Our Perspectives:
Commentary on the economy & regulatory policies affecting financial companies

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The Longbrake Letter*

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I. Optimism Has Escalated Into Overdrive, 2018 Should Be a Very Good Year, But Risks Stemming From an Overheating Economy Are Building

In spite of numerous natural and human-made disasters, 2017 was a great year for investors and many businesses. Economic activity was much better than in 2016, albeit it was still lackluster from a historical perspective.

As we enter 2018, consumer and business optimism is at levels not experienced since the dot-com days of the late 1990s. Passage of "The Tax Cuts and Jobs Act" by Congress and signed by President Trump just before Christmas has reinforced animal spirits that were already very bullish.

Most every forecaster has boosted expectations for GDP growth in 2018 to a range of 2.5 to 2.7 percent, which is 0.7 to 0.9 percent above the Federal Reserve's noninflationary potential level. Let the party roll on. But, for the few who look further ahead than just the next few months, this kind of accelerating momentum in economic activity at a time when the economy is already operating at full capacity and the labor market is running out of employable workers is cause for worry.

We have witnessed this end of cycle euphoria before. What is different this time is the massive tax stimulus which will now flow from tax reform and the prospective significant increase in spending that Congress is likely to enact in early 2018 when it finally gets around to passing the 2018 fiscal year budget. Congress has already approved $50 billion in disaster recovery spending and the Trump Administration has proposed another $81 billion, which Congress seems likely to pass. In addition, Republicans want to increase the budget caps primarily for military spending and the Democrats want to increase the budget caps primarily for discretionary spending. A sizable increase in spending caps, perhaps by as much as $90 billion annually, seems pretty likely at this point.

Think about all of this—optimism bordering on euphoria, massive tax cuts effective January 1, 2018, and sizable increases in federal spending. 2018 should be a very good year and real GDP growth could well

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exceed the 2.5 to 2.7 percent forecast range. But the skunk at the party is that the economy is already operating at full tilt.

And, it's a global phenomenon. Elsewhere, global economic momentum continues unabated. Easy monetary policy, ample liquidity, and low-interest rates have finally taken root and are powering a synchronized global expansion. Nearly every economy is growing faster than its potential.

Easy monetary policies, ample liquidity, and low-interest rates facilitate debt leverage. Excessive debt leverage is always a harbinger of economic excesses which, sooner or later, must be unwound. As Hyman Minsky pointed out long ago, escalation of debt leverage is not sustainable in the long run.

Those who have studied economic cycles understand that there is a symmetry of sorts. Higher highs generally are followed by lower lows. This occurs because imbalances build during the expansion phase of the cycle. The longer the expansion lasts and the more overheated the economy becomes the greater will be the magnitude of the imbalances. While the expansion phase of the cycle generally occurs over an extended period of time, the contraction phase usually happens abruptly and the decent is quick and steep. The trigger for moving from expansion to contraction is a combination of the imbalances becoming too top-heavy and an event that triggers a loss of optimism. History tells us that it is very difficult to discern beforehand when the turning point will occur.

Experience indicates that momentum can support the expansion phase of the cycle for much longer than seems possible based upon cold analytical assessment. For a while, sometimes for a very long while, these Goldilocks moments go on and on sustained by optimism-driven positive feedbacks.

During times such as these, most come to believe that the good times will roll on indefinitely. Risk seems to have been tamed and caged. But, little by little, behaviors adapt to the perceived absence of risk. Decisions in a world in which risk no longer prevails as a governor contribute to creating unsustainable imbalances that ultimately and inevitably lead to market corrections which eliminate the imbalances. Whether the correction is mild or cataclysmic depends upon how long euphoria persists and how great imbalances become.

Already classical indicia of imbalances exist. Volatility is abnormally low and credit spreads are extremely tight; liquidity, as measured by the slowing growth in the supply of money and credit, is tightening; prices of equities are more than one standard deviation above "normal" levels; the spread between the real rate of return on investments and the cost of capital is narrowing; and debt leverage for governments and businesses is high and in many cases at all-time peaks.

Does this mean that the turning point is nigh? Not at all. History tells us that momentum can continue to assure the good times last for a very long time. But, history also tells us that as time passes, imbalances will build and the severity of the ultimate and inevitable correction will grow.

What will trigger the correction? Here the movie is clear as well. The correction follows attempts by central banks to lean against the consequences of economies operating above full capacity. When aggregate demand exceeds supply, inflation or the threat of inflation prompts central banks to tighten liquidity. It is always the loss of liquidity, real or imagined, that triggers a correction or recession. That is why the Federal Reserve's policy to raise interest rates and shrink its balance sheet, which is intended to achieve the proverbial soft landing, may ultimately be the trigger of the correction rather than the curative.

Stay tuned. Little by little, we are moving in that direction. But, in the meantime, enjoy the good times that seem likely to prevail in 2018.

In January's Longbrake Letter, I will include a recap of what happened in 2017. Spoiler alert—there

will be a lot of red ink in the summary, which is to say that the economy performed a lot better in 2017 relative to the forecasts. The letter will also include 2018 forecasts, most of which will be positive. The letter will also contain commentary and analysis of risks that could eventually lead to an end of the current expansion. I also intend to revisit the theory of secular stagnation, which most have dismissed, but may simply be silently at work.

II. Data and Econometric Model Revisions

Model source data are updated monthly and quarterly in the case of productivity and GDP data. There were no significant revisions to past source data in November.

Model assumptions and model statistical methodology for key economic phenomena generally remain unchanged from month to month. Periodically, however, it becomes apparent that data assumptions need to be updated to reflect emerging trends. Such is the case this month with respect to the very important assumption about the level of the non-accelerating inflation rate of unemployment (NAIRU). This particular assumption has to be teased out of the data and to a certain extent involves subjective judgment. Currently, there is considerable difference of opinion about NAIRU. It turns out that differences in the NAIRU assumption have extremely significant implications for inflation forecasts and thus for the conduct of monetary policy.

1. November Employment Forecast Assumptions

I changed my ***employment forecast assumptions*** significantly in November. I purposely have tied employment assumptions in my "**BASE**" scenario to **CBO**'s economic forecast, which was last updated in June. However, since that revision employment growth has been much stronger and unemployment has been considerably lower than **CBO**'s assumptions. The divergence has increased steadily. I am relatively certain that **CBO** will revise employment assumptions substantially when it releases its next update in January or February 2018. I could wait for this revision but the problem is that my "**BASE**" scenario forecasts are increasingly out of sync with recent economic trends.

In response to this problem, I made two changes to employment assumptions. The first change was to increase payroll employment growth in the "**BASE**" scenario. The change amounted to an increase in total payroll employment by 2.67 million by the end of 2021.This resulted in reducing the forecast unemployment rate at the end of 2021 from 4.76 percent to 3.96 percent, which is only slightly below the 4.12 percent November 2017 unemployment rate.

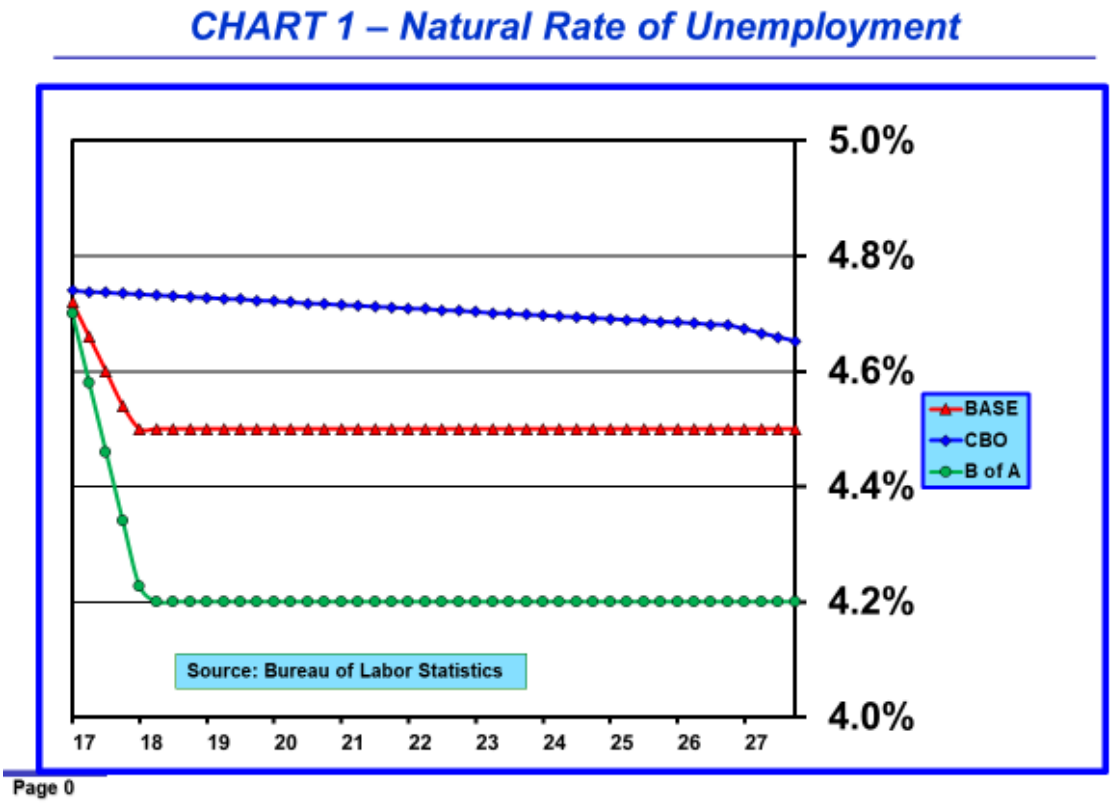
Faster payroll employment growth and a lower unemployment rate would be expected to lead to higher inflation and interest rates.

However, the second employment assumption change is offsetting. Increasingly, it appears that the non-accelerating inflation rate of unemployment (NAIRU) is lower than the level assumed by **CBO**. **CBO**'s NAIRU unemployment rate assumption was 4.74 percent in November 2017. This rate falls marginally to 4.71 percent by the end of 2021. The **FOMC**'s estimate of NAIRU is 4.4 to 4.7 percent; **B of A**'s is 4.2 percent and many other forecasters currently believe NAIRU is about 4.5 percent. I lowered the NAIRU unemployment rate assumption to 4.5 percent in January 2018 and held it constant for the remainder of the forecast period through 2027. A reduction in the expected unemployment gap reduces forecast increases in inflation and interest rates.

In conjunction with these assumption changes, I eliminated the methodology change I made in November for estimating future short-term (less than 26 weeks) and long-term (more than 26 weeks) rates of unemployment. The two measures sum to the U-3 unemployment rate.

2. November Non-Accelerating Inflation (Natural) Rate of Unemployment (NAIRU) Assumption

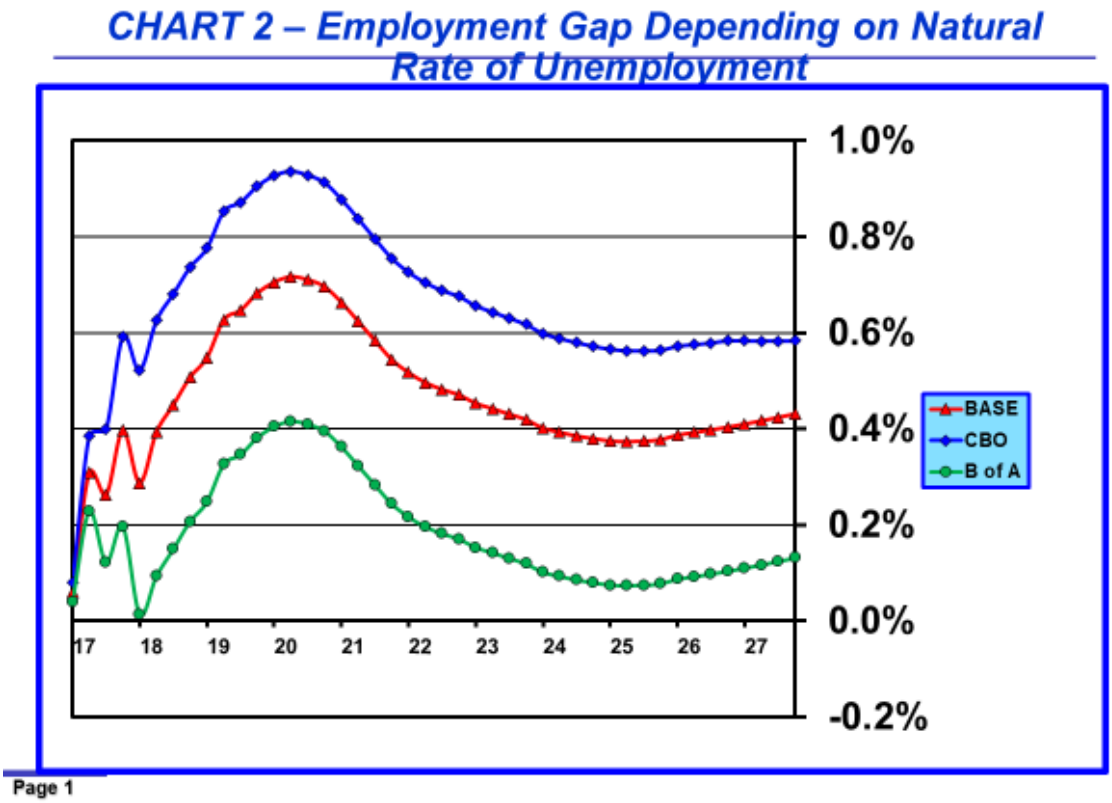
Chart 1 shows three sets of assumptions for the natural rate of unemployment (non-accelerating inflation rate of unemployment—NAIRU): (1) **CBO**'s June 2017 forecast, (2) a 4.5 percent constant level beginning in 2018, and (3) a 4.2 percent constant level beginning in 2018.



3. Forecast Employment Gap

Chart 2 shows the projected unemployment gaps for the three scenarios. The first thing to notice is that the unemployment gap is positive in all three scenarios. A positive unemployment gap indicates that the labor market is operating above its noninflationary potential. The consequence of a positive gap is upward pressure on inflation over time.

Second the positive unemployment gap peaks in all three scenarios in mid-2020: 0.94 for **CBO**'s scenario, 0.42 percent for **B of A**'s scenario, and 0.72 percent for the consensus scenario. Thereafter the employment gap shrinks but remains positive in all three scenarios, reaching by the end of 2027 0.58 percent for **CBO**'s scenario, 0.13 percent for **B of A**'s scenario, and 0.43 percent for the consensus scenario.



4. Impact of Unemployment Gap Assumptions on Core PCE Inflation Forecasts

As is evident in **Chart 3**, core inflation forecasts are impacted significantly by differences in the unemployment gap assumption. For example, core inflation in 2021 averages 2.03 percent in **CBO**'s scenario, 1.49 percent in **B of A**'s scenario, and 1.79 percent in the consensus scenario. The 54 basis points forecast core inflation difference between the **CBO** and **B of A** scenarios in 2021 is nearly equal to the 52 basis points differential in the unemployment gap assumptions between the two scenarios. By 2027 the difference in the unemployment gap between these two scenarios shrinks a bit to 46 basis points, while the difference in forecast core inflation has increased a little to 56 basis points.

5. Impact of Employment Gap Assumptions on Federal Funds Rate Forecasts

Federal funds rate forecasts are impacted to an even greater extent by differences in the unemployment gap assumption (see **Chart 4**). For example, the federal funds rate in 2021 averages 3.83 percent in **CBO**'s scenario, 2.91 percent in **B of A**'s scenario, and 3.43 percent in the consensus scenario. The 92 basis points forecast federal funds rate difference between the **CBO** and **B of A** scenarios in 2021 is approximately equivalent to a 1.8 basis point increase in the federal funds rate for each 1 basis point increase in the positive unemployment gap.

In 2027 the federal funds rate averages 3.44 percent in the consensus scenario, reflecting no change from the average forecast federal funds rate in 2021. In **CBO**'s scenario, the federal funds rate averages 3.90 percent in 2027 compared to 3.83 percent in 2021. In **B of A**'s scenario, the federal funds rate averages

CHART 3 – Core PCE Inflation Depending Upon the Natural Rate of Unemployment

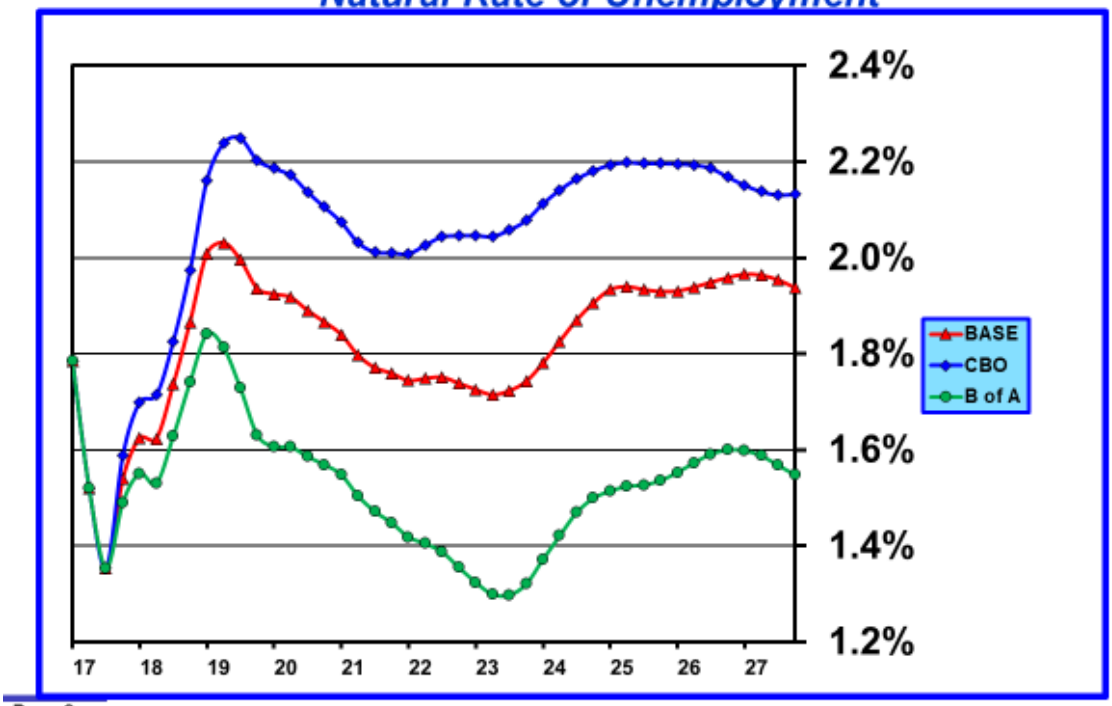
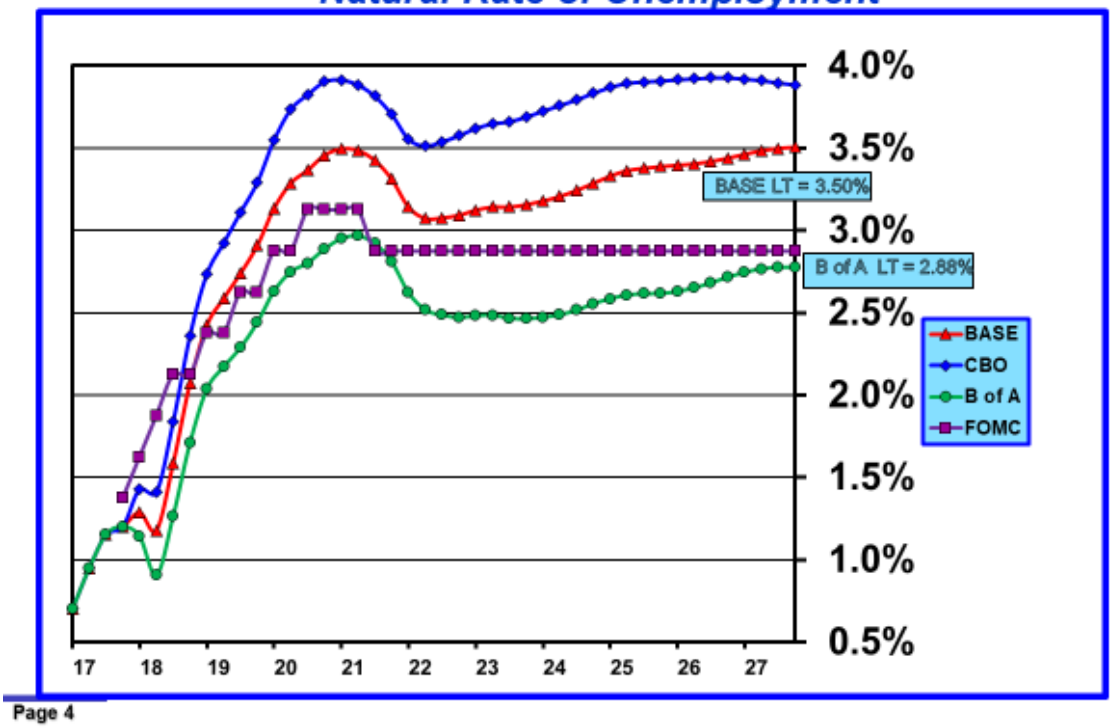


CHART 4 – Federal Funds Rate Depending Upon the Natural Rate of Unemployment



2.77 percent in 2027, nearly the same as **B of A** is projecting in its own forecast of 2.75 percent to 3.00 percent, compared to 2.91 percent in 2021. Notice that the federal funds rate declines slightly between 2021 and 2027 in **B of A**'s scenario while rising slightly in **CBO**'s scenario.

6. Implications for Monetary Policy

Charts 3 and **4** demonstrate the singular importance of the level of the natural rate of unemployment in impacting future inflation and, thus, what monetary policy course the Federal Open Market Committee (**FOMC**) should chart. If **CBO**'s assumptions about NAIRU are correct, then the **FOMC** should raise the federal funds rate substantially and quickly to contain a potentially significant rise in inflation.

However, if **B of A**'s NAIRU assumption is a more correct assessment of the labor market, an aggressive monetary policy, which would be reasonable pursuant to **CBO**'s NAIRU assumption, could throw the economy into recession and depress inflation even further below the **FOMC**'s 2.0 percent target than is currently the case.

This uncertainty about NAIRU argues for a cautious approach to the conduct of monetary policy. Indeed, to date, the **FOMC** has proceeded with caution. Its projections for future federal funds rate increases do not appear to be particularly aggressive and fall between the consensus scenario projections and the **B of A** low NAIRU scenario. If **B of A**'s NAIRU assumption turns out to be the more relevant one, the **FOMC** will either engage in fewer increases in the federal funds rate with a lower endpoint, or, if it adheres to its projected pathway, it will run the risk of tightening policy a little too much and in so doing could slow economic growth or even induce recession.

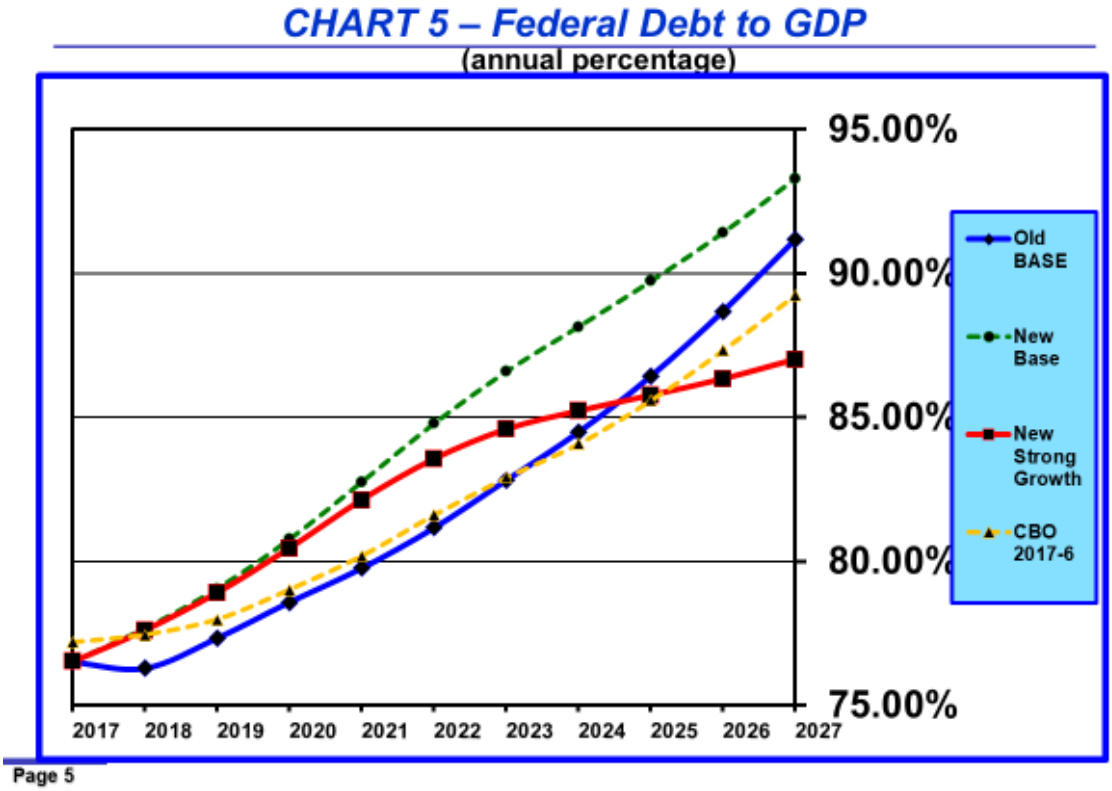
7. October Changes in Federal Budget Deficit Forecast Assumptions Increased in November Model

Assumptions about the federal deficit were increased in the ***November Longbrake Letter*** (October model) to account for disaster spending but more importantly to reflect probable increases in deficits stemming from tax reform. These assumption changes increased the accumulated federal government debt held by the public increased $1.16 trillion over the ten-year period. Increases were more heavily skewed to near-term years.

Assumptions about the federal deficit are increased further in the ***December Longbrake Letter*** (November Model) by an additional $530 billion to $1.69 trillion over the ten-year period. Again, this further increase occurs almost entirely in the next five years and reflects details of "The Tax Cuts and Jobs Act," a probable additional increase of $50 billion in disaster spending, and approximately $90 billion annual increase in the next few fiscal years in military and discretionary spending. Disaster spending does not count in the budget caps. Additional military and discretionary spending will require Congress to lift the budget caps by amending the Budget Control Act. This seems likely to occur when Congress passes the fiscal 2018 budget resolution sometime in early 2018.

Although Congress imposed a ten-year tax revenue reduction cap of $1.5 trillion on itself, analysts expect the impact of tax cuts on economic growth to result in an approximate increase of $500 billion in tax revenues. Thus, the net impact of "The Tax Cuts and Jobs Act" on tax revenues is a reduction of about $1.0 trillion. This effect is what "dynamic scoring" is all about. The additional nearly $700 billion increase in the deficit over the next ten years results from increased disaster, military, discretionary spending and greater interest payments on a larger accumulated federal deficit.

Chart 5 compares **CBO**'s June 2017 federal-deficit-to-nominal-GDP ratio and my "**Old BASE**" scenario ratio prior to the October and November changes in tax revenues and spending for the next ten years to the post-October and November "**New BASE**" scenario ratio. Also shown in **Chart 5** is the "**New Strong Growth**" scenario ratio. The overall effect of the tax revenue reductions and spending increases is to increase the accumulated deficit by about 2 percentage points by 2027 to 93.3 percent in the "**BASE**" scenario. Although this does seem like a significant change, it adds to a steadily increasing deficit ratio, which stood at 76.5 percent at the end of fiscal year 2017.



8. Other October Assumption Changes Retained

Two other assumption changes implemented in November were retained. These included the recalibration of the methodology for projecting the federal funds rate and redefinition of the core inflation forecasting equation.

III. Outlook for U.S. Real GDP

Third-quarter real GDP growth was strong on the surface but weaker in the details. Because of the negative impacts of hurricanes Harvey, Irma and Maria on economic activity, it is difficult to interpret third-quarter real GDP data. The market took the report in stride as a confirmation of moderately accelerating growth. In other words, the report did not revise sentiment for better or worse.

For the time being, optimists continue to hold sway and favorable economic momentum appears sufficient to guarantee good economic performance for several months and perhaps quarters to come.

1. "Final Estimate" of Third-Quarter GDP

The "**Final Estimate**" of third-quarter GDP growth was 3.2 percent. Details are shown in **Table 1**. The bottom four panels of **Table 1** show different measures of real GDP growth. These include the traditional "**Total GDP**" measure, and three alternatives—"**Final Sales**," "**Private**," and "**Private Domestic**."

Table 1
Composition of 2017 and 2016 Quarterly GDP Growth

	Third Quarter 2017 Advance Estimate	Third Quarter 2017 Preliminary Estimate	Third Quarter 2017 Final Estimate	Second Quarter 2017	First Quarter 2017	Fourth Quarter 2016
Personal Consumption	1.62%	1.60%	1.49%	2.24%	1.32%	1.99%
Private Investment						
Nonresidential	.49%	.59%	.58%	.82%	.86%	.02%
Residential	-.24%	-.20%	-.18%	-.30%	.41%	.26%
Inventories	.73%	.80%	.79%	.12%	-1.46%	1.06%
Net Exports	.41%	.43%	.36%	.21%	.22%	-1.61%
Government	-.02%	.07%	.12%	-.03%	-.11%	.03%
Total	**2.99%**	**3.29%**	**3.16%**	**3.06%**	**1.24%**	**1.76%**
Final Sales	**2.26%**	**2.49%**	**2.37%**	**2.94%**	**2.70%**	**.70%**
Private	**2.28%**	**2.42%**	**2.25%**	**2.97%**	**2.81%**	**.67%**
Private Domestic	**1.87%**	**1.99%**	**1.89%**	**2.76%**	**2.59%**	**2.28%**

Reported quarterly "**Total GDP**" growth tends to be highly variable because of volatility in various GDP components, especially inventories, and the methodology of annualizing quarterly growth rates which amplifies the impact of short-term aberrations in the growth of individual GDP components. "**Total GDP**" grew 3.16 percent in the third-quarter "**Final Estimate**" not much different from the 3.06 percent growth rate in the second quarter.

However, inventories component inflated the "**Total GDP**" measure of real GDP growth. The "**Final Sales**" measure of real GDP removes the contribution of changes in inventories. "**Final Sales**" grew 2.37 percent in the third quarter, which was much weaker than the 2.94 percent growth rate in the second quarter. Data in **Table 1** for "**Final Sales**" show that quarterly growth rates in inventories can be quite volatile and this then is also true for the "**Final Sales**" measure of real GDP growth

"**Private**" GDP omits both inventory changes and government investment spending. Growth in government expenditures rises during periods of economic weakness and falls during periods of strength or when fiscal austerity is the order of the day.

"**Private Domestic**" GDP omits inventory changes, government spending, and net exports. This measure gives the truest picture of the performance of the core of the U.S. economy, which accounts for approximately 87 percent to "**Total GDP**." Annualized quarterly growth rates of this measure are generally less volatile, varying over the past four quarters from 1.89 percent to 2.76 percent. The third quarter "**Final Estimate**" was 1.89 percent, which reversed an improving trend over recent quarters.

However, part of this shortfall could reflect the transitory negative impact of the hurricanes.

Discounting the hurricane impacts, the picture that the various measures of real GDP in recent quarters have painted gradual growth, which is somewhat above the potential rate, appears to remain valid.

2. Growth Rates of Real GDP Components—4-Quarter Moving Average

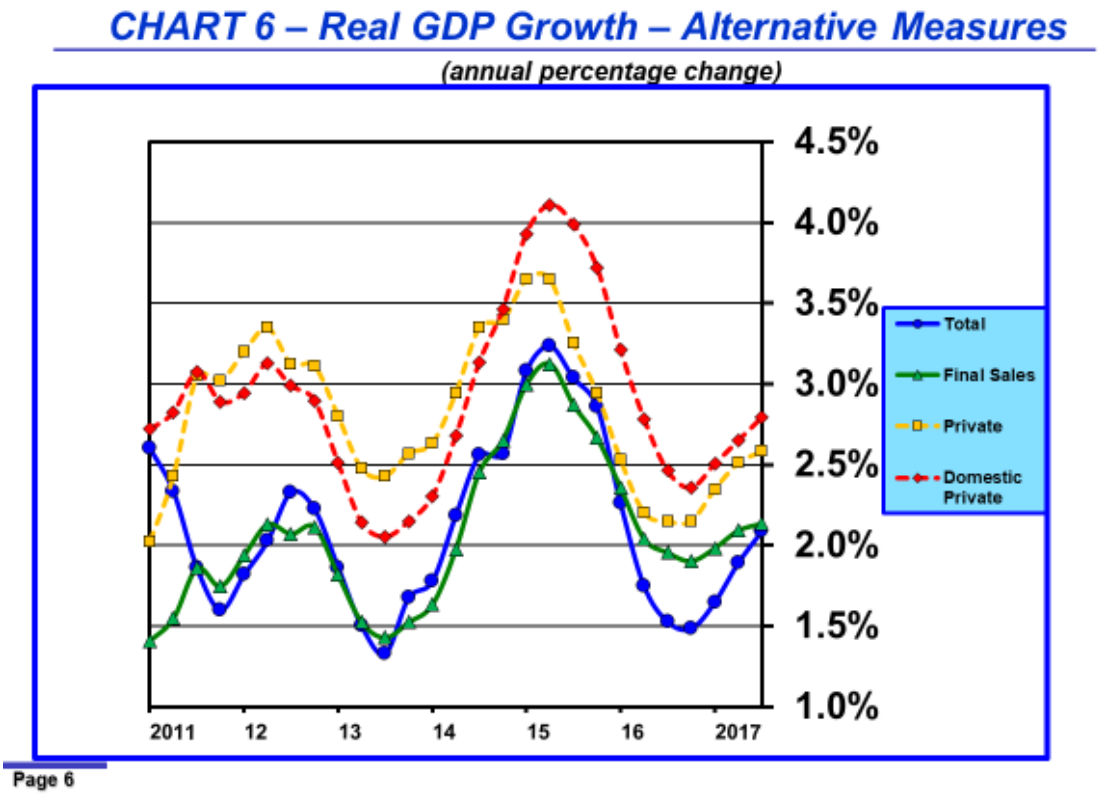
Because quarterly annualized GDP data in the customary Bureau of Economic Analysis (**BEA**) reports are highly volatile, without the kind of dissection of details discussed above quarterly data can be very misleading about the underlying trends in economic growth. **Table 2** and **Chart 6** show four-quarter moving averages of growth rates for GDP components as well as the four alternative measures of real GDP. This smooths out quarterly aberrations in the data and gives a clearer picture of the health and direction of the economy.

Table 2
Year-Over-Year Growth Rates for Components of Real GDP

	GDP Component Weight	Third Quarter 2017	Second Quarter 2017	First Quarter 2017	Fourth Quarter 2016	Third Quarter 2016	Second Quarter 2016	First Quarter 2016
Personal Consumption	69.51%	2.75%	2.80%	2.81%	2.73%	2.78%	2.99%	3.27%
Private Investment	17.22%							
Nonresidential	13.42%	3.28%	1.94%	.57%	-.59%	-.67%	-.24%	.84%
Residential	3.50%	1.76%	2.09%	3.34%	5.48%	7.41%	9.60%	10.43%
Inventories	.16%	-21.9%	-59.8%	-69.7%	-66.8%	-66.3%	-45.7%	-14.8%
Net Exports	-3.62%	7.83%	5.98%	6.33%	7.51%	10.59%	18.89%	22.88%
Exports	12.74%	2.27%	1.97%	.76%	-.33%	-.93%	-1.19%	-.52%
Imports	-16.37%	3.45%	2.83%	1.92%	1.27%	1.32%	2.50%	3.61%
Government	17.06%	.03%	.13%	.28%	0.75%	1.05%	1.29%	1.55%
Total	**100.0%**	**2.09%**	**1.89%**	**1.65%**	**1.49%**	**1.53%**	**1.75%**	**2.26%**
Final Sales	**99.84%**	**2.14%**	**2.09%**	**1.98%**	**1.90%**	**1.96%**	**2.04%**	**2.36%**
Private	**82.78%**	**2.58%**	**2.51%**	**2.35%**	**2.15%**	**2.15%**	**2.20%**	**2.53%**
Private Domestic	**86.41%**	**2.79%**	**2.65%**	**2.50%**	**2.36%**	**2.46%**	**2.78%**	**3.21%**

Since the second quarter of 2011 growth in "**Private**" GDP has been consistently greater than growth in "**Total GDP**." Since 2015 fiscal policy has been mildly supportive of "**Total GDP**" growth. In recent quarters government's contribution to real GDP growth has been small and diminishing, which has reduced the growth rate in "**Total GDP**" relative to "**Private**" GDP.

There are some important takeaways from **Chart 6**. First, all four measures of real GDP growth troughed in the fourth quarter of 2016 and have edged up since then. Second, "**Private**" GDP, which omits government spending and inventory accumulation, and "**Private Domestic**" GDP, which omits government spending, inventory accumulation, and net exports, have been growing more rapidly than "**Total GDP**" and "**Final Sales**."



3. Consumption and Disposable Income

Personal consumption contributed 1.49 percent to third-quarter real GDP growth compared to 2.24 percent in the second quarter and 1.32 percent in the first quarter. This volatility once again emphasizes the limitations of relying on quarterly data to discern trends. The four-quarter moving average trend is a more reliable indicator. It has been very stable over the past five quarters, varying between 2.73 percent and 2.81 percent.

In the long run, growth in nominal disposable income and consumer saving preferences determine growth in nominal personal consumption. Nominal disposable income depends upon a lot of things but the most important ones are the level of employment and wage rates. Tepid growth in employment and lethargic growth in wage rates will result in slow growth in disposable income. In recent months employment growth has been quite strong, but wage growth has been disappointing.

Chart 7 shows annual rates of growth in real disposable income and real consumer spending from 2000 through the first nine months of 2017. The negative impact of the Great Recession on both disposable income and consumption growth is clear in **Chart 7**. So, too, is the temporary depressing effect of the Obama tax increases on disposable income growth in 2012 but not on consumption growth. However, it is unclear why growth in disposable income has faltered recently while consumption growth has remained relatively strong.

This divergence is evident in **Chart 8**. Over the past two years, nominal disposable income growth has plunged while spending growth has remained relatively high and even increased over the past four quarters.

CHART 7 – Real Disposable Income and Consumption Growth

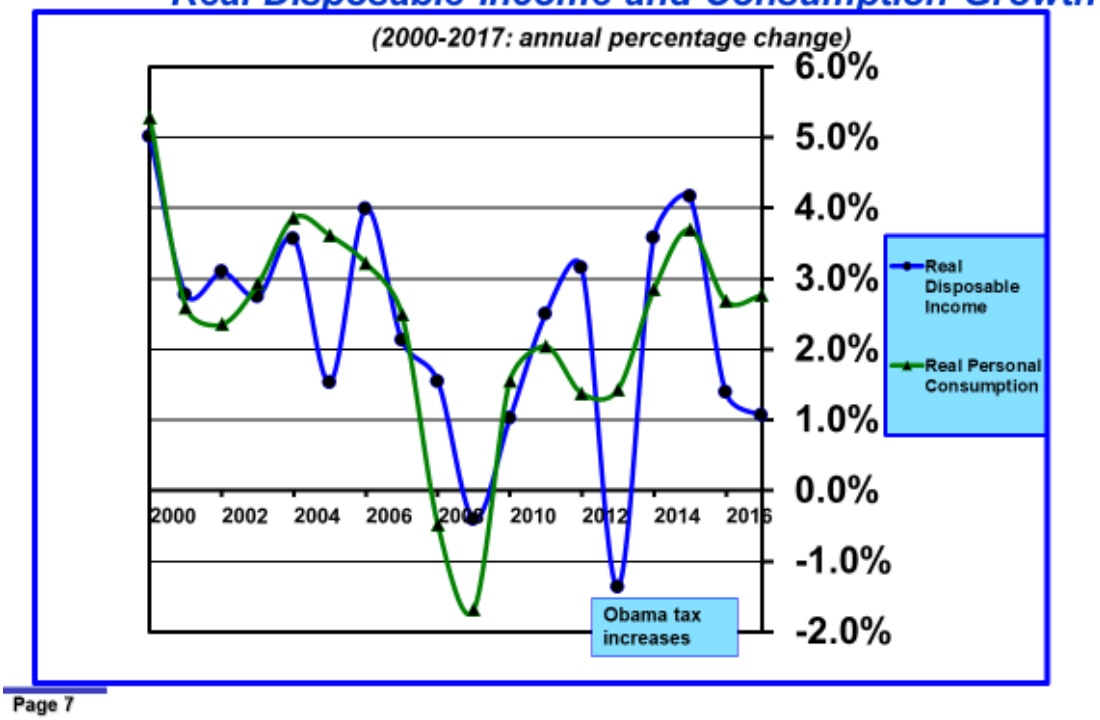


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CHART 8 – Nominal Disposable Income and Consumption Growth

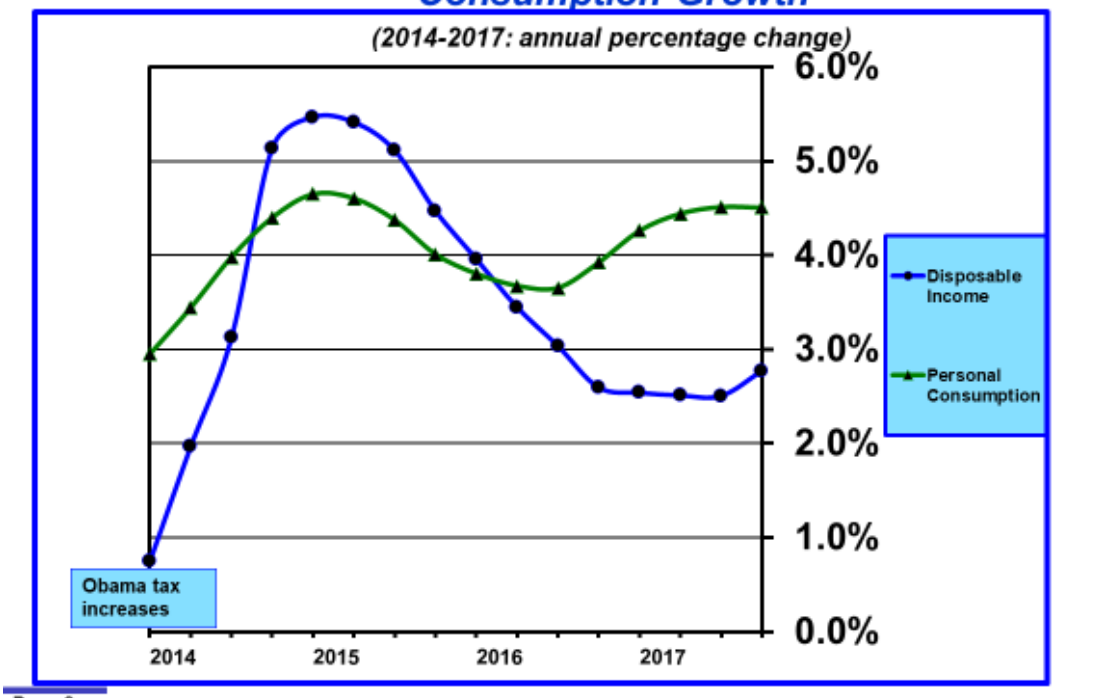

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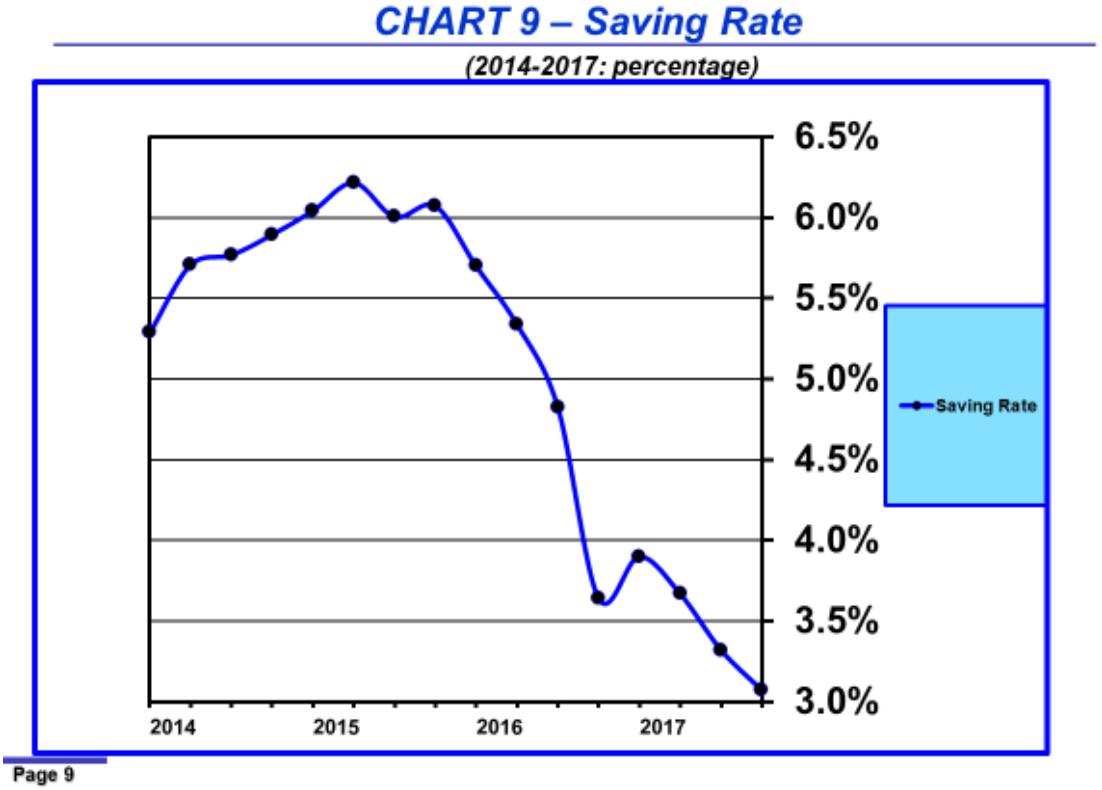
Chart 8 shows the 4-quarter moving average growth rates in nominal disposable income and consumption from 2014 through the third quarter of 2017. Growth in consumption is typically less volatile than growth in disposable income. Consumer saving serves as the buffer (see **Chart 9**). When growth in disposable income is weak, the saving rate declines as consumers dip into savings and increase borrowing to sustain consumption. This phenomenon is consistent with the permanent income hypothesis which posits that consumers will plan consumption expenditures based upon expected long-run sustainable income rather than adjust consumption to short-term oscillations in disposable income.

As is evident in **Chart 9**, so far as the reported data are concerned, consumer spending has been supported by a collapse in the saving rate from 6.1 percent during 2015 to 3.5 percent over the first eleven months of 2017. Continuing the downward trend, November's saving rate was 2.9 percent.



As can be seen in **Chart 8**, disposable income growth has slowed considerably over the last several quarters. This phenomenon only became apparent when **BEA** did its annual benchmarking of the National Income Accounts in July. The downward revisions are inconsistent with strong employment growth and some, albeit limited, acceleration in wage rates. **GS** believes that this inconsistency can be explained, at least in part, by tactical income shifting from one year to another in anticipation of tax reform and in part by its expectation that **BEA** will revise underreported disposable income up by 0.8 percent at the next benchmarking in July 2018. This would also lift the saving rate by 0.4 percent.[1] A simple check is to multiply the rate of growth of total hours worked over the past 12 months (1.59 percent) by the rate of growth in nominal weekly wages (2.60 percent). This results in a growth rate in wage income of 4.24 percent, which is closer to nominal growth in consumption of 4.50 percent compared to nominal growth in

[1]Spencer Hill. "Tactical Income Shifting and Compensation Slump," US Daily, Goldman Sachs Economics Research, September 22, 2017.

disposable income of 2.77 percent. This is suggestive evidence of underreporting of disposable income but not definitive since employee compensation only accounts for 63 percent of personal income.

Nonetheless, if the decline in disposable income growth has not been caused by incomplete disposable income data but is due to fundamental factors, then eventually growth in consumption will fall. In turn, since consumption is nearly 70 percent of total GDP, growth in GDP will decline.

Since the election of Donald Trump as president, consumer and business confidence has surged to the highest levels in 20 years. Over the same time, consumption growth has accelerated but income growth has merely stabilized at a relatively low level. Assuming the income data are reliable, which they might not be, income growth in coming months will need to accelerate to validate consumer optimism. Negligible acceleration in wage growth and the probable slowing in employment growth now that the labor market has exceeded full employment do not bode favorably.

Forecasts of growth in real consumer spending over the next several years are shown in **Table 3** and **Chart 10**. Real consumer spending increased 2.69 percent in 2016. This is not the final number as several more revisions will occur over the next few years.

Table 3
Real Personal Consumption Growth Rate Forecasts

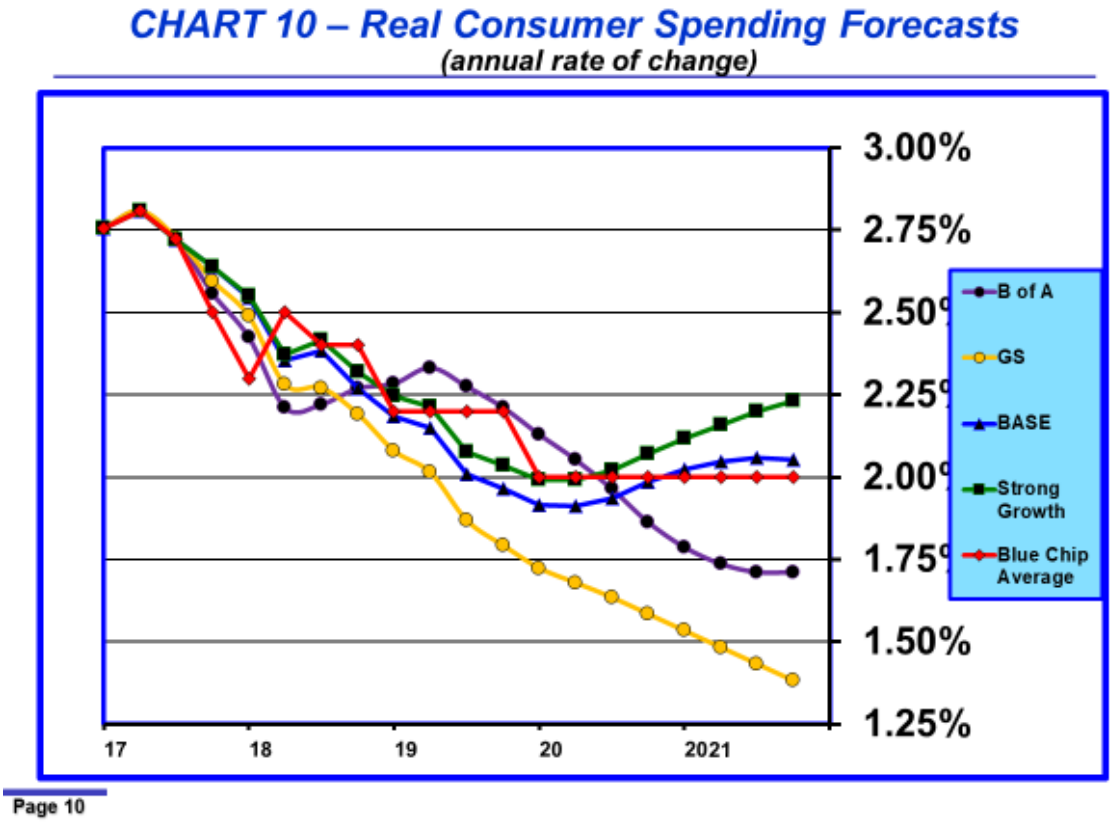
	2013	2014	2015	2016	2017	2018	2019	2020	2021
Actual	1.43	2.84	3.70	2.69					
B of A					2.56	2.27	2.21	1.86	1.71
GS					2.60	2.19	1.79	1.58	1.38
ISH Markit					2.70	2.50	2.30	2.40	2.40
Economy.com					2.60	2.60	2.20		
Blue Chip					2.60	2.40	2.20	2.00	2.00
Bill's BASE					2.64	2.27	1.97	1.99	2.05
Bill's Strong Growth					2.64	2.32	2.03	2.02	2.20

Most forecasters expect real consumer spending growth to slow in coming years because the economy is at or above full employment and employment growth is set to slow in coming quarters to match the underlying demographic dynamics of aging and slowing population growth.

This slowing pattern is apparent in the data in **Table 3** and **Chart 10**. Growth in real wages might moderate the forecast decline in consumer spending growth, but only if the growth rate in real wages increases. That would require productivity to improve from its recent very low level, which would be a welcome result, but is not at all assured.

Although all forecasters agree that consumer spending growth will slow, my projections for spending growth in 2018 are generally consistent with those of **B of A** and **GS**, but lower than those of several other forecasters. Beyond 2018, my forecasts of spending growth bottom in 2019 and then inch up in 2020 and 2021. My **BASE** scenario forecast differs little from the Blue Chip average. However, after 2018 **GS** is much more pessimistic than others and expects a substantial decline in consumer spending growth; the same is the case to a somewhat lesser extent for **B of A** after 2019. Although **GS**'s and **B of A**'s long-term pessimism about real consumer spending growth may turn out to be good forecasts, their estimates seem inconsistent with their assumptions about growth in employment and wage rates over the next few years.

Oher forecasters appear to be overly optimistic about real consumer spending growth in 2018. These kinds of forecasts point out the speculative nature of much of economic forecasting and weaknesses inherent in most econometric models.



But, having said all of this, a final caveat is in order. All of these forecasts predate the adoption of the "Tax Cuts and Jobs" Act, which will result in tax cuts for approximately 90 percent of individual taxpayers in 2018. Whether this will result in greater spending growth, greater saving growth, or some combination of both, will be debated in coming months. In the longer run, the data will give us the answer.

4. Business Investment

Real private investment consists of three principal categories—business investment, which is labeled "nonresidential" in the National Income Accounts, residential investment, and changes in inventories. While changes in inventories are volatile from quarter to quarter, over the very long run the growth rate in inventories closely tracks growth in business and residential investment.

Table 4 shows growth rates for real private investment and separately for two of its three principal components—nonresidential (business) and residential investment. Residential investment is 20 percent of total investment, nonresidential investment is 77 percent, and growth in inventories accounts for approximately 3 percent.

Nonresidential investment (business) growth faltered in 2015 and was crushed in 2016 by the collapse in oil and commodity prices. But business investment was down in other sectors as well. Investment growth was negative -0.59 percent in 2016.

Nonresidential investment came out of deep slumber in the first three quarters of 2017, rising at an annual rate of 6.1 percent. A recovery in energy investment accounted for much of this surge. Capital

Table 4
Real Private Investment (Residential and Nonresidential) Growth Rate Forecasts

	2013	2014	2015	2016	2017	2018	2019	2020	Ave. 1947-2017
REAL PRIVATE INVESTMENT									
Actual	5.02	6.21	3.83	0.63					**3.75****
B of A					3.97	4.66	4.17	3.36	
GS					4.14	5.20	3.60	2.81	
Bill's BASE					3.84	3.44	2.67	2.14	
Bill's Strong Growth					3.84	3.44	2.75	2.52	
REAL NONRESIDENTIAL (BUSINESS) INVESTMENT									
Actual	3.50	6.88	2.34	-0.59					**2.56***
B of A					4.72	5.40	4.31	3.41	
GS					4.87	5.57	3.58	2.96	
REAL RESIDENTIAL INVESTMENT									
Actual	11.88	3.46	10.23	5.48					**-0.32***
B of A					1.14	1.80	3.61	3.15	
GS					1.41	3.77	3.66	2.25	

*Average 1999-2017
**Real private investment = 1.68% for 1999-2017

investment growth in sectors other than energy and oil has improved slightly but only to about the underlying long-term trend rate of 2.56 percent. In light of the acceleration in global growth and the tightening U.S. labor market, the improvement in growth in investment spending so far has been underwhelming.

Forecasters expect **real private investment** growth will slow in the fourth quarter but still to be strong and above the long-term trend for all of 2017. Possible benefits of tax reform and tax cuts have largely been removed from 2017 forecasts, but are now embedded in the above-trend growth forecasts for 2018.

Although **GS** expects growth in nonresidential investment to be 4.9 percent for all of 2017, its capital expenditures tracker registered an above-trend level of nearly 8.0 percent in December. **GS** expects easier financial conditions and stronger domestic demand, as implied by purchasing manager surveys, to make 2018 a good year. With the passage of tax reform, as the **GS** capital expenditures tracker appears to be signaling, risks are now tilted in the direction of greater business investment growth in 2018.

Generally, in recent years, analyst forecasts of growth in business investment have been too optimistic and this may again prove to be the case with **B of A**'s and **GS**'s above-trend capital spending forecasts for 2018 and particularly for **B of A**'s continued above-trend forecasts in 2019 and 2020. However, several features of tax reform are intended to boost business investment, so the optimistic forecasts might come to pass this time and perhaps even be exceeded in 2018.

Following 2018 and over the next several years **GS** expects **business investment** to slow gradually to the long-term trend growth of 2.56 percent that has prevailed over the last 19 years, while **B of A** expects growth to be above-trend for 2018-2020.

B of A and **GS** are optimistic about the outlook for business investment growth to remain at a high level over the next several years because they expect corporate profits to accelerate, credit conditions to remain benign and uncertainty to diminish. The benefits of tax reform must now be added to those positive drivers. A potential weakness in **B of A**'s business investment model is the possibility of cumulative

negative effects over time of low interest rates and depressed innovation, as reflected in a slower rate of new business formation. (Note that the "Tax Cuts and Jobs" Act could lead to acceleration in new business formation, but such an acceleration would probably be driven by restructuring to take advantage of tax law rather than to any fundamental acceleration in investment and innovation.) Also, according to the Federal Reserve's data on capacity utilization, because firms are operating at less than full capacity, the incentive to invest has been dampened.

Housing—Real residential investment growth was very strong in 2015. Growth slowed considerably in 2016 but remained well above the long-term trend, which is not difficult considering that the annual rate of growth over the past 19 years has been slightly negative.

Housing inventories are lean and demand is relatively strong, resulting in upward pressure on housing prices. However, outsized housing price increases (see **Chart 11**), which are exceeding growth in wages and nominal disposable income, will eventually dampen single-family residential demand and inventories should improve with the consequence that residential investment growth should slow in coming years. Forecasts reflect this scenario, although trend growth is expected to exceed slightly (**GS** and **B of A**) that of overall real GDP growth over the next three years.

Housing starts are still historically low relative to family formation rates. The long-term trend rate in housing starts should be about 1.4 million based upon growth in household formation and replacement of existing homes. But, starts were 1.18 million in 2016, up 6.3 percent from 1.11 million in 2015. Housing starts have averaged 1.21 million over the first eleven months of 2017, which was 3.3 percent above the pace of the first eleven months of 2016.

As 2017 draws to a close, **B of A** expects housing starts will be 1.23 million in 2017 and 1.32 million in 2018 because of lower than expected activity in multifamily housing construction. **GS**'s forecast is similar—1.21 million starts in 2017 and 1.26 million in 2018.

According to **B of A**, the shortfall in housing starts relative to the level implied by demographics and historical trends in household formation can be traced to high levels of student debt, tighter credit standards, including higher down payment requirements, which many have difficulty meeting, and lifestyle changes among Millennials including delays in marriage and having children. The consequence is that Millennials have much lower homeownership rates, a phenomenon that seems likely to persist. This is depressing single-family construction.

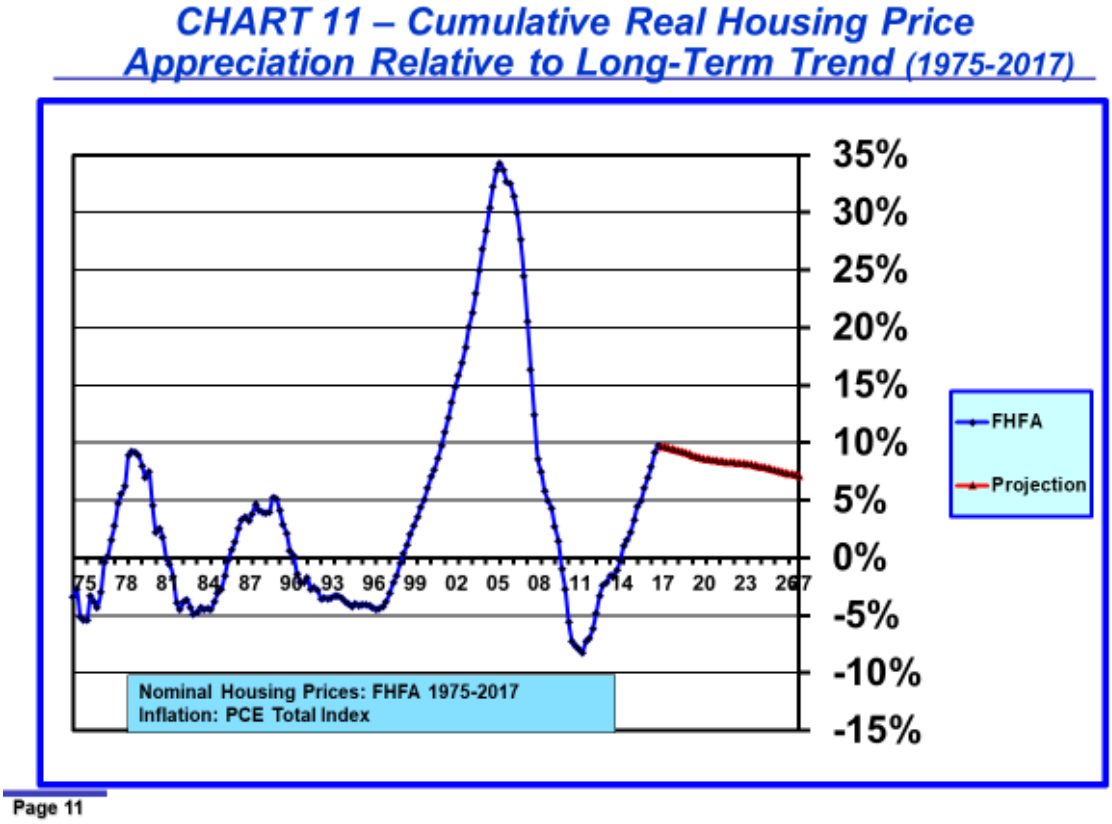
On the supply side, the number of homebuilders declined substantially during the Great Recession and has not recovered. Credit standards remain tight for construction loans and this is reducing the extent of speculative building. The October 2017 Federal Reserve's Senior Loan Officer quarterly survey indicated that lending standards in all categories of residential loans were unchanged or easier. The survey indicated a slight weakening in residential loan demand. Credit standards tightened slightly for multi-family real estate loans and demand weakened.

In summary, housing demand is depressed relative to demographics and historical trends in household formation and supply is weak. Overall housing inventory is very lean. In response, average housing prices have been rising faster than growth in nominal incomes. All else equal, this creates a feedback loop which depresses demand. Ordinarily, this would be offset by increased construction. But in the wake of the Great Recession's cataclysmic impact on builders and lenders, increased construction activity has been constrained.

Housing prices continue to move higher and were up 6.2 percent (S&P CoreLogic Case-Shiller National Home Price Index) in September over the prior year; the Federal Housing Finance Agency's purchase-only

housing price index was up 6.5% in the third quarter of 2017 compared to the third quarter of 2016. These increases are well above the 2.6 percent growth in aggregate nominal disposable income and 2.0 percent growth in per capita nominal disposable income over the past 12 months. This differential is eroding affordability and, thus, is not sustainable over the long run. Any increase in mortgage rates will simply make matters worse.

As **Chart 11** shows, average national housing prices were 9.7 percent above the long-run equilibrium trend level. With the exception of the housing bubble in the mid 2000s, this level of overvaluation matches or exceeds the housing price peaks in the late 1970s and late 1980s. The forecast slow downward drift in the amount by which average prices exceed the equilibrium trend level is probably optimistic. In all previous cycles, the decline from an overvaluation peak has been steep and significant. If the economy continues to run hot for a few more quarters, it is likely that housing prices will become even more overvalued. In my "**Strong Growth**" scenario high prices peak nearly 13 percent above-trend, but this is really just a guess. As a reminder, the amplitude of the housing price cycle matters in the sense that the greater the excess overvaluation becomes, the greater will be the consequences and pain of the inevitable price correction, with prices not just returning to trend level but falling below trend. In all previous cycles, prices have fallen below fair value during the correction and the severity of the decline mirrors to an extent the excess on the upside.



In summary, residential investment growth, which fell at -1.1 percent annual rate over the first three quarters of 2017, will continue to be weak in coming quarters because of continuing tight credit standards, higher housing prices and the potential for somewhat higher mortgage interest rates. I would place greater confidence in **B of A**'s conservative 1.8 percent forecast housing investment growth in 2018 relative to **BS**'s more optimistic 3.8 percent housing investment forecast.

5. Change in Inventories

Inventories added 0.79 percent to "**Total**" GDP growth in the third quarter, subtracted 1.46 percent in the first quarter and added 1.06 percent in the fourth quarter of 2016 (see **Table 1**). The change in inventories was very subdued in the second quarter, adding only 0.12 percent to real GDP. Quarterly changes in inventories are very volatile and that skews interpretation of quarterly "**Total**" GDP data.

As can be seen in **Table 5**, real inventory accumulation declined each quarter from the first quarter of 2015 to the second quarter of 2016. Inventory growth bounced back to $63.1 billion in the fourth quarter of 2016, but sagged to $1.2 billion in the first quarter and $5.5 billion in the "**Final Estimate**" for the second quarter; then rose to $38.5 billion in the "**Final Estimate**" for the third quarter.

Inventories generally add between 0.1 and 0.2 percent to annual real GDP growth. Based on the historical record, inventory accumulation in the second and third quarters of 2016 and the first and second quarters of 2017 was well below average. Accumulation in the third quarter was actually very close to the long-term trend level of $37.1 billion.

As can be seen in **Table 5**, initial inventory data are crude estimates and are subject to substantial revision over the next three years. The $38.5 billion inventory accumulation in the third quarter "**Final Estimate**" will be revised three more times in the next three years.

To add to the data quality problem, quarterly changes are annualized and this can greatly amplify the impact of data errors and contribute to misperceptions about the trend in real GDP growth. Volatile inventory data are especially troublesome in this regard.

There are two ways to gain a better sense of the underlying trend in real GDP growth. One way is to omit highly volatile data, especially data that are subject to substantial subsequent adjustment. That is why many analysts report the growth rate in "**Final Sales**," which omits inventory data, as I do in **Tables 1** and **2**.

Another method that helps give a better sense of the underlying trend in real GDP growth is to focus on year-over-year growth rates, which are calculated by dividing the average of the most recent four quarters by the average of the preceding four quarters. The result of that calculation methodology can be seen in **Table 2** by comparing the growth rates in "**Total GDP**" and "**Final Sales**." Quarterly data volatility in growth rates largely disappears—the impact of inventories on "**Total GDP**" growth is very small and the growth trends in "**Total GDP**" and "**Final Sales**" are similar.

Evercore ISI conducts a quarterly survey of inventories which covers 63 companies including retailers, restaurants, wine and spirits, auto dealers, homebuilders, industrial companies, chemical companies, and manufacturing and capital goods companies. It asks each company to rate current inventory levels on a five-dimension scale: "too high;" weight = 1, "little too high;" weight = 0.5, "about right;" weight = 0, "little too low;" weight = -0.5, and "too low;" weight = -1.

In the aggregate inventories were +1 in the third quarter compared to +12 in the second quarter, indicating that inventories have gone from being modestly too high to about right. However, while inventory levels are better for consumer goods companies, they remain high at +22 in the third quarter compared to +33 in the second quarter. Auto dealers, which is a subcategory, was +24 in the third quarter; retailers and restaurants, which also a subcategory, was +13. At the other end of the spectrum, homebuilders were -29 in the third quarter and the shortage of inventory grew during the quarter. Inventories for industrial, manufacturing, and capital goods companies were about right in the third quarter, but inventories for chemical companies were too low, reflecting the negative impact of recent hurricanes.

Table 5
Quarterly Real Inventory Data
(most recent data are in red)

	Advance Estimate	Preliminary Estimate	Final Estimate	First Annual Revision	Second Annual Revision	Third Annual Revision
2017 Q3	35.8	39.0	38.5			
2017 Q2	-.3	1.8	5.5			
2017 Q1	10.3	4.3	2.6	1.2		
2016 Q4	48.7	46.2	49.6	63.1		
2016 Q3	12.6	7.6	7.1	17.0		
2016 Q2	-8.1	-12.4	-9.5	12.2		
2016 Q1	60.9	69.6	68.3	40.7	40.6	
2015 Q4	68.6	81.7	78.3	56.9	68.2	
2015 Q3	56.8	90.2	85.5	70.9	96.2	
2015 Q2	110.0	121.1	113.5	93.8	105.6	
2015 Q1	110.3	95.0	99.5	112.8	114.4	132.2
2014 Q4	113.1	88.4	80.0	78.2	76.9	76.9
2014 Q3	62.8	79.1	82.2	79.9	66.8	85.6
2014 Q2	93.4	83.9	84.8	77.1	55.2	69.9
2014 Q1	87.4	49.0	45.9	35.2	36.9	38.7
2013 Q4	127.2	117.4	111.7	81.8	87.2	103.6
2013 Q3	86.0	116.5	115.7	95.6	93.6	109.0
2013 Q2	56.7	62.6	56.6	43.4	39.6	52.6

Evercore ISI's survey of inventories implies that growth in inventories should recover in the next quarter or two to closer to the long-term trend rate. And, indeed, that is what **BEA**'s figures indicate happened in the third-quarter GDP data.

6. Government Investment

Government investment added 0.12 percent to third-quarter real GDP growth after subtracting -0.03 percent in the second quarter and -0.11 percent in the first quarter (see **Table 1**). This means that there has been virtually no growth in government investment spending so far in 2017 (-.06 percent at an annual rate over the first three quarters of 2017).

Federal government spending rose at an annual rate of 0.26 percent and state and local spending declined at an annual rate of -0.25 percent during the first three quarters of 2017.

Table 6 shows recent growth rates in government spending and forecasts for 2017-2021. **GS** and **B of A** expect government investment spending growth to be not materially different from zero in 2017. **B of A** also doesn't expect much growth in 2018 or 2019. I expect **B of A** will revise its forecast upward in response to the passage of tax reform legislation. **GS** expects annual growth to exceed the 0.99 percent trend level of the past 19 years from 2018 to 2020 but then fall in 2021 to a level slightly below the long-term average. When **GS** revised its outlook for government investment in response to tax reform legislation, it raised its forecast for growth in federal investment spending substantially but reduced its outlook for growth in state and local investment spending to zero. The overall combined effect, however, was not much change in total government investment spending.

Table 6
Federal and State and Local Investment Spending Growth Rates

	2013	2014	2015	2016	2017	2018	2019	2020
Federal	-5.82	-2.43	-0.08	0.05				
State and Local	-0.81	0.52	2.31	1.18				
Total Government	-2.86	-0.65	1.39	0.75				
GS Federal					0.09	3.83	4.12	2.97
GS State and Local					-0.02	0.18	0.00	0.00
GS Total					0.02	1.58	1.62	1.20
B of A Total					0.01	0.47	0.53	
BASE					-0.06	0.90	1.57	1.44
Strong Employment					-0.06	0.90	1.57	1.54

7. Net Exports

In the "**Final Estimate**" net exports contributed 0.36 percent to third-quarter real GDP growth after adding 0.21 percent in the second quarter and 0.22 percent to first quarter real GDP growth (see **Table 1**). This reversed the negative trend that prevailed in 2014, 2015 and 2016 as the dollar strengthened. The reversal reflects stronger growth in exports and has been driven by a weaker dollar and an acceleration in global growth.

Although the trade deficit in goods and services has been relatively stable, rising slightly from 2.70 percent of GDP in January 2014 to 2.81 percent of GDP in October 2017, the shares of both imports and exports as offsetting components of GDP have declined. Exports have declined from 9.64 percent to 8.04 percent of GDP since January 2014. Over the same period, imports have declined from 13.88 percent to 12.23 percent of GDP. However, in recent months GDP shares of both imports and exports have stabilized and are showing preliminary signs of increasing.

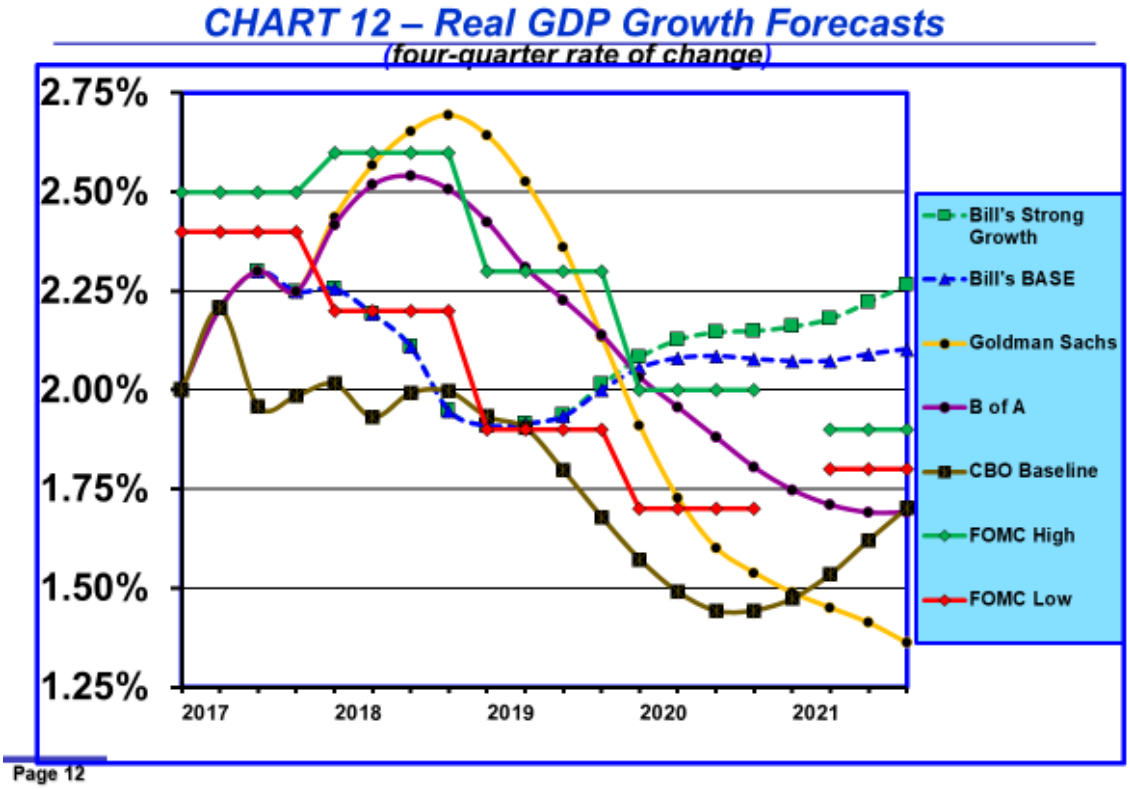
Part of the decline in imports was related to the collapse in energy prices, but part was also due to a worldwide decline in trade. In recent months global trade volumes have begun to grow once again, probably reflecting the current strength of global economic activity. This reversal might prove temporary. There is some evidence that a longer-term downward secular trend in global trade is in place due to technological advances and the related shift in economic activity toward knowledge-based services, which generally are located near the point of consumption. Prior to the recent upturn, the decline in trade was not limited to the U.S.; it has been a global phenomenon. An additional concern, which if realized could depress global trade, is follow through by the Trump Administration to implement its proposed trade policies.

8. Fourth Quarter 2017 GDP Forecasts

B of A's current fourth quarter real GDP forecast is 2.5 percent and **GS**'s is 2.5 percent.

9. Longer-Term Real GDP Forecasts

Chart 12 shows quarterly real GDP growth projections from the third quarter of 2017 to the fourth quarter of 2021. **Table 7** includes annual real GDP growth for 2013-16 and forecasts for 2017 to 2021. Generally, forecasts are tightly clustered in 2017 between 2.20 and 2.25 percent. My "**BASE**" and "**Strong Growth**" forecasts are at the low end of the range in 2018 but move to the high end of the range by 2021.



My "**BASE**" scenario is on the low end of the spectrum in 2018 because of lower assumed employment, investment and productivity growth. Most forecasters expect this year's momentum to carry over into 2018 with a modest added boost of approximately 0.3 percent from federal government tax cuts and spending increases. Economy.com is particularly optimistic. However, after 2018, growth slows considerably. **GS** is especially gloomy.

CBO's forecasts, based upon its June update, are generally more pessimistic than other forecasts until 2021. The **FOMC**'s high and low estimates from 2017 to 2020 reflect a gradual deceleration in growth and generally track expectations of other forecasters.

Table 7
Real GDP Growth Forecasts
(year-over-year average)

	2013	2014	2015	2016	2017	2018	2019	2020	2021
Actual	1.68	2.57	2.86	1.49					
B of A					2.25	2.51	2.14	1.80	1.69
GS					2.25	2.69	2.13	1.54	1.36
IHS Markit					2.20	2.40	2.20	2.20	2.20
Economy.com					2.20	2.90	2.30		
Blue Chip Average					2.20	2.40	2.10	2.10	2.00
CBO					1.99	2.00	1.68	1.44	1.70
FOMC High*					2.50	2.60	2.30	2.00	
FOMC Low*					2.40	2.20	1.90	1.70	
Bill's BASE					2.25	1.95	2.00	2.08	2.10
Bill's Strong Growth					2.25	1.95	2.01	2.15	2.26

*Q4 to Q4—sensitive to specific Q4 values and may diverge from year-over-year trend; with three quarters of GDP data for 2017 now reported, a 2.25 percent year-over-year estimated growth for all of 2017 would translate into a 2.48 percent Q4 2016 to Q4 2017 increase, which is within the **FOMC**'s projection range.

IV. U.S. Employment Developments

Payroll employment growth was strong in both October and November following September's hurricane-depressed growth, bringing the three-month average employment gains to 170,000, which is not much different than the 11-month average during 2017 of 174,182. Thus, hiring remains brisk and well above the natural increase in labor supply, which is growing about 81,000 monthly. Consequently, the labor market continues to tighten. The unemployment rate ticked up a bit to 4.12 percent but still remains at the lowest level in 16 years.

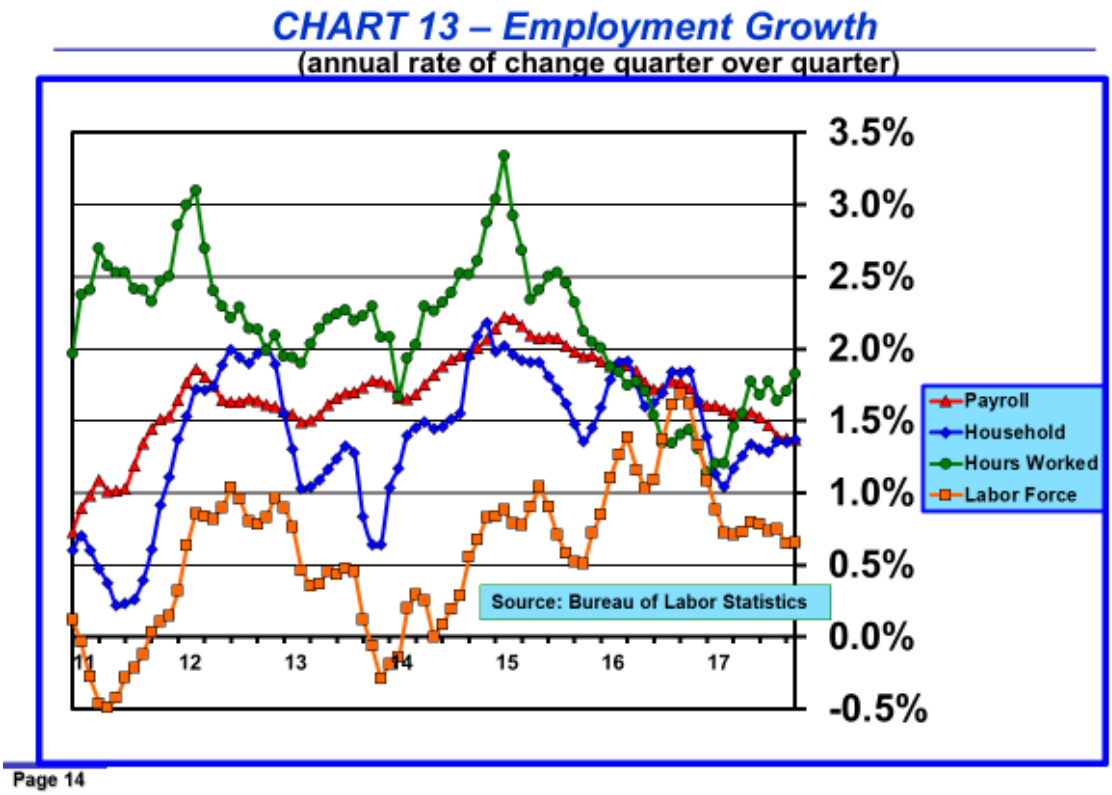
However, disappointing and somewhat perplexing in light of strong payroll employment growth and low unemployment, is the failure of wages to show much upward momentum.

1. Employment Growth

Chart 13 shows the three measures of employment growth—payroll employment, household employment, and total hours worked. **Chart 13** also shows the labor force growth rate, which indicates the expected equilibrium rate of employment growth when the economy is at full employment. When growth in the three measures of employment exceeds growth in the labor force, the unemployment rate declines and the labor market tightens. This is exactly what continues to happen currently.

As can be seen in **Chart 13**, the trend in the annual rate of quarterly growth in payroll employment has slowed gradually from the cyclical peak of 2.22 percent in February 2015 to 1.37 percent in November 2017. Monthly payroll employment growth averaged 226,000 in 2015, 187,000 in 2016 and 174,250 over the first eleven months of 2017.

Household employment growth has also been decelerating gradually, averaging 209,200 in 2015, 173,400 in 2016, and 164,400 over the first eleven months of 2017. Payroll and household employment growth generally are similar when averaged over several months but can diverge enormously from month to month.



Over the past 12 months, the annual rate of quarterly household employment growth has been 1.37 percent, the same as payroll employment growth of 1.37 percent. Growth in these two measures of employment should be nearly identical over long periods of time, but as is clear in **Chart 13**, the growth rates can diverge, sometimes substantially, over short time spans.

Visually, **Chart 13** paints a picture of gradually slowing employment growth. This is what is to be expected because the labor market has exceeded full employment by most measures and thus monthly growth should slow to approximately the underlying growth rate dictated by demographic trends, which is well under 1.0 percent—the labor force is growing currently at an annual rate of 0.65 percent.

Growth in total hours worked by all employees has been slowing as well. Growth has decelerated from a cyclical peak of 3.34 percent in February 2015 to 1.83 percent in November 2017. Over this time span, the average length of the workweek has shortened from 34.54 hours to 34.41.

2. Employment Participation

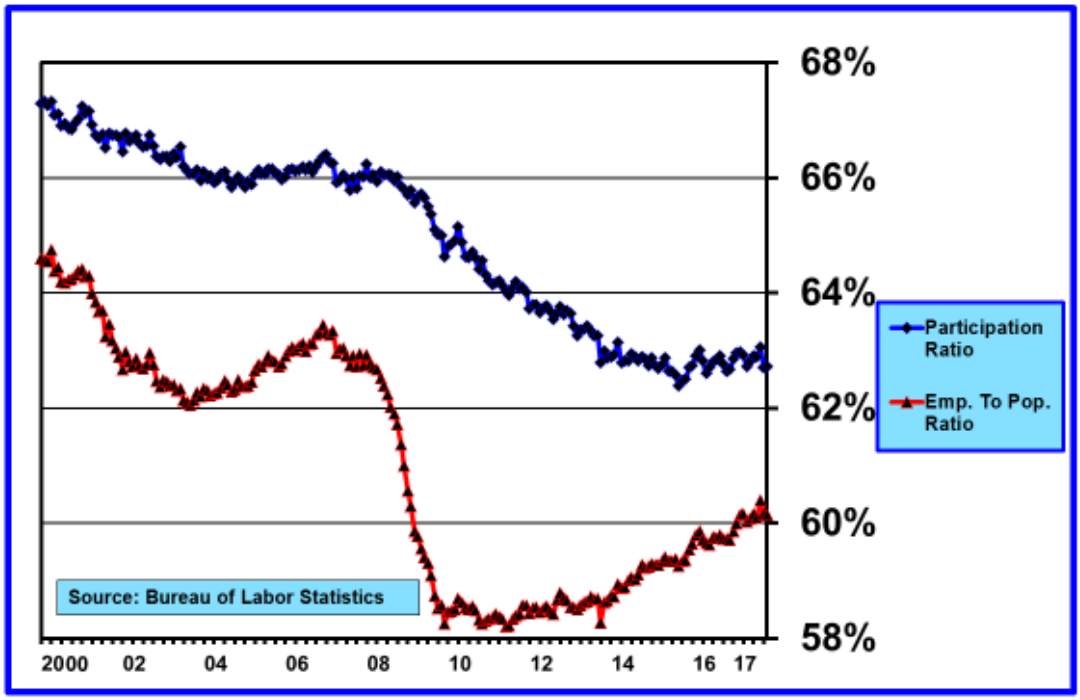
Employment participation had been declining until about a year ago, reflecting demographic shifts and an increase in discouraged workers exiting the labor force due to poor job prospects during and following the Great Recession. Between 50 and 75 percent of the downward trend in participation has been driven by retiring baby boomers and this trend should continue to reduce participation by about 0.20 percent annually over the next ten years.

As the labor market continues to tighten, an important question is whether people in the other 25 to

50 percent of the decline in the participation rate since the Great Recession will return to the labor force. Close analysis indicates that some already have done so and others may follow in coming months as the labor market continues to tighten and jobs become more plentiful.

Because discouraged workers are not counted in the labor force there has been debate about their numbers and whether they would reenter the labor force once the labor market tightened. As can be seen in **Chart 14**, the increase in the participation rate from 62.39 percent in September 2015 to 62.72 percent in November 2017 is evidence that many discouraged workers have reentered the labor market in the last few months as jobs have become more abundant. If that were not the case, retirements would have driven the participation ratio down to about 61.96. This is a swing of approximately 1.22 million workers many of whom were probably discouraged but have now reentered the labor.

CHART 14 – Labor-Force-Participation and Eligible-Employment-to-Population Ratios (U-3 Measure)



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This is corroborated in a recent **GS** analysis.[2] **GS** studied whether some long-term unemployed workers and those not currently in the labor market have reentered the labor market as jobs have become more plentiful. **GS** found that this has occurred and is likely to continue. Employment of people in these categories should continue to boost labor force participation and slow the decline in the unemployment rate. The potential policy implication is that the labor market might not be quite as tight as implied by the U-3 unemployment rate and this could provide room to the **FOMC** to slow the rate of monetary policy tightening because the non-accelerating inflation rate of unemployment (NAIRU) would be lower.

Categories of nonparticipation include disabled people, discouraged people who say they want a job, and those who say they don't want a job. **GS** found that nearly half of the participation decline in each of these categories since the Great Recession has reversed over the past two years.

[2]David Mericle, Daan Struyven, and Avisha Thakkar. "*A Divided Labor Market*," US Economics Analyst, Goldman Sachs Economic Research, October 29, 2017.

Looked at from a different angle, **GS** analyzed reemployment rates for various employment categories over the past year. It found that reemployment occurred for 56 percent of short-term unemployed, 39 percent of long-term unemployed, 27 percent of discouraged workers, 22 percent of those who said they did not want a job, 5 percent of disabled people, and 3 percent of retirees.

There is one category in particular in which participation fell substantially following the Great Recession. This category is prime-aged males from 25-54 years of age. Participation for this category declined from 90.5 percent to 88.0 percent and has only recovered modestly to 88.5 percent over the past two years. And, even this small improvement is more than accounted for by those aged 45-54. In contrast, participation of prime-age women has recovered to the pre-Great Recession level.

Some of the decline in prime-age male participation is due to structural change involving more at-home dads whose spouses pursue professional careers. However, there is ample evidence that a considerable portion of the decline stems from social issues. For example, the incarceration rate of prime-age males in the U.S. is more than 3 times the level in the next highest country. Mortality rates have ceased to improve in recent years and are considerably about rates in other developed countries—2.5 percent versus 1.5 percent. The opioid epidemic among prime-age males is surely a factor. And, some cite video-game addiction as a contributing factor.

Analysts do not expect prime-age male participation to improve much and consequently the labor market will continue to tighten and employers will increasingly complain about an inadequate supply of skilled workers.

3. Measures of Unemployment Reflect a Labor Market That Is Above Full-Employment

As can be seen in **Chart 15**, the U-3 unemployment rate has fallen to 4.12 percent and is now below the minimum level reached prior to the Great Recession and is nearing the lows reached just prior to the 2001 recession. The November U-3 unemployment rate was considerably below **CBO**'s full employment (NAIRU) estimate of 4.73 percent.

The U-6 measure of unemployment, which adds those working part time who would prefer full-time employment and those marginally attached to the labor force to the U-3 measure, has fallen to 7.96 percent and nearly matches the pre-Great Recession low of 7.92 percent reached in December 2006. The U-6 measure of unemployment has fallen 194 basis points since the end of 2015 compared to a decline of 90 basis points in the U-3 measure, which underscores an improving labor market that is now above full employment.

Long-term and short-term unemployment rates are also indicators of labor market tightness and are shown in **Chart 16**. The short-term unemployment rate has now fallen well below the minimum level reached prior to the Great Recession. The long-term unemployment rate has declined from over 4 percent in the aftermath of the Great Recession to .97 percent in November. It is still about 0.25 percent above the minimum level reached in 2006 just prior to the onset of the Great Recession.

4. Forecasts of the U-3 Unemployment Rate

Forecasters expect the labor market to continue to tighten. The current U-3 unemployment rate is 61 basis points below **CBO**'s full-employment estimate of the non-accelerating inflation rate of unemployment (NAIRU).

CHART 15 – U-3 and U-6 Unemployment Rates

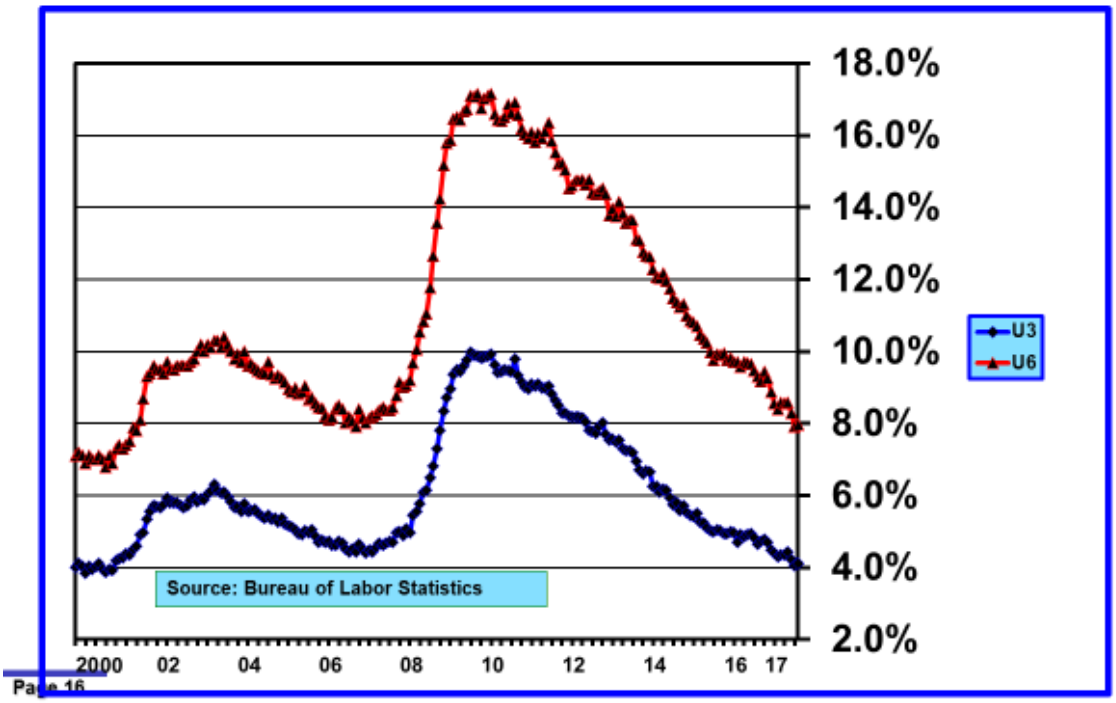
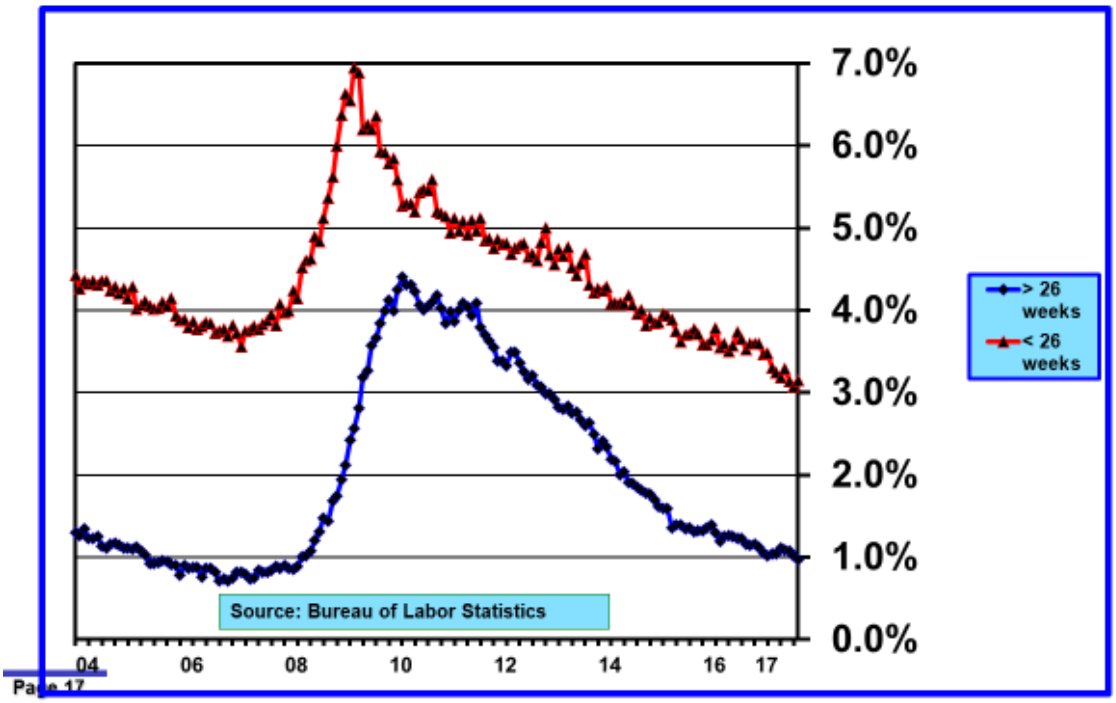
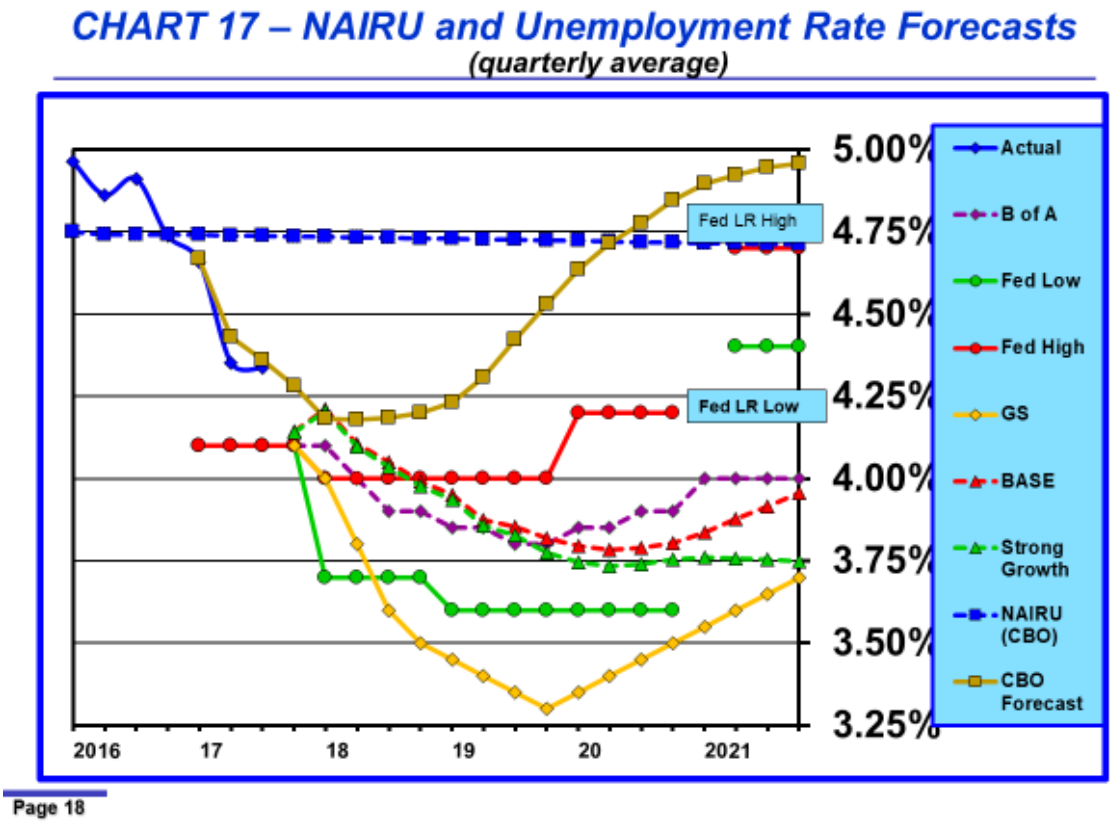


CHART 16 – LT (>26 weeks) and ST (<26 weeks) Unemployment Rates



As the term NAIRU implies, when unemployment falls below this level for any length of time not only is it likely that wages will increase but inflation will probably increase as well. For that reason, the **FOMC** is now crafting monetary policy to maintain full employment but limit the potential for tight labor markets to foster inflation. The traditional monetary policy tool involves raising interest rates. The recent acceleration in economic growth, both domestically and globally, has emboldened the **FOMC** to "normalize" monetary policy more rapidly. However, the recent decline in inflation, if sustained, may delay implementation of tighter policy.

Chart 17 shows U-3 unemployment rate forecasts for **B of A**, **GS**, **FOMC** high and low range, and my "**BASE**" and "**Strong Growth**" scenarios. **CBO**'s estimate of NAIRU is also shown in **Chart 17**.



Most forecasts project the unemployment rate to stay below **CBO**'s NAIRU over the next three years. **GS** is particularly optimistic. It forecasts that the unemployment rate will fall to 3.3 percent by the end of 2019. **B of A** expects the unemployment rate to bottom at 3.8 percent in 2019 and then begin rising gradually. The FOMC's projections for the unemployment rate are similar, falling to a range of 3.7 percent to 4.0 percent in 2018 and 3.6 percent to 4.0 percent in 2019 and then rising gradually to a long-run stable NAIRU range of 4.4 percent to 4.7 percent, which is consistent with the emerging consensus view.

My unemployment rate forecasts in the **"BASE**" scenario bottom at 3.78 percent in 2020. This parallels the **FOMC** and **B of A**, but not **GS**.

It is now evident that the unemployment rate will probably stay below **CBO**'s June 2017 forecast for a period of time and will not turn up nearly as soon. **CBO** forecast that the unemployment rate would bottom at 4.18 percent in early 2018 and then begin rising rather quickly to nearly 5.0 percent by the end of 2021. That forecast is now clearly out of sync with the recent decline in the unemployment rate and

the expectations of other forecasters. Thus, when **CBO** updates its economic forecasts in early it is likely that it will lower its forecast for the unemployment rate. In addition, it also seems likely that **CBO** will reduce its estimate of the NAIRU unemployment rate.

After 2019 most forecasts, including the **FOMC**'s long-run projected range, move upwards gradually but remain considerably below **CBO**'s estimate of NAIRU.

Increasingly, it appears that structural changes in the labor market have lowered NAIRU to a greater extent than indicated by **CBO**'s estimates. The implication of a lower NAIRU is straightforward—the labor market is not quite as tight as past cyclical experience would imply. To the extent that this turns out to be the case there will be less upward pressure on wages and inflation and the **FOMC** could slow the rate at which the federal funds rate is normalized. While financial markets seem inclined toward this view, the **FOMC** remains on a course to raise the federal funds rate much more than financial markets currently expect.

5. As the Labor Market Has Tightened, Wage Growth Has Accelerated Less Than Expected

Now that the labor market is above full employment, theory and past experience indicate that growth in wages should be accelerating. That is what is supposed to happen when excess supply disappears and demand is increasing. The data indicate this is occurring but to a more limited extent than past experience implies should be the case.

Historically, there has been considerable inertia in wage adjustments which has resulted in a slow rise in average wages even after the labor market has reached or exceeded full employment. Inertia may be greater in this cycle than previously for several reasons. First, collective bargaining power provided by unions on the behalf of labor continues to decline as a catalyst for higher wages. Second, because wage increases might not have slowed as much as they could have during the extended period of labor market slack, there may be less pressure to increase wages as much now that the labor market has tightened. Third, lingering employee long-term job insecurity may be dampening demands for higher wages. Responses to a University of Michigan survey question addressing concerns about layoff risk over the next five years remain elevated. Also, the long-term unemployment rate remains elevated. Fourth, falling inflation expectations may also be a factor. Fifth, retirement of high-wage baby boomers and replacement with low-wage new entrants may be depressing the average level of wage rates, which would moderate the average rate of wage increases. Sixth, there may be more capacity in the labor market than **CBO**'s NAIRU unemployment rate implies, if NAIRU has declined. The **FOMC**'s Summary of Economic Projections implies a median estimate of NAIRU of 4.55% and the median estimate from the Survey of Professional Forecasters is 4.5 percent compared to **CBO**'s estimate of 4.73 percent.[3] Seventh, low productivity gains in recent years may also be a factor in retarding wage rate acceleration.

On the other hand, however, some of the historical inertia appears to have been offset as many states and local governments have raised minimum wage floors over the past two years.

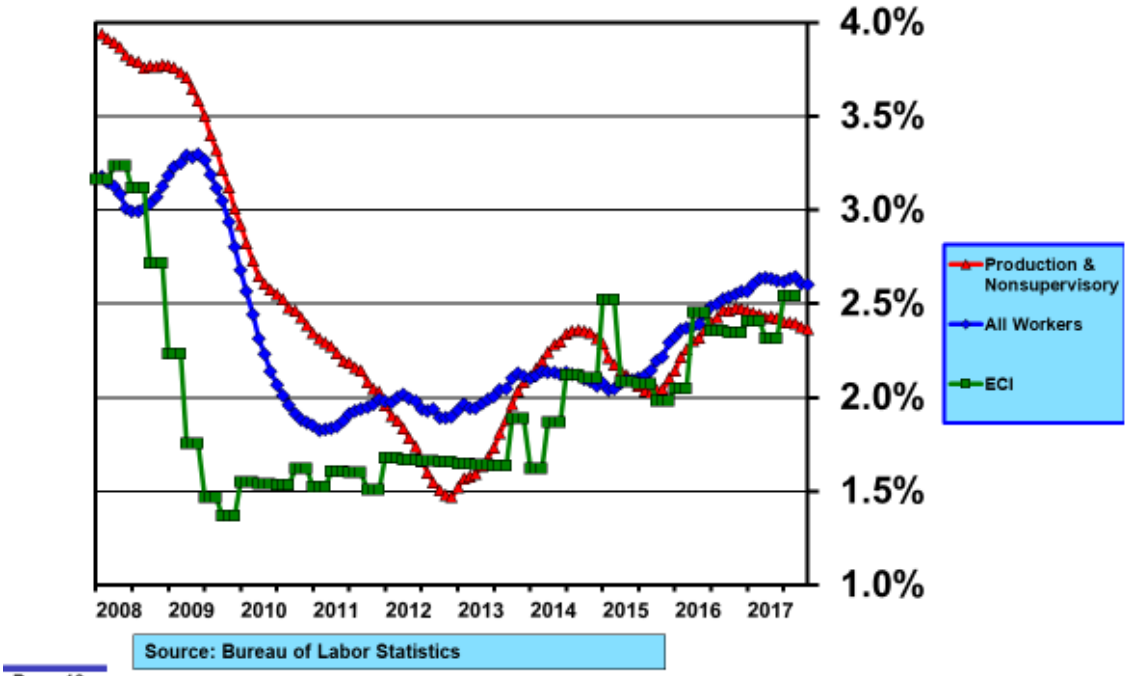
Interestingly, the University of Michigan survey indicates that the share of workers who have not received a pay increase over the previous 12 months has been edging up and remains above the highest level that occurred following the dot.com bust in 2001.

[3]Regis Barnichon and Christian Matthes. "The Natural Rate of Unemployment over the Past 100 Years," Federal Reserve Bank of San Francisco Economic Letter, 2017-23, August 14, 2017. In this paper, the authors conclude that NAIRU has fluctuated within a tight band of 4.5 percent to 5.5 percent over the past 100 years. The authors' estimate of the current level of NAIRU is close to the lower bound of this range.

As can be seen in **Chart 18**, increases in wage growth are following the traditional upward cyclical trend as the labor market tightens. But those increases are not as great as historical experience indicates should be occurring. Consequently, forecasts of wage rate increases, which have been based largely upon historical relationships, have been consistently higher than have actually materialized.

CHART 18 – Hourly Wage Rate Growth – ECI, All Workers and Production and Nonsupervisory Workers

(annual year over year and 12-month moving average rates of change)



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There are three primary broad-based measures of labor compensation that provide information about compensation trends. All are compiled by the Bureau of Labor Statistics (**BLS**). One is released monthly as part of the monthly labor situation report and includes both hourly and weekly wage rates for all employees and separately for production and nonsupervisory workers, but includes no information about benefits which comprise approximately 30 percent of total compensation. A second measure, the employment cost index (ECI), is released quarterly and consists of wages and salaries, benefits, and total compensation indices (see **Chart 13**). A third measure is also released quarterly as part of **BLS**'s report on output, total hours worked, and productivity.

Chart 18 shows the rate of growth in hourly wages for all workers, production and nonsupervisory workers, and ECI (total wages and salaries). All three sets of measures in **Chart 18** track each other closely over time. All three measures had been rising gradually, but growth has stalled over the past few months for the all workers measure and has edged down for production and nonsupervisory workers, even as the unemployment rate has fallen well below NAIRU.

Although these measures are highly correlated over time because compilation methodologies differ for each set percentage changes over fixed time periods will not always be in sync. Currently, all three sets are exhibiting a similar level and trend. Average hourly wages (12-month moving average) of all employees have risen 2.60 percent annually over the past 12 months compared to 2.55 percent a year ago. Increases in average hourly wages (12-month moving average) of production and nonsupervisory workers have edged

down a little, rising 2.37 percent annually in November compared to 2.48 percent a year ago. ECI growth in wages and salaries has risen from 2.36 percent in the third quarter of 2016 (4-quarter moving average) to 2.54 percent in the third quarter of 2017.

To a certain extent, focusing only on hourly wages is a bit misleading. Growth in average weekly earnings for all employees, which factors in the length of the workweek and thus incorporates changes in the mix of full and part-time employees, has been faster than growth in hourly wages, rising from 2.15 percent in November 2016 to 2.60 percent in November 2017 (see **Chart 19**). This outcome reflects no change in the average length of the work week, which was 34.41 hours in both November 2016 and November 2017.

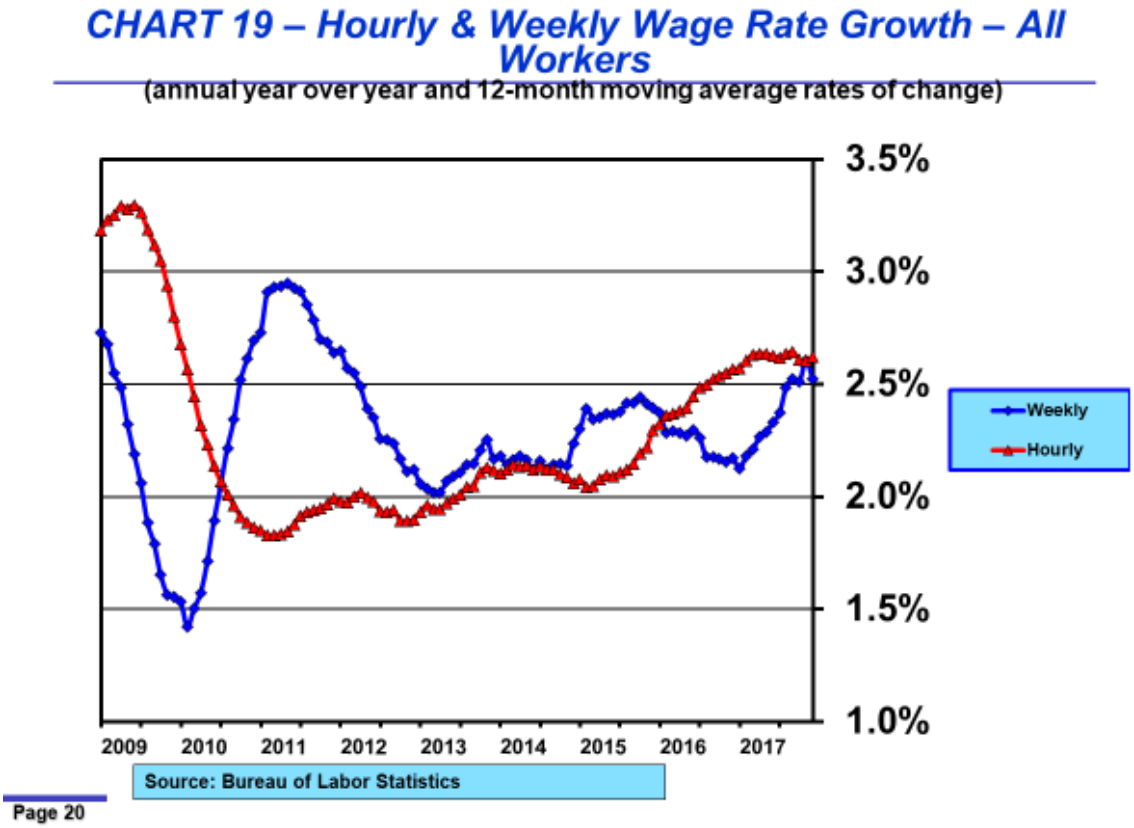
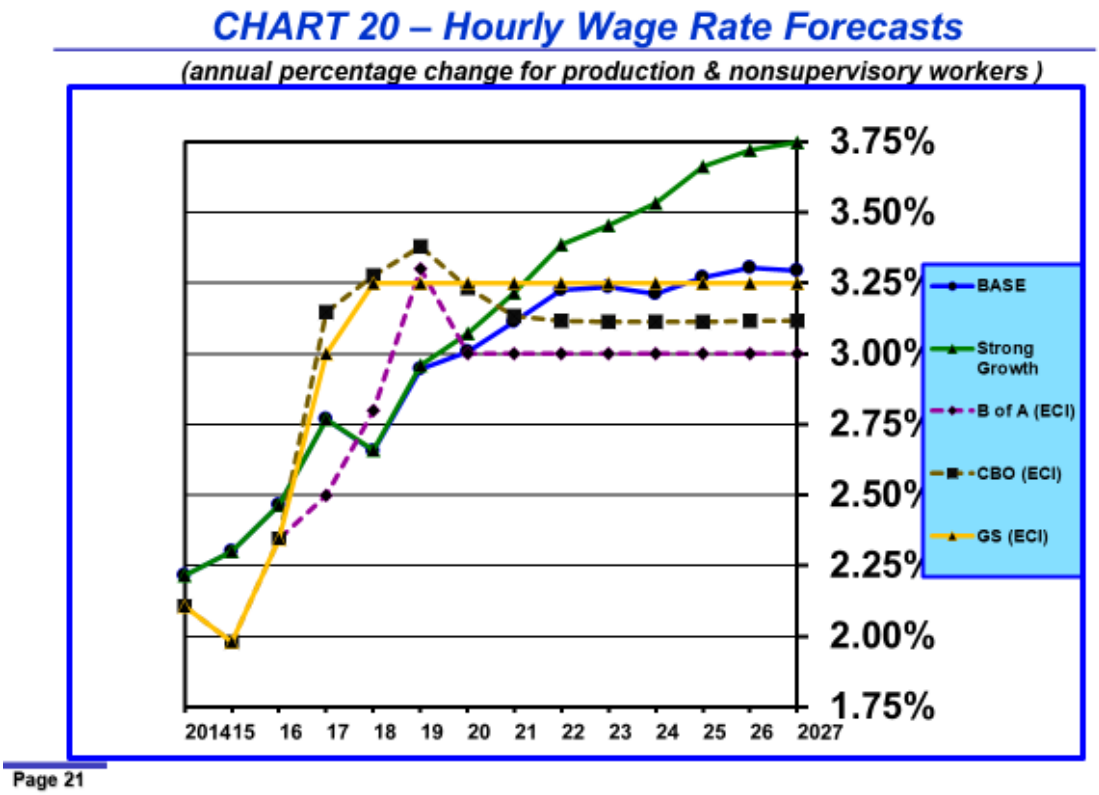


Chart 20 shows **CBO**'s, **GS**'s and **B of A**'s projections for growth in the wages and salaries component of ECI for all workers and my projections for wage growth for production and nonsupervisory workers over the next ten years.

CBO, GS and **B of A** forecast wage rate growth only for ECI. Although the methodologies for constructing these different wage data series differ, the directionality of all is highly correlated over time, even if the levels aren't precisely the same at every point in time. **GS**'s ECI wage growth forecast rises to 3.25 percent by 2018 and remains at that level thereafter. **B of A**'s ECI forecast rises to 3.3 percent in 2019 but then recedes to 3.0 percent. **CBO**'s ECI forecast rises to 3.4 percent in 2019 but then slows to 3.1 percent by 2021.

Forecast wage growth for production and nonsupervisory workers rises more slowly than **CBO**'s and **GS**'s projections in my "**BASE**" and "**Strong Growth**" scenarios, reaching 3.0 percent in 2019. Thereafter wage growth in my "**BASE**" scenario tracks **CBO**'s and **GS**'s projections closely and is not much



higher than **B of A**'s projections.

However, wage growth continues to accelerate gradually in my "**Strong Growth**" scenario to 3.75 percent by 2027, reflecting the impacts of faster employment growth, an extraordinarily low unemployment rate of 3.5 percent by 2027 and an extremely tight labor market with a positive gap of approximately 1.0 percent by 2027, based upon the assumption that NAIRU is 4.5 percent. Although this scenario is theoretically possible, it is unlikely to occur. The sharp increase in wage growth reflects strengthening wage bargaining power due to the excess of labor demand relative to supply and also greater increases in inflation. If, however, there has been a structural shift in the labor market which has decreased NAIRU even more than 4.5 percent, then my model would not project such a large increase in wage growth in the "**Strong Growth**" scenario. For example, if NAIRU is 4.2 percent, as **B of A** believes, wage growth would be 3.28 percent in 2027 instead of 3.75 percent.

GS's wage tracker registered 2.6 percent in November 2017, about 50 basis points short of its long-run expected 3.0–3.25 percent annual rate of increase. **GS** assumes a 3.5 percent unemployment rate, which is well below NAIRU, 2.0 percent inflation, and 1.0–1.25 percent annual productivity increases (nonfarm productivity increases would be higher, about 1.4–1.7 percent, as the measure of productivity **GS** cites does not cover the entire economy).

In **GS**'s view, the recent weakness in wage growth results from inflation and productivity below expected long-run values. In other words, the historical forces determining wage rate growth have not changed. The upward adjustment in wage rate growth will be consistent with historical precedent and levels of the key determinants—inflation, productivity, and labor market slack. **GS** corroborates its view by demonstrating that low unemployment metropolitan statistical areas have experienced faster wage growth acceleration in

recent months than high unemployment areas.

GS also compared the recent Federal Reserve's Beige Book wage information with the Beige Books for 1997 and 2006, which were also times when the economy was at full employment. **GS** examined "labor market tightness," "labor market conditions," and "wage pressures." **GS** concluded that the Beige Book assessment of three of these three labor market dimensions is similar to 1997 and 2006 and in both of the previous cycles, wage growth accelerated in the following year.[4]

While **GS** is sticking to its guns, others are less certain that wage rate growth will accelerate nearly as much.

6. Modeling the Relationship Between Labor Market Tightness and Wage Growth

Economic theory posits that when the demand for labor increases relative to the available supply, wage rates should rise more rapidly. This theoretical concept is embedded in the Phillips Curve. The Phillips Curve defines a statistical relationship in which decreases in the unemployment rate, improvements in productivity and increases in inflation should increase nominal wage growth. A recent **GS** study using city-level data confirmed the reasonableness of the Phillips Curve theoretical framework.[5]

In recent months, the labor market has tightened considerably and the unemployment rate is well below **CBO**'s estimate of NAIRU. However, increases in wage rates have been muted. This has led to speculation about whether the Phillips Curve is dead.

As can be seen in **Chart 20**, analysts, including myself, expect wage growth to accelerate and this acceleration should occur in the next few quarters. These forecasts are based on a Phillips Curve model of wage rate behavior which by and large fits the historical data well. Historically, the apparent slow response of wage rates to a tightening labor market can be explained by time lags between cause and effect and non-linearities in the relationship between labor market variables and wage growth. This historical pattern has repeated predictably over several past cycles and it is this consistency which has prompted forecasters to expect wage rate growth to accelerate in the current cycle.

My statistical estimation of nominal wage rate growth is based on the following labor variables: short-term unemployment of less than 26 weeks, long-term unemployment of 26 weeks or more, the gap between the U-3 unemployment rate and **CBO**'s NAIRU rate adjusted down in recent months to reflect the consensus view that NAIRU is 4.5 percent, the rate of growth in total hours worked, and the square of total hours worked to incorporate a possible nonlinear relationship between nominal wage rate growth and the strength of the labor market. The model also includes the other two standard Phillips Curve variables—nonfarm productivity and core PCE inflation.

Table 8 shows the coefficients of these variables which specify the relationship between each variable, holding the impacts of all other variables constant, and the nominal wage rate. Average time lags, measured in months for each variable, are also shown in **Table 8**.

As short-term and long-term unemployment rates rise and labor market slack expands, increases in nominal wage rates decline. The impact of a change in the short-term unemployment rate is greater and affects nominal wage rate growth more quickly than a change in the long-term unemployment rate. A

[4]Spencer Hill. "Quantifying Wage Signals in the Beige Book," US Daily, Goldman Sachs Economic Research, October 4, 2017.

[5]Dann Struyven. "*Will the Phillips Curve Bend or Break?*" US Daily, Goldman Sachs Economic Research, October 17, 2017.

Table 8
Nominal Wage Rates—Impacts of Labor Market Variables, Productivity, and Core PCE Inflation

	Coefficient	Average Lag (in months)
ST Unemp. Rate <26 weeks	-2.06	14.0
LT Unemp. Rate >26 weeks	-1.25	47.9
Labor Market Gap	-1.47	18.1
Growth in Hours Worked	0.88	23.0
Growth in Hours Worked^2	2.86	
Productivity	0.30	46.0
Core PCE Inflation	0.78	9.1

tightening in labor market slack of 1 percentage point raises nominal wage rates by 1.47 percent in an average of 18.1 months.

Growth in total hours worked raises the nominal wage rate, but its incremental effect is nonlinear as can be seen in **Table 9**. The average lag time between cause and effect is about 2 years (23.0 months), which explains in part the apparent slow response of nominal wage rate increases to acceleration in employment market growth.

Table 9
Incremental Impact of Growth in Total Labor Hours Worked on Nominal Wage Rates

Growth in Total Labor Hours Worked	Incremental Impact on Nominal Wage Rate Growth
3.0%	2.87%
2.0%	1.87%
1.0%	0.90%
0.0%	0.00%
-1.0%	-0.85%
-2.0%	-1.64%
-3.0%	-2.31%

Core PCE inflation impacts the nominal wage rate with an average lag of about one year (9.1 months). A one percentage point increase in core PCE inflation lifts nominal wage rate growth by 78 basis points. Once the labor market has tightened sufficiently, there is probably a positive feedback loop between the increase in the nominal wage rate and changes in inflation, but the statistical analysis indicates that increases in the wage rate lag behind and depend on increases in inflation to occur first.

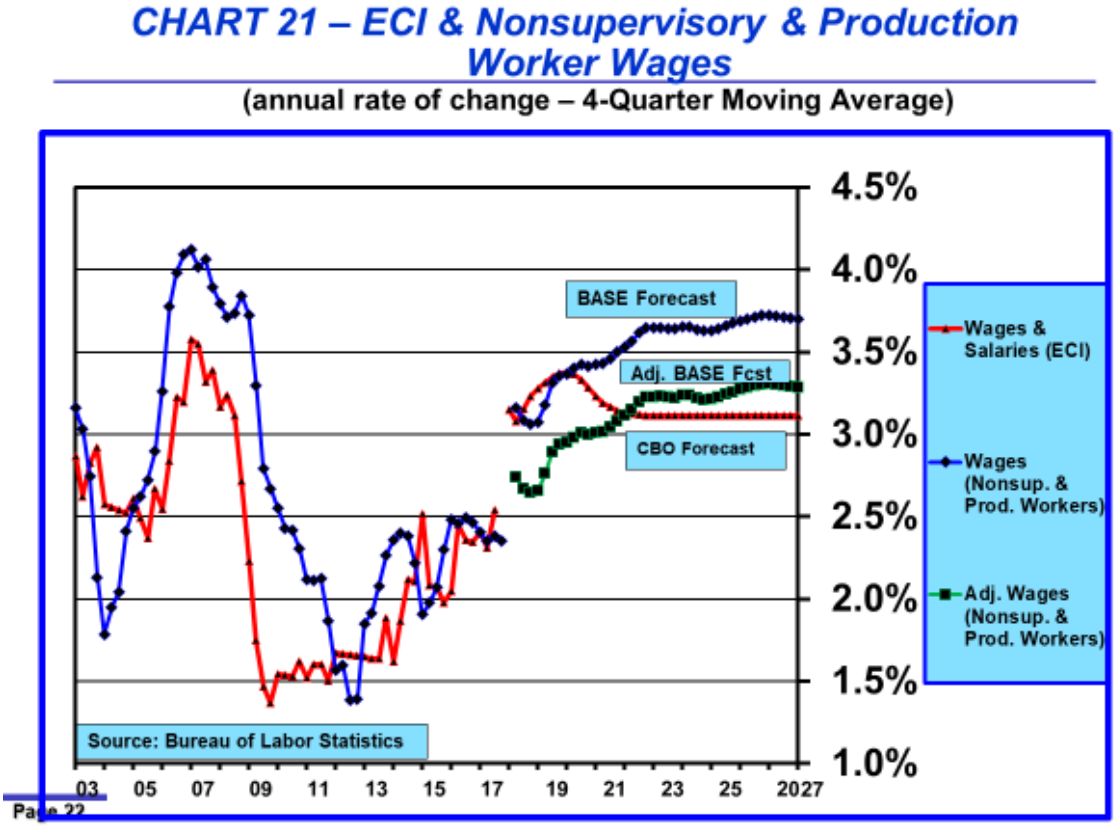
Finally, while productivity does have a positive impact on the nominal wage rate, it is smaller than most believe and takes a long time to have even this small impact. A one percentage point increase in nonfarm productivity raises the nominal wage rate by 30 basis points but this takes an average of almost 4 years (46.0 months) to occur.

You can see in **Chart 20** how a very tight labor market sustained over time, as is the case in the "**Strong Growth**" scenario, can result in a much higher rate of increase in the nominal wage rate.

Although my econometric model describes well the historical relationships between nominal wage rate growth and the economic variables in the Phillips Curve, over the past five months the model has overestimated the rate of increase in the nominal wage rate and that error has averaged nearly 3 standard deviations; the November prediction error was nearly 5 standard deviations. This is too recent a phe-

nomenon to conclude that the historical relationship is breaking down.

However, the model indicates that the inflection point is at hand when growth in the nominal wage rate should accelerate. This is evident in **Chart 21**. The chart shows that the wage rate for nonsupervisory and production workers and the rate of growth in salaries and wages reported by the **BLS** in the employee cost index (ECI) data respond to the strength of the labor market over the cycle in a similar pattern.



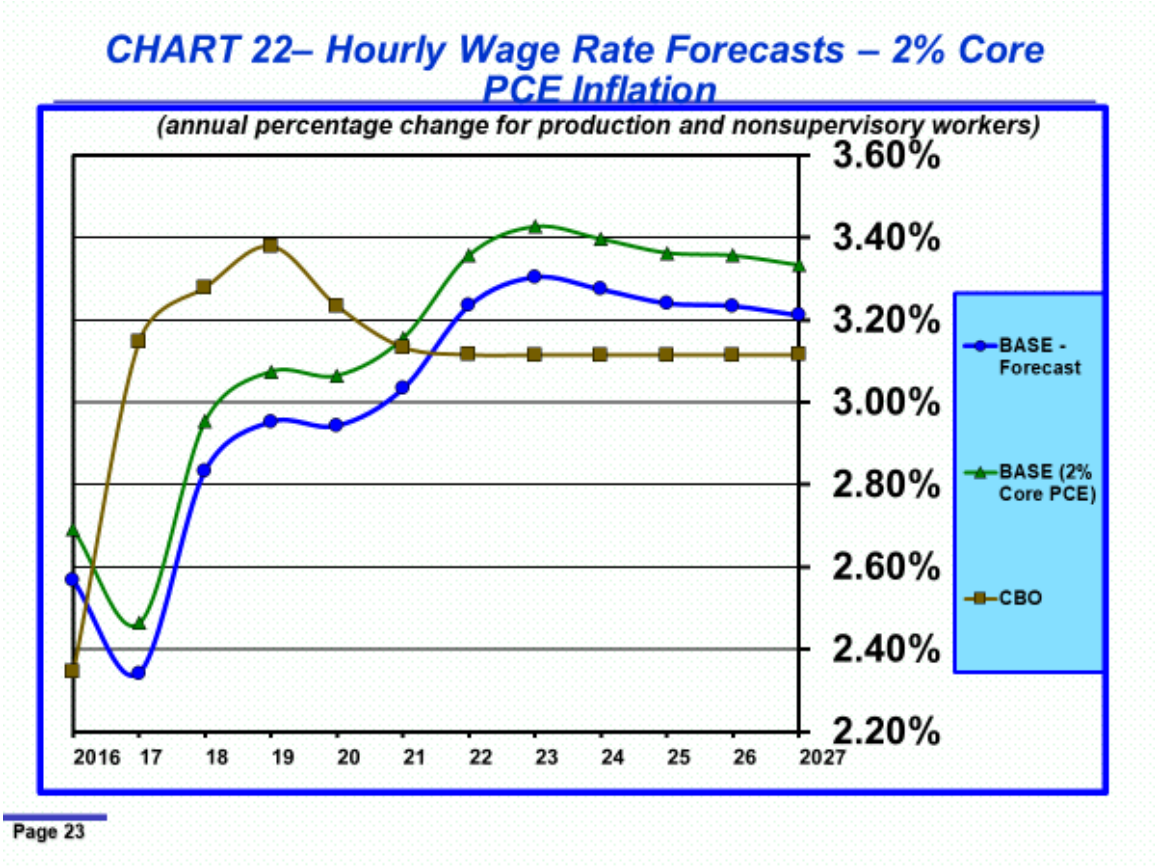
My model's forecast of rising wage rate growth for nonsupervisory and production workers and **CBO**'s forecast of rising ECI salaries and wages growth both indicate that wage growth should already be 3.0 percent or greater rather than stalling out at approximately 2.5 percent over the past six to seven quarters.

Furthermore, even if wage growth does accelerate in coming months, it is unlikely to rise to 3.75 percent as indicated in **Chart 21**. However, if NAIRU is 4.2 percent rather than 4.5 percent, then wage rate growth, according to my model, would rise to only 3.25 percent, which is more consistent with other forecasts (see **Chart 20**). In **Chart 21**, I show an adjusted wages and salaries wage growth alternative which subtracts the large forecast error of the last several months. In so doing, the assumption is that the Phillips Curve still will guide wage rate growth in coming months but the level will be approximately 50 basis points lower than it would be if the historical relationship held fully.

If the nominal wage rate does not accelerate in the next few months and close the forecasting error gap, then it will be time to reconsider whether there really has been a structural change in the historical Phillips Curve. This is not a trivial matter. If wage rate growth is poised to accelerate, as the model predicts, the FOMC should continue to raise the federal funds rate to contain a buildup of inflationary pressures. However, if wage growth does not accelerate meaningfully, an overly aggressive monetary policy could hasten onset of recession.

7. Impact of 2 Percent Inflation on Nominal Wage Growth Rate

Chart 22 shows two alternative nominal wage rate growth curves—one for my forecasts of the core PCE inflation rate and an alternative one in which core PCE inflation is assumed to be constant at the **FOMC**'s target of 2.0 percent.



Because my forecast of core PCE inflation averages less than 2.0 percent, my forecasts for nominal wage growth rate average 10 to 15 basis points less in the "**BASE**" scenario—about an average annual rate of increase of 3.22 percent between 2021 and 2027 compared to 3.34 percent if inflation averages 2.0 percent. My "**BASE**" scenario parallels **GS**'s long-term 3.25 percent and **CBO**'s long-term 3.12 percent rates of increase.

V. Inflation

Surprising just about everyone, core PCE inflation has declined this year even as unemployment fell below **CBO**'s estimate of NAIRU. This has led to much head scratching. Nonetheless, most **FOMC** members remain confident that both core and total PCE inflation will return to the 2.0 percent target level by 2019.

When core PCE inflation was 1.87 percent in 2016 and appeared to be well on the way to reaching 2.0 percent, **FOMC** members were confident that the target of 2.0 percent would be reached by the end of 2018. However, core inflation has declined steadily since February and stood at 1.48 percent in November and was not materially higher than its recent low of 1.25 percent in July 2015. Initially, **FOMC** members dismissed the pullback in inflation citing transitory factors, but the persistent decline over several months

has led some members to worry about the possibility that inflation expectations have become unanchored to the downside.

Total PCE inflation, which had been depressed by the plunge in oil prices and lower import prices in late 2015, rebounded to 2.18 percent in February, up from the 0.19 percent rate of increase that prevailed in September 2015. But total PCE inflation has declined since then and was 1.76 percent in November.

As can be seen in **Table 10** (**Chart 23** shows historical core PCE price index data and data from **Table 10** in graphical form), forecasts of the core PCE inflation index now indicate that inflation will be lower in 2017 than in 2016. Over the longer run, **B of A** expects core PCE inflation to settle at the **FOMC**'s 2.0 percent target. **GS** is forecasting 2.1 percent in 2020 and 2021 before dropping back to 2.0 percent in following years. **CBO** projects that 2.0 percent will be reached by the end of 2018 and will remain at that level thereafter. **FOMC** projections reflect a rise to the 2.0 percent target during 2019 and a possible modest overshoot of the 2.0 percent target in 2020.

Table 10
Core PCE Inflation Forecasts—B of A, GS, Bill's "BASE", Bill's "Strong Growth" and FOMC High and Low

Core CPE	2013	2014	2015	2016	2017	2018	2019	2020	2021
Actual	1.55	1.48	1.37	1.87					
B of A					1.48	1.81	1.92	2.02	2.02
GS					1.50	1.80	1.90	2.10	2.10
CBO					1.77	1.97	1.99	2.01	1.99
IHS Markit*					2.10	1.70	2.20	2.70	2.40
Economy.com*					2.00	2.10	2.80		
Blue Chip Average*					2.10	1.90	2.30	2.30	2.30
Bill's BASE					1.54	1.87	1.94	1.87	1.76
Bill's Strong Growth					1.54	1.88	2.00	1.98	1.95
FOMC High					1.5	1.9	2.0	2.1	2.0
FOMC Low					1.5	1.7	2.0	2.0	

*CPI—total index; on average CPI averages about 25 basis points higher than CPE

Part of the unexpected recent softness in core PCE inflation is related to quality improvements in cell phones, but other price categories, such as shelter and medical services inflation, have been weaker than expected.

As can be seen in **Chart 23**, my econometric model indicates core PCE inflation will closely track the estimates of others through 2020 but softens in 2021. During 2018, 2019, and 2020 core PCE inflation forecasts in the "**BASE**" and "**Strong Growth**" scenarios are just shy of 2.0 percent but then decline slightly from 2021 to 2023 before edging up to between 1.9 percent ("**BASE**") and 2.25 percent ("**Strong Growth**") by 2027.

Chart 24 shows core PCE inflation estimates for my "**BASE**" and "**Strong Growth**" scenarios from 2017 to 2027. What is notable in **Chart 24** is that inflation in my "**BASE**" scenario approaches the **FOMC**'s 2.0 percent target in 2018 and 2019 but barely and only briefly exceeds it.

Note, however, that if NAIRU is 4.2 percent rather than 4.5 percent, core inflation, as shown in **Chart 3**, will range between 1.4 and 1.6 percent rather than being close to, but slightly below, the **FOMC**'s 2.0 percent target.

While one should never discount the possibility of a sea-change in the economic environment in the

CHART 23 – Core PCE Inflation

(annual percentage rate)

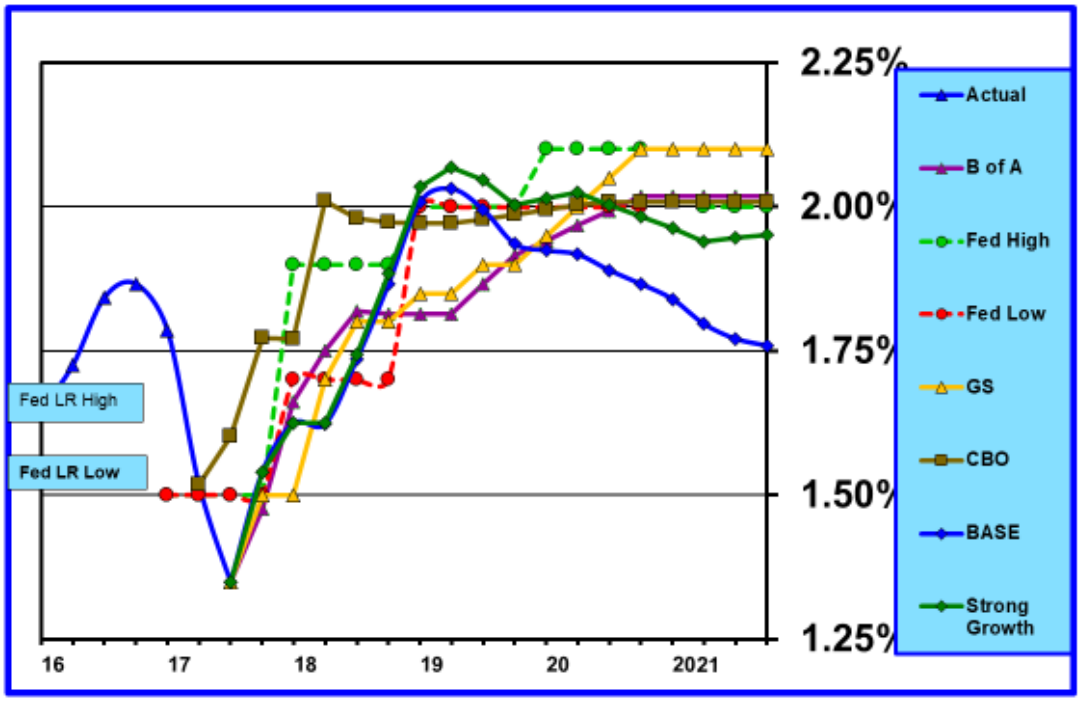


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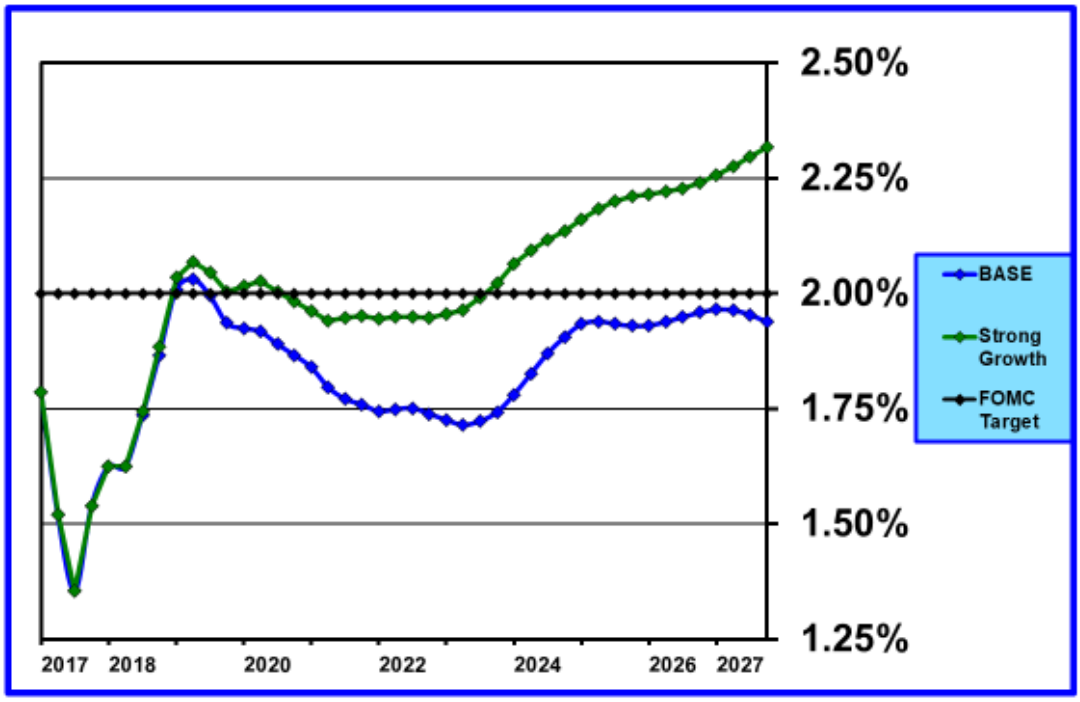
CHART 24 – Core PCE Inflation

(annual percentage rate)



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future that would set inflation on a different course, there are good reasons to conclude that core PCE inflation may remain modestly below 2.0 percent in coming years, notwithstanding an economy that is operating at full employment and which might benefit from additional fiscal stimulus in the coming year.

When all is said and done, the bottom line is that core PCE inflation is likely to be near 2.0 percent over the next few years. Top-down models imply that core inflation will be a little but not much below 2.0 percent in coming years. That is consistent with the historical record. Alternative indices and granular analysis of individual inflation components suggest that inflation will rise to about 2.0 percent but not much more than that. The problem with the bottom-up approach is that it does not necessarily capture the unexpected surprises such as this year's reduction in inflation because of price changes in wireless communications plans.

VI. Monetary Policy

Members of the Federal Open Market Committee (**FOMC**) have gone to considerable lengths in recent years to communicate as clearly and transparently as possible their assessment of the economy and what they collectively believe is an appropriate monetary policy to meet the twin objectives of full employment and moderate inflation.

1. Monetary Policy-Making Process

FOMC members gather in Washington, DC eight times a year. At the end of each meeting, the **FOMC** releases a statement that contains an assessment of economic activity, employment and inflation and commentary about risks to the outlook. The statement concludes with a summary of the course of monetary policy and specific actions the **FOMC** has decided to implement. For several years at the second meeting during a quarter members update their economic projections and the chairmen holds a press conference. The intent has been to provide greater transparency about the conduct of monetary policy. In recent years, it has been the practice to announce changes in monetary policy at the second meeting during the quarter. Because the release of economic projections and a press conference follows this meeting, the chairman has the opportunity to explain reasons for any policy changes. As a result, the markets have been rarely surprised in recent years. This has contributed to a lessening of market volatility.

However, the market keeps its own counsel and does not blindly accept indications of future policy that are embedded in **FOMC** member economic projections, the **FOMC** statement, the press conference, and speeches given by Federal Reserve officials. While the market does not always agree with the **FOMC**'s assessment of the economic outlook and the likely course of monetary policy, it has come to trust the **FOMC** to update its views as new real-time information becomes available and not to blindly pursue a rigid policy agenda. At the present time, the disagreement between the market forecast for the federal funds rate and the projections of all others, including repor**FOMC** members, is unusually large. The market expects only three more increases in the federal funds rate to a range of 2.00 percent to 2.25 percent. The number of forecast increases from others range from 6 (**FOMC** median) to 8 (see **Table 14**).

Federal Reserve Board of Governors Chair, Janet Yellen, said in a speech to the G30 on October 15, 2017, "... *we continue to expect that the ongoing strength of the labor market will warrant gradual increases in that rate [federal funds] to sustain a healthy labor market and stabilize inflation around our 2 percent longer-run objective.*" Market participants collectively believe that low and declining inflation will cause the **FOMC** to limit the number of increases in the federal funds rate after December. Yellen pushed back

on this view saying that "... *my best guess is that these soft readings will not persist and with the ongoing strengthening of labor markets I expect inflation to move higher next year. Most of my colleagues on the* ***FOMC*** *agree.*"

This guidance sounds unambiguous, but markets refuse to believe. We now know that Janet Yellen will not be Fed chair beginning in February 2018, but her replacement, Jerome Powell, who is currently Vice Chair of the Board of Governors, has consistently supported the recent approach to monetary policy and is expected to continue to stay the course. There is considerable inertia in the formulation of monetary policy, and Jerome Powell is unlikely to initiate any kind of significant monetary policy course adjustment.

So, the disagreement between the market and others about the level of the long-run equilibrium federal funds rate will continue and the eventual outcome will depend upon future developments.

2. Beige Book—Assessment of the Economy

Three weeks prior to each **FOMC** meeting, the Beige Book is published. It summarizes in anecdotal form recent economic activity in each of the 12 Federal Reserve districts. The most recent Beige Book covered the period from early October to November 17. Overall, economic activity was downgraded slightly from the previous report with 11 district banks reporting "modest" or "moderate" growth, which means trend real GDP growth is about 2 percent. In the previous report, all 12 district banks reported modest or moderate growth. Chicago was downgraded to "slightly."

Labor markets are considered to be tight, but wage and price pressures are "subdued" but some firming is evident. Shortages of skilled workers, particularly in manufacturing, construction, transportation, and some sectors of health care, are impeding growth. Nonetheless, there is not much evidence of increasing pressure on wages except in specific sectors such as transportation and construction.

Price inflation "strengthened" since the previous report. The recent increase in commodity and materials prices was noted, as well as some upward pressure on transportation costs.

3. Economic Activity

In the December statement, the **FOMC** upgraded its assessment of overall economic activity from *"... has been rising moderately so far this year*" in the September statement to "... *has been rising at a solid rate.*" With respect to business investment, the **FOMC** repeated its previous assessment: "... *business fixed investment has picked up in recent quarters.*" With respect to household spending, the **FOMC** repeated its previous assessment: *"... has been expanding at a moderate rate.*" Overall, the market viewed the **FOMC**'s statement as mildly dovish and the bond market rallied slightly following the announcement.

Table 11 shows the **FOMC**'s central tendency projections for real GDP growth for 2015 to 2020, as well as the long-term potential real rate of GDP growth. Most forecasters have not had to adjust their beginning of the year estimates of real GDP growth in 2017; however, as can be seen in **Table 11**, the FOMC has raised its expected range each quarter during 2017. There are two reasons for this seeming inconsistency. First, the **FOMC** forecasts the growth rate based upon the change in the level of GDP in the fourth quarter of 2016 to the expected level of GDP in the fourth quarter of 2017. Most others calculate the annual growth rate as the change in average GDP over the four quarters of 2017 relative to average GDP for the four quarters in 2016. Averaging over four quarters smooths out anomalous quarterly reports. Because the **FOMC** compares only two quarters rather than comparing the averages of four quarters, its

forecasts can be skewed up or down by quirks in data for the fourth quarters of 2016 and 2017. This leads to the second reason why the **FOMC** raised its GDP growth forecast range. In July, the Bureau of Economic Analysis revised GDP data for the past three years. There was a substantial downward adjustment to the fourth quarter 2016 GDP estimate. This reduced the denominator and boosted the reported growth rate. Thus, the **FOMC**'s projection conveys a false sense of a progressively strengthening economy.

Table 11
Economic Projections of Real GDP (Q4/Q4) by Federal Reserve Board Members and Federal Reserve Bank Presidents, December 2017

Real GDP %		Central Tendency						
		2015	2016	2017	2018	2019	2020	Long Run
Q4/Q4	Actual	2.02	1.84					
Y/Y	Actual	2.86	1.49					
2017	Dec			2.4 - 2.5	2.2 - 2.6	1.9 - 2.3	1.7 - 2.0	1.8 - 1.9
	Sep			2.2 - 2.5	1.8 - 2.2	1.7 - 2.1	1.6 - 2.0	1.8 - 2.0
	June			2.1 - 2.2	1.8 - 2.2	1.8 - 2.0		1.8 - 2.0
	Mar			2.0 - 2.2	1.8 - 2.3	1.8 - 2.0		1.8 - 2.0
2016	Dec		1.8 - 1.9	1.9 - 2.3	1.8 - 2.2	1.8 - 2.0		1.8 - 2.0
	Sep		1.7 - 1.9	1.9 - 2.2	1.8 - 2.1	1.7 - 2.0		1.7 - 2.0
	June		1.9 - 2.0	1.9 - 2.2	1.8 - 2.1			1.8 - 2.0
	Mar		2.1 - 2.3	2.0 - 2.3	1.8 - 2.1			1.8 - 2.1
2015	Dec	2.1	2.3 - 2.5	2.0 - 2.3	1.8 - 2.2			1.8 - 2.2
	Sep	2.0 - 2.3	2.2 - 2.6	2.0 - 2.4	1.8 - 2.2			1.8 - 2.2
	June	1.8 - 2.0	2.4 - 2.7	2.1 - 2.5				2.0 - 2.3
	Mar	2.3 - 2.7	2.3 - 2.7	2.0 - 2.4				2.0 - 2.3
2014	Dec	2.6 - 3.0	2.5 - 3.0	2.3 - 2.5				2.0 - 2.3
	Sep	2.6 - 3.0	2.6 - 2.9	2.3 - 2.5				2.0 - 2.3
	June	3.0 - 3.2	2.5 - 3.0					2.1 - 2.3
	Mar	3.0 - 3.2	2.5 - 3.0					2.2 2.3
2013	Dec	3.0 - 3.4	2.5 - 3.2					2.2 - 2.4
	Sep	3.0 - 3.5	2.5 - 3.3					2.2 - 2.5
	June	2.9 - 3.6						2.3 - 2.5
	Mar	2.9 - 3.7						2.3 - 2.5
2012	Dec	3.0 - 3.7						2.3 - 2.5

In apparent response to the passage of tax legislation, **FOMC** members raised their projections for economic growth 0.4 percent in 2018 and 0.2 percent in 2019. These adjustments generally conform to what other forecasters expect.

FOMC members have downgraded once again the long-run potential rate of growth to a range of 1.8 to 1.9 percent. Members are apparently unswayed by Treasury Secretary Mnuchin's rosy analysis that "The Tax Cuts and Jobs Act" will raise the potential and actual rates of real GDP growth substantially in coming years.

4. Employment

Most believe the labor market has exceeded the non-accelerating inflation rate of full employment (NAIRU). The U-3 unemployment rate in November was 4.1 percent, which was 0.6 percent *below* **CBO**'s estimate

of NAIRU. The **FOMC** noted that "... *the labor market has continued to strengthen* ...," wording that has been repeated in several **FOMC** statements this year. It upgraded its assessment of labor market conditions, stating that "*labor market conditions will remain strong.*"

FOMC projections of the U-3 unemployment rate are shown in **Table 12**. During 2017 the more rapid than expected decline in the U-3 unemployment rate has forced **FOMC** members to slash their unemployment rate projections by 0.4 percent in 2017, 0.6 percent in 2018 and 0.7 percent in 2019. Importantly, **FOMC** members also reduced the range for the long-term unemployment rate during the year, which is presumably the **FOMC**'s version of NAIRU, by 0.3 percent to 4.4 to 4.7 percent. By lowering the long-run range for the unemployment rate, the **FOMC** is indicating that while the labor market is tight, it is not necessarily overheated to an excessive degree. Of particular note, however, is that the **FOMC** expects the labor market to continue operating well above its estimate of full employment for the next three years.

Table 12
Economic Projections of Unemployment Rate by Federal Reserve Board Members and Federal Reserve Bank Presidents, December 2017

Unemp.Rate %		Central Tendency						
		2015	2016	2017	2018	2019	2020	Longer Run
Actual		5.02%	4.72%					
2017	Dec			4.1	3.7 - 4.0	3.6 - 4.0	3.6 - 4.2	4.4 - 4.7
	Sep			4.2 - 4.3	4.0 - 4.2	3.0 - 4.4	4.0 - 4.5	4.5 - 4.8
	June			4.2 - 4.3	4.0 - 4.3	4.1 - 4.4		4.5 - 4.8
	Mar			4.5 - 4.6	4.3 - 4.6	4.3 - 4.7		4.7 - 5.0
2016	Dec		4.7 - 4.8	4.5 - 4.6	4.3 - 4.7	4.3 - 4.8		4.7 - 5.0
	Sep		4.7 - 4.9	4.5 - 4.7	4.4 - 4.7	4.4 - 4.8		4.7 - 5.0
	June		4.6 - 4.8	4.5 - 4.7	4.4 - 4.8			4.7 - 5.0
	Mar		4.6 - 4.8	4.5 - 4.7	4.5 - 5.0			4.7 - 5.0
2015	Dec	5.0	4.6 - 4.8	4.6 - 4.8	4.6 - 5.0			4.8 - 5.0
	Sep	5.0 - 5.1	4.7 - 4.9	4.7 - 4.9	4.7 - 5.0			4.9 - 5.2
	June	5.2 - 5.3	4.9 - 5.1	4.9 - 5.1				5.0 - 5.2
	Mar	5.0 - 5.2	4.9 - 5.1	4.8 - 5.1				5.0 - 5.2
2014	Dec	5.2 - 5.3	5.0 - 5.2	4.9 - 5.3				5.2 - 5.5
	Sep	5.4 - 5.6	5.1 - 5.4	4.9 - 5.3				5.2 - 5.5
	June	5.4 - 5.7	5.1 - 5.5					5.2 - 5.5
	Mar	5.6 - 5.9	5.2 - 5.6					5.2 - 5.6
2013	Dec	5.8 - 6.1	5.3 - 5.8					5.2 - 5.8
	Sep	5.9 - 6.2	5.4 - 5.9					5.2 - 5.8
	June	5.8 - 6.2						5.2 - 6.0
	Mar	6.0 - 6.5						5.2 - 6.0
2012	Dec	6.0 - 6.6						5.2 - 6.0

If the U-3 unemployment rate, which is the simple measure used in the monetary policy Taylor Rule to assess what the level of the federal funds rate should be, were the only relevant employment policy measure, the **FOMC**'s task to proceed aggressively in "normalizing" interest rates would be unambiguous. In previous monetary policy tightening cycles, the **FOMC** has always moved more quickly to raise rates when the labor market tightened than it has so far in this cycle.

While the **FOMC** overestimated expected real GDP growth for many years until recently, it simultaneously underestimated the decline in the unemployment rate. While these forecasting misses would

seem at first blush to be inconsistent, with the benefit of hindsight there have been two drivers. One is that productivity has not recovered to higher levels as expected which explains why real GDP growth has not measured up to expectations. The other is that labor force participation has been much weaker than in previous economic recoveries, resulting in a faster decline in the unemployment rate. Neither of these developments was anticipated. Earlier projections of real GDP growth and the unemployment rate were based on past experience of cyclical recovery patterns which have not repeated as expected.

5. Inflation

In its December statement, the **FOMC** factually reported inflation developments: "*On a 12-month basis, both overall inflation and inflation for items other than food and energy have declined this year and are running below 2 percent. Market-based measures of inflation compensation remain low; survey-based measures of longer-term inflation expectations are little changed, on balance.*" As a matter of fact, market-based measures of inflation compensation ended the year at about the same level they were at the beginning of the year.

In the outlook paragraph of the policy statement, the **FOMC** opined that: "*Inflation on a 12-month basis is expected to remain somewhat below 2 percent in the near term but to stabilize around the Committee's 2 percent objective over the medium term. ... the Committee is monitoring inflation developments closely.*" This wording was exactly the same as it has been in the past several statements. In other words, in spite of the recent decline in inflation, the **FOMC** remains confident that inflation will increase to its target of 2 percent in a reasonable period of time. This could lead to a slower pace in increasing rates. It should be noted that two members of the **FOMC**, Neel Kashkari and Charles Evans, voted against the increase in the federal funds rate, preferring to maintain the then current range. Two dissenting votes is unusual. It suggests that, if inflation continues to disappoint expectations by not rising, a slower pace of increases, even though the employment market is very tight, might become the majority view.

As can be seen in **Table 13**, the **FOMC** increased the projected range for inflation in 2017 from 1.5 to 1.6 percent to 1.6 to 1.7 percent. Since 10 of 12 months inflation reports had been released at the time of the **FOMC** meeting, this was essentially a mark-to-market exercise. Perhaps more importantly, the range of expected inflation in 2018 was reduced by 0.1 percent. Nonetheless, **FOMC** members still expect the 2.0 percent inflation target to be reached by 2019.

In its recent statements, the **FOMC** has dropped the phrase "stabilize around 2 percent" and replaced it with the terminology "symmetric," which is intended to convey that its 2.0 percent target is not a ceiling but an average over the cycle. While the term "symmetric" has a certain logic to it, the **FOMC** has not conducted policy in the past on this basis and does not appear inclined to do so currently. Core inflation has remained consistently below 2.0 percent for the past 20 years. Perhaps now that the economy is at full employment inflation will finally rise to 2.0 percent. However, not all of the recent decline in core inflation can be blamed on transitory and technical factors. Prices for goods remain under considerable pressure. My own statistical analysis indicates that inflation is likely to remain close to but below 2.0 percent for an extended period of time (see **Chart 22**).

6. FOMC Statement—Assessment of Risks

FOMC members dismissed the impacts of the recent hurricanes and California wildfires: "*Hurricane-related disruptions and rebuilding have affected economic activity, employment, and inflation in recent months but have not materially affected the outlook for the national economy.*" Thus, the policy course

Table 13
Economic Projections of Inflation by Federal Reserve Board Members and Federal Reserve Bank Presidents, December 2017

Variable		Central Tendency						
		2015	2016	2017	2018	2019	2020	Long Run
PCE Inf. %	Dec	**0.6**	**1.6**	1.6 - 1.7	1.7 - 1.9	2.0	2.0 - 2.1	2.0
2017	Sep			1.5 - 1.6	1.8 - 2.0	2.0	2.0 - 2.1	2.0
	June			1.6 - 1.7	1.8 - 2.0	2.0 - 2.1		2.0
	Mar			1.8 - 2.0	1.9 2.0	2.0 - 2.1		2.0
2016	Dec		1.5	1.7 - 2.0	1.9 - 2.0	2.0 - 2.1		2.0
	Sep		1.2 - 1.4	1.7 - 1.9	1.8 - 2.0	1.9 - 2.0		2.0
	June		1.3 - 1.7	1.7 - 2.0	1.9 - 2.0			2.0
	Mar		1.0 - 1.6	1.7 - 2.0	1.9 - 2.0			2.0
2015	Dec	0.4	1.2 - 1.7	1.8 - 2.0	1.9 - 2.0			2.0
	Sep	0.3 - 0.5	1.5 - 1.8	1.8 - 2.0	2.0			2.0
	June	0.6 - 0.8	1.6 - 1.9	1.9 - 2.0				2.0
	Mar	0.6 - 0.8	1.7 - 1.9	1.9 - 2.0				2.0
2014	Dec	1.0 - 1.6	1.7 - 2.0	1.8 - 2.0				2.0
	Sep	1.6 - 1.9	1.7 - 2.0	1.9 - 2.0				2.0
	June	1.5 - 2.0	1.6 - 2.0					2.0
	Mar	1.5 - 2.0	1.7 - 2.0					2.0
2013	Dec	1.5 - 2.0	1.7 - 2.0					2.0
	Sep	1.6 - 2.0	1.7 - 2.0					2.0
	June	1.6 - 2.0						2.0
	Mar	1.7 - 2.0						2.0
2012	Dec	1.7 - 2.0						2.0
Core PCE Inf. %	Dec	**1.4**	**1.7**	1.5	1.7 - 1.9	2.0	2.0 - 2.1	2.0
2017	Sep			1.5 - 1.6	1.8 - 2.0	2.0	2.0 - 2.1	2.0
	June			1.6 - 1.7	1.8 - 2.0	2.0 - 2.1		2.0
	Mar			1.8 - 1.9	1.9 - 2.0	2.0 - 2.1		2.0
2016	Dec		1.7 - 1.8	1.8 - 1.9	1.9 - 2.0	2.0		2.0
	Sep		1.6 - 1.8	1.7 - 1.9	1.9 - 2.0	2.0		2.0
	June		1.6 - 1.8	1.7 - 2.0	1.9 - 2.0			2.0
	Mar		1.4 - 1.7	1.7 - 2.0	1.9 - 2.0			2.0
2015	Dec	1.3	1.4 - 1.7	1.7 - 2.0	1.9 - 2.0			2.0
	Sep	1.3 - 1.4	1.5 - 1.8	1.8 - 2.0	1.9 - 2.0			2.0
	June	1.3 - 1.4	1.6 - 1.9	1.9 - 2.0				
	Mar	1.3 - 1.4	1.5 - 1.9	1.8 - 2.0				
2014	Dec	1.5 - 1.8	1.7 - 2.0	1.8 - 2.0				
	Sep	1.6 - 1.9	1.8 - 2.0	1.9 - 2.0				
	June	1.6 - 2.0	1.7 - 2.0					
	Mar	1.7 - 2.0	1.8 - 2.0					
2013	Dec	1.6 - 2.0	1.8 - 2.0					
	Sep	1.7 - 2.0	1.9 - 2.0					
	June	1.7 - 2.0						
	Mar	1.8 - 2.1						
2012	Dec	1.8 - 2.0						

of "*gradual adjustments in the stance of monetary policy*" will be consistent with gradual improvement in economic activity and labor markets and a slow increase in inflation to the 2.0 percent target.

"*Near-term risks to the economic outlook appear roughly balanced, but the Committee is monitoring inflation developments closely.*" This wording is unchanged in the last several **FOMC** policy statements. So, although **FOMC** members are confident that inflation will eventually reach the 2 percent target level, the use of the word "*monitoring*" acknowledges that there is some uncertainty and communicates to the market that if future data indicate that inflation is not moving up toward the target, the **FOMC** will adjust monetary policy. This interpretation was reinforced by the two dissenting votes at the December meeting.

7. FOMC Statement—Monetary Policy

As expected, the **FOMC** raised the federal funds rate range by 25 basis points but noted that monetary policy remains accommodative and supportive of stronger economic activity and higher inflation. The policy paragraph was identical word-for-word with previous recent **FOMC** policy statements.

Interestingly, there was no mention in the policy statement about the balance sheet normalization program, which was commenced in October. Apparently, the FOMC regards this as old news and perhaps the lack of mention was intentional to keep market participants focused on adjustments in the federal funds rate. The market has not focused on the possible longer run implications of balance sheet shrinkage. Perhaps this is because the shrinkage will be very limited initially. But let there be no doubt that liquidity will begin to be impacted in a meaningful way. Already measures of the supply of money and credit indicate that growth is slowing and "quantitative tightening" and increases in the federal funds rate will only serve to depress growth further. Another indicator of decreasing liquidity is the narrowing of the yield spread between the 10-year and 2-year Treasury securities from 125 basis points at the beginning of the year to 51 basis points at the end of December. The deceleration in growth of money and credit is consistent with a maturing economic cycle but has not yet reached the red zone which in previous cycles has sent a reliable signal of heightened recession risk.

VII. Interest Rates

Last month I revised my econometric model to accommodate better for the impact of the long period of zero short-term interest rates. These model revisions improved the reliability of my interest-rate forecasts. Of course, the forecasts themselves depend on assumptions about employment growth, labor market tightness, productivity, and inflation. This means that interest-rate forecasts depend upon a lot of assumptions, some or many of which might prove to be inaccurate. Nonetheless, for a plausible range of assumptions, the model provides a bounded range of interest-rate forecasts.

1. Interest Rates—Federal Funds Rate

The **FOMC** raised the federal funds rate 25 basis points at its December meeting to a range of 1.25 to 1.50 percent. **Table 14** shows the forecast pathways for the federal funds rate expected by various analysts over the next several years. The **FOMC**'s median pathway and the market's forward yield curve implied pathway are also shown in **Table 14** for comparative purposes. Also, **Table 14** shows the forecast pathway for the federal funds rate for three different assumptions (**CBO**, 4.5 percent and 4.2 percent) about NAIRU

in my "**BASE**" scenario and two different assumptions (4.5 percent and 4.2 percent) about NAIRU in my "**Strong Growth**" scenario. The three "**BASE**" scenario alternative forecasts for the federal funds rate are shown in **Chart 4**.

Table 14
Number of Federal Funds Rate Increases of 25 Basis Points

	2018	2019	2020	2021-27	Total	Long Run
FOMC median	**3**	**2**	**2**	**-1**	**6**	**2.75-3.00***
B of A	3	3	0	0	6	2.75-3.00*
GS	4	4	0	0	8	3.25-3.50*
IHS Markit	3	3	1	0	7	2.75-3.25
Economy.com	3	5	0	0	8	3.25-3.50
Market Forecast	2.5	.5	0	0	3	2.00-2.25
Bill's BASE - NAIRU CBO	4	3.5	2.5	0	10	3.75-4.00#
Bill's BASE - NAIRU 4.5%	3	3	2	0	8	3.25-3.50#
Bill's BASE - NAIRU 4.2%	1.5	3	1.5	0	6	2.75-3.00*
Bill's Strong Growth -NAIRU 4.5%	3	3.5	2.5	4	13	4.50-4.75#
Bill's Strong Growth -NAIRU 4.2%	1.5	3	2	3.5	10	3.75-4.00#

*FOMC, B of A and GS rates are equilibrium estimates
#Bill's estimates are forecasts which peak above the likely equilibrium rate

With respect to the issue of additional increases in the federal funds rate in 2018 and subsequent years, there is considerable divergence among the **FOMC**'s own projections, forecasts of analysts and the market forecast embedded in federal funds futures. The expected number and timing of federal funds rate increases made by several analysts, including myself, the **FOMC** and the market is shown in **Table 14**.

In its December Summary of Economic Projections (SEP), the median **FOMC** members' view was three increases in the federal funds rate during 2018 to 2.00 - 2.25 percent; two increases in 2019 to 2.50 - 2.75 percent; and two in 2020 to 3.00 - 3.25 percent, which would lift the federal funds rate 25 basis points above the **FOMC**'s expected long-term equilibrium level of 2.75–3.00 percent.

In the past the SEP projections have proved to be very unreliable guides to future monetary policy. For example, at the beginning of 2016 the **FOMC** median projected four increases in the federal funds rate during 2016. Only one occurred. While most seem to agree that 2018 will see three increases, there is divergence of opinion about the total number of increases the **FOMC** will implement during the current monetary policy tightening cycle.

GS expects more tightening than **B of A** and the **FOMC** and a higher equilibrium level of the federal funds rate of 3.25 to 3.50 percent compared to 2.75 to 3.00 percent for the **FOMC** and **B of A**.

My federal funds rate forecast in my "**BASE**" scenario (4.5 percent NAIRU) agrees with the consensus of three increases in 2018. Two additional increases occur in 2019 and 2020, bringing the federal funds rate to 3.25 - 3.50 percent. This is not an equilibrium rate but a forecast that reflects a cyclical peak of an economy operating slightly above full capacity; unemployment is approximately 70 basis points below NAIRU and real GDP is about 110 basis points above its long-term potential level.

My estimate of the long-term equilibrium rate ranges from 2.75 to 3.00 percent, which is the same range as the **FOMC** and **B of A**. That is also the range indicated by my "**BASE**" scenario, 4.2 percent NAIRU alternative, which has a much smaller positive employment gap which diminishes to close to zero over the forecast period.

In my "**Strong Growth**" scenario the federal funds rate rises to 4.50 - 4.75 percent by 2027. This higher projected rate reflects the consequences of a tight monetary policy in an overheated economy—the unemployment rate falls gradually to 3.5 percent in this scenario by 2027, considerably below the assumed NAIRU rate of 4.5 percent. Such a high rate is unlikely to occur because monetary policy tightening will in all likelihood slow economic growth or even result in recession long before rates rise to this high a level.

Chart 25 shows the quarterly progression in the federal funds rate from the present through 2021 implied by the **FOMC**'s high, low and average projections. It also shows forecasts for **B of A, GS**, my "**BASE**" scenario 4.5 percent NAIRU alternative and the **market** forecast embedded in federal funds futures. My forecast pathway is similar to **GS**'s and the top end of the **FOMC**'s projection range. The **market** forecast is much lower than all other forecasts and tops out in a range of 2.00 percent to 2.25 percent in 2020.

CHART 25 – Federal Funds Rate Forecasts

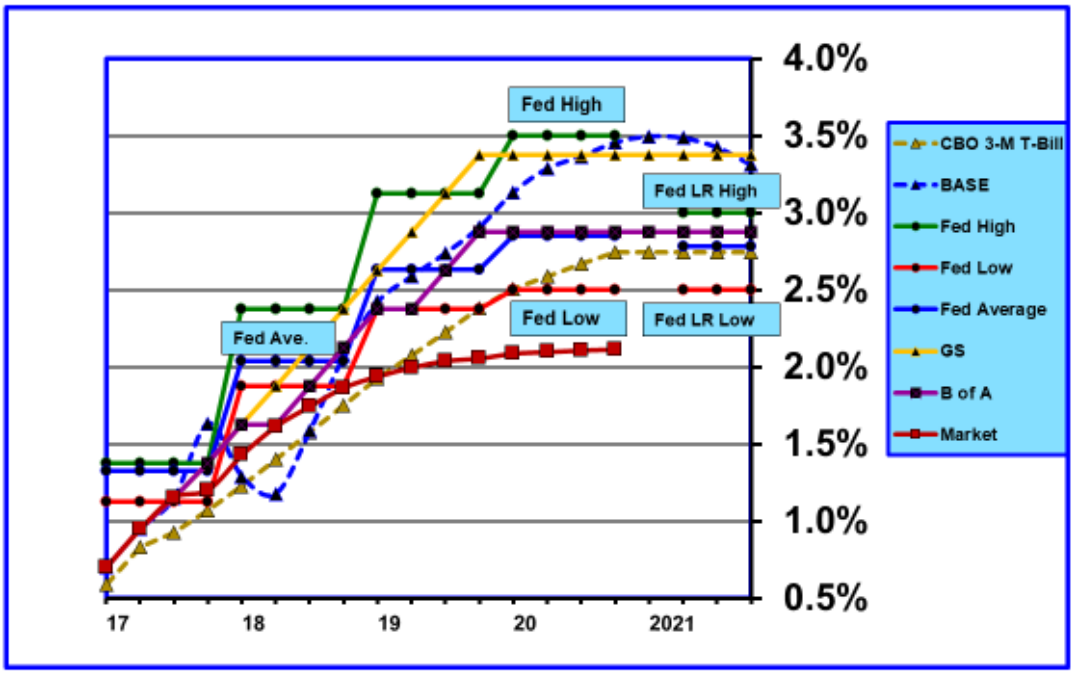

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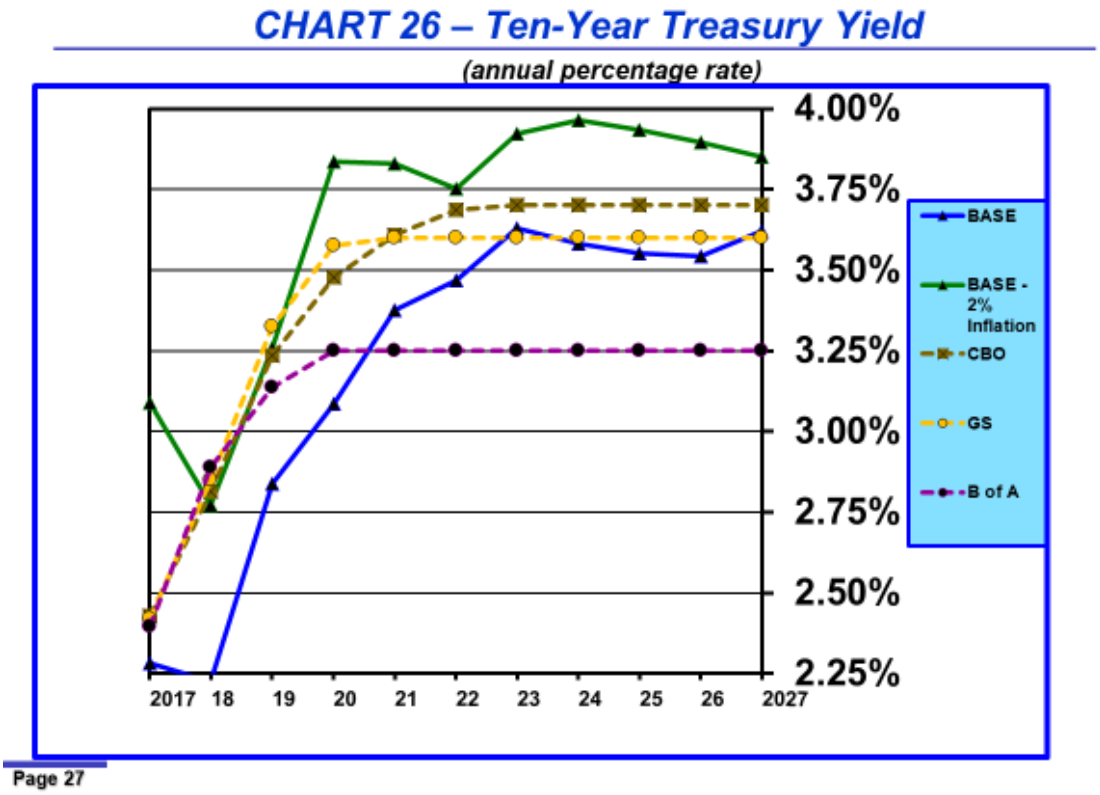
Chart 4 compares the forecast pathways for the federal funds rate for my three NAIRU "**BASE**" scenario alternatives.

Over the past several years, **FOMC** members have steadily reduced the median estimate of the long-term nominal value of the federal funds rate from 4.25 percent to 2.75; the central tendency range is currently 2.25 - 3.00 percent. Based upon my model, my sense is that the **FOMC**'s median projection for the federal funds rate is reasonable with its estimate of long-term real GDP growth of 1.7 to 1.9 percent and assuming that the real rate of interest when the economy is at full employment and NAIRU is zero is approximately 0.75 percent.

2. Interest Rates—10-Year Treasury Note Yield

Chart 26 shows forecasts for the 10-year Treasury note yield over the next ten years. Over time analysts have reduced their forecasts for the ten-year yield. Partly this is a mark-to-market exercise driven by the persistent decline in this yield contrary to expected increases. But the adjustments also reflect a growing consensus that the long-run equilibrium real rate of interest has declined considerably from its historical level. Analysts still expect long-term rates to rise from the current level, but no longer to as high a level.



Assuming an inflation rate of 2.0 percent, my model indicates that the 10-year neutral rate should be between 3.75 percent and 4.00 percent, depending on the level of productivity. The long-term equilibrium rate is 3.60 percent for **GS**, 3.25 percent for **B of A** and 3.70 percent for **CBO**. These estimates do not differ materially from my estimated range of 3.75 percent to 4.00 percent.

My forecast for the 10-year yield in my "**BASE**" scenario (4.5 percent NAIRU), which is shown in **Chart 26**, is similar to **CBO**'s and **GS**'s forecasts and above **B of A**'s forecast. The range in my average annual forecasts is 3.50 to 3.75 percent between 2021 and 2027, rather than 3.75 to 4.00 percent that my model says would prevail if inflation were 2.0 percent in the "**BASE**" scenario.

Note that my estimate of the equilibrium 10-year rate would be quite a bit lower than 3.50 to 3.75 percent, if NAIRU is 4.2 percent rather than 4.5 percent.

APPENDIX

Outlook—2017 and Beyond—Forecast Summary for the U.S. and the Rest of the World, Highlights of Key Issues, and Identification of Risks

Observations about the 2017 U.S. and global economic outlook and risks to the outlook are listed below. As events unfold during 2017, this will enable the reader to track my analytical prowess. Observations which are on track are denoted by "+"; observations not on track are denoted by "-"; indeterminate observations are denoted by "?" and general observations are denoted by "✓".

1. **U.S.—December Assessment:** Strong consumer, business, and investor optimism, continue to influence economic activity favorably on balance; early in 2017 survey data were much stronger than hard economic data reports, but better hard economic data are now being reported; congressional enactment of tax reform is contributing to business and market optimism, and optimism is fueling an acceleration in economic activity and growth

   ✓ **Congress enacted tax reform President Trump signed it into law just before Christmas; tax reform is expected to add 0.2% to 0.3% to GDP growth in both 2018 and 2019**

   ✓ **The surge in confidence that followed Trump's election has been sustained by higher stock prices, strong employment growth, accelerating global growth, and the enactment of tax reform**

   ✓ **The index of leading indicators surged 1.2% in October after dipping 0.2% in September due to the impact of hurricanes; it is 5.2% above the October 2016 level and is signaling strong GDP growth**

   ✓ **The Citi U.S. Surprise Index continues to surge and moved from 6.4 on Oct. 11 to 40.2 on Oct. 31 to 63.1 on Dec. 5**

   ✓ **The Chicago Federal Reserve's National Activity Index decreased from 0.76 in October, which was the highest level since December 2006, to 0.15 in November, still indicating that economic activity is expanding at a greater rate than the historical average, but at a somewhat slower pace**

   ✓ **The Conference Board's index of leading indicators continues to rise, increasing 0.4% in November and up 3.0% over the past six months**

   - ***2017 real GDP Y/Y*** growth projections range from 2.0% to 2.4%. The FOMC's central tendency Q4/Q4 projections range from 1.9% to 2.3%. (Q4/Q4 projections are highly dependent upon potential anomalies in Q4 data; therefore, Y/Y estimates, which average all four quarters, usually are more stable estimates.) Risks are tilted to the upside because of fiscal policy activism to cut taxes and increase infrastructure spending.

     ? GS's U.S. Current Activity Indicator (CAI) has been well above the long-term potential level of 1.5% throughout 2017: it was 4.0% in December compared to 4.1% in November and 4.0% in October; the CAI is a proxy for real GDP growth; in early 2017 CAI was high because of strong survey data; the more recent rise in the index has been driven by stronger hard data;

     + B of A's 2017 forecast is 2.25% and GS's is 2.25%; my "BASE" scenario forecast is 2.25% and my "Strong Growth" scenario is 2.25%

     + FOMC boosted its 2017 Q4/Q4 central tendency range in December to 2.4-2.5%; if year-over-year real GDP growth is 2.25%, Q4/Q4 will be 2.5%; although this is above the beginning-of-the-year FOMC projection range, it would be within the original projection range, if BEA had not revised 2016 Q4 real GDP

- ***Real GDP output gap*** will remain high, but will narrow considerably during 2017 from about 1.2% to 0.5% to 0.8%. (The exact size of the output gap will be revised by CBO, probably in February 2017 and again in August 2017).

  ? CBO's estimate of the output gap in the fourth quarter of 2016 decreased from 1.30 percent to 0.45 percent. This improvement was comprised of two components—BEA's revisions to real GDP reduced the gap by 23 basis points; CBO's downward revisions in January and June of estimated potential real GDP reduced the gap by 62 basis points; the revised end of 2017 output gap should be zero or slightly negative

  + The third quarter output gap was -0.23%, which means that the economy was operating at slightly below full capacity; if Y/Y real GDP growth is 2.25%, the output gap at the end of the year should be close to zero

- ***Potential structural rate of real GDP growth*** has declined significantly in recent years. I expect potential growth to be about 1.3% to 1.4% in 2017. Long-term potential real GDP growth will edge up in coming years to between 1.75% and 2.0%.

  - Based on updated CBO data, I now expect potential GDP growth in 2017 to be approximately 1.58%

  + Long-term potential real GDP growth has moved slightly higher to a range of 1.8% to 2.1%

- ***Productivity*** should rise during 2017 from near zero in 2016 but is still likely to be less than 1.0%, as growth improves and investment increases; it will fall well short of the historical 2.1% average.

  - 2016 productivity was 0.00% Y/Y and .84% Q4/Q4; Y/Y productivity rose to an estimated 1.18% in the third quarter and Q3/Q3 was 1.34%

  - Y/Y productivity growth in 2017 is on a track to rise 1.3%, but Q4/Q4 could be .8%

- ***Employment*** growth should slow considerably during 2017; now that full employment has been reached actual employment growth should closely track growth in the labor force; payroll growth should average 125,000 to 150,000 per month.

  - Payroll employment growth averaged 174,200 over the first 11 months of 2017

  - Household employment growth averaged 164,400 over the first 11 months of 2017

  - Labor force growth over the same period averaged 80,800—eventually payroll and household employment growth will decline and converge to labor force growth

  + Evercore ISI temporary and permanent employment surveys remain strong, but have drifted lower from an average of 60.1 in December 2016 to 56.8 on December 29 (a value above 50 is favorable)

  + Manpower's employment survey for Q1 2018, which measures employment intentions, rose to a cyclical high of +19%

  - The Conference Board's labor market differential increased to +20.2 in November (the highest level since July 2001) compared to +18.1 in August, +16.1 in July, +13.6 in June, +11.7 in May, +10.9 in April, +12.8 in March, +7.3 in February and +6.0 in January, indicative of a very strong employment market

- ***Employment participation*** will resume a gradual decline during 2017 due to demographically-embedded retirements of baby boomers.

  - Participation rose from 62.67% in December 2016 to 62.72% in November

- ***Unemployment rate*** should edge down slightly to between 4.3% and 4.5%.

  - U3 unemployment rate in November was 4.12%; the unemployment rate is expected to fall further

- ***Hourly wage growth*** should edge up slightly during 2017 to a range of 2.7% to 3.1%.

  - Acceleration in wage rate growth has been slower than expected

  - BLS Y/Y hourly wage growth for all employees in November was 2.60%, which was little different from the 2.57% rate of growth in December 2016; Y/Y hourly wage growth for production and nonsupervisory workers was 2.37% in November, which was down from the 2.48% rate of growth in December 2016

  - The employment cost index grew a disappointing annual rate of 2.51% in the third quarter

  + GS's wage tracker was 2.6% in December

  + Consumer and business wage expectations surveys have risen to 2.8% from 2.6% at the beginning of the year

  + The Atlanta Fed wage tracker, which is based upon a different methodology was up 3.2% in November compared to 3.9% in October 2016; this measure has been relatively trendless during 2017

  + Evercore ISI's composite index of temporary and permanent placement wage pressures was a strong 64.9 in the week ending December 29 compared to 63.7 in December 2016 (a value greater than 50 indicates upward pressure on growth in wages)

- ***Nominal consumer disposable income***, measured on a Y/Y basis should slow as employment growth slows; this will be offset partially by an increase in average hourly wage rates; growth should be in a range of 2.75% to 3.25%.

  + As of November nominal consumer disposable income growth over the past 12 months was 2.77%; growth in 2017 appears likely to be in the middle of the forecast range

- ***Nominal consumer spending growth*** on the Y/Y basis will rise due in part to upward pressure on inflation in a range of 3.5% to 4.0%.

  - As of November, nominal consumer spending growth over the past 12 months was 4.50%; growth in 2017 appears likely to be above the top end of the forecast range; this strength is not due to inflation, which has declined, but reflects instead strong consumer confidence

  - November retail sales rose 1.3%; the year-over-year growth in nominal retail sales rose from 4.4% in September to 4.7% in October to 5.8% in November

  ? On line store sales have risen 5% over the past year; department store sales have declined 5% over the past year; B of A estimated that 34% of holiday sales were on line compared to 32% in 2016; online sales have increased 12.1% in 2017 compared to a 0.4% increase for brick and mortar establishments

  + Propelled by incentives and replacement sales due to hurricane damage, auto sales soared to an annual rate of 18.5 million units in September; auto sales in October remained at a high annualized 18.0 million units compared to sluggish sales for much of the year; however, unit prices have declined, reflecting the impact of incentives; sales have increased 2.6% year to date compared to 0.4% growth in 2016; B of A expects auto sales to be 17 million in 2017 and to continue declining to an annual rate of 13 million units by 2021

  ? U.S. vehicle production is expected to rise to 11.3 million units in Q4 from 10.7 million in Q3

  ? After relative stability for most of 2017, the University of Michigan Survey of Consumers sentiment index surged to 100.7 in October, which was a 13-year high; however it fell back to 98.5 in November and 95.9 in December, which was still at a strong level but not much different from monthly readings during most of 2017: it was 95.1 in September, 96.8 in August, 93.4 in July, 95.1 in June, 97.1 in May, 98.0 in April, 96.9 in March, 96.3 in February, 98.5 in January and 98.2 in December 2016; perhaps somewhat worrisome, the decline in this index over the past two months has come mostly from the expectations of future economic activity component

? Conference Board consumer confidence index rose to a near record high of 129.5 in November from 125.9 in October: it was 120.6 in September, 120.4 in August, 120.0 in July, 117.3 in June, 117.9 in May and 119.4 in April, 124.9 in March, 116.1 in February, 111.8 in January and 113.3 in December

? Bloomberg's U.S. Consumer Comfort index rose to 52.3 on December 2 from 52.1 on November 11, after dipping to 49.5 on October 6; this measure peaked at 53.3 on August 26, and is now much higher that the 51.3 registered on March 24, which had been the highest level in 16 years

? Evercore ISI's index of company surveys was 54.8 on December 29 which was the highest level in four years; this is consistent with moderate growth; the index remains above 50.1 registered on December 30, 2016

? According to the Federal Reserve Senior Loan Officer Opinion Survey, credit standards for credit cards and auto loans tightened in Q3, but demand remained unchanged

? Consumer credit has risen 5.9% over the past 12 months, the annual rate of growth in October was 10.4%, up from 6.6% in September and 4.2% in August

- ***Household personal saving rate*** will decline slightly as growth in spending exceeds growth in disposable income in a range of 5.0% to 5.5%.

  - The saving rate averaged 3.53% over the first 11 months of 2017 compared to 3.49% over the past 12 months—the large forecast miss was caused by a substantial downward revision in savings by the Bureau of Economic Analysis in its annual bench market revisions of National Income Accounts

- ***Stock prices***, as measured by the S&P 500 average, should be between 5% higher or 10% lower, on the downside reflecting rising wages, slowing growth in profit margins and rising short-term interest rates and on the upside reflecting growth friendly fiscal policy; there is analysis indicating that U.S. stock prices are overvalued as 2017 commences.

  - The S&P 500 stock index was up 19.4% as of December 29

- ***Manufacturing*** will continue to be weak with the PMI index just slightly above or below 50, reflecting the negative consequences of dollar strength.

  - Due to the impacts of Hurricanes Harvey and Irma, the industrial production index dropped from 105.2 in June and July to 104.7 in August; but strong upward momentum returned in September (105.2), October (106.1) and November (106.4); the index was 103.5 in January; recent manufacturing strength reflects in part stronger global growth and a weakening dollar

  - 94.6% (all-time high) of manufacturers were somewhat or very positive about business prospects for their companies in the fourth quarter compared to 89.8% in the third quarter, 89.5% in the second quarter and 93.3% in the first quarter versus 56.6% in 2016—the first and fourth quarter indices were all-time highs for this survey in its 20-year history

  - The NFIB optimism index skyrocketed to 105.8 in January and has held at a high level since then: 105.3 in February, 104.7 in March, 104.5 in April and May, 103.6 in June, 105.2 in July, 105.3 in August, 103.0 in September, 103.8 in October and a new cyclical high of 107.5 in November; these readings are the highest sustained level since 2004; however this high level of optimism has not translated into increased capital investment—there was no change in reported capital outlays in November consistent with the flat pattern that has prevailed throughout 2017; planned capital outlays edged down slightly in November—plans have remained stable throughout 2017

  - ISM manufacturing index eased to 58.2 in November from 58.7 in October and 60.8 in September, which was the highest level in 2017; the index was 58.8 in August, 56.3 in July, 57.8 in June, 54.9 in May, 54.8 in April, 57.2 in March, 57.7 in February, 56.0 in January and 54.5 in December (a value above 50 is favorable)

- ISM non-manufacturing index after jumping to 60.2 in October, which was the highest level of the year, fell to 57.4 in November; it was 59.8 in September, 55.3 in August and 53.9 in July, which was the lowest level in 2017; it was 57.4 in June, 56.9 in May, 57.5 in April, 55.2 in March, 57.6 in February, 56.5 in January and 56.6 in December (a value above 50 is favorable)

? Reflecting the theme of relatively strong economic activity, the GS analyst index leaped to the highest level in six years in December jumped coming in at 70.0 (the employment and wages sub-indices were even stronger in December): it was 66.1 in November, 57.0 in October, 56.6 in September, 57.2 in August, 57.2 in July, 52.9 in June, 59.5 in May, 47.1 in April, 51.5 in March, 56.7 in February, 58.8 in January and 60.7 in December (a value above 50 is favorable)

? S&P 500 earnings growth has been very strong, but National Income accounting data, which adjusts profits for inflation and depreciation, had been under downward pressure during 2015 and 2016 until a small increase in the second quarter and a much larger increase in the third quarter, which resulted in Q3/Q3 growth of 5.3%, still well below S&P 500 earnings growth

- ***Business investment*** spending growth should improve and be in a range of 1.0% to 3.0%.

  - Business investment grew at a stronger than expected rate of 6.1% over the first three quarters of 2017 and is expected to rise approximately 5% for the entire year

  ? Capacity utilization (the U.S. operating rate) was 77.0% in October, it had been depressed by hurricanes and dipped to 76.0% in September and 76.1% in August from 76.7% in July; it was 75.7% in January; it remains well below the 80.0% level that typically leads to a sustained acceleration in business investment spending

  ? According to the NFIB survey, capital spending has been solid but relatively stable during 2017, "but not enough for a significant improvement in GDP growth or productivity;" plans for capital outlays had risen to the highest level since 2006 in August but fell 5 points to 27 in September and October, although this decline might have been impacted by the hurricanes; the percentage of companies making capital expenditures fell 1 point in September to 59 and remained at 59 in October; nonetheless; anecdotal industry reports are more upbeat than they have been in recent years

  ? The second quarter survey of manufacturers indicated plans to increase capital spending 3.2% over the next year compared to 2.1% in the first quarter survey

  ? EvercoreISI's survey of capital goods has been rising steadily from 44.7 in January to 61.0 in the week ending December 29 (a value above 50 indicates growth in activity)

  ? EvercoreISI's third quarter company inventory survey indicated that the overhang that emerged in the second quarter has disappeared; auto dealer inventories are still high but have decreased from +43% in the second quarter to +24% in the third quarter; home builder inventories moved from a very low -25% in the second quarter to an even lower -29% in the third quarter

  ? According to the Federal Reserve Senior Loan Office Opinion Survey, C&I lending credit standards eased in Q3; however, demand has weakened over the course of 2017

  ? Commercial real estate credit standards remained unchanged in Q3, but demand weakened

- ***Residential housing investment*** should be about the same in 2017 as it was in 2016 in a range of 3% to 6%; housing starts should rise 2% to 5%.

  ? NAHB housing market index catapulted to an all-time high of 74 in December; this index has been edging up over the course of the 2017: it was 70 in November, 68 in October, 64 in September, 67 in August, 64 in July, 66 in June, 69 in May, 68 in April, 71 in March, 65 in February and 67 in January (a value above 50 is favorable)

  ? Higher mortgage rates depress housing investment; GS estimates that a 100 basis points increase in mortgage rates will decrease the level of residential housing investment by 4-8%

+ Annualized housing starts from January through November were 3.3% above the 2016 total, but are up 2.6% over the previous 12 months; housing starts are on track to be at the lower end of the forecast range

- Housing investment has declined at an annual rate of -0.6% over the first three quarters of 2017, and is projected to grow a mediocre 1.1% to 1.4% for the entire year

? Evercore ISI's homebuilders survey has been steady over the course of 2017: it was a strong 57.5 in December 2016 and 57.3 on December 29, 2017 (a value above 50 is favorable)

? Homeownership averaged 63.4% during 2016, the lowest level since 1967, but has edged up slightly to an average of 63.7% over the first three quarters of 2017; GS expects homeownership to stabilize at 65% over the next 3 years, which will boost annual housing starts by about 150,000 to 200,000 cumulatively over the next 3 years and increase growth in housing investment by 1% to 2% annually

? According to the Federal Reserve's senior loan officer survey, mortgage credit standards for residential loans remained the same or eased slightly in Q3, but demand weakened

- ***Residential housing prices*** should rise more slowly in 2017 in a range of 2% to 4% in 2016.

  ? GS estimates that median housing prices will grow 3-4% more slowly for each 100 basis points increase in mortgage rates

  - The Federal Housing Finance Agency's Housing Purchase Price Index rose 6.3% during 2016 and 6.5% over the past four quarters

  - According to the S&P Case-Shiller index, the year over year trend in housing prices was an increase of 6.2% in September, which is well above the rate of increase in nominal incomes and, thus, is not sustainable

  - CoreLogic reported that housing prices are overvalued (more than 10% over sustainable value) in 34% of the U.S.'s 100 largest metropolitan areas and undervalued in 28% (more than 10% under sustainable value); however, overvaluation tends to be concentrated in the larger metropolitan areas (46% of the 50 largest metro markets are overvalued)

  ? I estimate that national housing prices were 9.7% above the long-term trend level in the third quarter of 2017; for comparative purposes, this measure peaked at +34.2% in the first quarter of 2006 and bottomed at -8.2% in the first quarter of 2012

- ***Trade deficit*** should rise in 2017 as the increase in the value of the dollar depresses exports and increases imports.

  + The trade deficit in October, measured as a 12-month moving average, was 2.81%, slightly worse than December 2016's 2.67%

- The ***dollar's value*** on a trade-weighted basis should rise due to stronger economic growth and higher interest rates relative to other developed economies.

  - Trade-weighted dollar was down -6.6% in November from December 2016, although this is an improvement from the -8.7% decline in September; it is currently about the same level as prevailed in January 2015

- ***Oil prices*** are likely to trade in a narrow band of $40 to $55 per barrel because abundant and flexible supply in the U.S. will constrain prices if global demand accelerates.

  + Oil prices (West Texas Intermediate Crude) averaged $51 a barrel in 2017; however, oil prices averaged $58 in December, reflecting stronger global growth and a change in Saudi Arabia's policy in the direction of limiting production to constrain international supply; in the long run downside risks to prices outweigh upside risks because of rapidly rising U.S. shale oil production capacity; higher prices will stimulate increased production but this will take several months to materialize

- ***Monetary policy***—the Federal Reserve will raise the federal funds rate one to three times during 2017 in 25 basis point increments.

  + The FOMC raised the federal funds rate by 25 basis points in March, June and December

  + The FOMC updated its guidelines for shrinking its balance sheet at the June meeting; implementation began in October; so far there has been no unusual market reaction

  ? Financial conditions eased in 2017 and were 98.76 in mid-December compared to 100.05 in December 2016 and have now fallen well below the recent low of 99.57 reached in July 2016

- ***Total inflation*** measures (CPI and CPE) will be relatively stable in 2017: CPI will rise 2.0% to 2.4% and CPE will rise 1.7% to 2.0%.

  + Total CPE inflation was up 1.76% in November compared to November 2016; the index, which peaked in February at 2.18%, fell as the effects of the rebound from low oil prices experienced in early 2016 dropped out of the index; however, the index now appears to be headed higher by year end to a level within the forecast range

  + GS's inflation tracker was steady at 1.7% in November, October and September, which was up from 1.5% in August and 1.4% in July

  + University of Michigan 5-10 inflation expectations declined to 2.4% in November from 2.5% in October, a level that had prevailed for much of the year

  + 5-year, 5-Year Forward CPI Inflation Expectation rate derived from Treasury Inflation Protected Securities was 2.06% on December 28 compared to 2.08% on December 30, 2016; this translates into an expected long-run PCE inflation rate of approximately 1.81%

  + The third quarter 2017 survey of professional forecasters indicated a decline in long-term expected CPE inflation to 2.00% and CPI to 2.25%

- ***Core PCE inflation*** will rise slightly in a range of 1.6% to 1.9%, reflecting global disinflationary trends offset somewhat by the closing U.S. employment and output gaps.

  - Core CPE inflation was up 1.48% in November compared to November 2016; it now appears that core PCE inflation will be slightly below the bottom end of the forecast range by the end of the year

- The ***10-year Treasury rate*** is likely to fluctuate in a range between 1.75% and 2.75% in 2017. Faster than expected real GDP and employment growth would push the rate toward the top end of the range; greater than expected declines in inflation and/or heightened financial instability would push the rate toward the bottom end of the range.

  + The 10-year Treasury yield was 2.40% on December 29 compared to 2.45% on December 31, 2016

  ? The yield curve slope, as measured by the 10-year—2-year Treasury yield spread, has flattened from 130 basis points in December 2016 to 56 basis points in December 2017; this reflects tightening monetary policy

- ***Fiscal policy*** will have a positive impact on real GDP growth during both fiscal year and calendar year 2017, raising real GDP growth by 0.2 to 0.3%.

  - Congress passed the "Tax Cuts and Job Act" in late December 2017, too late to have any direct impact on 2017 GDP growth; however, the expected impact in 2018 and 2019 is 0.2% to 0.3% increase in real GDP growth in each year

  - Congress did not consider Infrastructure stimulus legislation in 2017, but may do so in 2018

  + Congress passed legislation to provide $15.2 billion in Hurricane Harvey relief aid and combined it with a suspension of the debt ceiling until December 6, thus averting the possibility of a government default for the time being; Congress passed an additional $34 billion in emergency

relief for Hurricanes Irma and Maria and California wildfires; the Trump Administration has asked Congress for an additional $81 billion, which the House has passed but the Senate has deferred action until 2018; this would bring the overall total of emergency relief nearly $131 billion

+ Congress has ignored President Trump's proposed budget; Congress passed a three-month continuing budget resolution, which extended government spending at fiscal year 2017 levels to December 6, a second continuing resolution extended the date to Dec. 22, and a third extended the date to January 19, 2018; adoption of a fiscal year 2018 budget resolution will need to occur prior to the expiration of the continuing resolution to avert the possibility of a partial government shutdown; both Republicans and Democrats want to raise the spending caps, but a consensus on details has yet to be reached; adoption of the fiscal year 2018 budget by Congress will require 60 votes in the Senate, so at least nine Democratic Senators will have to agree to support the final budget resolution

? Congress suspended the federal debt ceiling until December 6, which means that the debt ceiling is unlikely to become binding before March 2018

- The ***deficit*** as a percentage of nominal GDP will increase substantially from fiscal year 2016's level of 3.15% to a range of 3.50% to 4.25%. Stronger than expected growth and delayed implementation of tax cuts and infrastructure spending would push the deficit toward the lower end of the range.

  - The final fiscal year 2017 budget deficit was a better than forecast 3.41% and beat CBO's revised forecast by $27 billion; the 3.41% could change a little, either up or down, when 2017 Q3 nominal GDP data is revised in July 2018

- ***State and Local investment*** spending growth should range between 1.0% and 1.5%.

  - State and local spending fell at an annual rate of -0.2% during the first three quarters of 2017; growth for all of 2017 is expected to be zero

  - EvercoreISI's survey of state and local tax revenues was 48.4 in November compared to 46.0 in October, 47.8 in September, 47.0 in August, and 48.2 in July (a value of the index below 50 indicates modest deceleration); revenues have been weak all year, which may be related to the lack of growth in state and local investment spending in 2017

2. **Rest of the World—December Assessment:** Economic activity continues to be strong just about everywhere and has become self-reinforcing

   ✓ **GS's global current activity indicator (CAI) has held at 5.0% or higher (November was 5.3%) from September through December, which is the highest sustained level in seven years: this measure was 4.5% in August, 4.3% in July, 4.6% in May, 4.4% in April, 4.3% in March and 4.1% in February, indicating that global growth remains very strong; global growth will probably exceed the forecast pace of 3.4% for 2017**

   ✓ **CAI for major advanced economies has accelerated from 1.5% last summer to 3.7% in December**

   ✓ **CAI for emerging markets been accelerating all year, rising from 4.3% in January to 4.7% in February, 5.5% in March, 5.6% in April, 6.2% in May, 6.1% in June, 5.4% in July, 5.7% in August 5.9% in September, 6.1% in October, and 6.5% in November**

   ✓ **OECD's global index of leading economic indicators has been rising slowly over the past year and reached 100.2 in June, July, August, September and October compared to 99.9 in April and 100.0 in March**

✓ **The Citi Global Surprise Index has risen from +13.1 on September 4 to 23.7.0 on December 5, but momentum has slowed since late October**

✓ **The JP Morgan Global Manufacturing PMI increased to 54.0 in November from 53.5 in October, 53.2 in September and August and 52.7 in July, and is at the highest level since March 2011**

✓ **B of A's global cycle indicator was ever so slightly lower in November compared to October's very strong level**

- ***Global growth*** is likely to improve to 3.4% in 2017 from 3.0% in 2016. However, due to political instability in Europe and the possible negative impacts of a strong dollar on emerging market economies, risks are tilted to the downside.

  - B of A has increased its 2017 forecast to 3.7% and expects growth to be 3.8% in 2018

  - IMF has upgraded its 2017 global growth forecast to 3.6% and expects growth to edge up to 3.7% in 2018

  - GS has raised its 2017 forecast to 3.8% and expects 4.0% in 2018

  - Global growth has accelerated, political instability has been limited, and the dollar has weakened

  ? Global inflation has drifted up slightly due to firming commodities prices; diminishing output gaps should create modest further upside pressure; global inflation is expected to be 2.7% in 2017 and 3.0% in 2018

- ***European growth*** will be positive but will likely fall short of the consensus 1.4% because of potential social and political disruptions, but a decline in the value of the euro would have favorable consequences.

  ? Eurozone manufacturing PMI index has improved to its highest level since February 2011; it rose from 57.4 in August to 58.1 in September, 58.5 in October and 60.1 in November

  ? GS's Euro area CAI was 3.8% in both November and December well above potential of 0.9%

  - B of A has increased its 2017 GDP forecast to 2.3%

  - GS has raised its 2017 forecast to 2.3%

  - The euro has strengthened

- ***European inflation*** will rise from 2016's 0.2% but will probably fall short of the expected 1.2%.

  - Thanks to rebounding energy prices, the 2017 inflation forecast has been boosted to 1.5%; core inflation has also edged up and is expected to be 1.0% in 2017

- ***European financial markets*** should be relatively stable with periodic episodes of volatility prompted by specific events, such as the French and German elections or a potential banking crisis in Italy

  - No episodes of volatility have occurred

- ***European political dysfunction, populism and nationalism*** will continue to worsen gradually. Countries to watch closely include France, Italy, the Netherlands, Greece, Spain, and Portugal. Germany's election will occur toward the end of 2017 and could be significant, depending upon whether political and social turmoil escalates in other parts of Europe earlier in the year.

  + Dutch elections on March 15 resulted in a smaller than expected gain for the far-right Party for Freedom from 15 to 19 seats out of 150, which eliminated the possibility of a referendum on European Union membership; however, the parliament is more fragmented than ever and will require three or four parties to forge a coalition, which could take several months

- Emmanuel Macron, a centrist Europhile, convincingly won the French presidential election and his party captured a majority of seats in the parliament; this was interpreted as a setback for populism

+ While the German Bundestag elections on September 24 apparently guaranteed a fourth four-year term of Chancellor for Angela Merkel, her party, the center-right Christian Democratic Union, and the center-left Social Democrats lost substantial ground to parties on the left and the right; the right-wing Alternative for Germany party did much better than expected, garnering 12.7% of the votes, indicating that populism is gaining traction in Germany; to date, however, Merkel has been unable to forge a coalition government—a minority government or new elections may result

+ While the cyclical economic upturn in Europe has muted the tides of populism somewhat, Germany's election outcome indicates that it remains a significant force which could gain momentum should the European economy falter; Austria's new government includes a far-right populist party

? Italy is scheduled to hold elections in 2018; while popular support for the euro has ebbed, Italy's recent return to tepid growth may limit support for Euroskeptic parties, but it is still likely that centrist parties will emerge somewhat weaker just as has occurred in Germany and the Netherlands

? Greece has faded from the news and appears to be complying, albeit grudgingly, with creditor bailout requirements; however, the IMF expects yet another bailout will be required in the coming year

- ***U.K. growth*** is expected to decline to 0.9% in 2017 compared to 1.8% in 2016 as Brexit consequences begin to develop.

  ? The U.K. triggered the two-year withdrawal process from the EU on March 29; EU leaders held a summit in early April to map out the framework for negotiations on Britain's exit from the EU; based on that framework, the European Commission has developed detailed guidelines, which will be submitted to EU member states on the EU Council for approval; negotiations commenced in late June; concerns about the potential consequences of the U.K.'s departure from the EU have ebbed; a soft, rather than hard, exit appears to be gaining policy ascendancy

  ? Prime Minister May unexpectedly set early parliamentary elections with the hope of strengthening the Conservative Party's majority; instead Conservatives lost seats, Labour gained and the Scottish National Party lost seats to both Conservatives and Labour; Conservatives formed a minority government, but the likelihood of a "Hard Brexit" has been reduced and the possibility of a referendum and Scottish vote to leave the U.K. has ended, at least for the time being

  - Expected 2017 GDP growth has been marked up to 1.5%; however, given the U.K.'s impending exit from the European Union, growth is expected to decelerate in future years

  - GS's CAI was 2.3% in both November and December well above potential of 1.3%

- ***China's GDP growth*** is expected to be 6.6% but risks are to the downside.

  - The official 2017 GDP growth target has been cut to 6.5% from 7.0% set in 2016; 2017 GDP growth is tracking 6.8% (B of A and GS)

  - Growth momentum has been strong but some slowing is expected; however, downside risks of a sharp deterioration in growth are limited

  + GS's current activity indicator was 6.7% in November, exactly equal to potential; it was 6.5% in October and 7.0% in September

  ? The yuan was down against the dollar early this year, but it has strengthened in recent months; foreign reserves have stopped dropping and remain near a hefty total of $3 trillion

- ***China's leadership*** will continue to be slow in implementing **economic reforms** but financial and political stability will be maintained.

  + The 19th Communist Party Congress met in late October; President Xi received a second term; Xi set a policy course that strengthens political stability and probably diminishes the potential for financial instability

  ? Policy initiatives over the next several years will deemphasize economic growth and elevate the importance of initiatives that provide a "better life" for the Chinese people; economic reforms will occur but will be managed to assure social and political stability

- ***Japan***'s economic policies will continue to fall short of achieving the 2.0% inflation target; inflation is expected to rise from 0.2% in 2016 to 1.2% in 2017. GDP growth will also continue to fall short of the policy target, but is expected to rise from 1.0% in 2016 to 1.5% in 2017. Population decline and slow implementation of market reforms will continue to weigh heavily on both growth and inflation.

  - Total inflation is expected to be 0.5%, and core inflation is expected to be 0.5%; however, GS's Japan inflation tracker is 1.0%, implying upside pressure on inflation may be building

  ? Unemployment is 2.8% compared to NAIRU of 3.6%; in 1992 and 2007 when the employment gap was this large, inflation rose to more than 2.0%

  - GDP growth has been marked up to 1.8% by B of A and GS

  - GS's current activity indicator was a strong 3.0% in October, 4.4% in November and 3.2% in December, well above Japan's full potential level of 1.0%

  - Japan's economy is operating above full potential but the strong positive momentum appears to be solid and should continue for several more quarters

  ? Japan's stock market rose to its highest level since 1996 as company earnings continue to power ahead; profit margins were 6.2% in the second quarter compared to a 60-year average of 2.9%

  ? Prime Minister Shinzo Abe recently called for early parliamentary elections; voters returned his party and coalition partner to power with a super-majority of 313 of 465 seats, which will ensure Abe remains in power for several more years

  ? Abe plans to deploy increased revenue from higher consumption taxes into fiscal spending measures including education; he also plans to reform Japan's constitution

  ? Shortages of labor are helping Japan lead robotic innovation

  ? Monetary policy is likely to remain highly stimulative for a long-time to come

- ***India*** should continue to experience relatively strong real GDP growth in a range of to 7.0% to 8.0% in 2017.

  ? State elections early in the year resulted in a major victory for Prime Minister Modi's Janata Party, which will increase Modi's ability to pursue his reform agenda; most are optimistic that India will be able to sustain high GDP growth for a number of years, however and surprisingly, growth has slowed considerably so far this year

  - GDP growth is on track to reach 6.2% to 6.7% in 2017 and was a disappointing 5.7% in Q2, but is expected to accelerate to 7.2 to 7.6% in 2018

  + GS's current activity indicator rose sharply early in the year and peaked at nearly 12.0% in May and June but then fell to 5.0%, but rebounded to 9.8% in November, which was well above the full potential level of 7.1%

- ***Emerging*** **market countries** should experience better growth in 2017 than in 2015 and 2016 when falling prices for commodities depressed economic activity in many countries. Growth is

expected to improve from 2.6% in 2016 to 3.5% in 2017. However, a major downside risk is a strong dollar, particularly for emerging economies that have large amounts of dollar-denominated debt.

+ Growth is accelerating in tandem with accelerating growth in developed economies; the dollar's decline in value has helped growth accelerate

+ GS's current activity index for emerging markets countries has trended higher during 2017: it was 4.3% in January, 4.7% in February, 5.5% in March, 5.6% in April, 6.1% in May, 5.4% in July, 5.7% in August, 5.9% in September, 6.1% in October, and 6.5% in November

+ GDP growth is expected to be 5.1% in 2017 and 5.5% in 2018

- ***Brazil, Russia, and Venezuela, in particular***, will continue to struggle with the consequences of the steep decline in the prices of commodities and particularly in the price of oil.

  + Expected 2017 GDP growth for Brazil is 1.0% to 1.1%; GS's current activity indicator has been positive so far in 2017 and rose to nearly 5.0% in September and October, 4.6 in November and 4.7 in December; however, the political situation continues to be troublesome

  - Economic conditions are improving in Russia; GDP growth is expected to be 2.2% in 2017; however, GS's current activity indicator has deteriorated recently and was below 2.0% in September and October, but rose to 4.2% in November, reflecting the rise in oil prices

  + Economic and political conditions continue to deteriorate in Venezuela; bond default is approaching and vulture investors are buying bonds from traditional investors; regime change does not appear to be imminent; President Trump has voiced strong negative sentiments, but no action has been taken to strengthen economic sanctions

3. **Risks**—stated in the negative relative to the forecast (***+ risk realized***; ***- risk not realized***).

   December Assessment: No significant negative risks impacted economic activity or financial markets in 2017; a synchronous acceleration in global economic activity boosted nearly all global financial markets; developments in North Korea and Saudi Arabia pose potential risks, but have not impacted economic or market activity; synchronized acceleration in global economic growth and easy monetary policies have reduced market volatility

   - ***U.S. potential real GDP growth*** falls short or exceeds expectations; falling short is the more serious risk

     - Risk not realized; updated forecasts for actual 2017 real GDP growth are in the middle of the 2.0-2.4% forecast range

   - ***U.S. employment growth*** is slower or faster than expected; slower growth is the more serious risk

     + Through the first 11 months of 2017 employment growth has exceeded the top of the forecast range

   - ***Employment participation rate*** rises rather than remaining stable or falling modestly

     - The participation rate has been relatively stable, rising from 62.67% to 62.72%

   - ***U.S. hourly wage rate growth*** falls from its 2016 level of 2.6% or rises much more rapidly than expected; falling wage growth is the more serious risk

     - Risk not realized; hourly wage rate growth was 2.60% for all employees in November

   - ***U.S. Unemployment rate*** rises

     - Risk not realized, the rate has fallen more than expected

   - ***U.S. productivity*** remains below 1%

+ Q3 2016 to Q3 2017 productivity increased 1.3%; the 12-quarter moving average was 1.2%; the full year productivity increase is on track to be approximately 1.3% (12-quarter moving average)

- ***Real U.S. consumer income and spending*** increase less or more than expected; less than expected increases are the more serious risks

  - Consumer income has risen within the expected range

  + Consumer spending growth is above the upper end of the expected range

- ***U.S. stock prices*** fall more than or rise more than the expected range of -10% to +5%

  + Growth in stock prices is well above the upper end of the expected range

- ***Growth in U.S. residential housing investment and housing starts*** are less than or more than expected; below expectations is the more serious risk

  + Housing investment growth is on track to be less than expected

  - Housing starts are likely to be at the low end of the expected range

- ***U.S. residential housing price increases*** are less than expected

  - Housing prices are rising more than expected and are overvalued by more than 10% in 34% of the U.S.'s 100 largest metropolitan areas; I estimate that housing prices nationally are approximately 10% above the long-term trend level

- ***U.S. private business investment*** does not improve as much as or more than expected; falling short of expectations is the more serious risk

  + Business investment is likely to be above the top end of the forecast range by yearend

- ***U.S. manufacturing growth*** contracts or expands more than expected; contraction is the more serious risk

  - Manufacturing surveys are strong

- ***U.S. trade deficit*** does not widen as expected

  - Trade deficit has edged up slightly

- ***Value of the dollar*** rises substantially and triggers a global dollar squeeze

  - Risk not realized, the dollar has declined in value so far in 2017

- ***Oil prices*** rise above or fall below the expected range

  + Prices are above the top end of the forecast range in response to tighter inventories, stronger global growth and political developments in Saudi Arabia

- ***U.S. monetary policy*** tightens more than 75 basis points, spawns financial market uncertainty and contributes to global financial instability

  - The FOMC increased the federal funds rate 75 basis points

- ***Financial conditions*** tighten and cause financial market volatility

  - Risk not realized, financial conditions eased in 2017 and are supportive of slightly greater real GDP growth

- ***U.S. inflation*** falls or rises more than expected

  + Inflation is weaker than expected and is on a course to be lower than 2016's inflation rate

- ***U.S. interest rates*** fall or rise more than expected

  - Risk not realized; long-term rates have changed very little since the beginning of the year rather than rising slightly, as expected

  ? In a potentially worrisome development, the yield curve slope, as measured by the 10-year—2-year Treasury yield spread, has tightened from 125 basis points at the beginning of the year to 56 basis points in December

- ***U.S. fiscal policy*** is more expansionary than expected

  - Risk not realized; tax reform was signed just prior to Christmas; however, any impact will not occur until 2018

  - Infrastructure stimulus did not occur

- ***Federal budget deficit*** increases more than expected

  - Risk not realized; the final fiscal year 2017 deficit was slightly smaller than expected

- ***U.S. state and local spending*** does not rise as fast as expected

  - Risk not realized; spending is likely to be stable in 2017

- ***Global GDP growth*** does not rise as fast as expected

  - Risk not realized; growth is accelerating and is expected to be 3.8% (B of A and GS) in 2017

- ***Global trade*** declines as the U.S. and other countries pursue protectionist policies

  - Growth in global trade is at the highest level since 2011; other than cancelling TPP, the Trump administration has taken no material actions so far to limit trade; however, NAFTA negotiations appear to be faltering

- ***European growth*** is considerably less than expected

  - Risk not realized, growth is accelerating

- ***ECB***'s quantitative easing program is not successful in raising inflation and stimulating the European economy

  - Risk not realized, Europe's GDP growth is accelerating and inflation has stabilized; inflation is expected to rise 1.5% in 2017; core inflation is expected to rise 1.0% in 2017

- ***Europe***—financial market turmoil reemerges

  - Risk not realized; the steadily improving European economy has strengthened the euro and bolstered stock prices

- ***Europe***—political instability and social unrest rises more than expected threatening survival of the Eurozone and the European Union

  - The Netherlands Party for Freedom, which has an anti-immigration platform and Euroskeptic sympathies, did not do as well as expected in the Dutch elections on March 15

  - France elected a moderate centrist, Emmanuel Macron, as president and gave him a parliamentary majority

  + Centrist parties did poorly in Germany's Bundestag elections

  + Austria's Peoples Party campaigned on limiting immigration and won a surprise parliamentary majority and formed a government with the far-right Freedom Party

  - Populism remains worrisome but the improvement in European economic growth has diminished this risk for the time being

- ***Chinese*** leaders have difficulty implementing **economic reforms**

  ? The 19th Communist Party Congress met in late October—President Xi Jinping was confirmed for a second 5-year term, but more importantly he set a new policy course for China which deemphasizes economic growth and elevates the importance of a "better life" for the Chinese people

- ***China's growth*** slows more than expected

  - Risk not likely to be realized in 2017, but a significant slowdown is likely in future years; 2017 GDP growth is likely to be 6.8%

- ***Japan***—Abenomics and monetary policy are unsuccessful in raising inflation to the 2 percent target and economic growth continues to be below expectations

  + Growth momentum is improving; GDP growth for 2017 is forecast to be 1.8%

  - The inflation goal of 2% will not be met, but core inflation has moved up to 0.5% and prospects are for a higher level in 2018, although still well short of the 2.0% target

- ***Emerging economies***—a strong dollar leads to serious difficulties especially for countries with large amounts of dollar-denominated debt.

  - Risk not realized, the dollar's value has declined

- Severe and, of course, unexpected **natural disasters** occur, which negatively impact global growth

  + Hurricane Harvey devastated Houston, the 4th largest U.S. city; this disaster along with Hurricane Irma, which wreaked severe damage in Florida, probably reduced third quarter U.S. real GDP; however, the negative impacts are likely to prove temporary as rebuilding revs up in the fourth quarter of 2017 and the first quarter of 2018

- ***New risk***—North Korea's developing nuclear strike capability and potential for pre-emptive military intervention to neutralize that capability

  + Risk is simmering after the UN passed new stiff sanctions and North Korea's leader and President Trump traded bellicose comments—"North Korea would be met with fire and fury like the world has never seen."

  + North Korea continues to escalate the situation by testing ICBM missiles, two of the latest of which overflew Japan's northern most island of Hokkaido, and detonating what it claimed was a hydrogen bomb

  + North Korea now possesses the ability to launch massive global disabling cyber attacks

- ***New risk***—Saudi Arabia's anti-corruption purges of members of the royal family and prominent businessmen by crown prince Mohammad bin Salman and heightened tensions with Iran could elevate political turbulence in the Middle East and threaten higher oil prices

  + Oil prices (Brent crude) and the dollar's value are rising as tensions escalate

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