecting an increase in income exactly balances the share of the population expecting a decrease in income. An index above 100 means a larger share expects an increase in income.

Note: Shading denotes recession.

Source: University of Michigan; Bureau of Economic Analysis; CEA calculations.

Nonetheless, according to the 2013 Survey of Consumer Finances, the fraction of families with payment-to-income ratios greater than 40 percent declined below the level seen in 2001 (Bricker et al. 2014).

Earlier gains in household net worth (that is, assets less debts, also referred to as household wealth) also supported consumer spending growth in 2015, but to a lesser extent than in 2014 (Figure 2-18). Yet, declines in equity wealth since the second quarter of 2015 have likely weighed some on spending. The wealth-to-income ratio remained elevated in 2015, following its marked increase during 2013. Changes in net worth have been spread unevenly across households, though, and these disparities may have implications for families and macroeconomic activity. For example, wealth has become increasingly concentrated, such that the share of wealth held by the bottom 90 percent of households fell from 33.2 percent in 1989 to 24.7 percent in 2013 (Bricker et al. 2014).

Housing Markets

The housing market recovery picked up steam in 2015, undergoing what was by some measures the largest improvement since 2007. Single-family home sales, bolstered by stronger labor market conditions and low mortgage interest rates, increased substantially to their highest level since 2007. Real residential investment increased 9.0 percent during the four

Figure 2-17
**Household Debt Relative to
 Disposable Personal Income (DPI), 1995–2015**

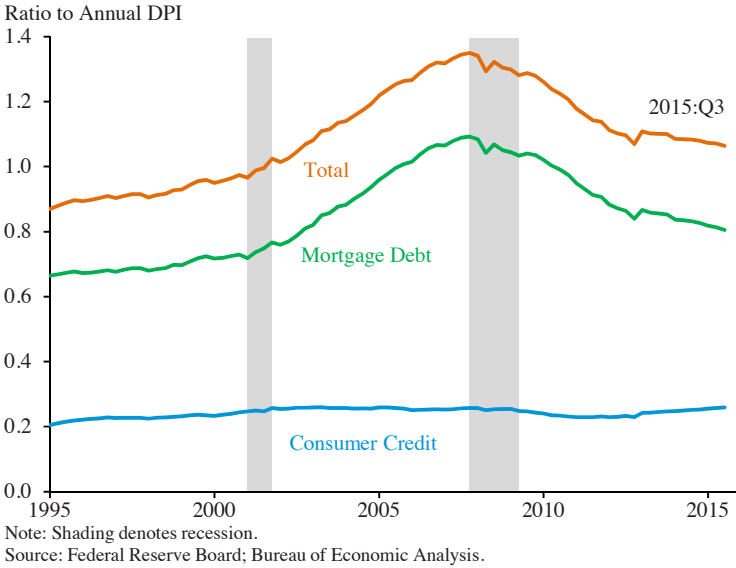
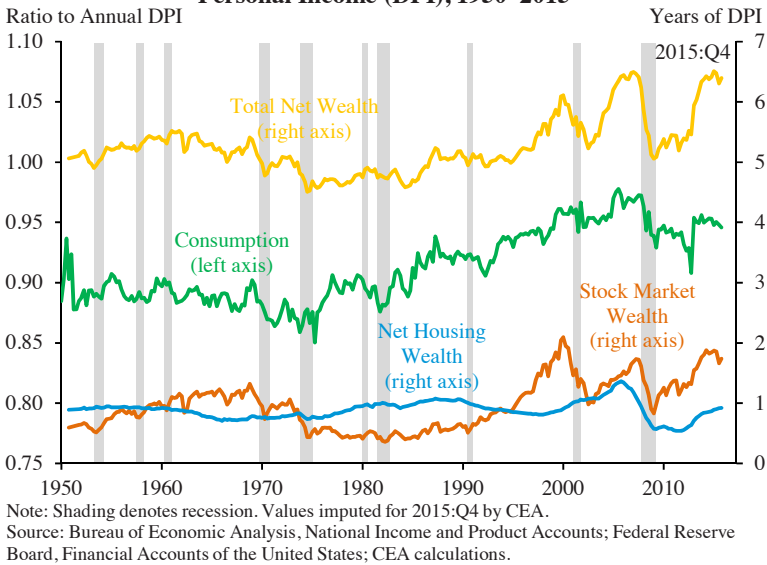


Figure 2-18
**Consumption and Wealth Relative to Disposable
 Personal Income (DPI), 1950–2015**



Box 2-5: Are Official Estimates of GDP Missing More Growth?

While GDP growth rebounded after its sharp drop in the recession, it has held above 2 percent, on average, since 2013, despite marked improvement in the labor market. The unemployment rate is one of the most informative statistics on business-cycle changes in economic activity, and generally seen as less prone to mis-measurement than real GDP. Thus, when the unemployment rate sends a more positive signal than GDP growth, it is natural to question, among other things, whether measurement error in GDP has gotten worse.¹ If true, this would change one's understanding of the economy and recovery.

Official GDP estimates from the Bureau of Economic Analysis use high-quality data from various sources and follow international standards for national accounting. Even with diligent efforts and improving methods, accurately measuring the U.S. economy is a formidable challenge given its size and complexity. The potential understatement of growth in the official GDP estimates could come from incomplete coverage of new goods and services, as well as prices that do not fully reflect quality improvements. This is a long-standing and well-known issue and has motivated a series of methodological improvements since the first estimate of national income was published in 1934.

The substantial declines in the unemployment rate and robust job gains in recent years would historically have tended to coincide with a pickup in real GDP growth relative to its trend. Yet, as Figure 2-viii shows, the official estimate of real GDP growth (the blue line) has held slightly above 2 percent in recent years, as opposed to picking up. One way to roughly quantify the amount of “missing” GDP growth vis-à-vis labor market recovery, is with an empirical regularity known as “Okun’s Law.” Official GDP growth has been about 1-percent point below the output growth predicted from the labor market (the orange line) since 2005 and about 2 percentage points below since 2010.² The persistent discrepancy between recovery in the product market and labor market

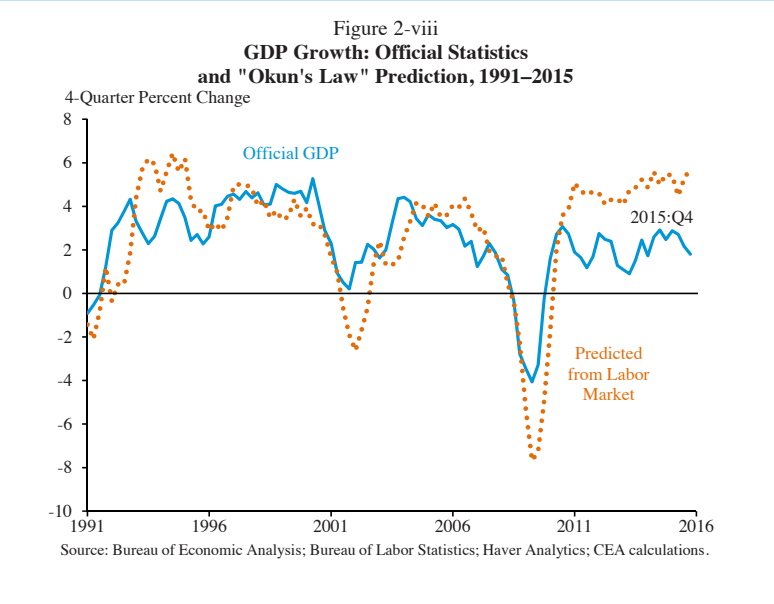
¹ For example, Hatzius and Dawsey (2015) calculated that measurement problems, including an underestimate of the high-tech price declines and free online media, have led to official statistics to miss 0.7 percentage point of annual growth this decade, up from 0.2 percentage point of missing growth in the 1996-2001 period.

² The labor-market prediction of output growth using “Okun’s Law” relies on several assumptions and is intended as an illustration. On its own, this gap is not evidence of measurement error in GDP. According to “Okun’s Law,” a 1 percentage point decline in the unemployment typically coincides with a 2 percentage point pickup in real output growth above its trend. . The trend here counterfactually assumes annual labor productivity growth at its historical average, changes in the labor force participation rate only due to demographics, and a constant unemployment rate of 4.9 percent.

might be a sign of a growing measurement problem or it may signal a slowdown in trend productivity.

Goods and services without a direct market exchange have long posed a challenge in GDP statistics, but the proliferation of free online media and open-source software have led to claims that digital “dark matter” is increasingly a source of missing GDP growth. Researchers have used various methods to value the real output in this sector, despite the fact that in some cases the inputs as well as the outputs do not have a market price. The quantitative impact on real GDP growth in each case is fairly modest. In many cases, the impact on consumer surplus, which is related to how much more consumers or firms would be willing to pay for these free goods and services, is large, but that is a measure of overall welfare, not simply output. Taken together, however, missing GDP from digital dark matter could be substantial; the question is whether we are missing more GDP growth than in the past. As one example, online videos may have largely substituted for television shows, neither of which are fully reflected in real GDP growth.

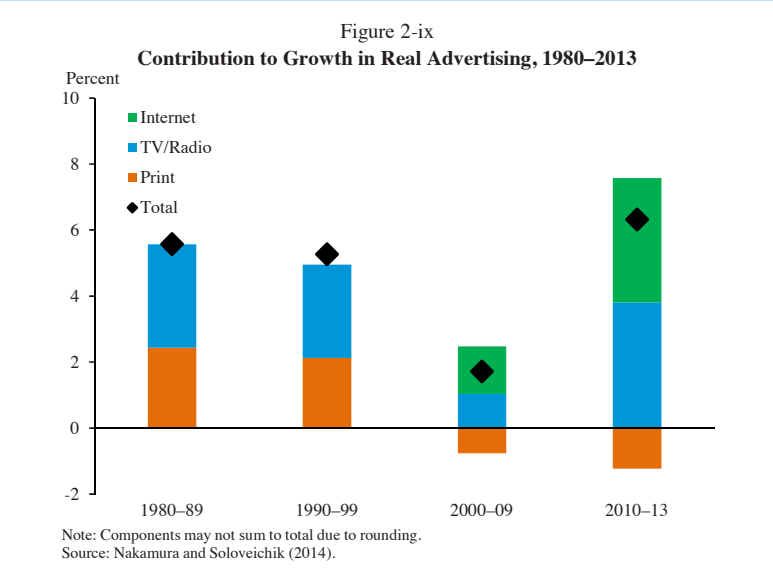
Alternate methods have led to widely different estimates of the value of online media to consumers. One method relies on the market-value of consumers’ time, either to value the time they spend watching online media, as in Brynjolfsson and Oh (2012), or to value the time saved with online search tools, as in Varian (2011). The estimates from this method tend to be considerable, though they are framed in terms



of consumer surplus, which should, in general, be much larger than the contribution to GDP. There are many goods and services, such as electricity or indoor plumbing, which consumers value more than their market price suggests, but GDP focuses on market prices not subjective willingness to pay. Taken together, research estimates roughly 0.4 percentage point of missing GDP growth a year from free online media accounts since 2007 (Hatzius and Dawsey 2015).

One way to value the output from online media is by its cost of production plus the cost of advertising that supports the content. The media is not “free” because consumers exchange exposure to ads for access to the media. Currently, advertising is not included in GDP, because it is treated as an intermediate good, yet this new method follows the national accounting framework for nonmarket goods. This method estimates much less missing GDP growth, only a few basis points of growth a year (Nakamura and Soloveichik 2014). The main reason for the modest overall effect is that advertising-supported media existed in the past, and so this method weighs the substitution from advertising-paid print media to online media. The Internet’s contribution to total advertising growth has increased considerably, while the contribution of print advertising has declined (Figure 2-ix).

Relative to the recession, there has been a pickup in advertising growth, consistent with more missing GDP growth. Yet, this approach also highlights a drawback with the official statistics, because currently



any shift from consumer-paid media to ad-supported media would show up as a decline in output.

Open-source software is an example of an even more daunting measurement challenge because, in many cases, it is both acquired and produced for free.³ One way to estimate the real investment of firms in open-source software is to use the “near-market good” approach from Nordhaus (2006). It is less clear how much more GDP growth is missing in recent years due to open-source software, but the expansion of online platforms providing these goods suggests a growing measurement issue.

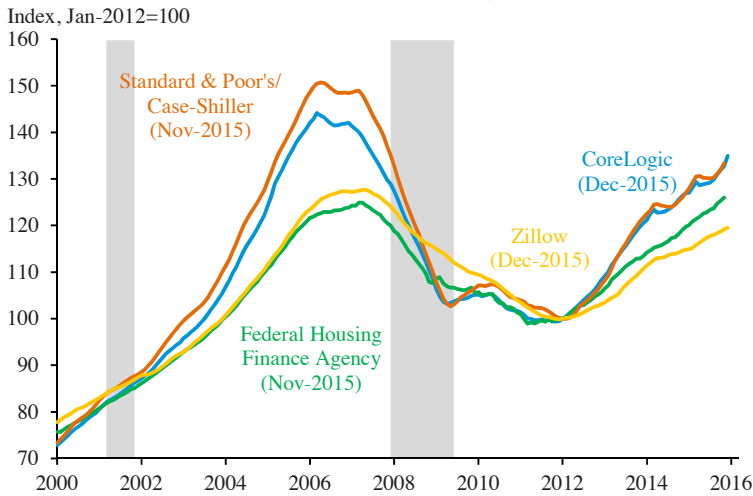
Taken together, it appears that the official statistics have always missed some GDP growth, and it is possible that the bias has worsened some in recent years, though not by nearly enough to explain the slowdown in productivity growth or the mismatch between labor and product market growth. Some of the measurement problems, particularly those related to quality-adjusted prices of high-tech goods, appear to have worsened lately. Still, the contributions to GDP and productivity growth from this mis-measurement are relatively modest, while mis-measurement in larger, hard-to-measure sectors like health care merit further in-depth study.

³ BEA measures “own account” software based on an estimate of wages paid to computer programmers and system analysts (see NIPA Handbook p. 6-29). To the extent that employers are paying programmers to produce open-source software, it will be included in BEA’s investment and GDP numbers. However, unlike traditional “prepackaged” software, open-source software does not generate investment from the sale of copies, so less investment is captured in GDP with the open-source approach than with traditional sales of prepackaged software.

quarters of 2015, above the 5.1-percent growth in 2014 and far faster than overall real GDP growth of 1.8 percent in 2015. While the cyclical recovery in the housing market is well underway, several structural challenges remain, including a constrained housing supply, low affordability in some areas of the country (see Box 2-6), and persistently muted household formation for 25-34 year-olds. These challenges may explain why some aspects of the housing market or areas of the country have yet to recover.

House prices continued to rise in 2015, similar to the pace in 2014 but below that of 2013. National home prices increased between 4 and 7 percent (depending on the index) during 2015, broadly in line with growth in 2014 but well below the rapid growth in 2013. Nominal house prices are between 19 and 36 percent above their recessionary trough and between 5 and 7 percent below their pre-recession peak (Figure 2-19). However, in real terms

Figure 2-19
National House Price Indexes, 2000–2015



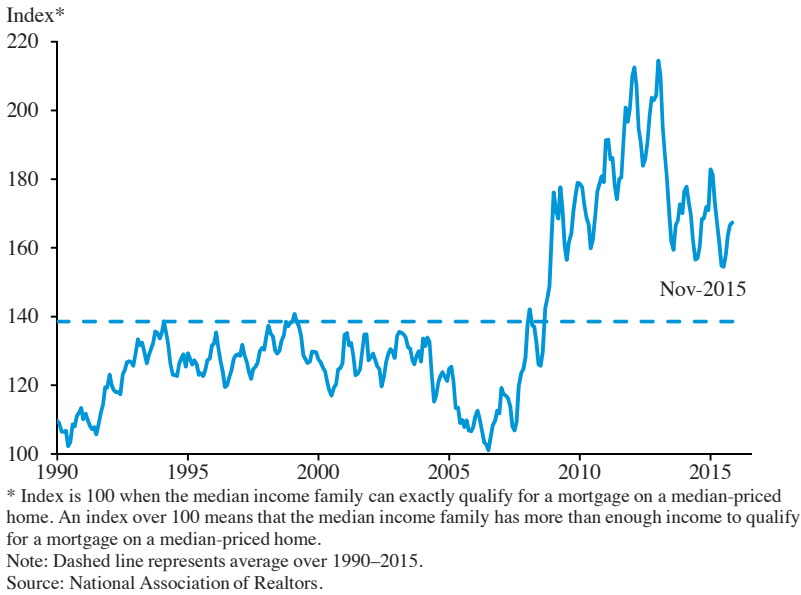
Note: Shading denotes recession. The Standard & Poor's/Case-Shiller, Federal Housing Finance Agency, and CoreLogic indexes all adjust for the quality of homes sold but only cover homes that are bought or sold, whereas Zillow reflects prices for all homes on the market.
Source: Zillow; CoreLogic; Federal Housing Finance Agency; Standard & Poor's/Case-Shiller.

(measured relative to the general rise in consumer prices), house prices still remain roughly 20 percent below their pre-recession peak.

Continued house price increases improved owners' equity relative to the debt they owe on their houses. Homeowners' equity as of December 2015 equaled slightly more than half of the total value of household real estate (57 percent), 20 percentage points higher than the recessionary trough and near the average of 60 percent in the two decades prior to the Great Recession. As of 2015:Q3, rising home prices since 2012:Q4 helped lift more than 7 million households out of a negative equity position (Gudell 2015). The overall share of single-family homeowners with an underwater mortgage (when mortgage debt exceeds the value of their house) was 13.4 percent in 2015:Q3, down from a high of 31.4 percent in 2012. In addition, the number of delinquent home mortgages (when the homeowner misses at least one monthly payment) has fallen to its lowest level since 2006, though the share of mortgages that are seriously delinquent (payment more than 90 days overdue with the bank considering the mortgages to be in danger of default) remains somewhat elevated. This improvement supports overall economic growth because homeowners with underwater or delinquent mortgages are less likely to spend or relocate in search of better-paying jobs.

Single-family homes remained more affordable in 2015 than the historical average, as rising incomes and low and steady mortgage rates partially

Figure 2-20
Housing Affordability Index, 1990–2015



offset the effect of rising house prices on the cost of homeownership (Figure 2-20). Nevertheless, affordability decreased somewhat in the past two years because median home prices grew faster than median family incomes. Box 2-6 covers an additional threat to affordability—housing supply constraints.

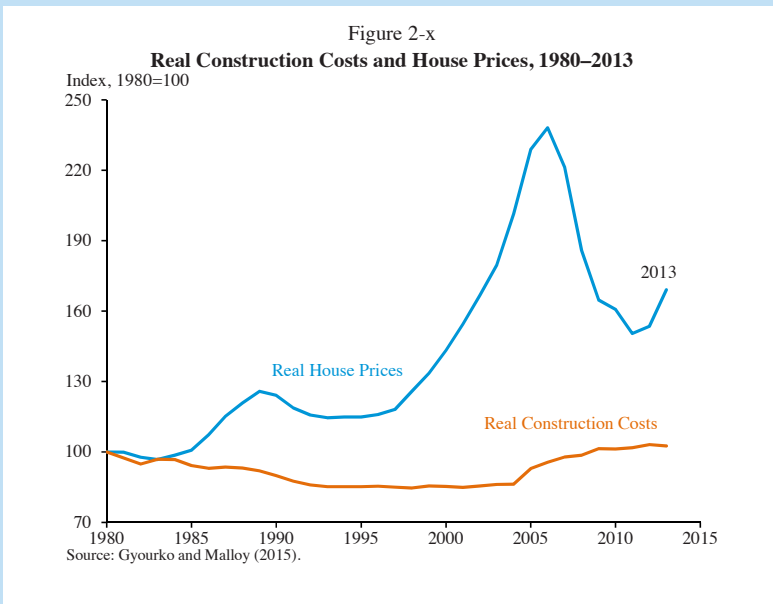
Despite the affordability of housing, national homeownership was 63.7 percent in the fourth quarter of 2015, much lower than the historical average due to a variety of trends in the housing market. The decline has been particularly concentrated among young households. The homeownership rate of those under the age of 35 was nearly 35 percent at the end of 2015, roughly 10-percentage points lower than its all-time high in 2004. A number of factors contributed to this decline. Most importantly, young adults are waiting longer to get married or form households. First-time home buyers are about three years older, on average, than the previous generation of homebuyers. Second, credit availability remains tight for borrowers with credit scores below 620. Third, it can be difficult for households, especially those living in urban areas, to save for a down payment. In response, the Administration has pursued policies to improve access to credit and expand homeownership. In January 2015, the President announced a reduction in the annual mortgage insurance premium on Federal Housing Administration (FHA) loans. The lower premium saved the typical new homeowner \$900 in 2015, and existing homeowners who refinanced realized similar savings. In addition, FHA’s new guidance for lenders of single-family loans took effect in

Box 2-6: Constraints on Housing Supply

Supply constraints provide a structural challenge in the housing market, particularly in high-mobility, economically vibrant cities. When housing supply is constrained, it has less room to expand when demand increases, leading to higher prices and lower affordability. Limits on new construction can, in turn, impede growth in local labor markets and restrain aggregate output growth. Some constraints on the supply of housing come from geography, while others are man-made. Constraints due to land-use regulations, such as minimum lot size requirements, height restrictions, and ordinances prohibiting multifamily housing, fall into the man-made category and thus could be amended to support more inclusive growth. While these regulations can sometimes serve legitimate purposes such as the protection of human health and safety and the prevention of environmental degradation, land-use regulations can also be used to protect vested interests in housing markets.

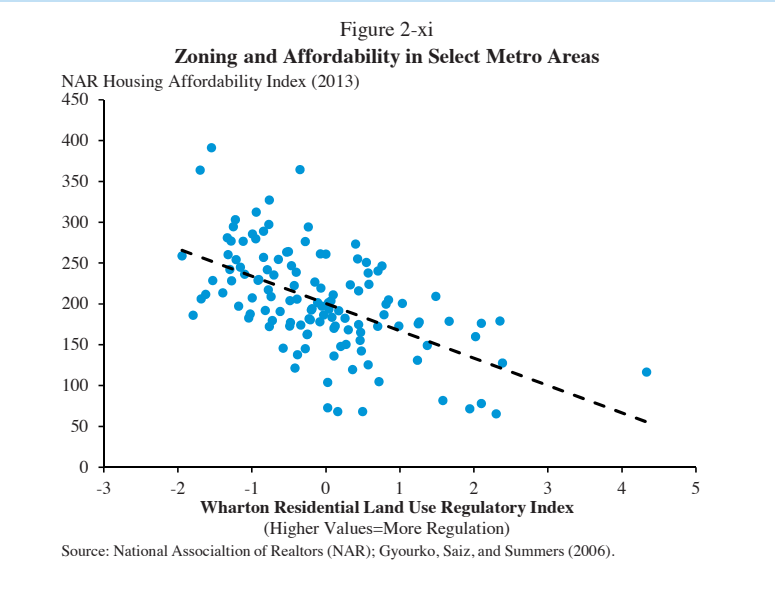
Gyourko and Molloy (2015) argue that supply constraints have worsened in recent decades, in large part due to more restrictive land-use regulations. House prices have risen faster than construction costs in real terms (Figure 2-x), providing indirect evidence that land-use regulations are pushing up the price of land.

According to Gyourko and Molloy (2015), between 2010 and 2013, real house prices were 55 percent above real construction costs, compared with an average gap of 39 percent during the 1990s. Several other



studies note that land-use regulations have been increasing since roughly 1970, driving much of the real house appreciation that has occurred over this time (Glaeser, Gyourko, and Saks 2005; Glaeser and Ward 2009; Been et al. 2014). This pattern is noteworthy because of the positive correlation between cities’ housing affordability and the strictness of their land use regulations, as measured by the Wharton Residential Land Use Regulation Index (Figure 2-xi; Gyourko et al. 2008). Cities to the lower right of the figure which include Boston and San Francisco, have stringent land-use regulations and low affordability. Cities at the upper left, which include St. Louis and Cleveland, have low regulation and high affordability. Supply constraints by themselves do not make cities low in affordability. Rather, the less responsive housing supply that results from regulation prevents these cities, which often happen to be desirable migration destinations for workers looking for higher-paying jobs, from accommodating a rise in housing demand.

In addition to housing affordability, these regulations have a range of impacts on the economy, more broadly. Reduced housing affordability—whether as an ancillary result of regulation or by design—prevents individuals from moving to high productivity areas. Indeed, empirical evidence from Molloy, Smith, and Wozniak (2012) indicates that migration across all distances in the United States has been in decline since the middle of the 1980s. This decreased labor market mobility has important implications for intergenerational economic mobility (Chetty et al. 2014)



and also was estimated in recent research to have held back current GDP by almost 10 percent (Hsieh and Moretti 2015).

Land-use regulations may also make it more difficult for the housing market to accommodate shifts in preferences due to changing demographics, such as increased demand for modifications of existing structures due to aging and increased demand for multifamily housing due to higher levels of urbanization (Goodman et al. 2015). A number of Administration initiatives, ranging from the Multifamily Risk-Sharing Mortgage program to the Affirmatively Furthering Fair Housing rule, try to facilitate the ability of housing supply to respond to housing demand. Ensuring that zoning and other constraints do not prevent housing supply from growing in high productivity areas will be an important objective of Federal as well as State and local policymakers.

September 2015, while additional work is underway to further increase clarity and transparency to encourage more lending to creditworthy borrowers.

Another phenomenon holding back homeownership that has less to do with access to credit is that, in some areas, home prices and rents are rising more quickly than either per capita personal income or wages. And real median income for household heads aged 25-34 in 2014 remained modestly below pre-recession levels. While homes are more affordable at the national level, housing has become more expensive in many desirable cities like San Jose, San Francisco, Los Angeles, San Diego, and New York (see Box 2-6). Finally, inventories of existing homes available for sale have not recovered fully and, by the end of 2015, were 7 percent below their average over 1997-2007.

Household formation showed some tentative signs of picking up in recent years from the low pace prevailing since the recession. The number of households continued to increase in 2015, albeit at a slower pace than in 2014. Most of the new households formed were among those between the ages of 65 and 74 (Kolko 2015). This uptick contributed to a solid rise in housing starts. Housing starts, including multifamily starts, were about 1.1 million units in 2015 (Figure 2-21). Nevertheless, starts remained well below the 1.5-to-1.7 million rate that is consistent with long-term demographics and the replacement of existing housing stock.⁷ Furthermore, because homebuilding has been below that pace since the recession, pent-up demand for housing may play a role in supporting further recovery in the housing

⁷ Demographics and historical trends would have predicted 1.2 to 1.4 million new households formed each year requiring housing (Joint Center for Housing Studies 2015). Together with the assumption that about 0.25 percent of the existing homes deteriorate and need to be replaced a given year, this yields an underlying trend of 1.5 and 1.7 million housing starts per year.

Figure 2-21
Single-Family and Multifamily Housing Starts, 2000–2015

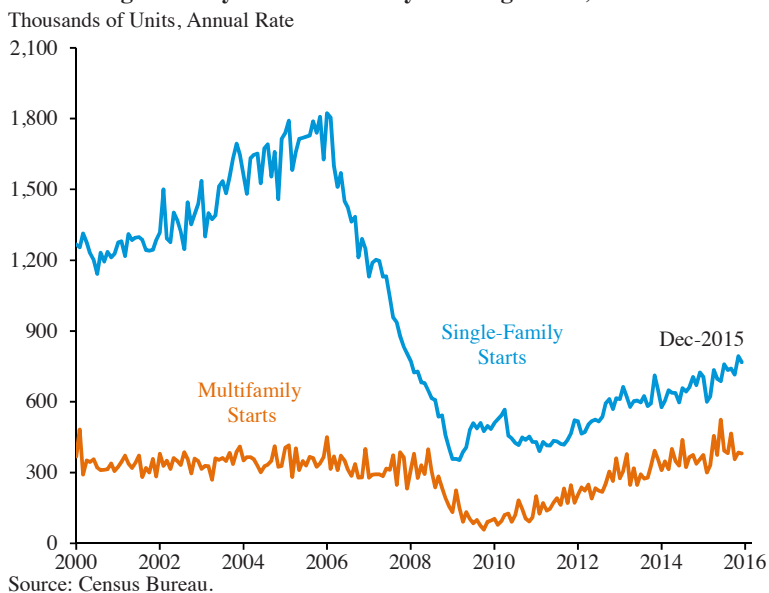


Figure 2-22
Average Annual Growth in Real Business Fixed Investment (BFI), 2010–2015



Note: Components may not sum to total due to rounding. Growth rate computed using Q4-to-Q4 changes.

Source: Bureau of Economic Analysis; Haver Analytics.

market. Nevertheless, the construction of multifamily units, mostly rental apartments, also picked up and now exceeds its pre-recession levels.

Investment

Business Fixed Investment. After being a bright spot early in the recovery, investment growth moderated in 2015. Real business fixed investment grew only 1.6 percent during the four quarters of 2015, slower than the 5-percent increase during 2012-14, and much slower than the 9-percent increase in 2010-11. In 2015, the rate of investment growth was largely maintained for intellectual property, but was offset by sharp declines in drilling and mining structures (see Box 2-1 for more details) and slower growth in equipment investment. The slowdown in investment growth is largely associated with the moderate pace of recovery in overall U.S. output and is not limited to the United States (Box 2-7).

Slower investment growth is a concern because it limits the productive capacity of the economy. Investment net of depreciation is required to increase the capital stock. In 2009, net investment as a share of the capital stock fell to its lowest level in the post-World War II era, and the nominal capital stock even declined. Although net investment has rebounded somewhat in the recovery, its level as a share of the capital stock remains well below the historical average (Figure 2-23).

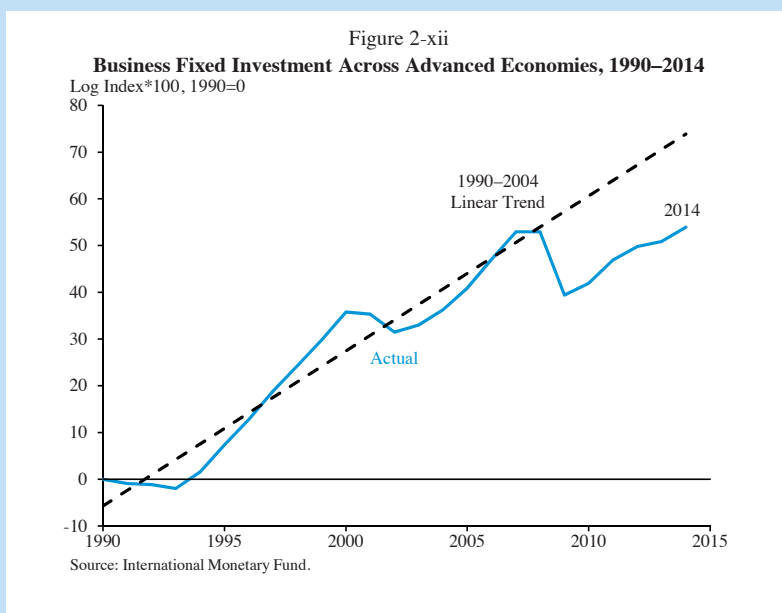
The slowdown in investment has also contributed to the slowdown in productivity growth. Historically, capital deepening—capital per hour worked—has added nearly 1 percentage point to labor productivity growth, but since 2007, capital deepening has added only about a half percentage point. The recovery in output has not been matched by a level of investment sufficient to generate substantial growth in the capital-to-labor ratio. Changes in capital deepening tend to reverse themselves, yet the persistence of low productivity is likely tied to the persistence of the investment slowdown. The pessimistic view is that the recent investment slowdown reflects a trend toward less capital due to a shift toward production with lower capital intensity, slower trend labor force growth, or fewer start-ups. The optimistic view, which is in line with historical experience, is that having largely bounced back from the capital overhang following the Great Recession, investment will return toward its prior, stronger trend.

With the sharp fall in output in 2008-09, the amount of capital services relative to output rose considerably (see Figure 2-24). Even years into the recovery, businesses had access to more capital services than the level of output would typically have required. The excess of capital suppressed new investment and helped lower capital services growth. Capital services relative to output have now regressed back to trend, a factor supporting

Box 2-7: Slowdown in Investment Growth across Advanced Economies

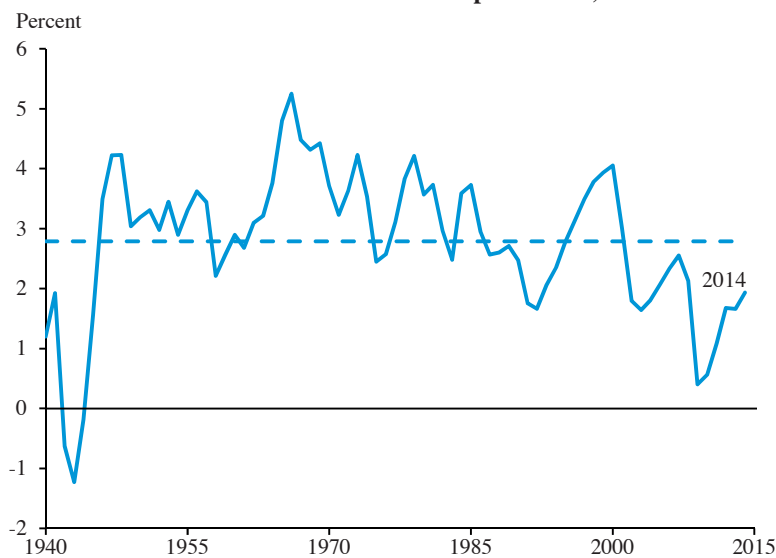
Across advanced economies, including the United States, business fixed investment is currently 20 percent below what would have been expected from pre-crisis trends (Figure 2-xii). The shortfalls have been in all categories of investment—not just business investment but also public investment and housing.

Weak investment in advanced economies may largely be explained by the steady, rather than increasing, pace of the recovery in output as opposed to other issues: such as confidence, regulatory factors or excessive share buybacks (IMF 2015). In the standard “accelerator” model, investment increases when output growth is expected to increase. With steady growth and some excess capacity left from the recession, it is not that surprising that firms’ demand for investment goods has increased slowly. Other trends common across advanced economies may be suppressing investment, such as: a digital start-up requiring less capital investment (Summers 2015); or constraints on entry of new firms (Decker et al. 2014).



future investment. This view is consistent with historically weaker periods of investment growth being, on average, followed by stronger periods. This historical pattern argues for faster growth in investment spending during 2016 than in the recent past.

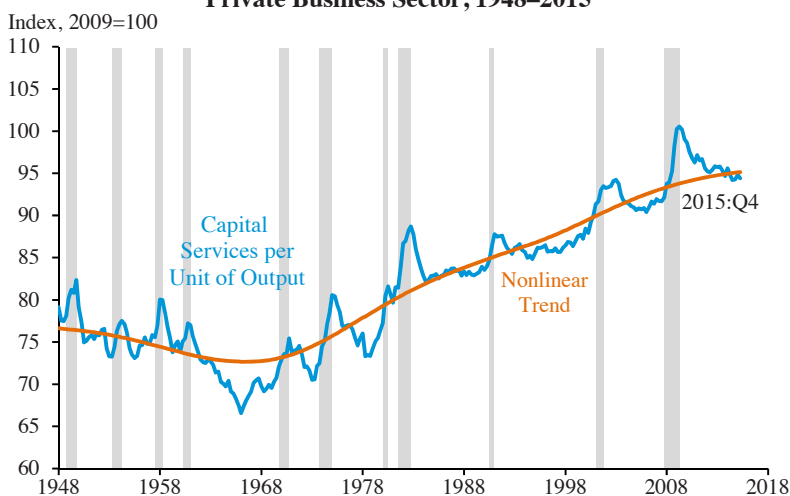
Figure 2-23
Net Investment as a Share of the Capital Stock, 1940–2014



Note: Dashed line represents average over 1940–2014.

Source: Bureau of Economic Analysis.

Figure 2-24
**Capital Services per Unit of Real Output,
 Private Business Sector, 1948–2015**



Note: Post-1964 data interpolated quarterly using Macroeconomic Advisers quarterly data. Pre-1965 data interpolated by moving average. Nonlinear trend is a bi-weight filter using a 60-quarter window.
 Source: Bureau of Labor Statistics, Labor Productivity and Costs; Macroeconomic Advisers; CEA calculations.

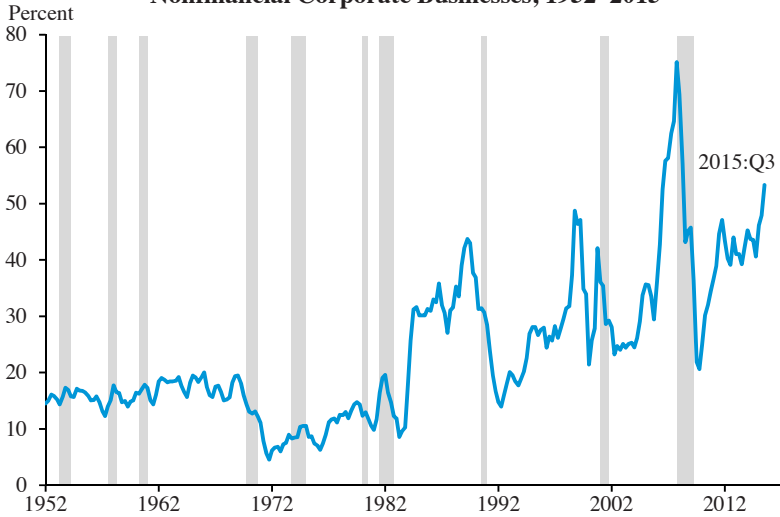
On the other hand, there are longer-running trends of less dynamism in the business sector, as discussed in Chapter 5 on innovation, pre-dating the last recession that could suggest persistently lower investment. The share of new firms among all firms—the start-up rate—has trended down over the past decades and fell further in this recovery. Moreover, research has shown that start-ups and young firms, which engage heavily in hiring and investment, are also failing at a higher rate since 2000 (Decker et al. forthcoming). The Administration has pursued policies to support investment, including additional funding for public research and development and public infrastructure. In addition, the President has proposed business tax reform that would directly spur private investment. (See also Box 2-8).

While investment has been low, the rate of payouts to shareholders by nonfinancial firms, in the form of dividends or net share buybacks (Figure 2-25) has been rising. Nonfinancial corporations are now returning nearly half of the funds that could be used for investment to stockholders. The share of funds being returned to stockholders, both in the form of dividends and net share buy backs, has been gradually trending higher for several decades and the current combined level was markedly exceeded only in the run-up to the last recession. The lower investment growth and higher share of funds returned to shareholders suggests firms had more cash than they thought they could profitably invest. The rise in payouts to shareholders may be related to the decline in the start-up rate as young firms are more likely to re-invest their cash flow than mature firms.

Inventory Investment. Inventories increased faster than final sales in 2015, pushing up manufacturing and trade inventories to 1.48 months' supply in November 2015. The inventory-to-sales ratio has risen this year, but has trended down over the past few decades, likely reflecting changes in supply-chain management and the diminishing share of goods in GDP (Figure 2-26). The unusually high level of oil inventories in 2015, related to both upside surprises in the supply of oil and weaker-than-expected global demand for oil, is a portion of the inventory buildup.

Real inventory investment—the change in the inventory stock—picked up noticeably in the first quarter of 2015, adding 0.9 percentage point to first-quarter GDP growth, and remained high in the second quarter. Inventory investment averaged about \$113 billion at an annual rate in the first two quarters of the year, well above the \$50 billion level of inventory investment needed to keep up with average sales growth. The third quarter saw a drop back down to \$86 billion, subtracting 0.7 percentage point from GDP growth. Inventory investment declined further in the fourth quarter to \$69 billion and subtracted 0.5 percentage point from GDP growth. As shown

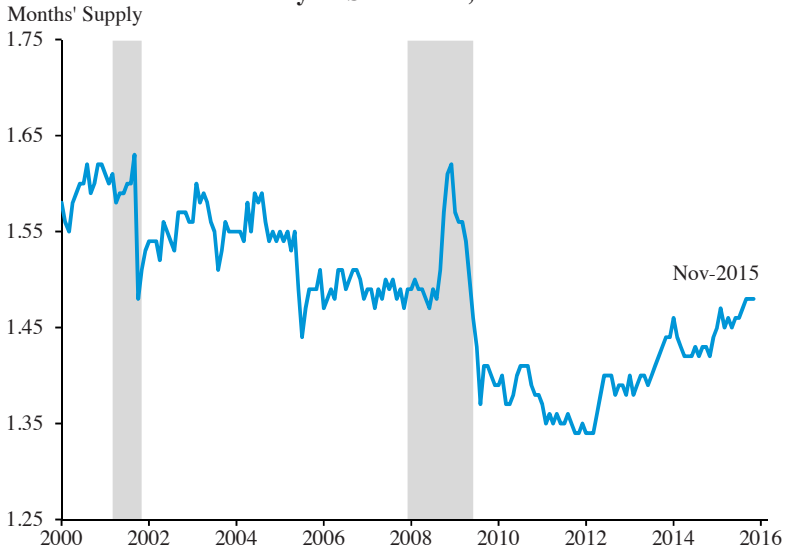
Figure 2-25
**Total Payouts to Shareholders,
 Nonfinancial Corporate Businesses, 1952–2015**



Note: Series shown is the four-quarter moving average of the ratio of dividends plus share buybacks relative to profits plus depreciation minus taxes.

Source: Federal Reserve Board; Haver Analytics; CEA calculations.

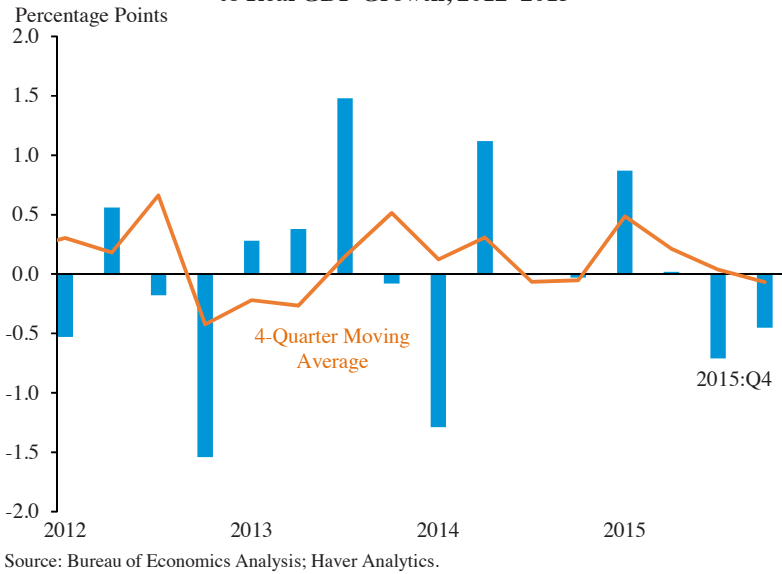
Figure 2-26
Inventory-to-Sales Ratio, 2000–2015



Note: Manufacturing and trade inventories at book value.

Source: Census Bureau, Manufacturing and Trade Inventories and Sales; Haver Analytics.

Figure 2-27
**Contribution of Inventory Investment
to Real GDP Growth, 2012–2015**



in Figure 2-27, changes in inventory investment often affect the quarterly pattern of output growth, but have limited effect on annual growth.

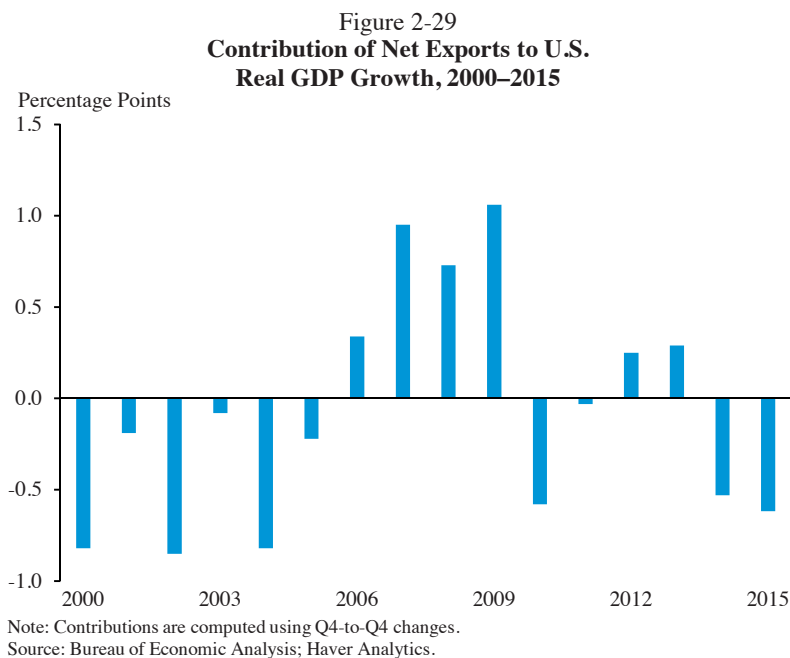
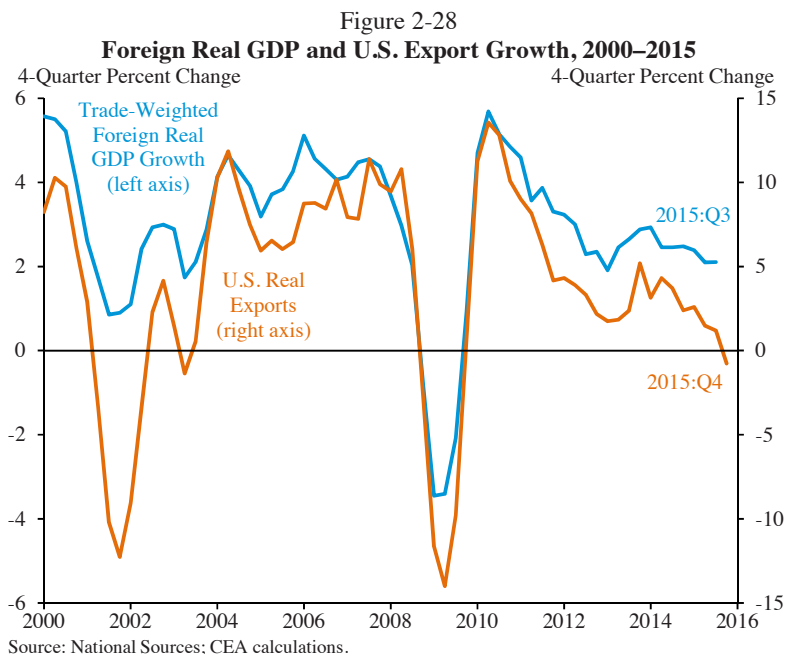
Net Exports

Weak demand in much of the world outside the United States—as discussed more in Chapter 3—and the stronger dollar that has come with it has been a drag on U.S. exports, which declined 6.9 percent in nominal terms during 2015. Part of this was due to the drop in export prices, as lower oil and commodity prices have meant lower prices for U.S. exports of agricultural goods or oil-related products. Adjusting for prices, real exports declined 0.8 percent during the four quarters of 2015, shown in Figure 2-28.

At the same time, real U.S. imports increased 3.4 percent, reflecting both the relative strength of domestic demand and the lower price of imports. Taken together, Figure 2-29 shows net exports subtracted 0.6 percentage point from GDP growth during 2015, after subtracting a comparable amount to overall growth in 2014. The external sector is likely to be a drag on growth in 2016 as well.

PRODUCTIVITY

Although employment growth has been strong, the growth in output has been more moderate. Thus, recent growth of labor productivity (that

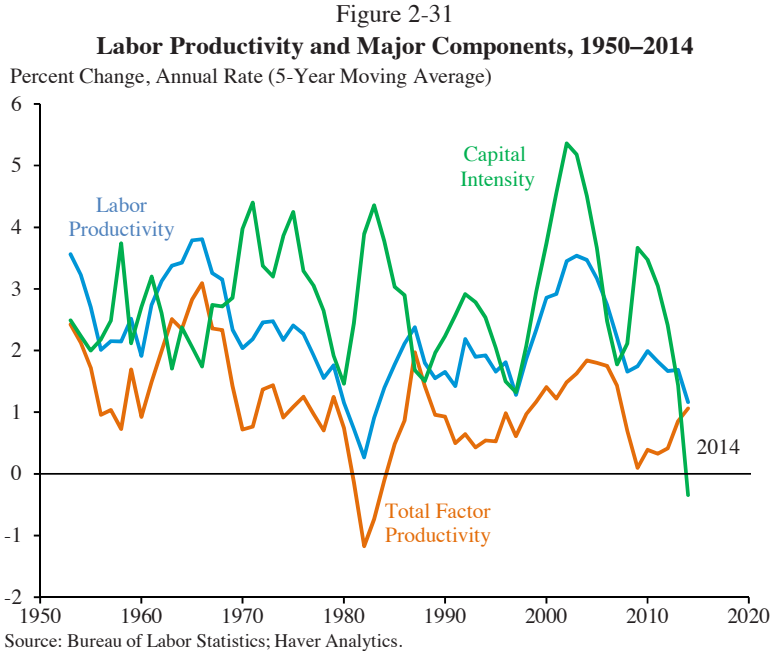
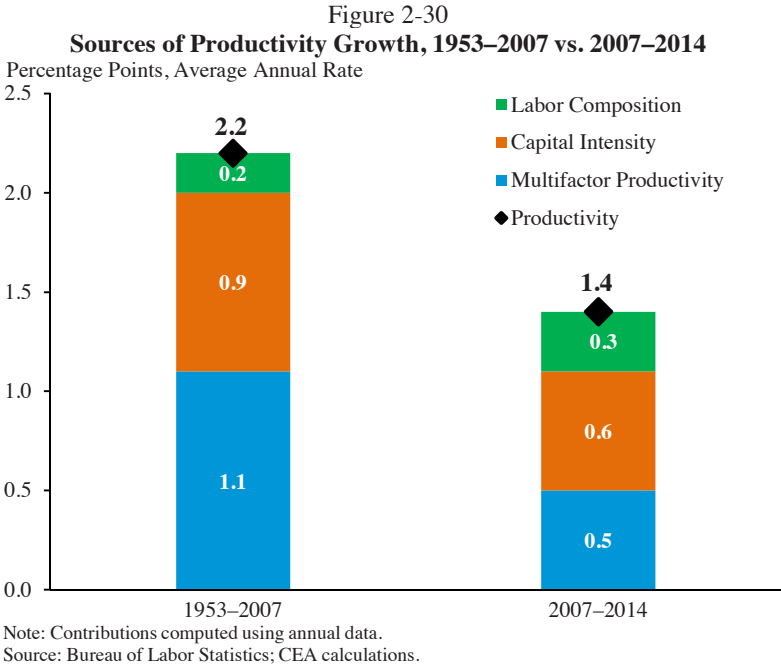


is, output per hour) has been below its long-term average pace. Because productivity fluctuates with the business cycle, it should be measured over a long interval, or between comparable cyclical stages. When measured with product-side data from the national income and product accounts (the measure published by the Bureau of Labor Statistics and based on data from the Bureau of Economic Analysis), labor productivity has risen at a 1.2-percent annual rate during the almost eight years from the business cycle peak in 2007:Q4 to 2015:Q3. But when using the income-side measure, nonfarm productivity has risen at a 1.6-percent rate. The best measure of productivity growth is probably the average of these figures, similar to the average used for gross domestic output in Box 2-4, yielding an estimate of a 1.4-percent annual rate of growth in productivity thus far in this business cycle. This is a slower pace of growth than the 2.2-percent growth seen between business-cycle peaks in 1953 and 2007, partially due to the transitory after-effects of the severe recession, including reduced investment associated with the capital overhang.

The slowdown in labor productivity growth in the post-recessionary period can be attributed to lower growth in total factor productivity and a reduction in capital intensity, as shown in Figure 2-30. Historically, capital intensity, or changes in capital per hour, has added nearly 1 percentage point to labor productivity growth. But, since 2007, capital intensity has added about a half percentage point, as discussed previously in the investment section. Thus, reduced capital deepening can account for roughly a third of the below-average productivity growth since 2007. Moreover, the contribution from total factor productivity growth over the past few years has been half its historical average of 1.1 percentage points. Increasing public infrastructure investment, an issue discussed in Chapter 6, and raising educational levels, as discussed in Chapter 4, will support labor productivity growth.

Since 2010:Q4, productivity growth has been even lower, averaging only 0.7 percent per year (using information from the income and product sides of the accounts). It is difficult to interpret productivity growth over very short windows, in part because it is affected by changing business-cycle conditions and also because it is subject to sizeable measurement error. Nevertheless, the same pattern applies even more strongly to this shorter window, with the majority of the most recent slowdown in productivity growth accounted for by the reduction in the amount of capital services per worker. As shown in Figure 2-31, a decline in capital intensity has not occurred previously in the postwar period.

How should recent productivity growth color forecasts of future productivity? The degree that a slowdown in capital accumulation has played an important role in the recent slower productivity growth offers some



grounds for optimism about the future. Historically, capital accumulation tends to pick up after a period of weakness. This could be even truer in the wake of the Great Recession, which is a rare enough event in its severity that it should not form a basis for future extrapolations about long-run trends. Moreover, historically longer time periods have given more accurate readings on future productivity growth. Labor productivity growth since the business-cycle peak in 1953 has averaged 2.1 percent a year, the figure that the Administration uses to project the long-term growth rate of labor productivity. Administration policies supporting infrastructure investment, education, trade, and immigration reform, will help facilitate the acceleration from the slow growth rate of recent years. However, in the near-term, the Administration's outlook foresees a continuation of relatively subdued productivity growth in 2016 but then a pickup in subsequent years.

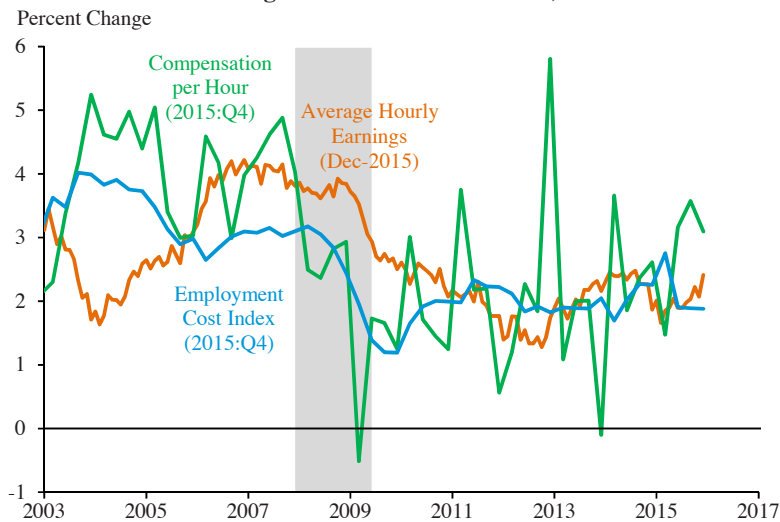
WAGE GROWTH AND PRICE INFLATION

Nominal wage growth began to slowly pick up in 2015, but, with the strengthening labor market, has room to rise even further. Average nominal hourly earnings for all private employees increased 2.7 percent during the 12 months of 2015, compared with 1.8 percent on average in the two prior years. Hourly compensation, as measured in the Employment Cost Index, increased 1.9 percent in 2015, down from 2.3 percent a year earlier. In contrast, the more-volatile compensation per hour rose 3.1 percent during 2015, above its 2.8 percent growth a year earlier. Taken together, as shown in Figure 2-32, wage growth has moved up gradually as labor markets have tightened, but has not reached a pace that would signal a full recovery. An important question in the labor market this year will be whether nominal wages will continue to grow faster as the labor market tightens.

Consumer prices, as measured in the price index for personal consumption expenditures (PCE) and shown in Figure 2-33, were up only slightly over 2015 due to large declines in energy prices (see Figure 2-34). Overall inflation was well below the Federal Reserve's longer-run objective of 2 percent. Core PCE inflation—which excludes energy and food prices and tends to be a better predictor of future inflation than overall inflation—was also less than the 2-percent target, rising only 1.4 percent during the 12 months of 2015.⁸ Lower imported goods as well as the pass through of

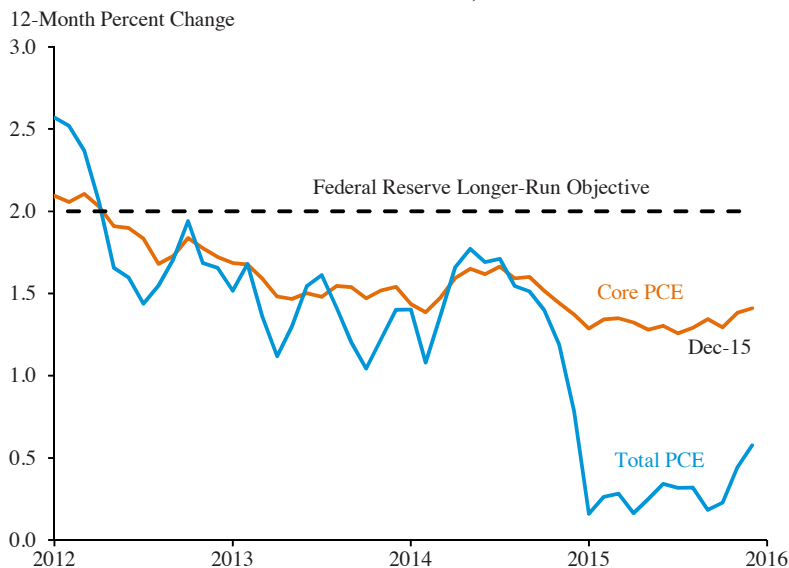
⁸ The Federal Reserve's defines its inflation objective in terms of the PCE price index. The consumer price index (CPI) is an alternate measure of prices paid by consumers and is used to index some government transfers and taxes. Largely because of a different method of aggregating the individual components, PCE inflation has averaged about 0.3 percentage point a year less than the CPI inflation since 1979. During the 12 months of 2015, for example, core CPI prices increased 2.1 percent, more than the 1.4 percent increase in core PCE prices.

Figure 2-32
Nominal Wage Growth Over Past Year, 2003–2015



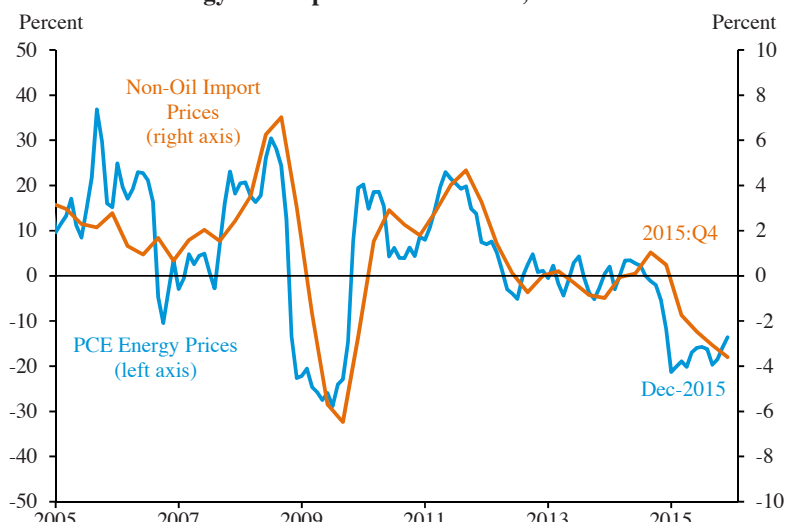
Note: Compensation per hour is for the business sector. Average hourly earnings are for production and nonsupervisory workers. The employment cost index is for the private sector.
 Source: Bureau of Labor Statistics; Department of Labor; Haver Analytics.

Figure 2-33
Consumer Price Inflation, 2012–2015



Source: Bureau of Economic Analysis; Haver Analytics.

Figure 2-34
Energy and Import Price Inflation, 2005–2015



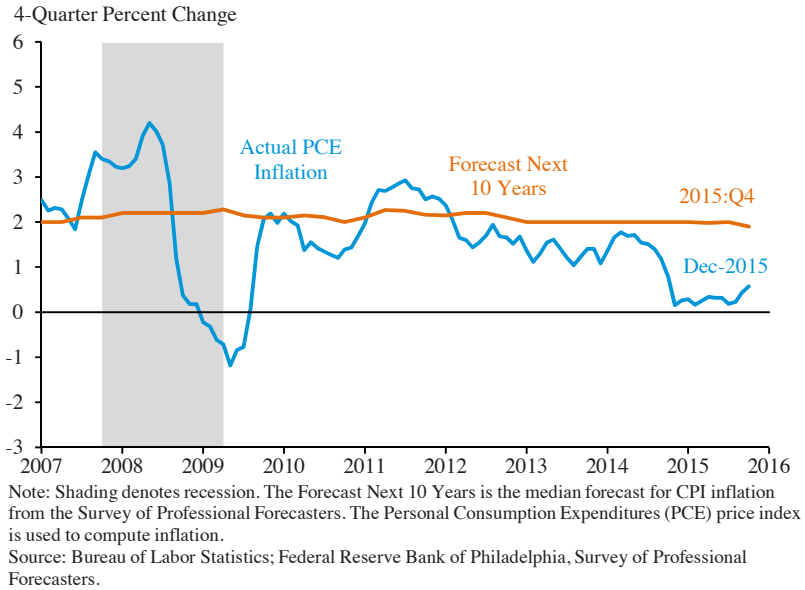
Note: The Personal Consumption Expenditures (PCE) energy price index is used to compute inflation.
 Source: Bureau of Economic Analysis; Haver Analytics.

lower energy costs to non-energy goods likely weighed on core inflation this year. The speed and degree to which these factors wane are two keys to the inflationary pressures in the economy this year.

Changes in import prices can meaningfully affect domestic price inflation through various channels. If imports become less expensive, then domestic price inflation may be reduced as consumers switch to relatively cheaper goods from abroad. Competitive pressures from lower import prices may also lead domestic producers to lower their prices. Finally, the lower price inflation for imported inputs may be passed through to goods produced domestically. Prices for non-oil imports declined sharply in 2015, weighing on domestic core price inflation (Figure 2-33). Over the four quarters of 2015, the price of non-oil imports fell 3.6 percent, the largest four-quarter decline since 2009:Q3. The decline in non-oil import prices likely reflects a stronger dollar as well as falling non-energy commodity prices. The pass through of non-oil import prices to core inflation is expected to continue, albeit to a lesser extent, in 2016.

Survey-based measures of long-term expectations for inflation, have been generally well-anchored, both during the last recession and more recently. This steadiness suggests a view that the factors that pushed down inflation in 2015 will be temporary as well as confidence that the Federal Reserve will be able to address any inflationary pressures in the coming years. Nevertheless, market-based measures of inflation compensation

Figure 2-35

Long-Term Inflation Expectations, 2007–2015

(estimated from the rates on Treasury inflation protected securities) have declined, raising some concerns about long-term inflation expectations.

FINANCIAL MARKETS

Over the course of the year, developments in U.S. financial markets largely reflected diminished prospects for global growth, particularly in China and other emerging markets, and expected tightening of monetary policy. At the same time, consensus forecasts of long-run U.S. interest rates have fallen, following the long downward trend that reflects a variety of factors ranging from demographics to changing term premiums. This section, like the rest of this chapter, focuses on developments through the end of 2015. In early 2016, U.S. and global equity indexes and commodity prices—especially oil—fell while spreads on high-yield bonds rose.

Since the early 1980s, long-term interest rates, as measured by the yields on 10-year Treasury notes, have trended downward, as shown in Figure 2-36. The evolution of U.S. interest rates over the past 20 years has coincided with interest-rate movements in advanced economies, including the United Kingdom and the euro area. The global trend in long-term rates is partly the result of lower inflation, lower foreign output growth, aging demographics, lower investment demand, and increased world saving, as evidenced by the reduction in rates beginning well before the financial

crisis.⁹ But these changes have been greatly exacerbated by some more transitory factors, including the effects of quantitative easing on the supply of long-term debt, lower term premiums, private-sector deleveraging, and flight-to-safety flows.

Longer-term interest rates, as measured by the yields on 10-year U.S. Treasury notes and shown in Figure 2-37, were relatively stable, on net, in 2015, ending the year at 2.3 percent, about the same rate as at the end of 2014, but noticeably down from year-end 2013. The yields on 3-month U.S. Treasury notes also remained low in 2015, only starting to rise meaningfully above zero in mid-November, reflecting expectations for the FOMC to raise its target rate.

Similarly, corporate borrowing costs rebounded almost 70 basis points over the 12 months of 2015 to 4.9 percent, roughly in line with its level at year-end 2013. Increased corporate bond yields coupled with roughly unchanged Treasury yields point to rising credit spreads.

Market estimates for long-term U.S. Treasury rates increased over the past year. The 10-year U.S. Treasury rate, 10 years forward, which measures the market's expectation of the 10-year interest rate a decade from today, was 3.2 percent in December 2015. The market-based forward rate was nearly 1 percentage point below the consensus forecast of 4.1-percent for 2022-26. Some of the gap may be explained by a lower term premium, global flight-to-safety flows, or divergent expectations about long-term productivity and output growth. Forward rates incorporate risk premiums, can be highly volatile, and their movements may reflect transitory developments as opposed to structural changes; as such, they may be poor predictors for future rates. For a more in-depth analysis into the 10-year U.S. Treasury rate, 10 years forward, and the overall shift to lower long-term rates, see the Council of Economic Advisers (2015) report, "Long-Term Interest Rates: A Survey."

Overall stock prices were little changed, on net, in 2015. The Standard and Poor's 500 (S&P) index edged down less than 1 percent for the year, following a 30 percent rise in 2013 (the best year since 1997) and another 11 percent rise in 2014. In the first half of 2015, the S&P index had increased; however, declines since August erased most of the year's gains. Nevertheless, at the end of December 2015, the S&P index was about 30 percent above its pre-recession peak in 2007.

⁹ Recent aging of the baby-boom generation has led to a disproportionate share of the population being distributed into age cohorts with relatively high saving rates, which in turn, has held down interest rates. Continued aging of the baby-boom generation will likely exert upward pressure on interest rates as its members enter retirement and consume their savings.

Figure 2-36
Nominal 10-Year Treasury Yields, 1980–2015

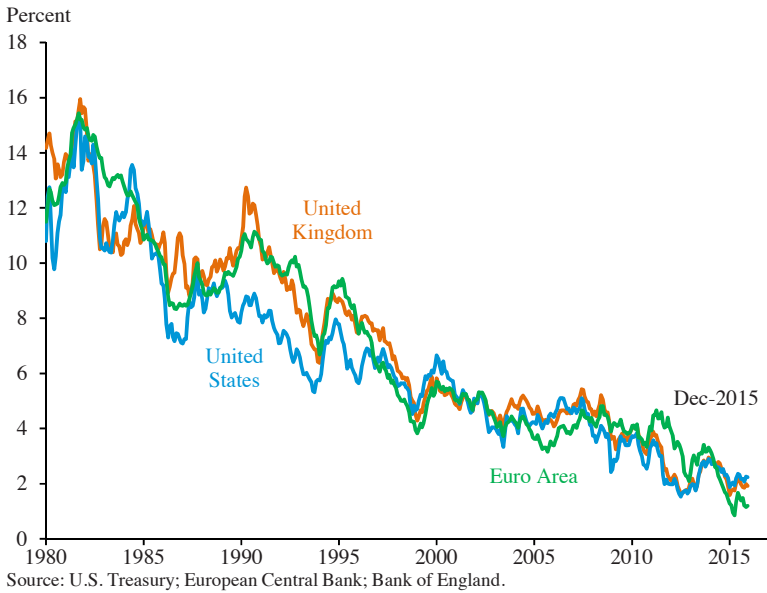
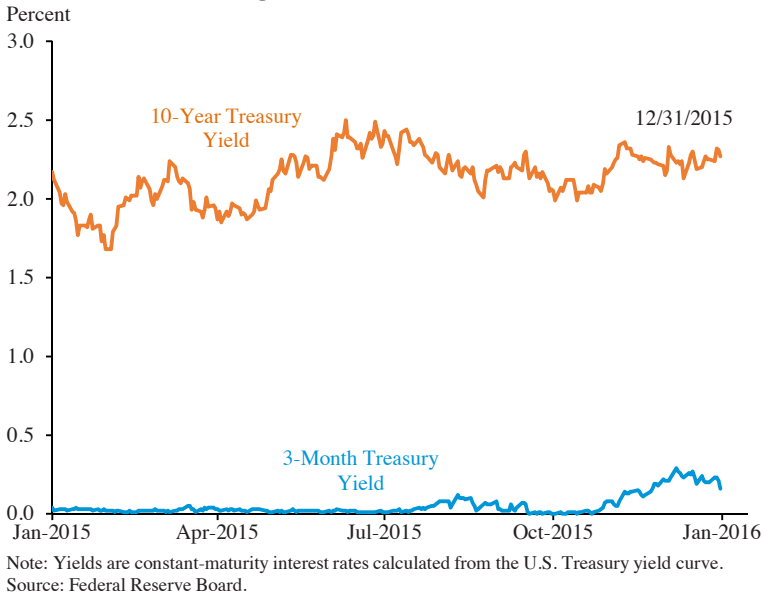


Figure 2-37
Nominal Long- and Short-Term Interest Rates, 2015



THE OUTLOOK

Forecast over the Next Three Years

Real GDP grew 2.2 percent on average during the three years through 2015, and the Administration forecast (finalized on November 17, 2015) projects an acceleration to 2.7-percent growth during 2016. The Administration forecast is slightly above the Blue-Chip consensus forecast of 2.6 percent and in line with the CBO forecast of 2.7 percent, two outside forecasts from January 2016. The Administration expects that investment will grow faster in 2016 than in the recent past, though weaker global demand likely will be partially offsetting. Federal fiscal policy will be stimulative in 2016 and even more so than it might otherwise have been without the Bipartisan Budget Agreement. With a strengthening State and local sector, fiscal actions will likely be expansionary in 2016. Meanwhile, core inflation (excluding food and energy) remains low, partly due to declining import prices, and below average capacity utilization, so resource utilization does not appear to impose any constraints during the next four quarters. For consumers, a pickup in nominal and real wage gains in 2015—together with strong employment growth—will probably boost spending in 2016. These income gains—following a multiyear period of successful deleveraging—leave consumers in an improved financial position. Business investment also shows brighter prospects for growth in 2016 than in earlier years as the overhang of excess capital that suppressed investment earlier in this expansion has been reduced. As the economy continues to grow, businesses will need new facilities, equipment, and intellectual property to meet growing demand. The decline in oil prices over the last year and half are likely to add to GDP, on net, in 2016, as discussed in Box 2-1.

Although most domestic signals are positive, the United States faces headwinds from abroad. The available indicators suggest that the economies of Brazil, Canada, China, India, and our euro area trading partners are growing slowly. The trade-weighted average of foreign GDP growth in 2015 was slower than in 2014. Slow global growth is forecasted for 2016 as well. Weakness abroad not only reduces our exports, but also raises risks of adverse financial and other spillovers to the U.S. economy.

With broader measures of labor market slack somewhat elevated and the capacity utilization rate in manufacturing at about 76 percent, the economy still has a bit of room to grow faster than its potential rate. Even if the unemployment rate falls below the level consistent with long-run stable inflation, near-term inflation likely will be held down by the recent declines

Table 2-1

Selected Interest Rates, 2015

	Dec-2014	Dec-2015	Difference
Federal Funds Effective	0.06	0.20	0.14
3-Month U.S. Treasury Yield	0.04	0.16	0.12
2-Year U.S. Treasury Yield	0.67	1.06	0.39
5-Year U.S. Treasury Yield	1.65	1.76	0.11
10-Year U.S. Treasury Yield	2.17	2.27	0.10
10-Year BBB Corporate Bonds Yield	4.18	4.87	0.69
30-Year U.S. Treasury Yield	2.75	3.01	0.26
30-Year Fixed Mortgage Rate	3.83	4.01	0.18

Note: All interest rates are the final daily or weekly data in the given month. Treasury yields are constant-maturity yields estimated by the Federal Reserve Board. Corporate bond yields are option-adjusted yields estimated by Standard & Poor's Global Fixed Income Research. The mortgage rate is that reported in the Freddie Mac Primary Mortgage Survey.

Source: Federal Reserve Board; Standard & Poor's; Freddie Mac; CEA calculations.

in import prices. And even if inflation increases modestly, it may remain below the Federal Reserve's long-run target of 2-percent inflation.

The Administration's economic forecast, presented in Table 2-2, underpins the President's FY 2017 budget. When the Administration forecast was finalized in November 2015, real GDP growth during the four quarters of 2015 was projected at 2.2 percent. Data released after the forecast was finalized point to real GDP growth during 2015 that is below the Administration's forecast.

By long-standing convention, this forecast reflects the economic effects of the President's budgetary and other economic policy proposals in the FY 2017 budget. Together these act to increase the growth rate of GDP during the 10-year budget window (Box 2-8).

Real GDP is projected to grow 2.7, 2.5, and 2.4 percent during the four quarters of 2016, 2017, and 2018, respectively. These growth rates exceed the Administration's estimated rate of potential real GDP growth over the long run of 2.3 percent a year. As a consequence, the unemployment rate is likely to fall from its 5.0 percent level in 2015:Q4—eventually falling to 4.5 percent in 2016:Q4 and remaining at that level before ticking back up to 4.6 percent in 2017:Q4. These levels, below the Administration's estimate of 4.9 percent for the rate of unemployment consistent with stable inflation, can be expected to incrementally raise inflation. As discussed in (Box 2-9), the effect of unemployment on changing the rate of inflation appears to have diminished in recent decades and estimates derived over the past two decades suggest that if the unemployment rate were to remain 1 percentage point below the stable-inflation rate of unemployment for a full year,

Table 2-2

Administration Economic Forecast

	Nominal GDP	Real GDP (Chain- Type)	GDP Price Index (Chain- Type)	Consumer Price Index (CPI-U)	Unemploy- ment Rate (Percent)	Interest Rate, 91- Day Treasury Bills (Percent)	Interest Rate, 10- Year Treasury Notes (Percent)
	Percent Change, Q4-to-Q4				Level, Calendar Year		
2014 (Actual)	3.9	2.5	1.3	1.2	6.2	0.0	2.5
2015	3.3	2.2	1.1	0.5	5.3	0.0	2.1
2016	4.3	2.7	1.6	1.9	4.7	0.7	2.9
2017	4.4	2.5	1.8	2.1	4.5	1.8	3.5
2018	4.3	2.4	1.9	2.2	4.6	2.6	3.9
2019	4.3	2.3	2.0	2.3	4.6	3.1	4.1
2020	4.3	2.3	2.0	2.3	4.7	3.3	4.2
2021	4.4	2.3	2.0	2.3	4.7	3.4	4.2
2022	4.4	2.3	2.0	2.3	4.8	3.4	4.2
2023	4.3	2.3	2.0	2.3	4.9	3.3	4.2
2024	4.3	2.3	2.0	2.3	4.9	3.3	4.2
2025	4.3	2.3	2.0	2.3	4.9	3.2	4.2
2026	4.3	2.3	2.0	2.3	4.9	3.2	4.2

Note: Forecast was based on data available as of November 17, 2015, and were used for the FY 2017 Budget. The interest rate on 91-day T-bills is measured on a secondary-market discount basis.

Source: Forecast was done jointly with the Council of Economic Advisers, the Department of the Treasury, and the Office of Management and Budget.

then the rate of inflation would increase by 0.2 percentage point. In the Administration forecast, the economy will be below the stable-inflation level of unemployment by an average of 0.3 percentage point in 2016, 2017, and 2018, which can be expected to raise the rate of core inflation by less than 0.1 percentage point each year. With the rate of core PCE inflation during 2015 at 1.4 percent, the 0.2-percentage point inflation increase during the next three years would still leave the rate of inflation at the end of 2018 below the Federal Reserve's 2-percent target for this index.

Nominal interest rates are currently low because of a reduction in the long-run interest rate and that the economy has not fully healed from the last recession. Monetary policy has also kept rates low. Consistent with the Federal Reserve's forward policy guidance at the time of the Administration forecast, long-term interest rates are projected to rise, consistent with the rise in short-term rates. Eventually, real interest rates (that is, nominal rates less the projected rate of inflation) are predicted to move toward, but still remain well below, their historical average. These interest-rate paths

are close to those projected by the consensus of professional economic forecasters. During the past several years, consensus forecasts for long-term interest rates and long-term economic growth have fallen, reflecting changes in views on productivity, the term premium, along with other global and domestic factors.

Forecast over the Long Term

As discussed earlier, the long-run growth rate of the economy is determined by the growth of its supply-side components, including those governed by demographics and technological change. The growth rate that characterizes the long-run trend in real U.S. output—or potential output—plays an important role in guiding the Administration’s long-run forecast. The potential output projections are based on the assumption that the President’s full set of policy proposals, which would boost long-run output, are enacted (Box 2-8). After three years of growth above potential through 2017, real output growth shifts down to its long-term trend rate of 2.3 percent. These growth rates are slower than historical averages due to the retirement of the baby-boom generation and slower growth of the working-age population.

Table 2-3 shows the Administration’s forecast for the contribution of each supply-side factor to the growth in potential real output: the working-age population; the rate of labor force participation; the employed share of the labor force; the length of the workweek; labor productivity; and the difference between productivity growth for the economy as a whole and the nonfarm business sector. The two columns of Table 2-3 show the average annual growth rate for each factor during a long period of history and over the forecast horizon. The first column shows the long-run average growth rates between the business-cycle peak of 1953 and the latest quarter available when the forecast was finalized (2015:Q3). Many of these variables show substantial fluctuations within business cycles, so that long-period growth rates must be examined to uncover underlying trends. The second column shows average projected growth rates between 2015:Q3 and 2026:Q4; that is, the entire 11¼-year interval covered by the Administration forecast.

The population is projected to grow 1.0 percent a year, on average, over the projection period (line 1, column 2), following the latest projection from the Social Security Administration. Over this same period, the labor force participation rate is projected to decline 0.4 percent a year (line 2, column 2). This projected decline in the labor force participation rate primarily reflects a negative demographic trend from the retirement of the baby-boom generation. During the next couple of years, however, rising labor demand

Box 2-8: Policy Proposals to Raise Output over the Next-Ten Years

The Administration has a wide-ranging and robust economic agenda that, if enacted, would expand the labor force and boost productivity. In line with long-standing precedent, the Administration's economic forecast incorporates the impact of the President's policy proposals. CEA estimates that, in total, these proposals would add over 5 percent to the level of output in 2026. The Administration's economic forecast, however, only incorporates 3-percentage points of the total boost to the level of output from these proposals. This adds about 0.3 percentage point on average to annual growth over the next 10 years. The remaining 2 percentage points are not included in the forecast for reasons discussed below. As a result, the Administration's forecast for the level of output in 2026 is about 1 percent higher than the forecasts from both the Congressional Budget Office and the Blue Chip consensus panel, as well as about 4 percent higher than the median forecast from the Federal Open Market Committee.

Immigration reform. The policy proposal with the largest effect on output is immigration reform, as embodied in the bipartisan Border Security, Economic Opportunity, and Immigration Modernization Act that passed the U.S. Senate in June 2013. CBO (2013b) estimated that this legislation, if enacted, would raise the level of real GDP by 3.3 percent after 10 years. This effect is so large because immigration reform would benefit the economy by counteracting the effects of an aging native-born population, attracting highly skilled immigrants that engage in innovative or entrepreneurial activities, and enabling better job-matching for currently undocumented workers who are offered a path to citizenship. Much of the overall effect is due to an expanded workforce, a factor that is incorporated in the budget savings from immigration reform. Thus, to avoid double counting in the budget savings, the workforce effects of immigration reform are not incorporated in the economic forecast. However, 0.7 percentage point of the total effect from immigration reform is due to increased total factor productivity, and this is reflected in the Administration's economic forecast.

Policies to expand cross-border trade and investment. The other set of policies with a large effect on output are a number of international agreements that would boost cross-border trade and investment, including the Trans-Pacific Partnership (TPP), the Transatlantic Trade and Investment Partnership (TTIP), an expansion of the Information Technology Agreement (ITA), a Trade in Services Agreement (TISA), and a possible Bilateral Investment Treaty (BIT) with China. TPP negotiations have concluded, and the Administration is working with Congress to secure its passage. A new study supported by the Peterson Institute for

International Economics (Petri and Plummer 2016) finds that TPP could raise U.S. real income by 0.5 percent in 2030. The European Commission (2013) estimates a roughly similar effect of TTIP on the U.S. economy, an increase of 0.4 percent in GDP in 2027.

Investments in surface transportation infrastructure. The Administration recognizes that investments in infrastructure support economic growth by creating jobs, boosting productivity, and strengthening the manufacturing sector. In December 2015, the bipartisan Fixing America's Surface Transportation Act (H.R. 22), which authorizes a \$17.8 billion increase in surface transportation investment over five years, was enacted into law. This funding is an important down payment, but the country must further transform our transportation system to achieve a cleaner, safer transportation future. The President's FY 2017 budget calls for \$32 billion per year over 10 years to support innovative programs that make our communities more livable and sustainable. The IMF (2014) estimates that given the current underutilization of resources in many advanced economies, a 1 percent of GDP permanent increase in public infrastructure investment could help increase output by as much as 2.5 percent after 10 years. See Chapter 6 in this *Report* for more discussion.

Policies to boost labor force participation. The Administration has pursued policies that enable all workers to participate in the labor force to their full potential by making it easier for workers to balance career and family responsibilities. The Administration's FY 2017 budget calls to triple the maximum child care tax credit to \$3,000 for children younger than 5, while enabling more middle-class families to receive the maximum credit. In addition, every year since 2013, the President has proposed a Federal-State partnership that would provide all 4-year olds from low- and moderate-income families with access to high-quality preschool. Finally, the budget calls to provide technical assistance to help States implement and develop paid parental leave programs. These policies would increase labor force participation and the level of output.

Policies to make college affordable. The Administration is committed to making college affordable. The budget includes \$60.8 billion over 10 years to make the first two years of community college tuition free for responsible students through a Federal-State cost sharing partnership. This plan would increase America's human capital and productivity by enabling 2 million people who would not have enrolled in college to earn an associate's degree.

Business tax reform. President Obama's framework for business tax reform issued in 2012 sets out a series of changes that would strengthen the economy in three main ways. First, by lowering average tax rates, the President's plan would boost investment in the United

States. Second, by moving to a more neutral tax system, the proposals would result in a more efficient allocation of capital. And third, to the degree the new system better addresses externalities, for example with a more generous research and development credit, it would also increase total factor productivity and therefore growth. (See Chapter 5 of last year's *Report* for a discussion of the economic benefits of business tax reform.)

Deficit reduction. CBO's (2013a) analysis of the macroeconomic effects of alternative budgetary paths estimates that a hypothetical \$2 trillion in primary deficit reduction over 10 years raises the long-term level of real GDP by 0.5 percent. This effect arises because lower Federal deficits translate into higher national saving, lower interest rates, and in turn, greater private investment. The Administration's FY 2017 budget proposal includes \$2.5 trillion in primary deficit reduction relative to the Administration's plausible baseline. Using CBO's methodology this would raise the level of output in 2026 by 0.6 percent.

due to the continuing business-cycle recovery is expected to offset some of this downward trend.

The employed share of the labor force—which is equal to one minus the unemployment rate—is expected to rise less than 0.1 percent a year during the next 11 years because the long-run unemployment rate is only slightly below the rate in 2015:Q3. The workweek is projected to be roughly flat during the forecast period, following a long-term decline of 0.2 percent a year. The workweek is expected to stabilize because some of the demographic forces pushing it down are largely exhausted.

Labor productivity in the nonfarm business sector is projected to increase 2.1 percent a year over the entire forecast (line 6, column 2), the same as the average growth rate from 1953 to 2015 (line 6, column 1). Productivity tends to grow faster in the nonfarm business sector than for the economy as a whole, because productivity in the government and household sectors of the economy is presumed (by a national-income accounting convention) not to grow (that is, output in those two sectors grows only through the use of more production inputs). The difference in these growth rates is expected to subtract 0.3 percent a year during the projection, similar to the 0.2 percent a year decline historically (line 10, columns 1 and 2). This productivity differential is equal to the sum of two other growth rates in the table: the ratio of nonfarm business employment to household employment (line 4) and the ratio of real output to nonfarm business output (line 7).

Summing the growth rates of all of its components, real output is projected to rise at an average 2.4 percent a year over the projection (line

Table 2-3

**Supply-Side Components of Actual
and Potential Real Output Growth, 1953–2026**

Component	Growth rate ^a	
	History	Forecast
	1953:Q2 to 2015:Q3 ^b	2015:Q3 to 2026:Q4
1 Civilian noninstitutional population aged 16+	1.4	1.0
2 Labor force participation rate	0.1	-0.4
3 Employed share of the labor force	0.0	0.0
4 Ratio of nonfarm business employment to household employment	0.0	0.0
5 Average weekly hours (nonfarm business)	-0.2	0.0
6 Output per hour (productivity, nonfarm business) ^c	2.1	2.1
7 Ratio of real output to nonfarm business output ^c	-0.2	-0.4
8 Sum: Actual real output ^c	3.0	2.4
Memo:		
9 Potential real output ^d	3.1	2.3
10 Output per worker differential: output vs nonfarm ^e	-0.2	-0.3

^a All contributions are in percentage points at an annual rate, forecast finalized November 2015. Total may not add up due to rounding.

^b 1953:Q2 was a business-cycle peak. 2015:Q3 is the latest quarter with available data.

^c Real output and real nonfarm business output are measured as the average of income- and product-side measures.

^d Computed as (line 8) - 2 * (line 3).

^e Real output per household worker less nonfarm business output per nonfarm business worker. This can be shown to equal (line 7) - (line 4).

Note: Output is the average of GDP and GDI. Population, labor force, and household employment have been adjusted for discontinuities in the population series. Nonfarm business employment, and the workweek, come from the Labor Productivity and Costs database maintained by the Bureau of Labor Statistics.

Source: Bureau of Labor Statistics, Current Population Survey, Labor Productivity and Costs; Bureau of Economic Analysis, National Income and Product Accounts; Department of the Treasury; Office of Management and Budget; CEA calculations.

8, column 2), slightly faster than the 2.3 percent annual growth rate for potential real output (line 9, column 2). Actual output is expected to grow faster than potential output primarily because of the small projected rise in the employment rate (that is, the decline in the unemployment rate) as currently unemployed workers find jobs, and others reenter the labor force or shift from part-time to full-time jobs.

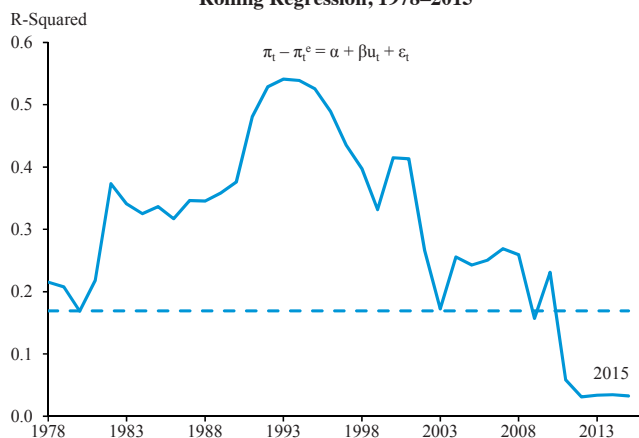
Real potential output (line 9, column 2) is projected to grow less than the long-term historical growth rate of 3.1 percent a year (line 9, column 1), primarily due to the lower projected growth rate of the working-age population and the retirement of the baby-boom cohort. If the effects of

Box 2-9: Stable Inflation Rate of Unemployment

Economic theory generally relates inflation rates and unemployment rates under the view that very low unemployment may signal tight labor markets that generate upward pressure on wages and high demand for goods and services that put upward pressure on prices. The accelerationist Phillips curve relates the increase in the rate of inflation to the rate of unemployment, or possibly some other measure of economic slack. It can also be used in conjunction with other inflation-sector equations to derive estimates for the rate of unemployment that keeps inflation stable (NAIRU), an essential notion for maximizing growth without ever increasing inflation rates. According to the Phillips curve, an unemployment rate below the one that would keep inflation stable will result in upward pressure on price inflation. Many have noted that the fit of the Phillips curve has deteriorated (for instance, Ball and Mazumder 2011). They observed that the Phillips curve would have predicted inflation to fall much more during the Great Recession than it did.

The deterioration in the ability of a simple Phillips curve model to fit the data is shown in Figure 2-x. As shown by the equation embedded in Figure 2-x, the change in the rate of inflation from its expectation (on the left hand side) is regressed against a demographically adjusted unemployment rate and a constant term. (From this regression, one can estimate the NAIRU as the ratio of the coefficient on the unemployment rate to the constant.) The measure of inflation expectations is lagged

Figure 2-xiii
R-Squared from Trailing 20-Year Price-Price Phillips Curve
Rolling Regression, 1978–2015

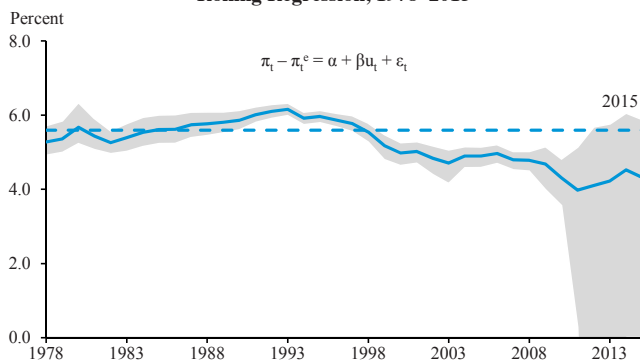


Note: Dashed line represents result from regression over entire sample period.
Source: Bureau of Labor Statistics; Federal Reserve Board, Haver Analytics; CEA calculations.

inflation up to 2007 and then expectations from the Federal Open Market Committee onward. Measuring inflation by the core CPI (that is, excluding food and energy), Figure 2-x depicts the goodness-of-fit (known as R^2) over rolling 20-year periods. During the 1990s, this relationship was robust, averaging an R^2 of 0.46 (meaning that movements in the unemployment rate accounted for 46 percent of the variation in inflation). Over an estimation period that includes the past 20 years, however, the R^2 is only slightly above zero (meaning that this model explains almost none of the recent variation in inflation).

The deterioration in fit in this Phillips curve relationship results in dramatically less precise estimates for the NAIRU, as shown in Figure 2-xi, which shows the band associated with a 50-percent probability that the true estimate lies within.¹ An increased goodness-of-fit corresponds to a thinner confidence band, implying less uncertainty over the true value of the NAIRU. Since 2011 though, uncertainty surrounding the true NAIRU has risen: A mere 50-percent confidence band in 2014 ranges from -4.3 to 6.1, providing little certainty over the current rate of unemployment that will keep inflation stable. Moreover this is only one model of the NAIRU, other models show similar increases in uncertainty over time and the total uncertainty is even larger than shown by any

Figure 2-xiv
NAIRU from Trailing 20-Year Price-Price Phillips Curve
Rolling Regression, 1978–2015



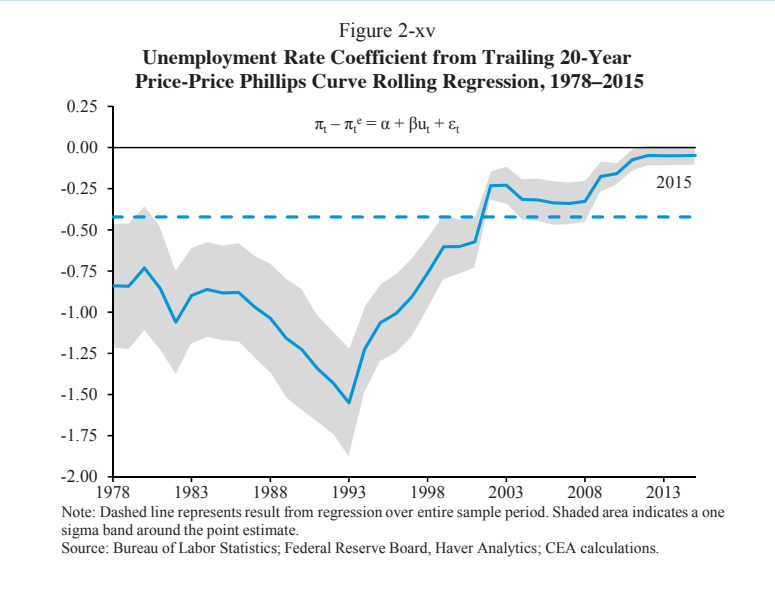
Note: NAIRU is the unemployment rate that keeps inflation stable. It is calculated as α/β . Dashed line represents result from regression over entire sample period. Shaded area indicates a 50 percent confidence band around the point estimate, calculated using a method discussed in Staiger, Stock, and Watson (1997) for analyzing the ratio of the means of two dependent normal random variables. Confidence bands since 2012 include implausible negative values.
Source: Bureau of Labor Statistics; Federal Reserve Board, Haver Analytics; CEA calculations.

¹ Confidence band calculated using a method discussed in Staiger, Stock, and Watson (1997), which extends upon a technique introduced in Fieller (1954). A 50 percent band is used—as opposed to a one-sigma band—because increasingly higher levels of confidence produce confidence bands that approach unboundedness starting after 2010.

individual model because of uncertainty over the true process driving inflation.

Similarly, the coefficient on the unemployment gap has changed noticeably, evolving toward zero as shown in Figure 2-xii. Over the entire estimation period, this coefficient has been about -0.4 (meaning that every point-year of low unemployment raises the rate of inflation by four-tenths of a percentage point). In contrast, from 2002 to 2010, this coefficient averaged about -0.25 , implying that for each point-year of unemployment rate below the NAIRU, inflation would rise by a quarter of a percentage point. And the most recent estimate suggests that each point-year of an unemployment rate below the NAIRU would result in a 0.03-percentage point increase in the inflation rate.

Although uncertainty surrounding the NAIRU has risen drastically over the past few years, a small coefficient on the unemployment rate reduces the economic importance of a precise estimate for the NAIRU. With an unemployment coefficient of -0.25 or less, an estimated NAIRU that differs by half of a percentage point from its true value will only move core CPI inflation slightly.



immigration reform on labor-force size were incorporated into this forecast, then potential real output growth would exceed the 2.3-percent rate shown in the table.

Upside and Downside Forecast Risks. Like any forecast, the Administration's economic forecast is uncertain, and several risks are worth enumerating here. One upside risk is from the homebuilding sector which has some upside potential given the current low level of household formation and its potential for increase. Another upside risk would be that more workers are drawn back into the labor force than expected. On the downside, it appears that growth in China and many other emerging-market countries is slowing, which may reduce U.S. exports. In addition, financial market developments—either reflecting spillovers from abroad or U.S.-specific issues—are another downside risk. Over the longer-run, there are some downside risks to the estimate of potential growth insofar as more recent lower productivity growth rates continue. Yet, as Box 2-5, discusses, some of the recent slowdown in productivity growth may be an artifact of the measurement issues in the official statistics and not entirely a reflection of the economy.

CONCLUSION

The economy continued to strengthen during 2015, especially in the labor market with robust employment gains and continued declines in unemployment. Job growth continued to exceed 200,000 a month for the year as a whole, extending the longest streak of uninterrupted private-sector job growth on record and contributing to an American recovery that has outpaced most other advanced economies. Demand is strong in the United States, especially in the household sector, and will continue to support solid growth in 2016. At the same time, we face challenges associated with the slowing global economy that are discussed in the next Chapter.

Looking ahead, some of the most important decisions that we make as a Nation are the structural policies that influence long-term growth. The President's budget sets forth a number of policies that can be expected to increase the level or long-term growth rate of potential output.

Such policies also aim to boost aggregate demand in the near term and to improve our long-term competitiveness, while promising fiscal restraint over the long run. They are an essential complement to policies that make sure this growth is shared by the middle class and those working to get into the middle class.