



The Longbrake Letter*

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July/August, 2017

I. Summer Lull

Summers are customarily a time to go on holiday, spend time with family and friends and recharge one's "batteries" in preparation for the onslaught of fall duties and obligations. Occasionally, our summers are not so serene. That was the case in 2007 and 2008. But July/August of 2017, except for the seemingly never ending drama emanating from the White House, has been very quiet. And, perhaps under the new White House head of staff, General John Kelly, and with President Trump heading off to a golfing holiday, even politics will be quiescent for a few days.

Volatility in financial markets has almost totally disappeared. Stock prices, while near all-time highs, have varied little over the past month. Bond yields, which remain near historical low levels, also have been stuck in a rut. Economic activity is grinding higher ever so slowly. Risks, which always lurk beneath the surface and which have a nasty habit of surprising markets, seem pretty bland at the moment. In previous letters, I have enumerated several "yellow flags" which well could be harbingers of worse times ahead. I will update that assessment in the September Longbrake Letter. But, for now, no financial markets crisis of any sort appears imminent. That could change when Labor Day passes and market participants put aside the mellow days of summer and take a harder look at economic and market prospects.

So, in the absence of any significant economic developments and the likelihood that economic challenges and financial markets volatility is a long ways off, this summer's July/August combined Longbrake Letter focuses on recent data reports and revisions in previously reported data.

What could change this benign environment sooner than later? The most likely culprit would be congressional gridlock at the end of September in passing a 2018 fiscal year budget resolution and raising the debt ceiling. In depth commentary on the economic, social and political outlook will resume in September.

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II. Data Revisions — Real GDP

Three significant sets of data revisions occurred in June, July and August. In June the Congressional Budget Office (**CBO**) revised its ten-year projections for selected measures of economic activity. It also revised its estimates of potential real GDP for the past several years which resulted in reducing the size of the GDP output gap. **CBO**'s projections are discussed in greater detail in the next section.

In July the Bureau of Economic Analysis (**BEA**) revised the National Income Accounts data. This is an annual exercise and results in updating and revising data for the three previous calendar years. Periodically, **BEA** will do a more comprehensive revision that stretches back more than the three most recent years. The next comprehensive data revision is scheduled for 2018.

In August, the Bureau of Labor Statistics (**BLS**) revised productivity data for the prior three years.

1. Real GDP and Components

This year's revisions to GDP and its components are compared with the unrevised data in **Table 1**.

Table 1
Revised and Unrevised Annual GDP Data for 2014, 2015 and 2016

	2014 Original	2014 Revised	2015 Original	2015 Revised	2016 Original	2016 Revised
Personal Consumption	1.95%	1.95%	2.16%	2.47%	1.86%	1.86%
Private Investment	.73%	.90%	.82%	.87%	-.26%	-.28%
Nonresidential	.76%	.86%	.27%	.30%	-.07%	-.08%
Residential	.11%	.11%	.39%	.34%	.18%	.20%
Inventories	-.14%	-.07%	.17%	.23%	-.37%	-.40%
Net Exports	-.15%	-.16%	-.71%	-.73%	-.13%	-.23%
Exports	.58%	.58%	.01%	.05%	.04%	-.04%
Imports	-.72%	-.74%	-.73%	-.78%	-.17%	-.19%
Government	-.16%	-.12%	.32%	.25%	.14%	.13%
Federal	-.19%	-.18%	.00%	-.01%	.04%	.00%
State and Local	.03%	.06%	.32%	.26%	.10%	.13%
Total	2.37%	2.57%	2.59%	2.86%	1.61%	1.48%
Final Sales	2.51%	2.64%	2.42%	2.63%	1.98%	1.88%
Private	2.67%	2.76%	2.10%	2.38%	1.84%	2.05%
Private Domestic	2.82%	2.92%	2.81%	3.11%	1.97%	2.28%

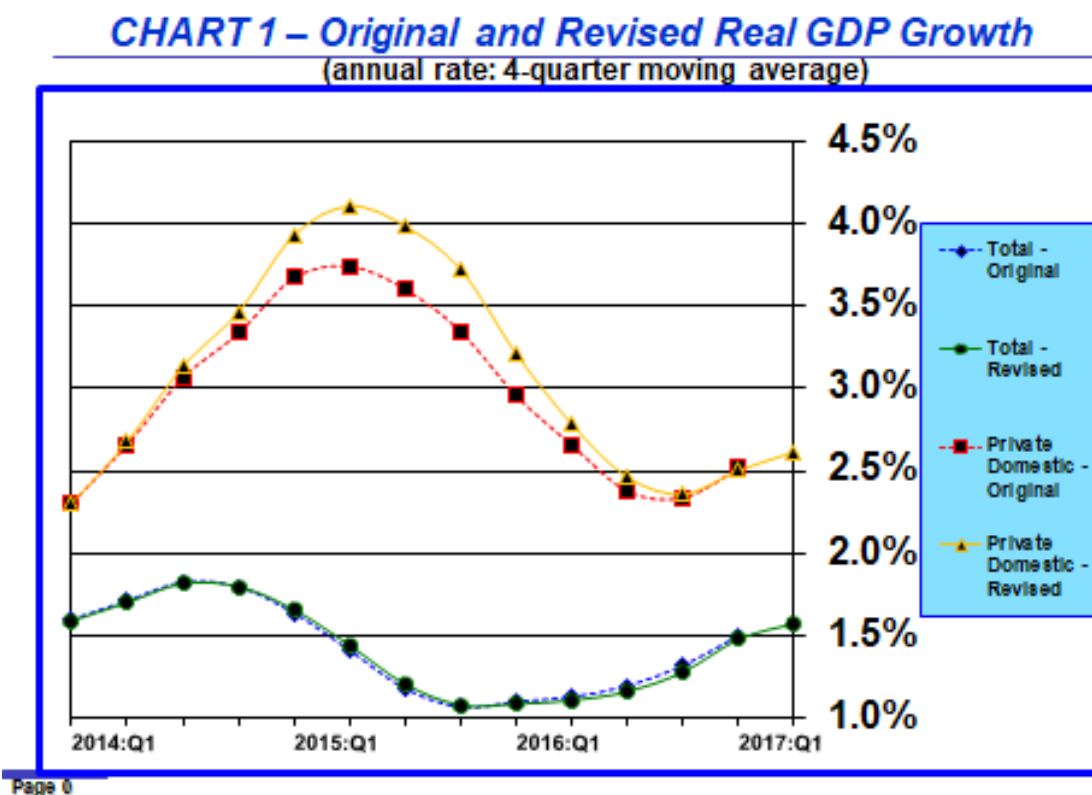
As you can see in **Table 1**, **BEA**'s revisions were generally small. Overall, the level of real GDP increased 0.23 percent in the fourth quarter of 2016 and 0.18 percent in the first quarter of 2017. **CBO**'s estimate of the output gap in the fourth quarter of 2016 decreased from 1.30 percent to 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.

Revised real “**Total GDP**” increased by 0.20 percent in 2014 and 0.27 in 2015 but declined 0.13 percent in 2016 — a total upward adjustment over the three years of approximately 34 basis points. Note that the different between this cumulative 34 basis points improvement and the fourth quarter of 2016 increase of 23 basis points has to do with the difference in measurement periods — year over year versus fourth quarter to fourth quarter.

Revised real “**Private Domestic**” GDP, which nets out inventories, government and foreign transactions, improved in each of the three years — 10 basis points in 2014, 30 basis points in 2015, and 31 basis points in 2016. The cumulative improvement of 71 basis points was much stronger than the 24 basis points improvement in “**Total GDP**.” Overall, “**Private Domestic**” GDP growth has been consistently stronger than “**Total GDP**” growth. This year’s GDP revisions strengthened this story.

When one looks at growth in “**Private Domestic**” GDP on a standalone basis, netting out the contributions to “**Total GDP**” of inventories, government and net exports, the revisions are much more dramatic as can be seen in **Chart 1**. First, notice that growth in “**Private Domestic**” GDP has been consistently much stronger than growth in “**Total GDP**.” This was especially true during 2015. Second, this year’s data revisions amplified this outperformance from the third quarter of 2014 through the third quarter of 2016. The domestic private economy is in much better shape than the topline GDP growth data would leave one to believe.



Changes in real GDP components were generally small. **Consumption** improved a cumulative 31 basis points, all of which occurred in 2015. **Investment** rose 20 basis points — **nonresidential investment** rose 12 basis points; **residential investment** declined 3 basis points; and **inventories** rose 10 basis points. **Net exports** worsened by 13 basis points, which was composed of 4 basis points deterioration in exports and 9 basis points decrease in imports — imports reduce real GDP, so a decrease improves real domestic GDP. **Government** spending decreased by 4 basis points which was entirely due to downward revisions to federal government spending. Federal government spending does not include transfer payments.

Government spending continues inexorably to shrink as a percentage of total GDP. Over the 2014-2016 period, total real GDP grew at an annual rate of 2.18 percent, while government grew at only 0.81 percent, more than all of which was due to a 1.39 percent annual rate of growth in state and local spending. Total real GDP net of government spending grew 2.48 percent annually. Of course, the argument is that if government spending had grown faster, total real GDP might actually have grown at a slower rate if government spending is less efficient in boosting productivity and growth than private sector spending. In any event, the percentage of total real GDP accounted for by government spending has declined from 32.9 percent in 1955 to 19.9 percent in 2005, 17.7 percent in 2014 and 17.3 percent in 2016. So, today, government investment spending is almost 50 percent smaller as a portion of real GDP than it was over 60 years ago.

2. Non-Farm Business Productivity

Because data revisions boosted real GDP in aggregate over 2014 to 2016, average annual productivity also rose from 0.56 percent to a still very weak 0.61 percent. The quarterly pattern of revisions is shown in **Table 2** and **Chart 2**.

Productivity was revised higher in 2014 and 2015 but lower in 2016. Productivity has improved over the first two quarters of 2017, rising at a 1.2 percent annual rate in both quarters. As a consequence, the four-quarter moving average has moved up from .00 percent in the fourth quarter of 2016 to 0.77 percent in the second quarter of 2017.

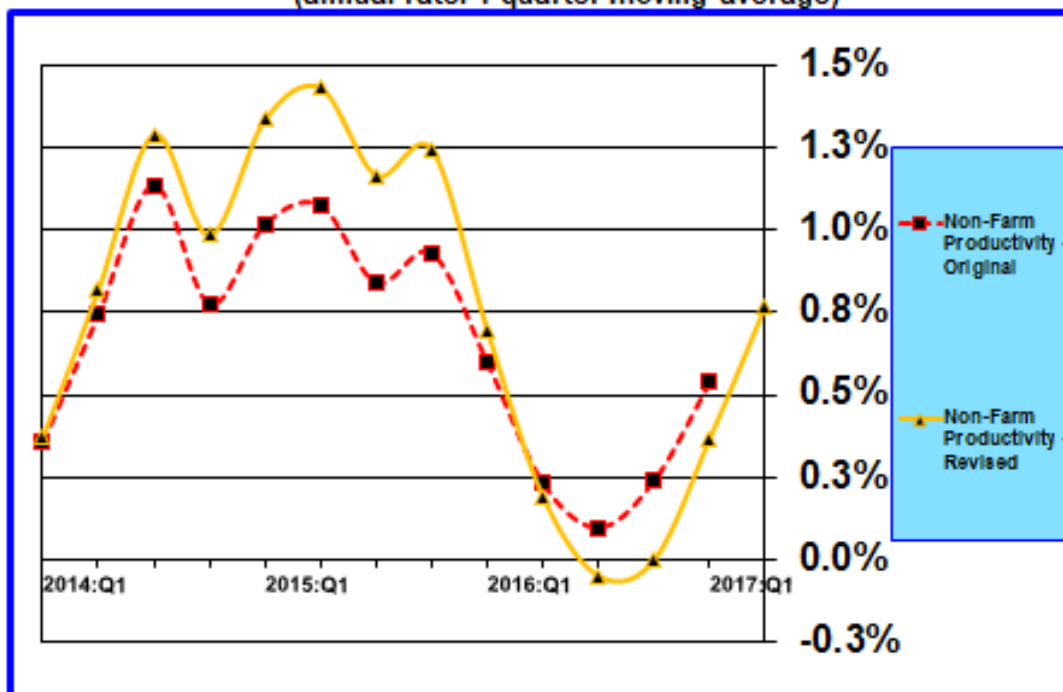
3. Inflation

Overall, revised data shown in **Table 3** and **Chart 3** indicate that both total and core PCE inflation changed very little over the 2014 to 2016 period. The impact of collapsing commodity prices and particularly the price of oil is very visible in the quarterly progression of total PCE inflation.

Revised data, while not changing the overall trend in inflation, tended to amplify cyclicity — lower lows and higher highs. The volatility of the adjustments is somewhat greater in the core PCE inflation measure than for total PCE. This might be linked to adjustments stemming from the pass through impacts of declining commodity prices.

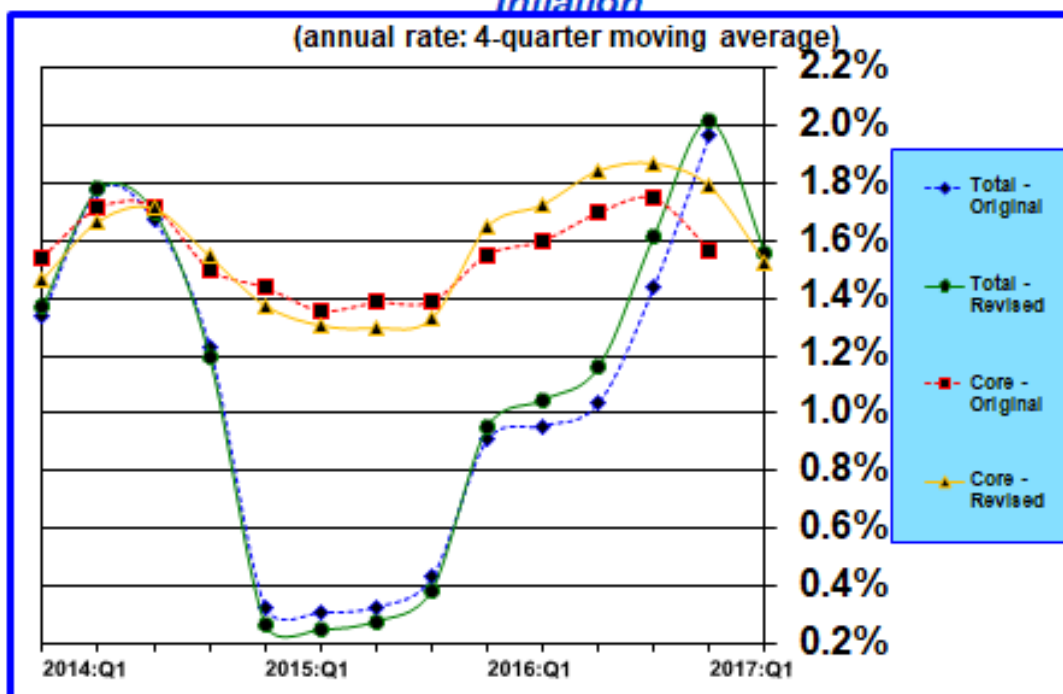
Revised data do not eliminate the recent declining trend in inflation. Indeed, the decline in core PCE inflation now appears to be more severe since it starts from a higher base in the fourth quarter of 2016. While the revised inflation data should not have much effect on the conduct of monetary policy, the higher level of core inflation during 2016 will probably be cited as evidence by hawkish sympathizers that the

CHART 2 – Original and Revised Non-Farm Productivity
(annual rate: 4-quarter moving average)



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CHART 3 – Original and Revised Total and Core PCE Inflation
(annual rate: 4-quarter moving average)



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Table 2
Revised and Unrevised Non-Farm Business Productivity Data for 2014 — 2017 (annual rate of change)

	Original: Annual Change	Original: 4-Quarter Moving Average	Revised: Annual Change	Original: 4-Quarter Moving Average
2014 Q1	.40%	.35%	.47%	.37%
2014 Q2	.98%	.74%	1.23%	.82%
2014 Q3	1.59%	1.14%	1.90%	1.29%
2014 Q4	.13%	.78%	.34%	.98%
2015 Q1	1.37%	1.02%	1.88%	1.34%
2015 Q2	1.22%	1.08%	1.61%	1.43%
2015 Q3	.65%	.84%	.84%	1.17%
2015 Q4	.50%	.93%	.66%	1.24%
2016 Q1	.04%	.60%	-.31%	.70%
2016 Q2	-.25%	.23%	-.41%	.19%
2016 Q3	.11%	.10%	-.12%	-.05%
2016 Q4	1.06%	.24%	.84%	.00%
2017 Q1	1.24%	.54%	1.17%	.37%
2017 Q2			1.19%	.77%
2014-16 Annual Average	.56%	.56%	.61%	.61%

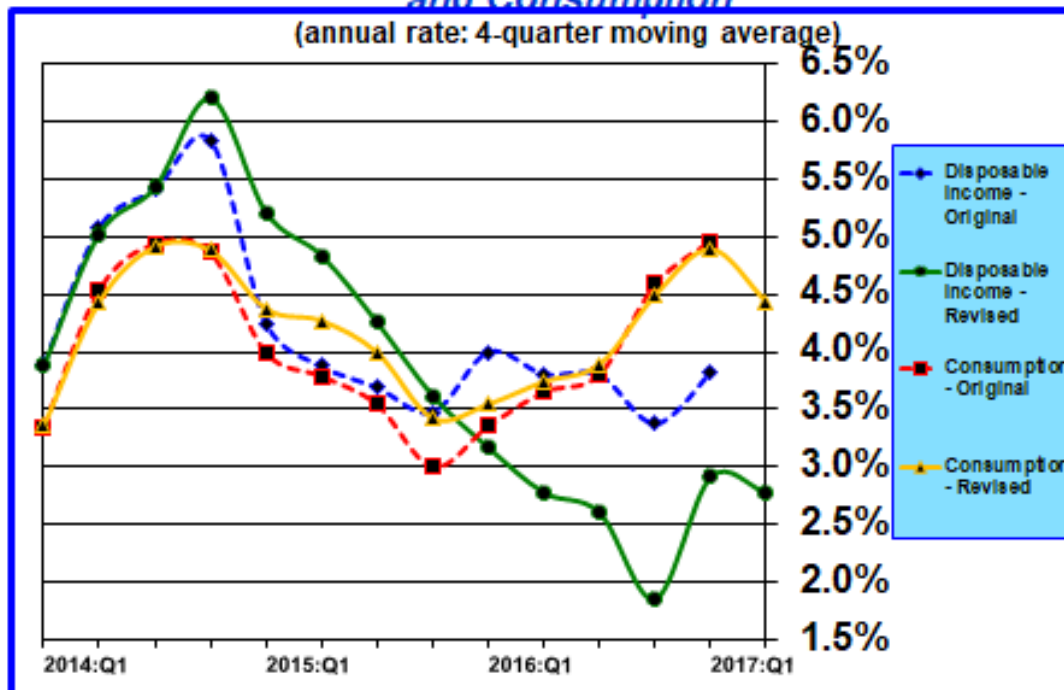
FOMC's 2 percent target is well within reach once recent temporary factors that depressed inflation in the first half of 2017 exit the year over year calculation. And, even though the first half of 2017 slowdown in inflation remains intact, the revised level of core PCE inflation is slightly more than 10 basis points higher. The market, however, did not respond by steepening the yield curve. Thus, the disagreement between the market's expectation of one to two more 25 basis point increases in the federal funds rate by the end of 2018 and the FOMC's expectation that four increases will occur remains in place.

4. Disposable Income, Consumption and Saving

Initial estimates of personal income, disposable income, consumption and saving, which is derived by subtracting consumption from disposable income, are notoriously unreliable. While the adjustments were modest over the first three quarters of 2014, thereafter the adjustments were substantial. As can be seen in **Table 4**, **Chart 4** (disposable income and consumption) and **Chart 5** (saving rate), revisions to percentage growth rates and the saving rate were substantial in all recent quarters beginning with the fourth quarter of 2014.

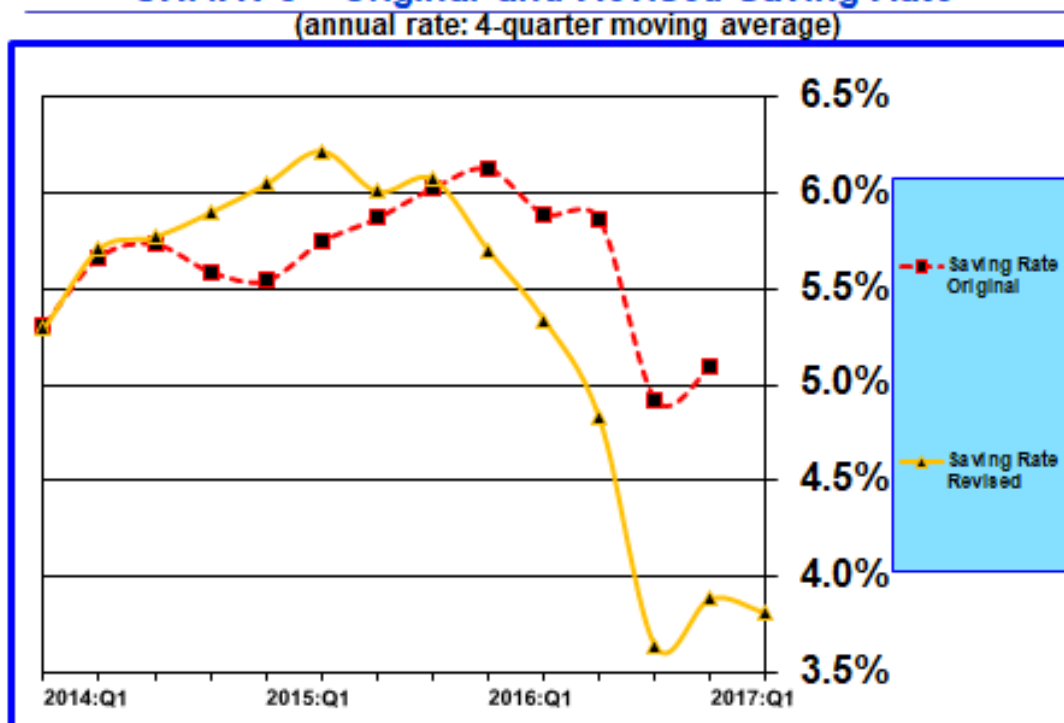
Disposable income growth accelerated from the fourth quarter of 2014 to the fourth quarter of 2015

**CHART 4 – Original and Revised Disposable Income
and Consumption**



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CHART 5 – Original and Revised Saving Rate



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Table 3
Revised and Unrevised Quarterly PCE Inflation Data for 2014 - 2017

	Total PCE Original	Total PCE Revised	Core PCE Original	Total PCE Revised
2014 Q1	1.34%	1.37%	1.51%	1.46%
2014 Q2	1.78%	1.78%	1.55%	1.67%
2014 Q3	1.67%	1.70%	1.74%	1.71%
2014 Q4	1.23%	1.20%	1.69%	1.54%
2015 Q1	.33%	.27%	1.49%	1.37%
2015 Q2	.31%	.25%	1.43%	1.30%
2015 Q3	.33%	.28%	1.34%	1.30%
2015 Q4	.43%	.39%	1.36%	1.33%
2016 Q1	.91%	.95%	1.46%	1.65%
2016 Q2	.96%	1.05%	1.60%	1.72%
2016 Q3	1.04%	1.16%	1.63%	1.84%
2016 Q4	1.44%	1.62%	1.73%	1.87%
2017 Q1	1.96%	2.01%	1.73%	1.79%
2017 Q2		1.56%		1.52%
2014-16 Annual Average	1.02%	1.01%	1.54%	1.54%

but then plummeted in 2016. The deteriorating trend continued in the first two quarter of 2017. Over the three-year period, the average annual rate of growth in disposable income declined by 35 basis points.

Revisions to consumption were in the opposite direction showing stronger consumption growth than originally reported. Over the three-year period, revised consumption spending growth increased 11 basis points.

This swing of 46 basis points naturally crushed the saving rate, which declined 16 basis points from 5.69 percent to 5.53 percent. The decline from 5.70 percent in the first quarter of 2016 to 3.81 percent in the second quarter of 2017 is particularly dramatic.

Given the history of substantial revisions to initial estimates, weak saving growth over the past five quarters may well be revised away, probably from raising the estimates of disposable income. If, however, the data can be relied upon, the future implications are worrisome. Eventually consumers will bring spending growth into alignment with income growth. Such a realignment would decrease spending growth and depress real GDP growth. Because employment growth must slow in coming quarters to reflect the natural underlying growth rate of the labor force in an economy at full employment, slower consumer spending seems assured. Alternatively, consumers could maintain spending growth by borrowing. There certainly is room for this to occur because consumers' debt leverage has declined substantially since the end of the Great Recession from 128 percent of disposable income in 2008 to 103 percent in 2016. However, there are already preliminary indications of modest increases in delinquency rates for some categories of

Table 4
Revised and Unrevised Quarterly Data for the Saving Rate and Growth in Disposable Income, Consumption for 2014 - 2017

	Disposable Income Original	Disposable Income Revised	Consump- tion Original	Consump- tion Revised	Saving Rate Original	Saving Rate Revised
2014 Q1	3.89%	3.87%	3.35%	3.36%	5.31%	5.29%
2014 Q2	5.08%	5.02%	4.54%	4.43%	5.66%	5.71%
2014 Q3	5.41%	5.42%	4.94%	4.91%	5.73%	5.77%
2014 Q4	5.83%	6.20%	4.86%	4.88%	5.59%	5.90%
2015 Q1	4.25%	5.21%	3.99%	4.37%	5.54%	6.04%
2015 Q2	3.88%	4.83%	3.79%	4.27%	5.74%	6.22%
2015 Q3	3.69%	4.25%	3.54%	3.99%	5.87%	6.01%
2015 Q4	3.48%	3.62%	3.00%	3.42%	6.02%	6.07%
2016 Q1	4.00%	3.17%	3.36%	3.55%	6.12%	5.70%
2016 Q2	3.81%	2.78%	3.65%	3.74%	5.89%	5.34%
2016 Q3	3.80%	2.60%	3.80%	3.89%	5.86%	4.83%
2016 Q4	3.38%	1.85%	4.59%	4.49%	4.92%	3.64%
2017 Q1	3.82%	2.91%	4.96%	4.89%	5.10%	3.89%
2017 Q2		2.78%		4.43%		3.81%
2014-16 Average	4.22%	3.87%	4.15%	4.26%	5.69%	5.53%

consumer credit, such as credit cards and auto loans.

III. Data Revisions — Congressional Budget Office

Customarily **CBO** updates its ten-year federal budget forecast twice a year. The first revision in the calendar year occurs in either January or February and the second occurs in June, July, or August. Revisions in 2017 occurred in January and June. The January (or February) update drops the most recently completed fiscal year (2016) and adds a fiscal year (2027).

CBO bases its budget forecasts on current law and thus revisions will reflect the expected impact of any legislation enacted since **CBO's** previous update. In addition, **CBO** updates key economic assumptions that affect forecast tax revenues, spending and the size of the federal debt and interest expense on that

debt.

The difference between its projections of revenues and expenses is the annual budget deficit (once in a very great while it is a surplus). This exercise requires **CBO** to project key economic variables including population, employment, GDP, inflation, interest rates, housing prices, income, profits, productivity and several other measures.

CBO forecasts are similar to those of others, including mine, although there are some important differences because **CBO**'s projections are constrained by current law even when it is highly likely that Congress will change current law. Other forecasters are not constrained in this way and usually attempt to incorporate the impacts of expected policy changes in their projections.

1. My Econometric Model and Scenarios of the Future U.S. Economy

Before examining **CBO**'s economic June data revisions and commenting on the implications, it may be helpful to describe briefly how I construct my economic scenarios since they can serve not only as a means of making my own forecasts but can also be compared to forecasts of others.

a. Forecasting Perils

Forecasts can be made for individual economic variables or they can be derived from more complex models that attempt to measure the interaction of many variables, the flow through effects of feedbacks and time lags, and the impacts of policy interventions.

Few economists attempt to create their own complex forecasting models and instead either make estimates of economic variables based upon their experience and intuition or rely on “canned” econometric models prepared by others. There are risks to both methods. The “educated guesses” may be well conceived and reasonable, but much of the time the easier and safer approach is to make a forecast that differs little from the consensus of others.

Complex interactive models reduce the risk of overlooking linkages and feedback effects and, arguably, provide more reliable forecasts. However, models generally have two limitations. First, models have a fixed architecture. For example, the architecture of most of the commercially-available econometric models, as well as the Federal Reserve's model, is built around a DSGE — dynamic stochastic general equilibrium — architecture which assumes that over time the economy will always revert to a general equilibrium. These models did not work particularly well in foreshadowing the Great Recession — partially because they did not include non-rational behavioral phenomena and partially because they did not incorporate adequately the interaction between activity in financial markets and real economic activity.

Second, forecasting outputs of models rely upon stochastic equations of historical data relationships. Forecasting outputs will be dependable if the current structure of the economy and relationships among economic variables are similar to the historical structure and relationships upon which the model's predictive equations are based. Significant changes, such as in the structure of the economy stemming from technological innovations, societal culture influencing behavioral responses, or political governance, can change relationships among economic variables in ways that are not captured particularly well, if at all, in

stochastic equations based upon historical data. All models, including my own, suffer from the risk that the past is not a good predictor of the future.

b. Integrate Model Outputs With Logical Analysis and Critical Thinking

For these reasons I have long argued that the forecasting outputs of models need to be combined with rigorous logical analysis of current developments and trends which are often not captured well or at all in models based on historical data.

One can see the wisdom in these cautions about econometric models and reliance upon the stability of past relationships by asking why virtually the entire professional academic and policy establishment missed the dramatic slowdown in real potential GDP growth (see **Chart 5** below). Real potential GDP growth depends upon growth in total hours worked and productivity. The establishment missed significant changes in the behavior of both variables which have persisted long enough that they can no longer be dismissed as temporary cyclical casualties of the Great Recession.

c. Persistence of Lower Than Expected Growth in Total Hours Worked

Debate among academicians and policymakers about the decline in the growth rate of total hours worked is more advanced than debate about the causes in the collapse of productivity. The emerging consensus is that the “surprising” decline in the labor participation rate is not all that surprising when cultural changes and demographic trends are factored in. There is still debate, however, about whether some of the cultural changes reflect the unintended effects of government policies. A particularly salient example involves the statistical correlation between the increase in the use of opioids by prime-age males, Medicaid benefits, and the decline in the prime-age male labor force participation rate. Some argue that policy revisions could reverse this adverse trend.

In any event a consensus has emerged that total hours worked will grow about 0.5 percent annually in coming years compared to a 0.9 percent growth rate in the population. This means that there will be a steady decline in the employment participation rate. While this development has negative implications for the long-term solvency of social welfare programs, such as social security and Medicare, general agreement that this will be a persistent phenomenon dilutes the typical tendency to engage in denial and will spur two types of policy debates. First, policymakers will begin to examine how to respond to the consequences because they can no longer assume that the problem will be self-curing. Second, policymakers can explore ways to boost the employment participation rate through a variety of initiatives, such as free community college tuition and government infrastructure investment.

d. Persistence of Lower Than Expected Productivity Growth

Debate about the causes of persistent anemic productivity is at a much earlier state and denial is still a driver. There is general acknowledgement that long-term productivity improvement has moderated some, but most believe that recent weak productivity, averaging 0.6 percent over the past seven years compared to a long-term average of about 2.2 percent, is an aberration driven by short-term and temporary factors.

Thus, most models of economic activity assume that productivity will rise over the next few years to a much higher rate than has prevailed over the past seven years. This is typical of a mean-reversion mentality and assumptions embedded in standard econometric models. However, the expected rebound has yet to materialize.

Persistent weak productivity now that the economy is at full employment is eroding complacency and denial and debate about the causes and future course of productivity is building. These debates, which I explore in another section of this month's letter, are still at an early stage and thus there is less of a consensus about appropriate policy responses. However, there is growing global sentiment that greater government intervention may be warranted, both through fiscal infrastructure spending and also through policy changes that stimulate greater competition and moderate regulatory constraints, particularly those that inhibit productive activity without there being a meaningful offset in quality of life impacts. The sentiment for more active government policy has also been influenced by the failure of monetary policy to lift potential economic growth rates.

Table 5 shows average productivity over past time periods, as well as projections of future productivity. Over the 50 years from 1955-2004 productivity rose 2.19 percent annually. In the 12.5 years from 2005 to 2017 productivity has risen 1.20 percent annually and only .60 percent over the past seven years. **CBO** assumes partial mean reversion to an average annual productivity gain over 2021-27 of 1.77 percent. Over the same time period I assume productivity averages 1.53 annually in my **"BASE"** scenario and 1.83 percent in my **"Strong Growth"** scenario. I have also constructed an alternative **"Low Productivity"** scenario in which productivity rises 1.38 percent annually during this period, which is still above average growth in productivity over the past 12.5 years.

Table 5
Historical Average Productivity and Forecasts — CBO, "BASE," "Strong Employment," and "Low Productivity"

	1955-2004	2005-2017	1955-2017	2021-2027	2017-2020
Actual	2.19	1.24	2.00		
CBO				1.77	1.56
BASE				1.53	1.29
Strong Employment				1.83	1.51
Low Productivity				1.38	1.27

e. Bill's Approach to Econometric Modeling

Like other econometric models, I construct predictive equations for key economic variables based on logical relationships with other available data measures and estimate the parameters of these equations based upon historical data. So, in that regard, my modeling is subject to the same historical structural rigidity risks as are inherent in other econometric models. I do adjust for historical structural shifts. This limits the likelihood that forecasts are flat out wrong right out of the box, but does not accommodate the possibility of future structural shifts or those that might be underway but are too recent to be visible in the data. This is why logical analysis of current developments is important. It is always appropriate to raise the question of whether economic relationships are shifting and what potential impact such shifts might have on model forecasts. Thus, it is always important to consider the viewpoints and analytical justifications

offered by others, even when they might be considered to be far-fetched.

In addition to the risk of structural changes in the relationships among economic variables, there is ever present the potential that the historical equations do not properly define the underlying relationships. In economists' jargon, this is called "specification error." For example, it is accepted theory that employment influences inflation. When unemployment is low, labor becomes scarce, labor's wage bargaining power increases, wages grow more rapidly, and inflation pressure builds. Economists refer to this relationship as the "Phillips Curve." But, although there is logic in the relationship between employment and inflation, there is not set agreement as to exactly how that relationship will play out. There are timing lags, changes in labor bargaining power, shifts in the composition of the labor market and other factors which may or may not be important to include in specifying the statistical impact of employment on inflation. I have a methodology, which differs in details from the methodology of others. I do not claim that my methodology is better or best. But, I do regularly review my methodology and change it when there is additional information that I judge to be relevant.

Like others, the historical data inputs I use come from publically available data sources. However, when it comes to forecasting values for economic variables I do have choices. I can accept the forecasts of others or I can make my own, either arbitrarily based on logic and "common sense" or derive them through modeling. The only forecasts of data from others I use as model inputs come from **CBO**. These data inputs are limited to historical (not future) growth in potential real GDP, non-inflation increasing rate of unemployment (NAIRU) — both historical and future, future growth in the non-institutional population, future growth in the eligible labor force, and the annual federal budget deficit over the next ten years. I could provide arbitrary assumed values for each of these variables in my model, but have chosen to rely on **CBO's** expertise.

In addition, I provide arbitrary assumptions for several variables, which I judgmentally vary for each economic scenario. These include: payroll employment, oil prices, housing prices, stock prices, business investment growth, and government investment growth. I can choose values for anyone of these measures based on the assumptions of others. I have done this for payroll employment growth in the "**BASE**" scenario where I have replicated **CBO's** June 2017 forecast for payroll employment growth with only minor modifications. But, I hasten to add that my assumptions for payroll growth differ from **CBO's** in my other economic scenarios.

Forecast values for all other economic variables are derived from the model itself.

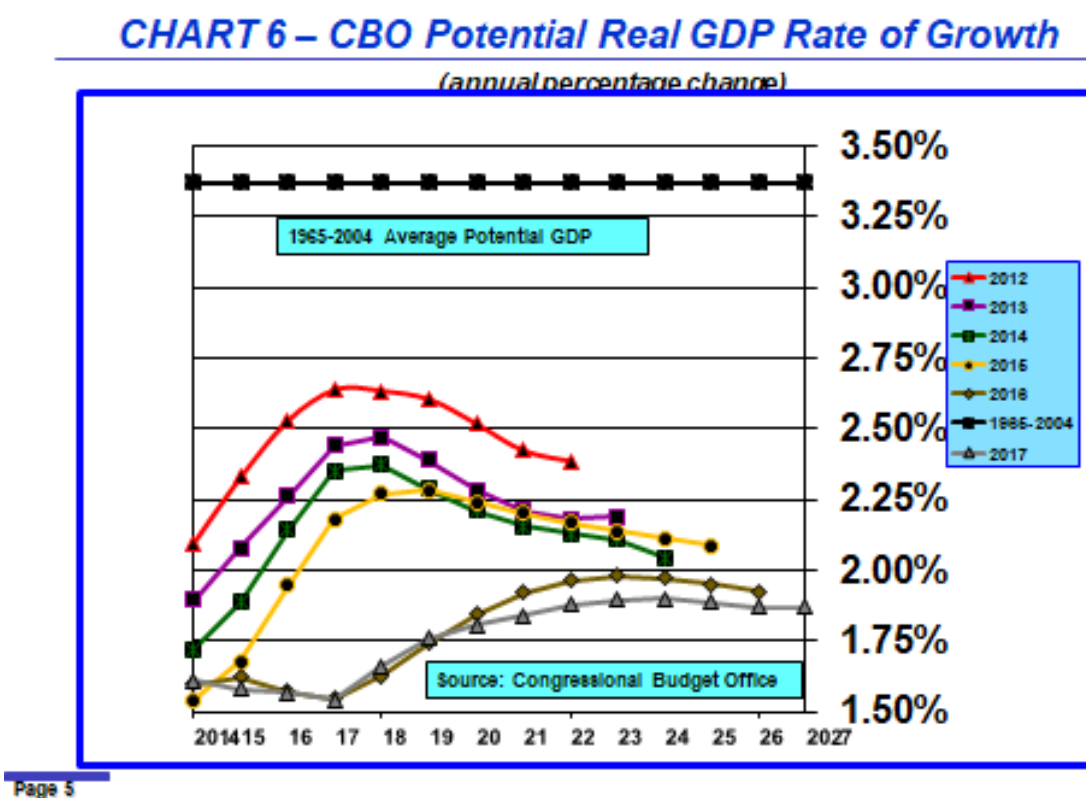
f. Summary Comment

In summary, models can be useful tools, but if their use is not accompanied by critical thinking their data inputs and outputs can be misleading. Keep these observations in mind as I summarize **CBO's** June 2017 update of its economic assumptions and forecasts. The tendency to engage in "reversion to the historical mean" is present at times as is a tendency to craft data inputs to conform to predetermined views of "what should be."

2. CBO's Potential GDP Growth and the Output Gap

In January **CBO** reduced expected 2017 real GDP growth by 0.04 percent and lowered 2018 by 0.20 percent. There was no further change in the June **CBO** revision to 2017, but 2028 was raised by .05 percent, for a net change of 0.15 percent in 2018. For the years 2019 to 2027, CBO lowered forecast real GDP growth in both the January and June revisions. This continued an ongoing trend of lowering its forecasts with each revision and acknowledges the reality that weak growth is likely to continue.

More importantly, as can be seen in **Chart 6**, **CBO** once again reduced potential real GDP growth slightly in the long run in both its January and June revisions. This year's downward adjustments, however, were relatively minor.

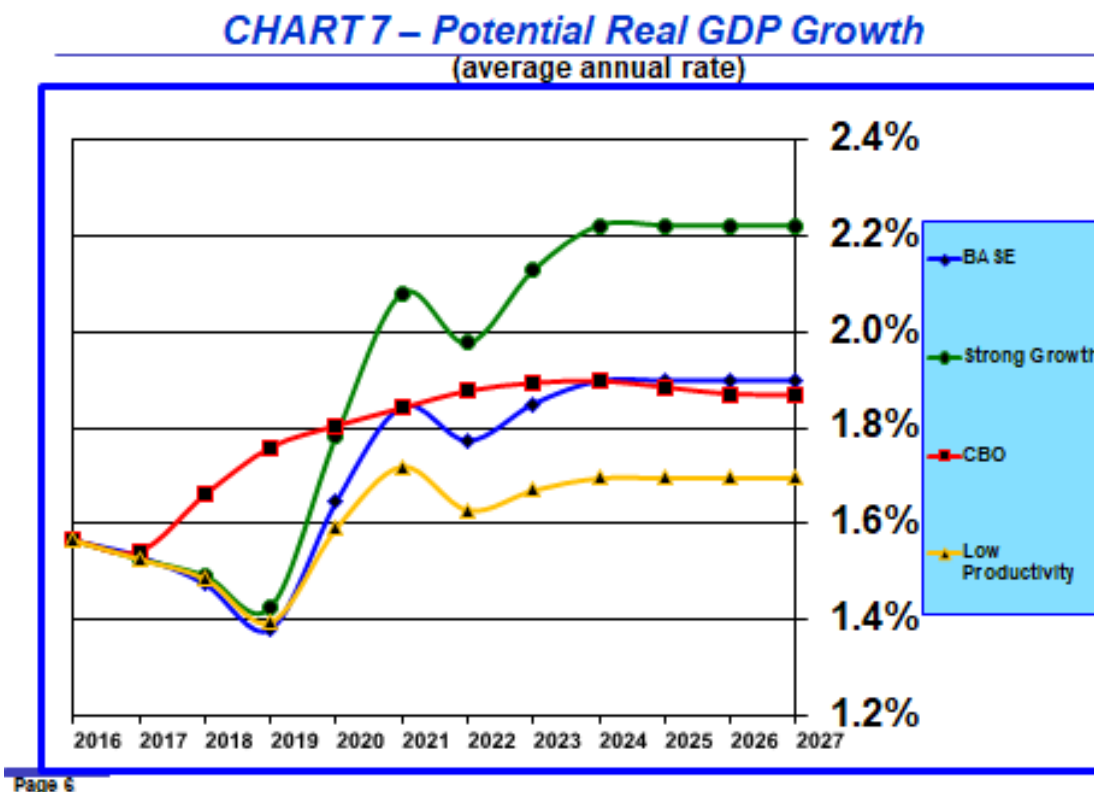


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x I calculate potential real GDP growth by combining assumptions about potential growth in total hours worked and productivity. **Chart 7** compares my potential GDP growth projections for my “**BASE**”, “**Strong Growth**”, and “**Low Productivity**” scenarios with **CBO**’s June 2017 projections.

Notice that my “**BASE**” potential real GDP is very similar to **CBO**’s. That is because my assumptions about growth in total hours worked and productivity are virtually the same as **CBO**’s during this time period.

My somewhat lower projection of potential real GDP growth over the next two years is due to my less optimistic assumptions about productivity growth that flow directly from recent experience. Unlike **CBO**, I am not optimistic that productivity will bounce back quite as quickly. Productivity assumptions



are shown in **Chart 8**.

CBO revises its estimates of potential real GDP retroactively as well. This means that the historical output gap, defined as the difference between potential and actual real GDP, can change. **Chart 9** shows **CBO**'s calculated output gap for the past few years as well as my estimates for the “**BASE**” and “**Strong Growth**” scenarios.

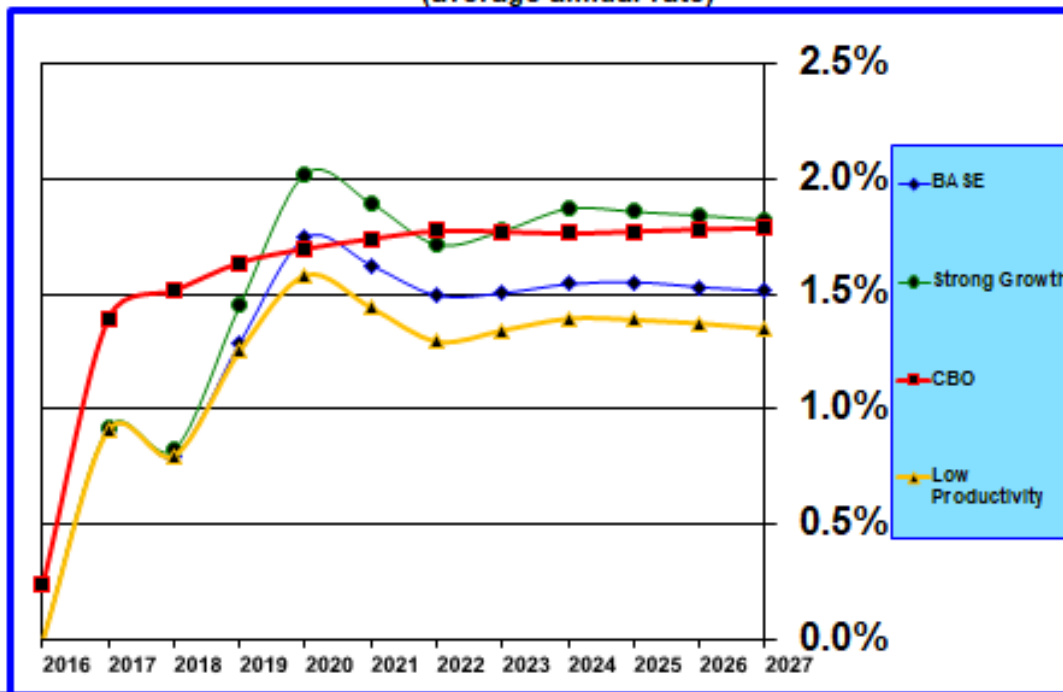
3. CBO's Real GDP Forecasts

Table 6 and **Chart 10** show real GDP growth forecasts for the next several years. Based upon its June 2017 revisions, **CBO**'s real GDP forecasts are similar to those of others, including my “**BASE**” scenario.

CBO's June 2017 estimate of the 2013 output gap is now 2.21 percent, but in 2012 its estimate of the 2013 output gap was 6.04 percent. Almost all of the decrease in the size of the 2013 output gap has been caused by **CBO**'s retroactive reduction in potential real GDP for 2013. I do not attempt to estimate the current output gap, preferring instead to accept **CBO**'s measure of the current output gap. I also accept **CBO**'s retroactive adjustments. The divergence between my measures of the output gap and **CBO**'s measure only occurs in future years and depends on my model's forecasts for actual and potential real GDP. My higher projected output gap results from lower estimates of potential real GDP, as shown in **Chart 7**, but also from even smaller increases in actual real GDP, as shown in **Chart 10** and **Table 6**.

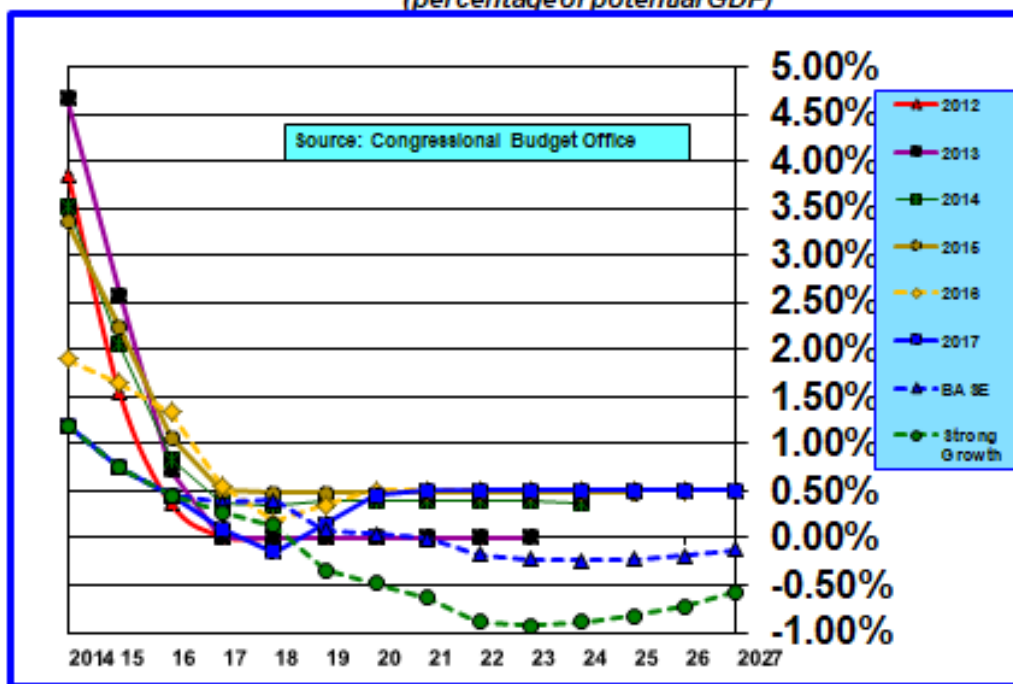
Notice that my projections for real GDP in my “**BASE**” scenario track **CBO**'s closely for 2021-

CHART 8 – Productivity
(average annual rate)



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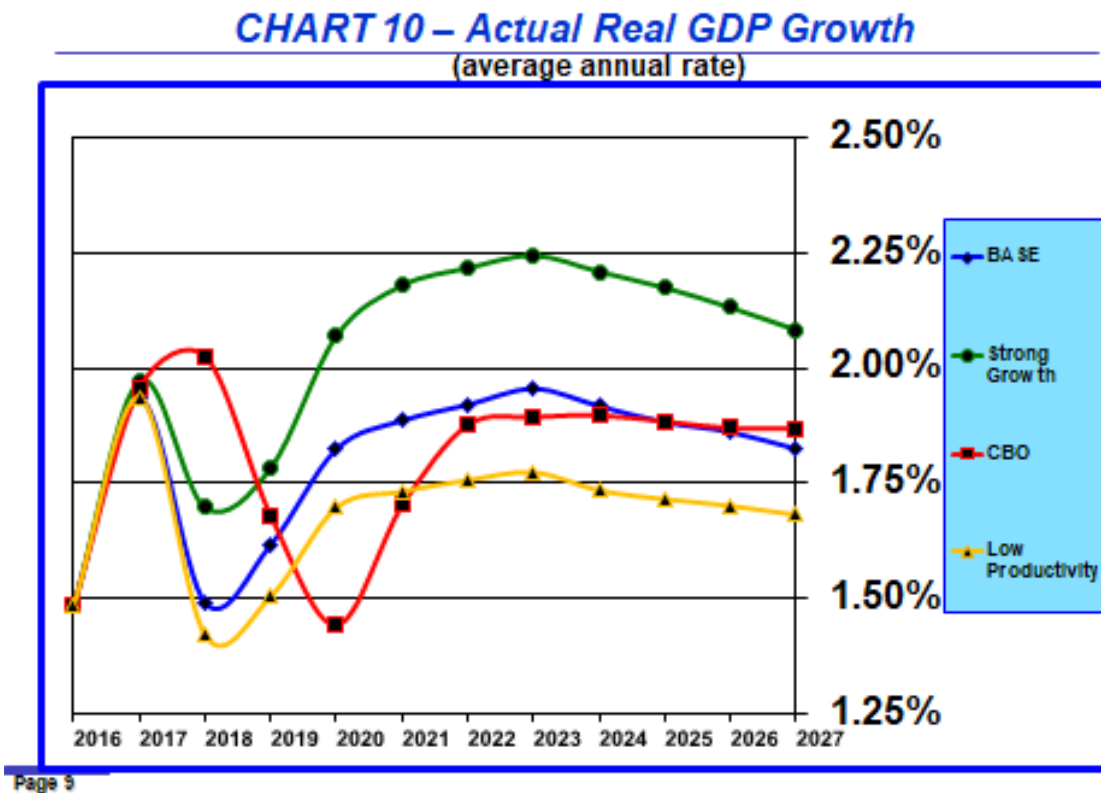
CHART 9 – Output Gap – CBO, BASE, Strong Growth
(percentage of potential GDP)



Page 8

Table 6
Actual Real GDP Growth Rate Forecasts

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
CBO	1.96	2.03	1.68	1.44	1.70	1.88	1.89	1.90	1.88	1.87	1.87
B of A	2.04	2.11	2.09	1.80	1.69	1.69	1.69	1.69	1.69	1.69	1.69
GS	2.05	2.21	1.80	1.56	1.75	1.75	1.75	1.75	1.75	1.75	1.75
Fed High (Q4/Q4)	2.20	2.20	2.00							Long	2.00
Fed Low (Q4/Q4)	2.10	1.80	1.80							Term	1.80
BASE	1.93	1.49	1.62	1.82	1.89	1.92	1.96	1.92	1.88	1.86	1.83
Strong Growth	1.94	1.69	1.79	2.07	2.18	2.22	2.26	2.27	2.23	2.15	2.09
Recession-Stagnation	1.69	0.43	2.40	2.18	1.71	1.92	1.95	1.88	1.87	1.84	1.79
Low Productivity	1.90	1.41	1.51	1.70	1.73	1.76	1.79	1.79	1.77	1.73	1.71

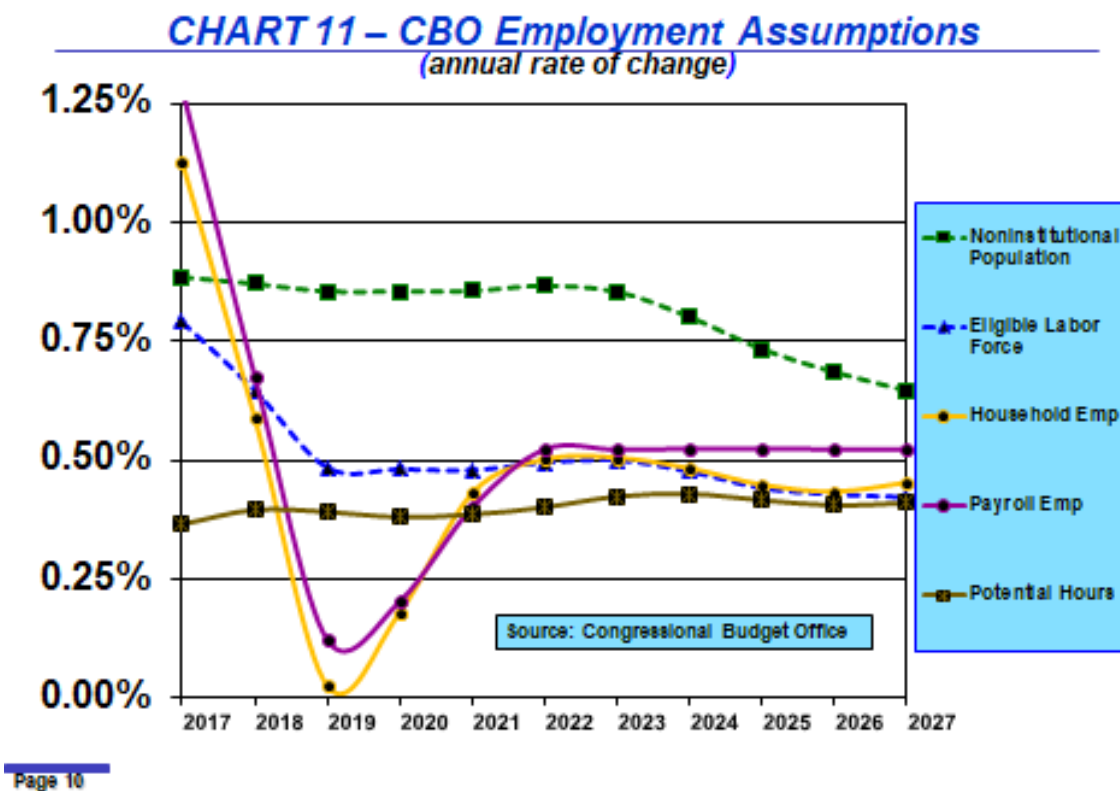


2027, but differ somewhat from 2017 to 2020. These near-term differences are rooted in **CBO**'s somewhat unusual employment growth assumptions, which I incorporate only partially in my analysis of the "**BASE**" scenario. In addition, as can be seen in **Chart 10**, I assume a slower rebound in productivity in the near term. While **CBO** indicates that its higher productivity assumption is based on potential, it appears to have used its estimate of potential productivity in calculating its forecast of actual real GDP in 2017 and 2018. My somewhat higher employment growth assumptions for 2018-2020, and my lower productivity growth over the same period are partially offsetting, but the net result is below market consensus estimates of real GDP growth in both 2018 and 2019, as can be seen in **Table 6**.

4. CBO's Employment Assumptions

Some of **CBO's** estimates of employment growth in its August 2016 update, specifically household and payroll employment, didn't make a whole lot of sense. Payroll employment growth plunged to nearly zero before rebounding. This pattern appeared to be contrived to force a return to a long-term stable real GDP output gap of 0.5 percent (see **Chart 9**) from a slightly positive output gap at the end of 2018. This anomaly was partially eliminated in the January 2017 data revision, but reappeared in the June 2017 revision.

This oddity in **CBO's** employment assumptions is clearly visible in **Chart 11**. Growth rates for the non-institutional population and the eligible labor force trend downward very gradually, reflecting embedded demographic trends. One would expect the same gradual downward trend to prevail for actual household and payroll employment growth. But this would mean that the forecast unemployment rate, which is already below the natural rate (NAIRU — non-accelerating inflation rate of unemployment) and that gap is expected to widen in coming months, would have to remain well below the natural rate for an extended period of time. But, accepting this would be inconsistent with **CBO's** estimates of the natural rate of unemployment. **CBO** solves this dilemma by forcing employment growth to near zero until its target 0.5 percent output gap is reattained. This occurs by the end of 2021. Thereafter, **CBO's** assumptions for the four measures of employment growth move in sync.



There are other interesting observations about the data in **Chart 11** and **Table 7**. Annual growth in all employment measures converges to approximately 0.4 to 0.5 percent after 2020. Growth in the non-institutional population is the outlier. In a stable employment environment, this measure should be

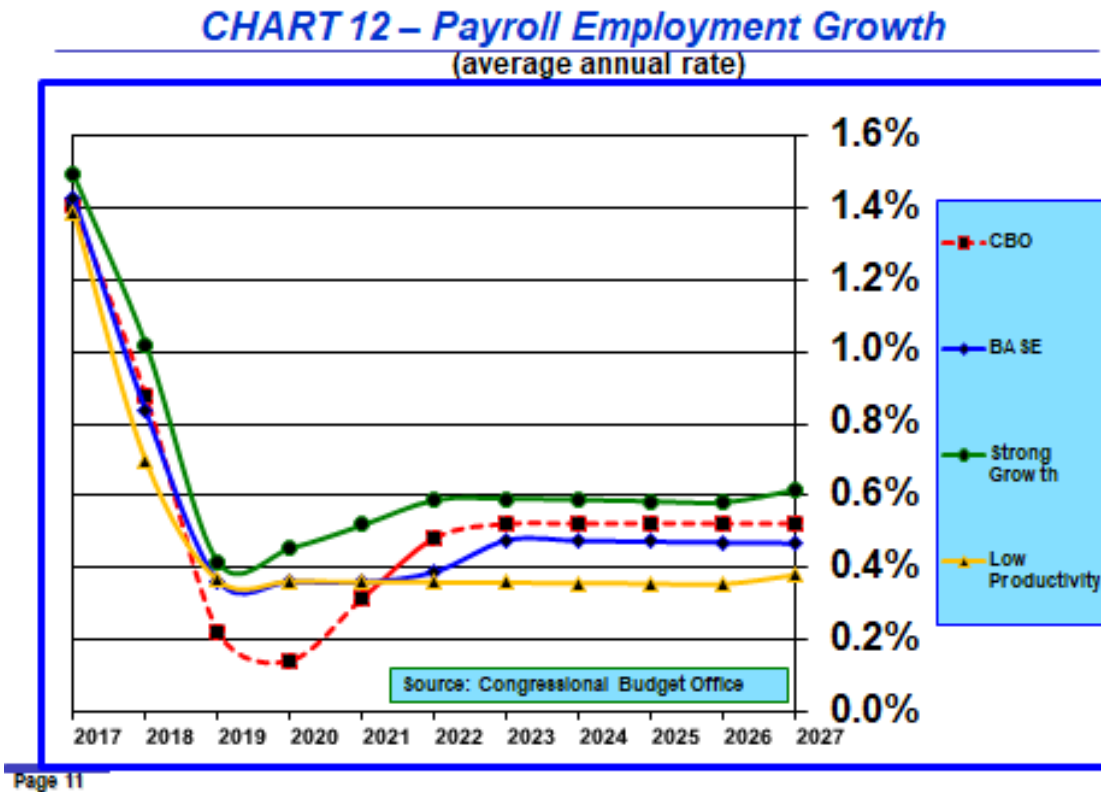
growing at the same rate as the others. The fact that it is not means that participation in the labor force is assumed to decline over time. This is primarily the consequence of an aging population. CBO assumes a participation rate of 62.90 percent at the end of 2017. It falls to 61.09 percent by the end of 2026, which amounts to 20 basis points annually or about 320,000 fewer workers annually than would be expected if the participation rate remained constant.

Table 7
Comparison of CBO August 2016, January 2017 and June 2017 Assumptions for Various Measures of Employment

		August 2016	January 2017	Pct. Change	June 2017	Pct. Change
Non-institutional Population Growth	2021-26	0.914%	0.807%	-.107%	0.812%	-.102%
Eligible Labor Force Growth	2021-26	0.535%	0.470%	-.065%	0.475%	-.060%
Household Employment Growth	2021-26	0.542%	0.475%	-.067%	0.460%	-.082%
Payroll Employment Growth	2021-26	0.518%	0.504%	-.014%	0.482%	-.036%
Potential Hours Worked Growth	2021-26	0.488%	0.488%	.000%	0.410%	-.078%
Participation Rate	2017:Q4	62.55%	62.82%	.27%	62.90%	.35%
Participation Rate	2026:Q4	60.10%	61.09%	.99%	61.09%	.99%
Non-institutional Population (000)	2017:Q4	256,940	256,552	-.15%	255,938	-.39%
Non-institutional Population (000)	2026:Q4	279,173	276,232	-1.05%	275,678	-1.25%
Eligible Labor Force (000)	2017:Q4	160,179	161,169	.62%	160,985	.50%
Eligible Labor Force (000)	2026:Q4	167,778	168,746	.58%	168,409	.38%
Household Employment (000)	2017:Q4	153,537	153,894	.23%	154,093	.36%
Household Employment (000)	2026:Q4	159,507	160,427	.58%	160,109	.38%
Payroll Employment (000)	2017:Q4	146,448	146,801	.24%	147,205	.52%
Payroll Employment (000)	2026:Q4	151,982	153,375	.92%	153,398	.93%

As I mentioned above, I rely on some of **CBO's** assumptions to provide the basic economic inputs for my statistical work. Key among them are data about growth in the non-institutional population and the eligible labor force. I do not use **CBO's** household or payroll employment survey data as basic inputs because these are variables I choose to test in scenario analysis. I do, however, structure my payroll employment projections in my “**BASE**” scenario to end up at the same level by the end of 2027 that **CBO** forecasts. As can be seen in **Chart 12**, I moderate CBO's near-term anomalous decline in payroll growth in my “**BASE**” scenario, but not entirely. Employment growth in my other scenarios is also pulled down a little from 2019 to 2021. Then, I derive estimates of household employment and the unemployment rate from the payroll data. Payroll and household employment are tightly correlated over time.

In the next three years, according to assumptions published by **CBO** in June 2017, growth in payroll employment is projected to fall to 12,000 monthly during the first quarter of 2020 from 2016's actual monthly average of 186,667. **CBO** then assumes that monthly payroll growth accelerates to about 65,000 by 2022 and remains at that level for the remainder of the forecast period. Long-term monthly employment



growth would average about 90,000, if the participation rate remained constant.

Table 7 compares **CBO**'s August 2016, January 2017 and June 2017 assumptions for various measures of employment.

The revised average growth rates over 2021-2026 have slowed by a few basis points for all five employment measures. Growth rates fell less for the eligible labor force and household employment than for the non-institutional population because of the increase in the assumed participation rate. The growth rate in payroll employment fell even less for the same reason but also because **CBO** marked up the starting value to reflect recent strong payroll employment growth.

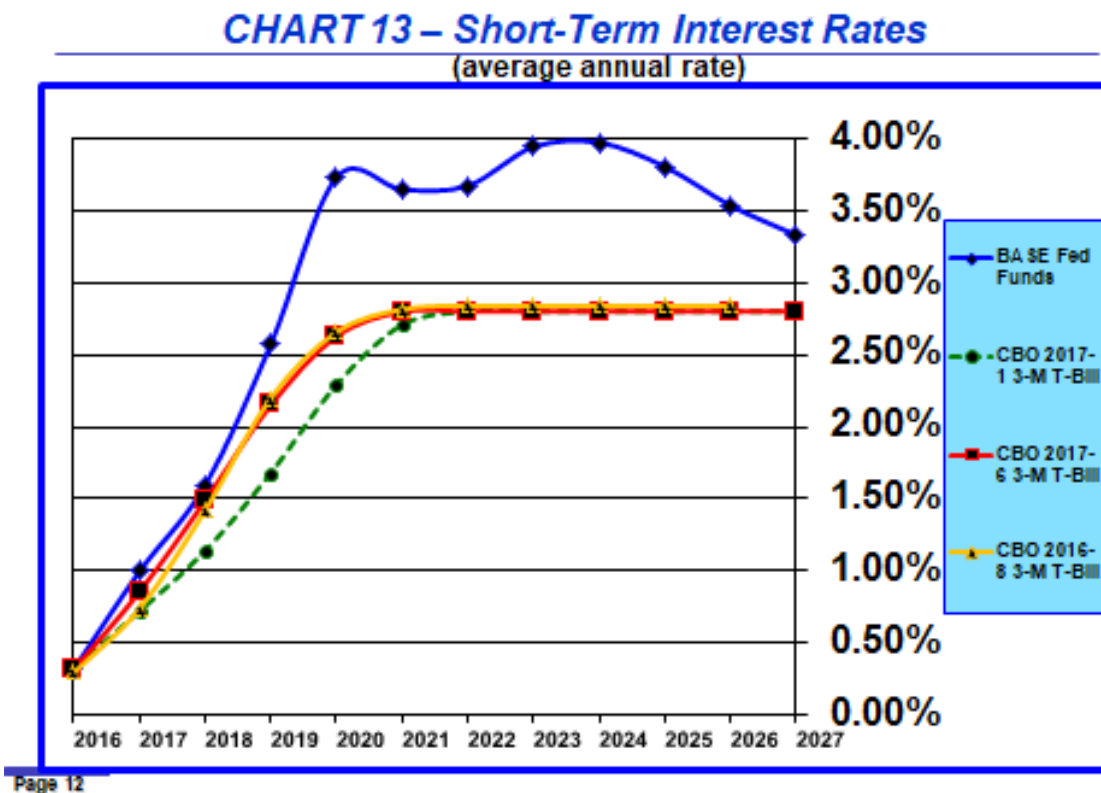
Compared to its August 2016 estimate, **CBO** in its June 2017 revision raised its assumed labor force participation rate by 35 basis points in 2017 and by 100 basis points in the longer run, which more than reversed the cut of 50 basis points in the longer run participation rate that occurred in its August 2016 update.

The annual growth in the non-institutional population is now expected to be just 0.81 percent in the long run compared to 0.91 percent in the August 2016 update. This means the population is now expected to grow 3.5 million fewer people over the next ten years. However, the eligible labor force is expected to increase by about 0.6 million due to higher expected participation. Household employment increases by a similar amount.

5. CBO's Interest-Rate Projections

CBO projects interest rates for the 3-month Treasury bill and the 10-year Treasury note for the next ten years as part of its estimation of the amount of interest payable on accumulated U.S. government debt. It updates its interest-rate assumptions along with other data revisions.

Chart 13 compares **CBO's** 3-month Treasury bill rate estimates for its last three data revisions — August 2016 (yellow line with black triangles), January 2017 (dashed green line with black circles) and June 2017 (red line with black squares). **CBO** had reduced short-term interest rate assumptions modestly in January 2016, particularly in 2018, 2019 and 2020, to better match market expectations at that time and acknowledge the “lower for longer” expectations that have emerged from a permanently lower neutral rate. But, it reversed this reduction in June and moved short-term rate projections back to about the same levels that prevailed in its August 2016 assumptions. This has the impact of increasing total interest paid on the debt over time and raises the amount of the accumulated public federal debt over ten years.

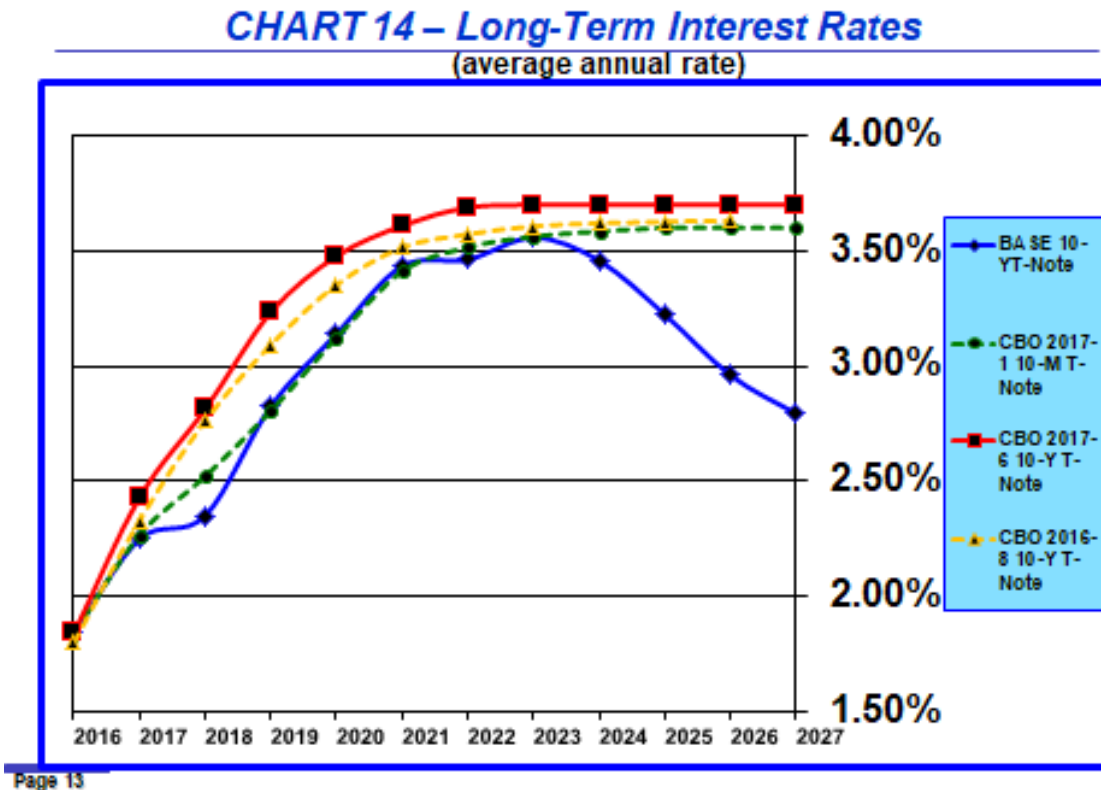


CBO now assumes that short-term interest rates will rise slowly to 1.07 percent by the end of 2017, 1.75 percent by the end of 2018, 2.38 percent by the end of 2019 and edging up further to 2.80 percent in the longer run.

My “**BASE**” scenario federal funds rate estimates are shown in **Chart 13** for comparative purposes. Historically, the federal funds rate tends to be a little higher than the 3-month Treasury bill, which accounts for part of the higher level from 2020 to 2027. But, the “**BASE**” scenario also assumes that the output gap is slightly positive during much of this time period rather than the 50 basis points negative gap assumed

by CBO. This puts upward pressure on the federal funds rate.

CBO's longer-term rate projections are shown in **Chart 14**. Again, CBO lowered its long-term rate projections from August 2016 to January 2017 and then raised them in June 2017 to approximately the same levels that prevailed in August 2016. What is most important in the long-term rate projections is CBO's estimate of the stable long-term level of the 10-year rate, which was 3.63 percent in August 2016, 3.60 percent in January 2017 and 3.70 percent in June 2017. The most recent update places further modest upside pressure on the size of the federal public debt over time.

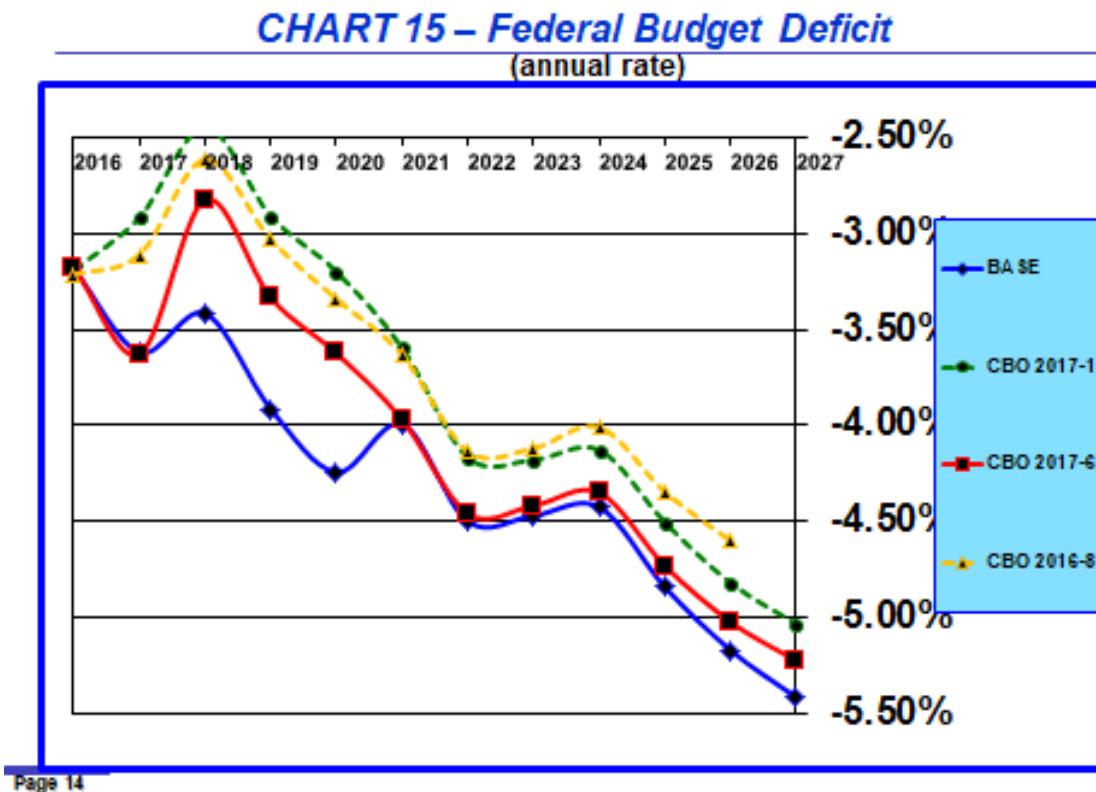


Projections of the 10-year Treasury note yield in my “**BASE**” scenario track about 50 basis points below CBO’s projections in 2018 and 2019 and never converge to CBO’s 3.70 percent long-term level. Much of the difference stems from my lower estimates of core PCE inflation in the longer run.

6. CBO’s Fiscal Projections — Annual Budget Deficit and GDP to Public Debt Ratio

Chart 15 shows CBO’s annual budget deficit projections for its last three data revisions — August 2016 (yellow line with black triangles), January 2017 (dashed green line with black circles) and June 2017 (red line with black squares).

Overall, annual budget deficits are larger in every year in the June 2017 revision. Annual budget deficits in the January 2017 revision compared to the August 2016 revision had improved from 2017 to 2020 and worsened from 2022 to 2026; however, the small amount of near-term improvement disappeared in the



June 2017 update.

My projection of the annual budget deficit in the “**BASE**” scenario hugs CBO’s June 2017 projections in the long run. Larger deficits in the near term stem from my less bullish outlook for economic growth.

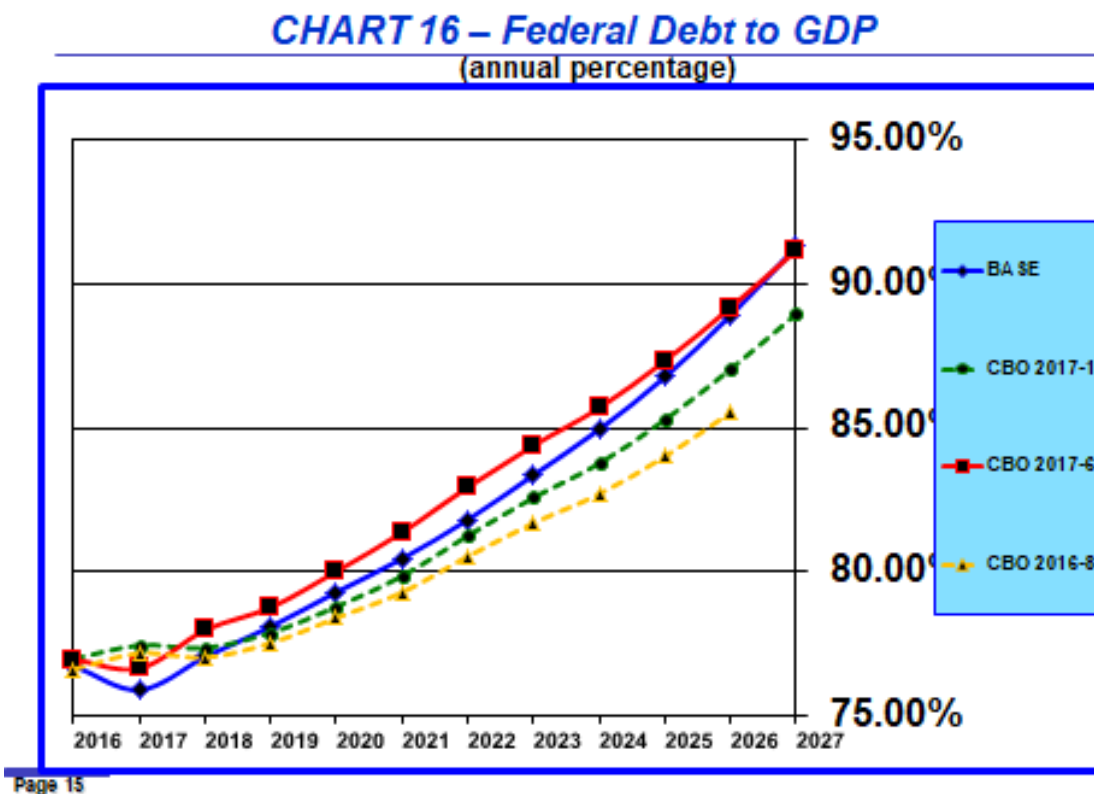
Chart 16 shows the ratio of the projected level of the accumulated federal public debt to estimated future nominal GDP. Not surprisingly given the increases in annual budget deficits, **CBO**’s projections are higher in every year. By 2026 the ratio rises from 77.0 percent for the 2016 fiscal year to 89.2 percent in the June 2017 update compared to 87.0 percent in the January 2017 update and 85.5 percent in the August 2016 revision. The trend is disquieting and worrisome.

The estimate of the federal debt to GDP ratio in my “**BASE**” scenario is not materially different from **CBO**’s June 2017 projections.

IV. Outlook for U.S. Real GDP

1. “Advance Estimate” of Second Quarter GDP

The “**Advance Estimate**” of second quarter GDP growth of 2.6 percent was about what the consensus expected.



Annual benchmarking reduced first quarter real GDP growth from 1.4 to 1.2 percent, bringing average growth for the first two quarters of 2017 to 1.9 percent.

Details of the “**Advance Estimate**” are shown in **Table 8**. The bottom four panels of **Table 8** show different measures of real GDP growth. These include the traditional “**Total GDP**” measure, and three alternatives — “**Final Sales**,” “**Private**,” and “**Private Domestic**.”

Reported quarterly “**Total GDP**” growth tends to be very volatile because of volatility in various GDP components, especially inventories, and the methodology of annualizing quarter growth rates which amplifies the impact of short-term aberrations in the growth of individual GDP components. “**Total GDP**” grew 2.57 percent in the second quarter “**Advance Estimate**” compared to 1.24 percent in the first quarter.

However, most of the difference between the first and second quarters measures of annualized real GDP growth is due to the change in inventories component. The “**Final Sales**” measure of real GDP removes the contributions of changes in inventories. “**Final Sales**” grew 2.59 percent in the second quarter “**Advance Estimate**” compared to 2.70 percent in the first quarter and 2.62 percent in the third quarter of 2016. The anomaly for this measure of real GDP occurred in the fourth quarter of 2016 when “**Final Sales**” grew only 0.70 percent. But as will become clear in a moment, that aberration was due to another GDP component involving the contribution of exports and imports to 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

Table 8
Composition of 2017 and 2016 Quarterly GDP Growth

	Second Quarter 2017 Advance Estimate	Second Quarter 2017 Preliminary Estimate	Second Quarter 2017 Final Estimate	First Quar- ter 2017	Fourth Quarter 2016	Third Quarter 2016
Personal Consumption	1.93%			1.32%	1.99%	1.92%
Private Investment						
Nonresidential	.64%			.86%	.02%	.42%
Residential	-.27%			.41%	.26%	-.18%
Inventories	-.02%			-1.46%	1.06%	.16%
Net Exports	.18%			.22%	-1.61%	.36%
Government	.12%			-.11%	.03%	.09%
Total	2.57%			1.24%	1.76%	2.78%
Final Sales	2.59%			2.70%	.70%	2.62%
Private	2.47%			2.81%	.67%	2.53%
Private Domestic	2.29%			2.59%	2.28%	2.17%

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 very stable, varying over the past four quarters from 2.17 percent to 2.59 percent. The second quarter “**Advance Estimate**” was 2.29 percent, which was slightly weaker than the estimate of 2.59 percent in the first quarter..

Overall, the picture that the various measures of real GDP paint is one of gradual growth that is somewhat above the potential rate so that the output gap has been shrinking gradually, but steadily.

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

Because quarterly annualized GDP data in the customary **BEA** reports are highly volatile, without the kind of dissection of details discussed above they can be very misleading about the underlying trends in economic growth. **Table 9** and **Chart 17** show four-quarter moving averages of growth rates for GDP components as well as the four alternative measures of real GDP. This smooths out aberrations and gives a clearer picture of the health and direction of the economy.

Since mid-2014 net exports have depressed **Total** real GDP growth. That development is a direct consequence of a stronger dollar and is corroborated by the slowdown in industrial production and manufacturing which are more directly linked to international trade than other sectors of the economy.

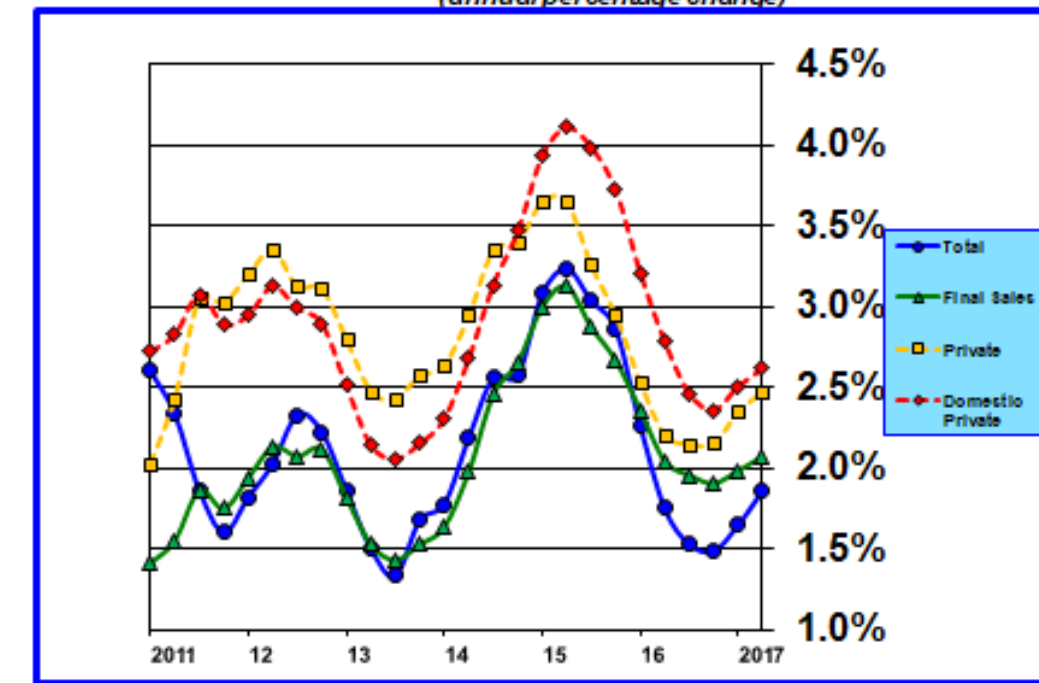
Growth in “**Private**” GDP was greater than growth in Total GDP during 2011, 2012, 2013 and 2014, a period when fiscal policy was contractionary. Since 2015 fiscal policy has been mildly supportive of **Total** real GDP growth.

Table 9
Four Quarter Moving Average Growth Rates

	Second Quarter 2017 Advance Estimate	Second Quarter 2017 Preliminary Estimate	Second Quarter 2017 Final Estimate	First Quarter 2017	Fourth Quarter 2016	Third Quarter 2016
Personal Consumption	2.77%			2.81%	2.73%	2.78%
Private Investment						
Nonresidential	1.85%			.57%	-.59%	-.67%
Residential	2.12%			3.34%	5.48%	7.41%
Inventories	-62.43%			-69.70%	-66.81%	-66.27%
Net Exports	6.04%			6.33%	7.51%	10.59%
Government	.18%			.28%	.75%	1.05%
Total	1.86%			1.65%	1.49%	1.53%
Final Sales	2.07%			1.98%	1.90%	1.96%
Private	2.47%			2.35%	2.15%	2.15%
Private Domestic	2.62%			2.50%	2.36%	2.46%

CHART 17 – Real GDP Growth – Alternative Measures

(annual percentage change)



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There are three important takeaways from **Chart 17**. First, all four measures of real GDP growth peaked in either the first or second quarter of 2015 and have steadily decelerated since then. Second, “**Private GDP**” growth, which omits government spending and inventory accumulation, had been growing more rapidly but has converged with the “**Total GDP**” growth rate in recent quarters. This is due to growth weakening in the private sector rather than strengthening in the government sector. Third, “**Total**

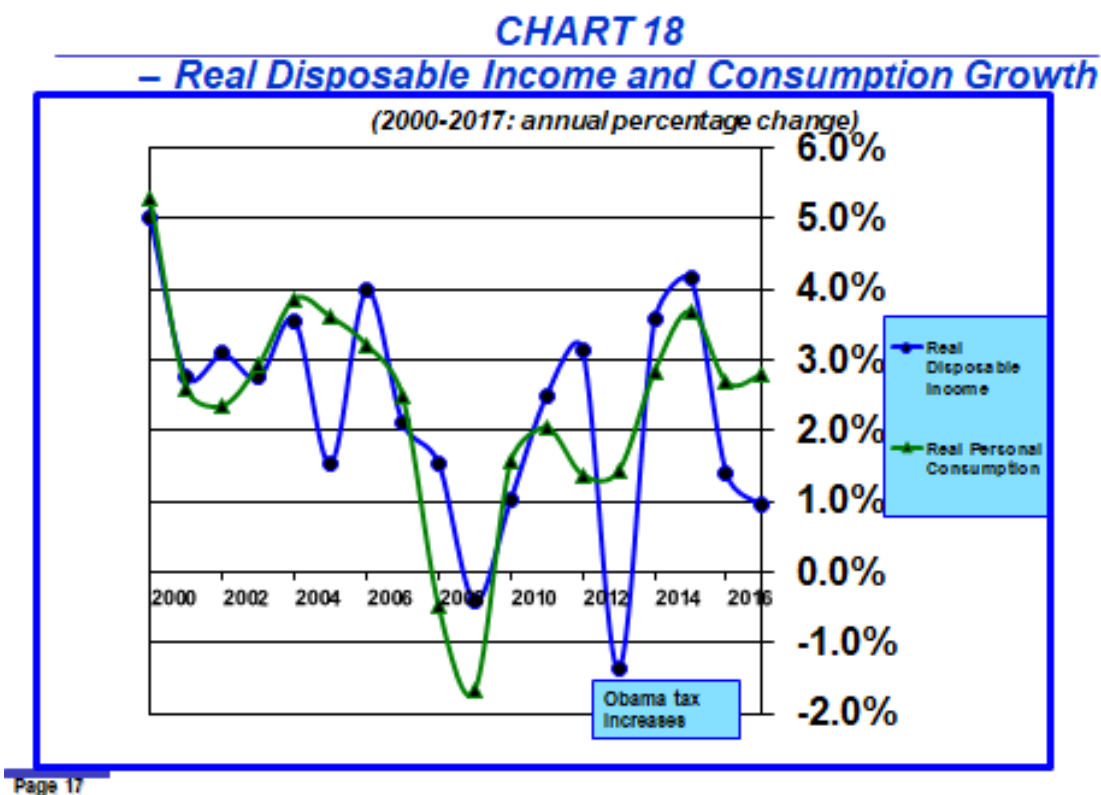
GDP” growth has been consistently dragged down by a higher growth rate in net foreign sales. This differential has worsened in the last two years because of strong dollar appreciation that has boosted domestic demand for imports and depressed foreign demand for exports.

3. Consumption

Personal consumption contributed 1.93 percent to second quarter real GDP growth compared to 1.32 percent in the first quarter. First quarter consumption growth was initially reported as an implausibly low 0.44 percent but the revised figure is still unusually weak relative to strong employment growth. The four-quarter moving average trend is a more reliable indicator and it rose from 2.73 percent in the fourth quarter to 2.81 percent in the first quarter and 2.77 percent in the second quarter. The recent growth rate in consumption has been relatively stable in a range of 2.70 to 2.80 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.

Chart 18 shows annual rates of growth in real disposable income and real consumer spending from 2000 through the first half of 2017. The impact of the Great Recession on both disposable income and consumption growth is clear in **Chart 18**. So, too is the temporary depressing effect of the Obama tax increases on disposable income growth in 2012 but not on consumption growth.



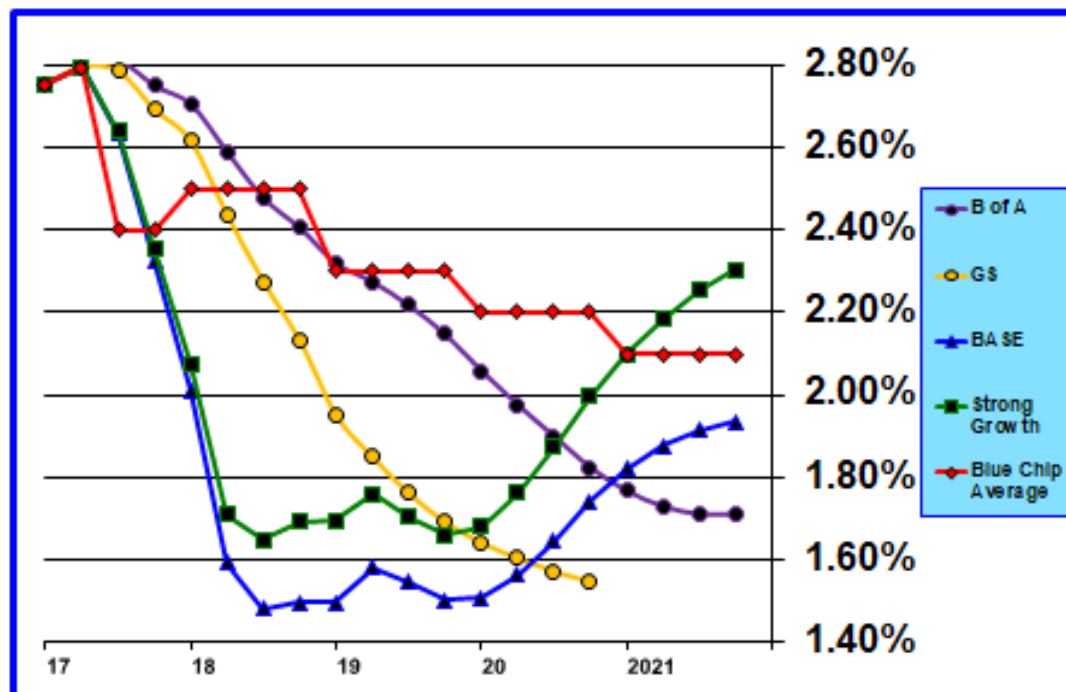
Over the past two years, disposable income growth has plunged while spending growth has remained relatively high. So far as the reported data are concerned, consumer spending has been supported by a collapse in the saving rate from over 6.0 percent during 2015 to less than 4.0 percent over the first six months of 2017. All of this seems a bit strange since employment growth has been strong and nominal wage rates have edged a bit higher. Perhaps **BEA** will revise disposable income up in the future, but we will have to wait until July 2018 to see whether this occurs.

Forecasts of growth in real consumer spending are shown in **Table 10** and **Chart 19**. Real consumer spending increased 2.69 percent in 2016, which was revised down from 2.74 percent in the latest **BEA** revision. This is not the final number as several more revisions will occur over the next few years.

Table 10
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					2.75	2.41	2.15	1.82	1.71
GS					2.69	2.13	1.69	1.55	
Global Insight					2.50	3.20	3.00	2.60	2.50
Economy.com					2.50	2.80	2.20		
Blue Chip					2.40	2.50	2.30	2.20	2.10
Bill's BASE					2.32	1.50	1.50	1.74	1.94
Bill's Strong Growth					2.35	1.69	1.66	2.00	2.30

CHART 19 – Real Consumer Spending Forecasts
(annual rate of change)



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

This slowing pattern is apparent in the data in **Table 10** and **Chart 19**. 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. That would be a welcome result, but is not at all assured.

Although all forecasters agree that consumer spending growth will slow, there are differences in my projections for spending growth in 2017 and 2018 compared to other forecasters. My 2017 and 2018 forecasts, shown in the “**BASE**” and “**Strong Growth**” scenarios, are well below the forecasts of others. Beyond 2018, my forecasts of spending growth initially are stable in the “**BASE**” scenario and “**Strong Growth**” scenarios, but then rise in 2020 and 2021. **GS** is very pessimistic 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.

With the exception possibly of **GS**, all forecasters appear to be overly optimistic about real consumer spending growth in 2018. Global Insight’s excessive optimism persists beyond 2018, perhaps because it actually believes that the Trump administration’s 3 percent real GDP growth assumption is attainable. These kinds of forecasts point out the speculative nature of much of economic forecasting and weaknesses inherent in most econometric models.

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 11 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 half of 2017, rising at an annual rate of 7.2 percent in the first quarter and 5.2 percent in the second quarter. A recovery in energy investment accounted for about half of the increase. Other sectors contributed as well. In addition, the acceleration in global growth had a favorable impact on nonresidential investment growth.

Forecasters expect real private investment growth to be strong and above the long-term trend for

Table 11
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					3.73**
B of A					3.76	3.81	3.99	3.41	
GS					3.81	2.95	2.50	2.23	
Bill's BASE					3.42	2.21	2.27	2.20	
Bill's Strong Growth					3.62	3.00	3.03	3.03	
	REAL NONRESIDENTIAL (BUSINESS) INVESTMENT								
Actual	3.50	6.88	2.34	-0.59					2.51*
B of A					4.22	4.10	4.06	3.41	
GS					4.26	3.30	2.68	2.33	
	REAL RESIDENTIAL INVESTMENT								
Actual	11.88	3.46	10.23	5.48					-0.25*
B of A					2.04	2.69	3.71	3.41	
GS					2.09	1.62	1.82	1.84	

*Average 1999-2017;

**Real private investment = 1.58% for 1999-2017

all of 2017 due to the recovery of investment in energy and stronger global growth. Possible benefits of tax reform and tax cuts have largely been removed from 2017 forecasts. Some optimism remains for a fiscal boost in 2018, but as can be seen in **Table 11**, **B of A** is more optimistic than **GS**.

Although **GS** expects growth in nonresidential investment to be 4.26 percent for all of 2017, its capital expenditures tracker registered about 6.0 percent in July. In addition to a continuation of the first half's momentum, **GS** expects easier financial conditions and stronger domestic demand, as implied by purchasing manager surveys, to make 2017 a good year. This might prove to be too optimistic based on declining auto demand, somewhat tighter credit access, and the declining spread between return on capital and cost of capital. Generally, in recent years, analyst forecasts of growth in business investment have proved to be optimistic.

Following 2017 and over the next several years **GS** expects business investment (nonresidential investment) to match trend growth of 2.51 percent that has prevailed over the last 19 years, while **B of A** expects growth to be above trend for 2017-2020. I have been consistently skeptical in the past about what I felt were overly optimistic forecasts and that skepticism has been merited. **GS's** forecasts are now more consistent with my view. I continue to expect that investment growth will remain near the average of the past 19 years, even if Congress enacts public infrastructure investment stimulus legislation, which increasingly appears to be doubtful.

B of A is especially optimistic about the outlook for business investment growth to remain at a high level in 2018 and 2019 because it expects corporate profits to accelerate, credit conditions to remain benign and uncertainty to diminish. 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. Also, according to the Federal Reserve's data on capacity utilization, because firms are operating at less than full capacity, the incentive to invest is dampened.

Now that the labor market appears to have exceeded full employment, one theory is that companies will increase capital investments to offset rising wage rates. There does appear to be some evidence which corroborates this expectation. Evercore ISI conducts a semi-annual survey of capital expenditures and hiring plans. In its most recent survey, conducted between May 15 and June 7, Evercore ISI found that a net of 30 percent of Chief Financial Officers plan to increase capital expenditures in 2017 compared to 9 percent in the November 2016 survey. In addition, **GS**'s capital expenditures tracker has strengthened over the last year. It attributes this primarily to the general improvement in domestic and international growth momentum.

Of course, plans do not necessarily translate into actual expenditures. Other considerations matter. Two important considerations are wages and existing capacity utilization.

GS's research indicates that a 1 percent increase in wage growth boosts growth in capital expenditures by 0.5 percent.¹ This is a relatively small amount and wage growth has risen far less than 1 percentage point.

Capacity utilization, as measured by the Federal Reserve, was 76.6 percent in June compared to 75.8 in June 2016. Although this measure has been improving slowly, it is well below the 80.0 (the 45-year average for this measure is 79.9) percent level traditionally considered to be an indication of tight capacity utilization. It should be noted, however, that Tan Kai Xian of GavekalResearch, believes the Federal Reserve's measure understates the actual utilization rate.² He cites an alternative measure constructed by the Institute for Supply Management, which indicates capacity utilization is running above 80 percent. This measure is based on asking survey respondents to indicate their current operating rate compared to their "normal" capacity level. Tan Kai Xian also cites falling real corporate profits, in contrast to rising S&P nominal profits, as further evidence that the U.S. is operating above full capacity in both the labor and capital markets. But, assuming that this analysis is valid, it does not imply necessarily that capital expenditures will increase. If expected returns on new capital expenditures relative to the cost of capital are insufficient, companies will not make those investments, regardless of the tightness of capacity.

Housing — Real residential investment growth was very strong in 2015. Growth in 2016 slowed considerably 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 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 match (**GS**) or slightly exceed (**B of A**) that of overall real GDP growth.

Housing starts are still historically low relative to family formation rates. The 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 1.20 million in the first six months of 2017, which was 3.9 percent above the pace of the first six

¹David Mericle and Ben Snider. "Will a Tighter labor Market Boost Capex?" US Daily, Goldman Sachs Economics Research, June 8, 2017.

²Tan Kai Xian. "Mind The (Output) Gap," GavekalResearch, June 13, 2017.

months of 2016.

Starts are expected to rise only modestly in 2017 and will still be below 1.4 million. **B of A** lowered its forecast recently and now expects housing starts will be only 1.22 million in 2017 and 1.35 million in 2018 because of lower than expected activity in multifamily housing construction.

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 July 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 strengthening in residential loan demand. However, credit standards tightened for commercial 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.

Housing prices were up 5.6 percent (S&P CoreLogic Case-Shiller National Home Price Index) in May over the prior year; the Federal Housing Finance Agency's purchase only housing price index was up 6.0% in the first quarter of 2017 compared to the first quarter of 2016. These increases are well above the 2.8 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.

In summary, weak residential investment growth, which rose at an annual rate of 2.9 percent in the first half of 2017, will continue to be weak in coming quarters because of higher housing prices and the potential for somewhat higher mortgage interest rates. I would place greater confidence in **GS**'s conservative forecast relative to **B of A**'s marginally more optimistic forecast.

5. Change in Inventories

Inventories subtracted 1.46 percent from "**Total**" GDP growth in the first quarter after adding 1.06 percent in the fourth quarter of 2016 (see **Table 7**). The change in inventories was very subdued in the second quarter, subtracting only -.02 percent from real GDP.

As can be seen in **Table 12**, real inventory accumulation declined each quarter from the first quarter of 2015 to the second quarter of 2016. Inventory growth bounced back to a \$63.1 billion in the fourth quarter of 2016, but sagged to \$1.2 billion in the first quarter and was -\$0.3 billion in the "**Advance Estimate**" for the second quarter.

Table 12
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 Q2	-.3					
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

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 anomalous.

As can be seen in **Table 12**, initial inventory data are crude estimates and are subject to substantial revision over the next three years. The -\$0.3 billion inventory accumulation in the second quarter “**Advance Estimate**” will be revised five 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.

Table 13 shows recent growth rates in government spending and forecasts for 2017-2020. Both **GS** and **B of A** expect government investment spending to be close to zero in 2017. After the election of Donald Trump as president last November I boosted my forecast of government investment spending based upon the expectation that Congress would adopt some form of infrastructure spending fiscal stimulus. Government

infrastructure spending legislation increasingly appears unlikely to occur this year and the chances for later enactment have diminished. Accordingly, I have now eliminated additional government investment spending and reverted to a forecast that assumes an annual rate of increase in government spending of about 1.1 percent. This low rate of growth is optimistic relative to the annual 0.8 percent rate of growth in government investment spending over the past 17 and a half years.

Table 13
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					-0.07	1.18	1.16	1.04
GS State and Local					0.32	1.82	2.30	2.09
GS Total					0.07	1.62	1.86	1.69
B of A Total					0.08	0.08		
BASE					0.21	1.08	1.10	1.10
Strong Employment					0.25	1.28	1.35	1.36

6. Net Exports

In the “**Advance Estimate**” net exports contributed 0.18 percent to second quarter real GDP growth after adding .22 percent to first quarter real GDP growth (see **Table 8**). 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 2.76 percent of GDP in June 2017, the shares of both imports and exports as offsetting components of GDP have declined. Exports have declined from 9.64 percent to 8.01 percent of GDP since January 2014. Over the same period imports have declined from 13.88 percent to 12.16 percent of GDP.

Part of the decline in imports is related to the collapse in energy prices, but part is also due to a world-wide decline in trade. The decline in global trade does not appear to be a temporary phenomenon. The declining trend is traceable at least in part to technological advances and the related shift in economic activity toward knowledge-based services, which generally are located near the point of consumption. The decline in trade is not limited to the U.S.; it is a global phenomenon.

7. Second Quarter 2017 Forecast Update

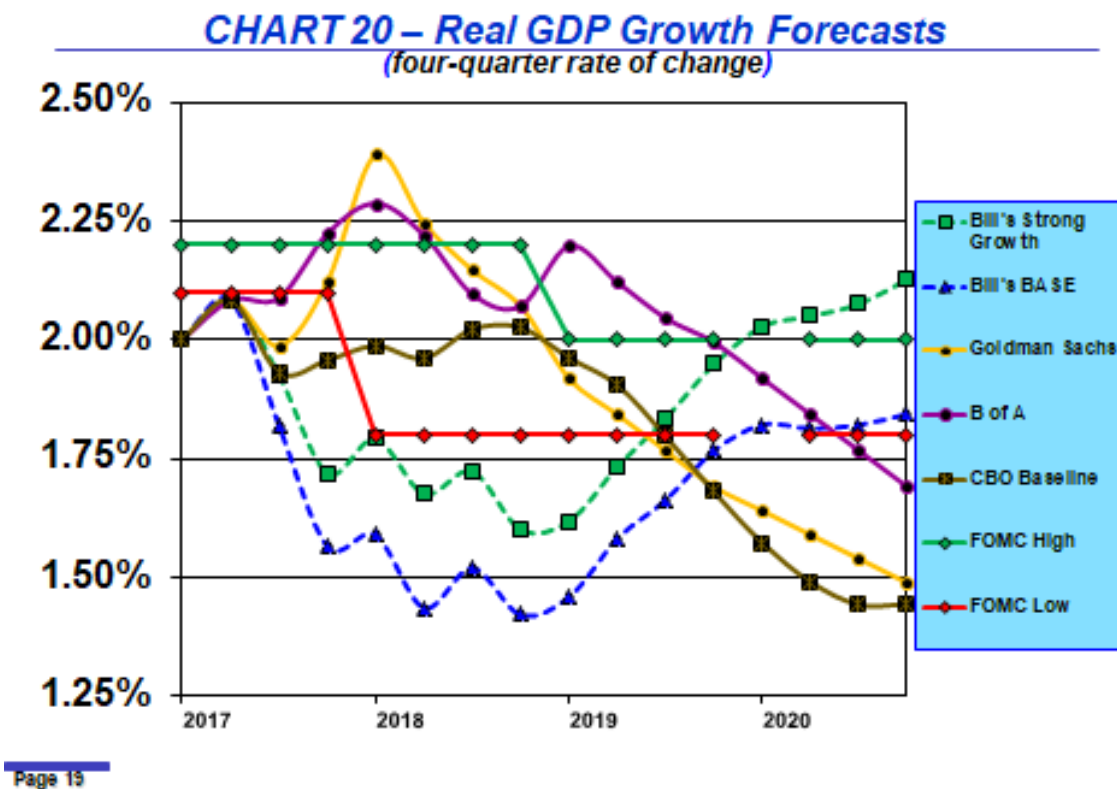
B of A has reduced its forecast for the second quarter “**Preliminary Estimate**” of GDP growth from 2.6 percent to 2.4 percent, reflecting recent data reports that indicate weaker construction spending.

8. Third Quarter 2017 Forecasts

GS is currently forecasting third quarter to come in at an above trend level of 2.6 percent. **B of A** is slightly more optimistic with a third quarter forecast of 2.8 percent.

9. Longer-Term Real GDP Forecasts

Chart 20 shows quarterly real GDP growth projections from the third quarter of 2017 to the fourth quarter of 2020. **Table 14** includes annual real GDP growth for 2013-16 and forecasts for 2017 to 2020. Generally, forecasts are tightly clustered in 2017. My “**BASE**” and “**Strong Growth**” forecasts are at the lower end of the range in 2018, but move to the higher end of the range by 2020.



My “**BASE**” scenario is on the lower end of the spectrum in 2018 because of lower assumed employment and productivity growth. **CBO**’s forecasts, based upon its June update, are now generally similar to other forecasts in 2017 but, with the exception of **GS**’s forecasts, are somewhat more pessimistic in 2019 and 2020. The **FOMC**’s high and low estimates during the 2017-2019 periods reflect no improvement in growth over time and generally track expectations of other forecasters.

Table 14
Real GDP Growth Forecasts
(year-over-year average)

	2013	2014	2015	2016	2017	2018	2019	2020
Actual	1.68	2.57	2.86	1.49				
B of A					2.10	2.17	2.09	1.80
GS					2.07	2.24	1.80	1.56
Global Insight					2.20	2.70	2.40	2.20
Economy.com					2.20	2.60	2.10	
Blue Chip Average					2.10	2.40	2.10	2.00
CBO					1.96	2.03	1.68	1.44
FOMC High*					2.20	2.20	2.00	
FOMC Low*					2.10	1.80	1.80	
Bill's BASE					1.93	1.49	1.62	1.82
Bill's Strong Growth					1.97	1.70	1.78	2.07

*Q4 to Q4 — FOMC year-over-year 2017 equivalent is a range of approximately 2.10 to 2.20 percent, which is in line with other 2017 forecasts

V. U.S. Employment Developments

July's increase in payroll employment was 209,000. This was only slightly above the consensus expectation of 200,000. This brought average monthly payroll gains for the first seven months of 2017 to 184,300, not much different from the monthly average of 186,700 in 2016.

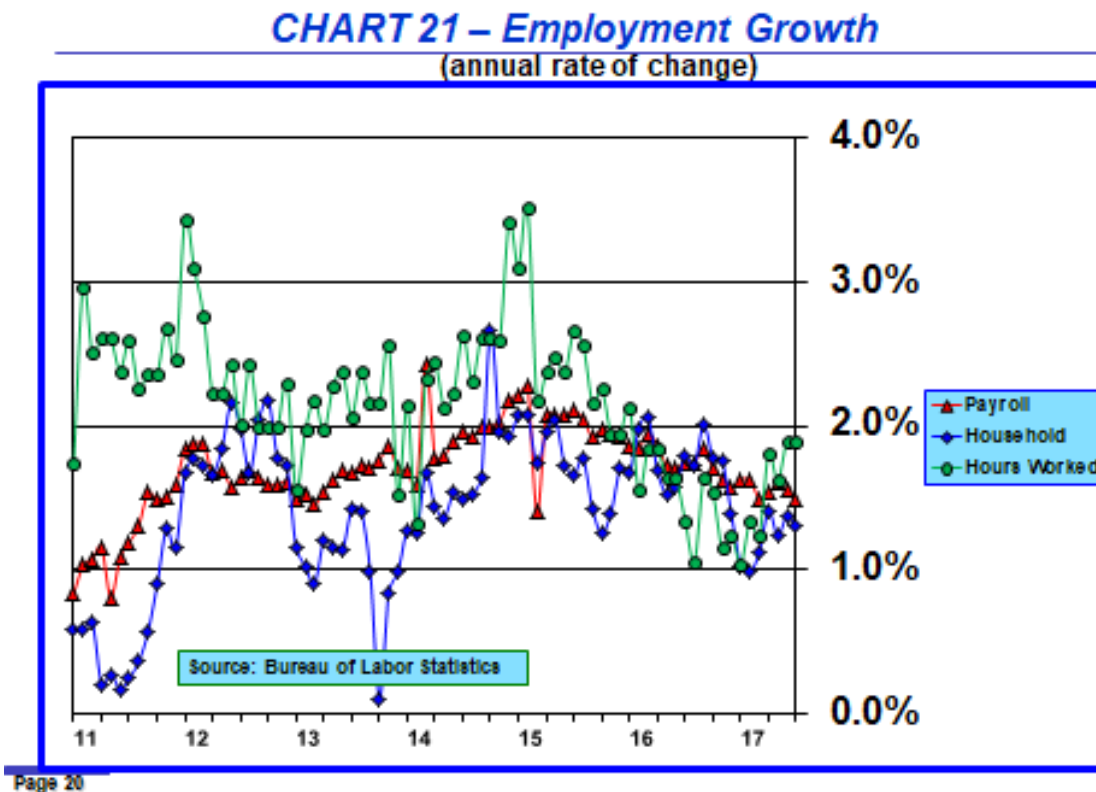
Continued strong monthly employment growth over the past few months has resulted in a decline in the unemployment rate 4.35 percent, which is well below **CBO's** full employment estimate of 4.74 percent. In coming months, monthly payroll employment gains are likely to converge to the underlying natural rate of growth in the labor force, which currently is in a range of 70,000 to 80,000. If monthly growth well above the natural rate continues over the next several months, the labor market will overheat and the **FOMC** will continue to raise the federal funds rate at a faster than expected pace with the intent to prevent an upside breakout in inflation.

1. Employment Growth

As can be seen in **Chart 21**, the trend in the 12-month rate of growth in payroll employment has slowed gradually from the cyclical peak of 2.27 percent in February 2015 to 1.49 percent in July 2017. Payroll employment growth averaged 226,000 in 2015, 187,000 in 2016 and 184,000 over the first seven months of 2017.

Household employment growth has been decelerating averaging 209,200 in 2015, 173,400 in 2016, and 122,000 over the first seven months of 2017. Household employment has grown at a slower annual rate of 1.30 percent over the past 12 months compared to payroll employment growth of 1.49 percent.

Growth in total hours worked by all employees has been slowing as well. The 12-month moving average



length of the work week for all employees has shortened from 34.53 hours at the beginning of 2016 to 34.39 hours in June. However, the recent acceleration in the average length of the workweek and strong household employment growth has boosted the 12-month growth rate in total hours worked by all employees was 1.89 percent over the past 12 months. Growth had been slowing until recently. The growth rate was 1.24 percent in 2016, 1.94 percent in 2015 and 3.42 percent in 2014.

Chart 21 shows the three measures of employment growth — payroll employment, household employment, and total hours worked. Probably the most important thing to notice in **Chart 21** is the choppy downward trend in employment growth. This is indicative of a maturing labor market.

2. Employment Participation

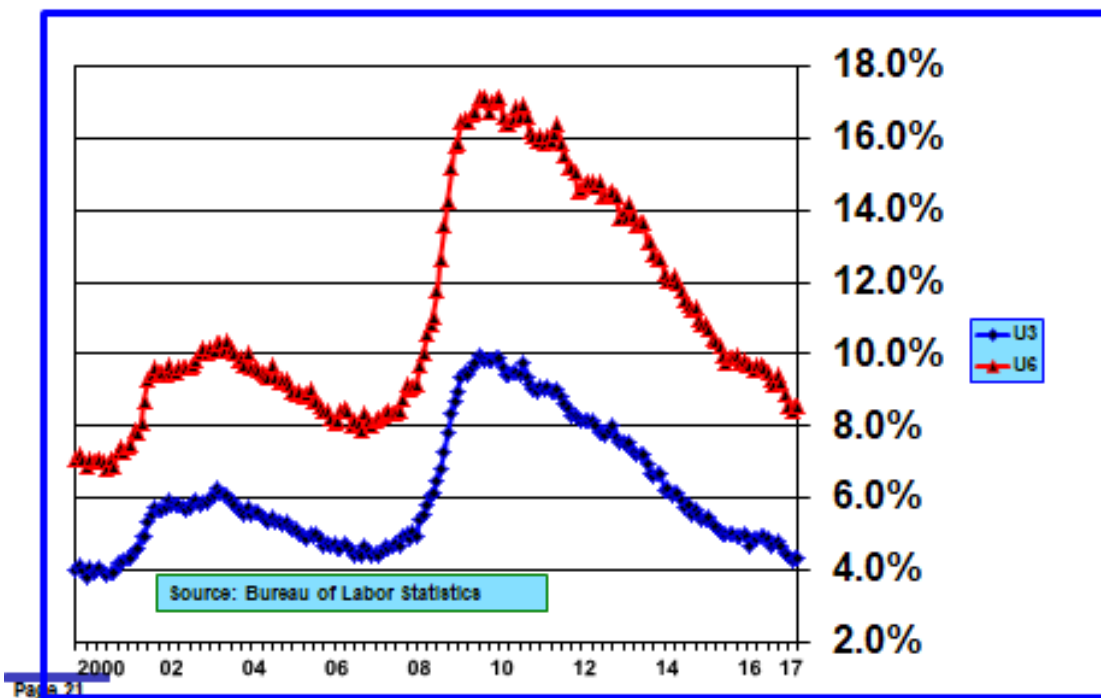
Employment participation had been declining until about a year ago, reflecting demographic shifts and an increase in discouraged workers exiting the labor force due to poor job prospects during and following the Great Recession. The downward trend in participation driven by changing demographics should continue to reduce participation by about 0.20 percent annually over the next ten years. 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. The increase in the participation rate from 62.39 percent in September 2015 to 62.90 percent in July 2017 is suggestive 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, the participation ratio should have fallen to about 62.02. This is a swing of

approximately 2.25 million workers many of whom were probably discouraged but have now reentered the labor.

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

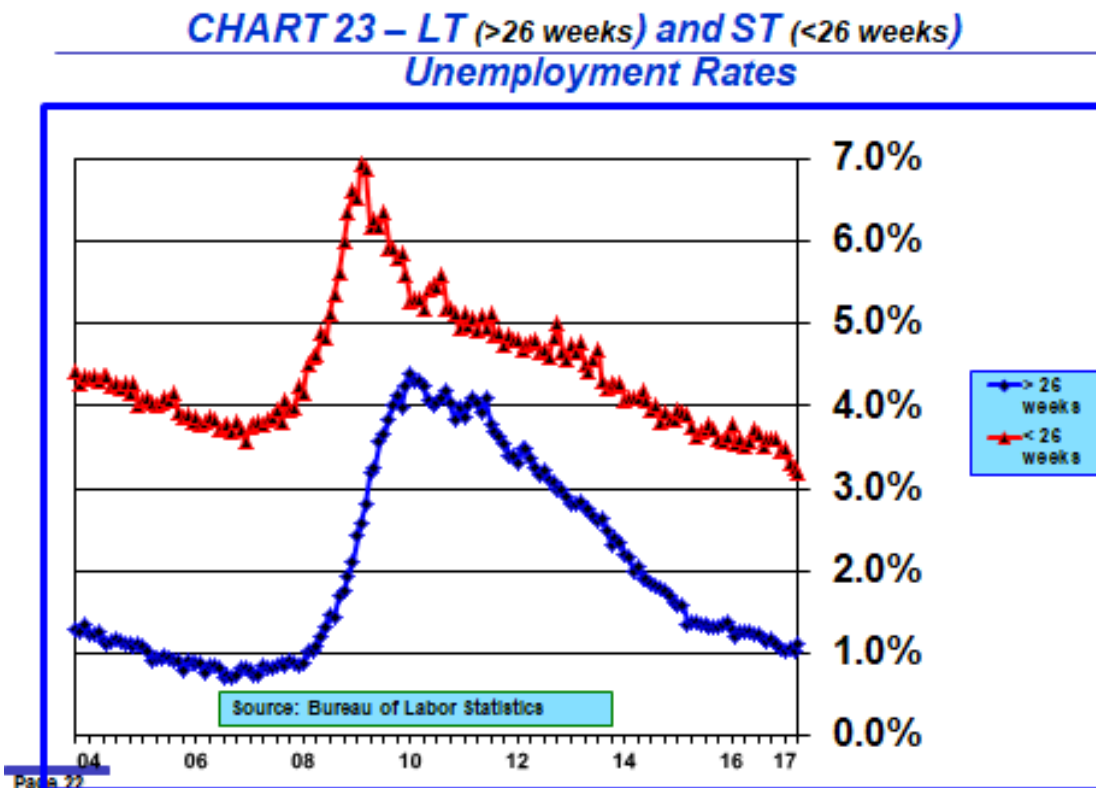
As can be seen in **Chart 22**, the U-3 unemployment rate has fallen to 4.35 percent and has now fallen below the minimum level reached prior to the Great Recession. The July U-3 unemployment rate was considerably below CBO's full employment (NAIRU) estimate of 4.74 percent.

CHART 22 – U-3 and U-6 Unemployment Rates



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 8.57 percent and is approximately 0.4 percent above the pre-Great Recession low reached in early 2007. The U-6 measure of unemployment fell 143 basis points over the past 19 months compared to a decline of 67 basis points in the U-3 measure, which underscores an improving labor market that is now apparently above full employment.

Long-term and short-term unemployment rates are also indicators of labor market tightness and are shown in **Chart 23**. The short-term unemployment rate has now penetrated 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 1.11 percent in July. It is still about 0.30 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

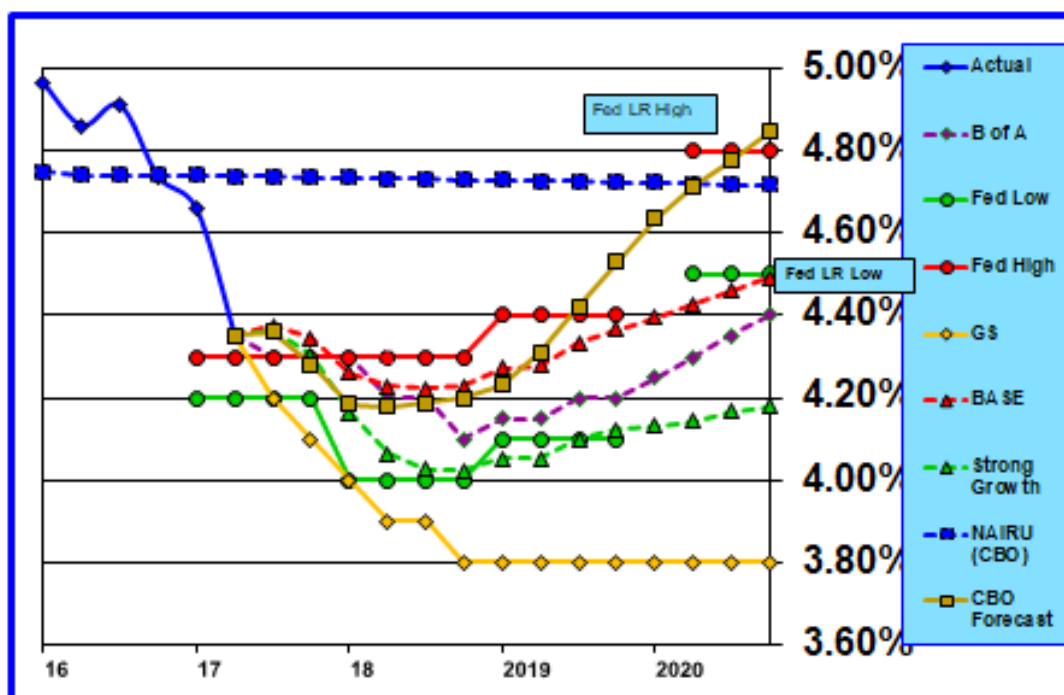
Forecasters expect the labor market to continue to tighten. The current U-3 unemployment rate is 39 basis points below **CBO**'s full-employment estimate of the non-accelerating inflation rate of unemployment (NAIRU).

As the term NAIRU implies, when unemployment falls below this level for any length of time not only do wages increase but inflation increases 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. Recent indications of stronger economic growth both domestically and globally have emboldened the **FOMC** to "normalize" monetary policy more rapidly.

Chart 24 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 24**. Reflecting the recent more rapid decline in the unemployment rate than expected, **B of A**, **GS** and the **FOMC** have all lowered their unemployment rate forecasts.

Most forecasts project the unemployment rate to stay below NAIRU over the next three years. **GS** and **B of A** are the most optimistic and anticipate that the unemployment rate will fall to 3.8 to 4.2 percent by the end of 2018. The unemployment rate falls to 4.23 percent in my "BASE" scenario and to 4.02 percent in my "Strong Growth" scenario.

CHART 24 – NAIRU and Unemployment Rate Forecasts
(quarterly average)



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During 2019 and 2020 various forecasts diverge considerably. **GS** is the most optimistic. Its forecast unemployment rate forecast remains anchored at 3.8 percent. **B of A** on the other hand expects the unemployment rate to rise to 4.4 percent by the end of 2020. **CBO** is even more pessimistic and expects the unemployment rate to reach 4.85 percent by the end of 2020.

The **FOMC**'s and my unemployment rate forecasts are similar to **B of A**'s forecasts during 2019. My "**BASE**" scenario rises to 4.49 percent and my "**Strong Growth**" scenario edges up slightly to 4.18 percent by the end of 2020.

After 2019 most forecasts, with the exceptions of **GS**'s, including the **FOMC**'s long-run projected range, move upwards gradually toward **CBO**'s NAIRU. **CBO** also expects the unemployment rate to begin rising in 2019 and by 2020 its forecast exceeds its estimate of NAIRU by the end of 2020.

Increasingly, it appears that structural changes in the labor market may 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 believed. To the extent that this turns out to be the case there will be less upward pressure on 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 appears to be 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.

Historically, there is considerable inertia in wage adjustments which results 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 a number of 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 is less need 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. Fourth, falling inflation expectations may also be a factor. 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. In short, increases in wage growth are now following the traditional cyclical pattern as the labor market tightens.

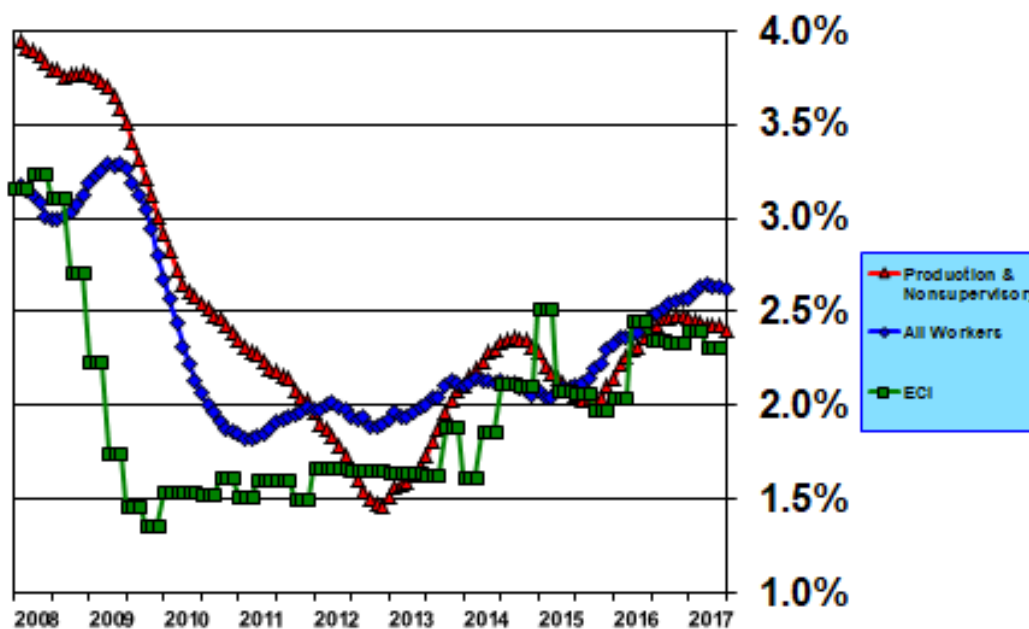
Forecasts of wage rate increases, which have largely based upon historical relationships have been consistently higher than have actually materialized.

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 25**). A third measure is also released quarterly as part of **BLS**'s report on output, total hours worked, and productivity.

Chart 25 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 25** track each other closely over time. All three measures had been rising gradually, but have growth has stalled over the past few months.

Although these measures are highly correlated over time, because compilation methodologies differ for each set of measures percentage changes over fixed time periods will not always be in sync. Currently, all three sets of measures are exhibiting a similar level and trend. Average hourly wages (12-month moving average) of all employees have risen 2.62 percent annually over the past 12 months compared to 2.49 percent a year ago. Average hourly wages (12-month moving average) of production and nonsupervisory workers

CHART 25 – Hourly Wage Rate Growth – ECI, All Workers and Production and Nonsupervisory Workers
(annual year over year and 12-month moving average rates of change)



Source: Bureau of Labor Statistics

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have risen 2.41 percent annually compared to 2.40 percent a year ago. ECI growth in wages and salaries has fallen from 2.45 percent in the second quarter of 2016 to 2.31 percent in the second quarter of 2017.

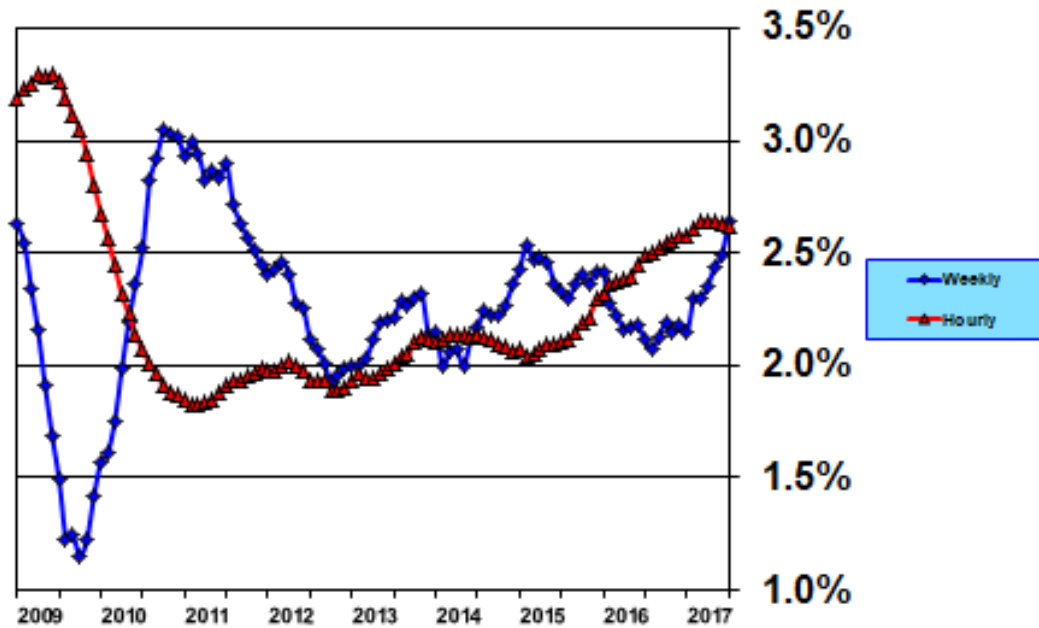
To a certain extent, focusing only on hourly wages is a bit misleading. Growth in average weekly earnings for all employees, which factors in the length of the workweek and thus incorporates changes in the mix of full and part-time employees, has been a little faster than growth in hourly wages, rising from 2.11 percent in July 2016 to 2.64 percent in July 2017(see **Chart 26**). This outcome reflects a modest slowing in the average length of the workweek from 34.47 hours in July 2016 to 34.39 hours in July 2017. In fact, the average length of the workweek has been stable since the start of 2017, which could be due to stabilization in the proportions of part-time and full-time workers. Until recently, the proportion of part-time workers had been increasing.

Chart 27 shows my projections for wage growth for production and nonsupervisory workers over the next ten years and **CBO's**, **GS's** and **B of A's** projections for growth in the wages and salaries component of ECI for all workers.

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 3.5 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.

CHART 26 – Hourly & Weekly Wage Rate Growth – All Workers

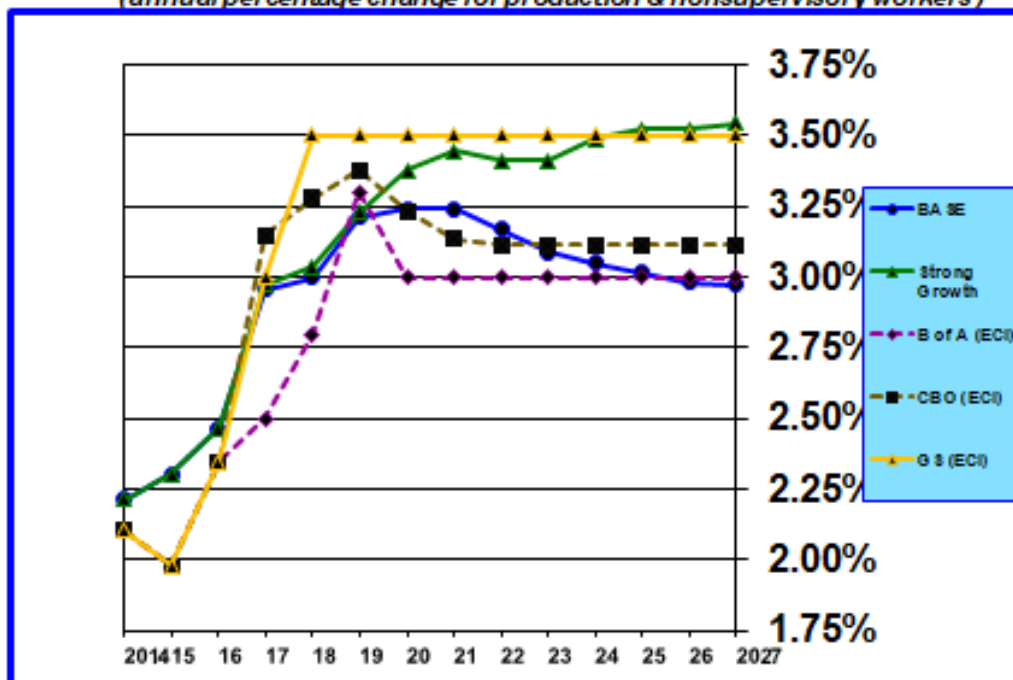
(annual year over year and 12-month moving average rates of change)



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CHART 27 – Hourly Wage Rate Forecasts

(annual percentage change for production & nonsupervisory workers)



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Wage growth for production and nonsupervisory workers rises at about the same rate as **CBO's** and **GS's** projections in my “**BASE**” and “**Strong Growth**” scenarios, reaching 3.17-3.23 percent in 2019. Thereafter wage growth in my “**BASE**” scenario tracks CBO's projections closely and is not much different from **B of A's** projections. Wages continue to rise gradually in my “**Strong Growth**” scenario to 3.54 percent by 2027, reflecting the impacts of faster employment growth and lower short-term and long-term unemployment rates.

GS's wage tracker registered 2.3 percent in July 2017, about 120 basis points short of its long-run expected 3.50 percent annual rate of increase. **GS's** 3.50 percent level assumes a 3.8 percent unemployment rate, which is well below NAIRU, 2.0 percent inflation, and 1.25 percent annual productivity increases (nonfarm productivity increases would be higher 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.

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

6. Factors Affecting Wage Rate Growth

Models for forecasting nominal wage growth typically include inflation, productivity, and the unemployment rate as variables. Over time, to preserve real purchasing power, nominal wages should rise and fall in tandem with the rate of inflation. Productivity is included as a variable because labor should receive a portion of productivity gains in the form of higher nominal wage increases. The inclusion of the unemployment rate is simply a way of measuring the effect of the gap between the supply of labor and the demand for labor on nominal wage rates.

However, in my view the U-3 unemployment rate is an oversimplification of the complexity of labor market dynamics that influence nominal wage rates. Accordingly, I include four labor market variables in my model of nominal wage rate growth in place of the U-3 unemployment rate. These measures do a better job of teasing out oscillations in nominal wage rates over the cycle than using the U-3 rate alone.

Two of the four employment measures involve splitting the U-3 rate into two components: the short-term unemployment rate, defined as those unemployed for 26 weeks or less; and the long-term unemployment rate, defined as those unemployed for more than 26 weeks. The sum of these two variables equals the U-3 unemployment rate. However, it turns out that the coefficients of these two variables and the lag times are very different. The impact of the short-term unemployment rate is about twice as great as the impact of the long-term unemployment rate. The average lagged impact of the short-term unemployment rate on the nominal wage rate is 17.1 months while the average lagged impact of the long-term unemployment rate is 45.1 months. This means that a high short-term unemployment rate will have a relatively quick and substantial negative impact on the nominal wage rate, while a high long-term unemployment rate, which

occurred and persisted following the Great Recession, will slow down acceleration in nominal wage rates during the expansion phase of the next cycle. This explains in part why nominal wages have been so slow to respond to a tightening labor market recently.

The third measure is the unemployment gap which is the difference between **CBO's** estimate of NAIRU and the U-3 unemployment rate. To a certain extent this measure contains information similar to the short-term and long-term unemployment rates, but because NAIRU is not a constant level over time, it picks up the impact of employment market slack that is the absolute levels of the short-term and long-term unemployment rates do not pick up. The coefficient of the unemployment gap measure is negative and about the same level as the coefficient of the long-term unemployment rate. The average lagged impact on the nominal wage rate is 15.1 months.

The fourth labor variable is the growth rate in total hours worked. This variable is a proxy for the strength of economic growth over the cycle and over time. It is positively correlated with nominal wage rate growth — the faster hours worked rises, the faster nominal wage rates rise. Its average lagged impact is 22.5 months. Because this variable primarily captures the cyclical effect of labor growth, it needs to be interpreted in conjunction with the short-term and long-term unemployment rates. But there is also a secular trend element embedded in this variable. Thus, as labor growth slows in coming years, there will be less upside pressure on wage rates. Some might argue that this is counter-intuitive because slower labor growth could increase the scarcity value of a smaller labor pool. Although the model does not address this possibility directly, the inclusion of both the short-term and long-term unemployment rates should control for labor scarcity.

In summary, my model of nominal wage rates includes core PCE inflation, productivity and four measures of employment.

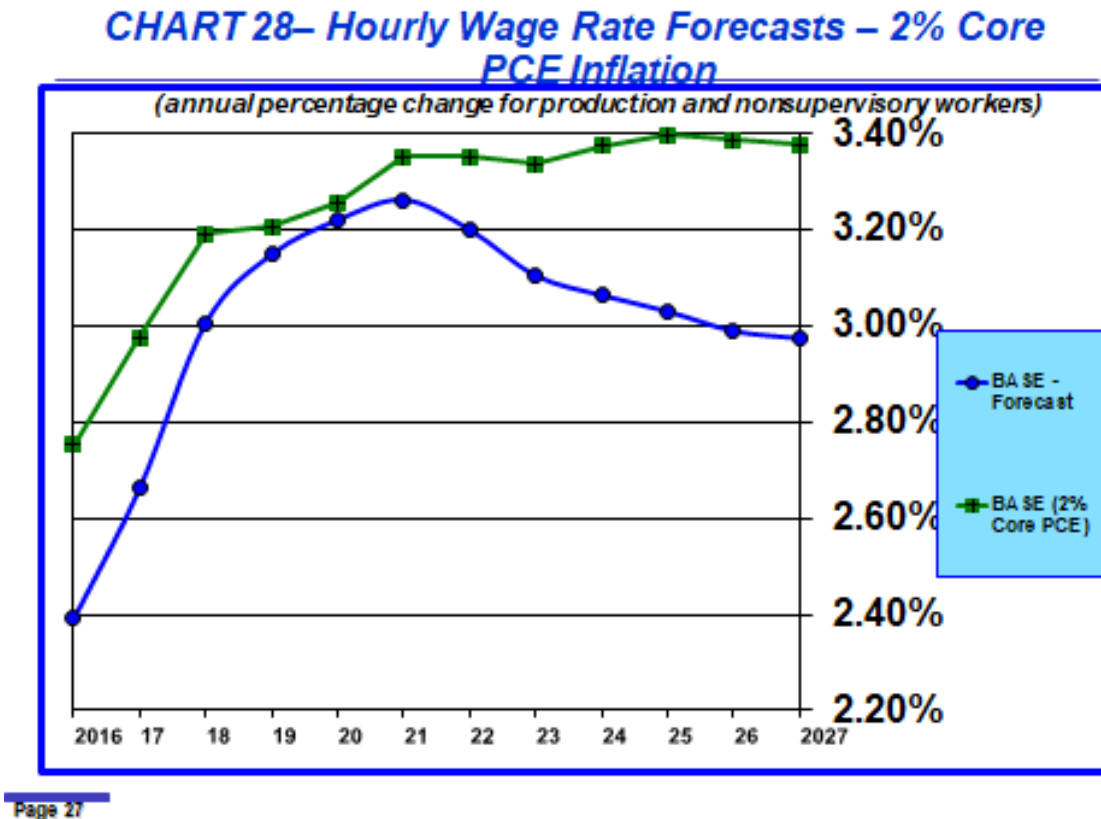
A 1 percent increase in **core PCE inflation** raises the rate of growth in nominal wages by 78.5 basis points. About half of the lagged adjustment occurs between months 4 and 12 and the remainder occurs between months 13 and 36. Wages respond relatively quickly to changes in inflation. In addition, it is possible that a feedback loop will kick in such that an increase in wages will lead to a further increase in inflation. This is a cost-push feedback loop which can become embedded in automatic cost-of-living contractual price wage adjustments. In recent years such automatic increases have become less prevalent. **GS**, based on that inflation expectations have become more important.³ The impact of these structural changes has been to anchor inflation and this, in turn, has been accompanied by a decrease in the volatility of changes in wage rates.

A 1 percent increase in **nonfarm productivity** raises the rate of growth in nominal wages by 27.9 basis points. This is a rather small impact, which implies that labor does not benefit much from improvements in productivity. About 23 percent of what impact there is occurs with a 13 to 18-month lag with the remainder not kicking in until after 48 months have elapsed.

³Sven Jeri Stehn. "The Missing Reflation," Global Economics Analysts, Goldman Sachs Economics Research, June 16, 2017.

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

Chart 28 shows the two nominal wage rate growth curves — one for my forecasts 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 35 basis points less in the “**BASE**” scenario — about an average annual rate of increase of 3.02 percent between 2021 and 2027 compared to 3.37 percent if inflation averages 2.0 percent. Both alternatives fall between **B of A**'s long-term 3.0 percent rate of increase and **GS**'s 3.50 percent rate of increase.

VI. Inflation

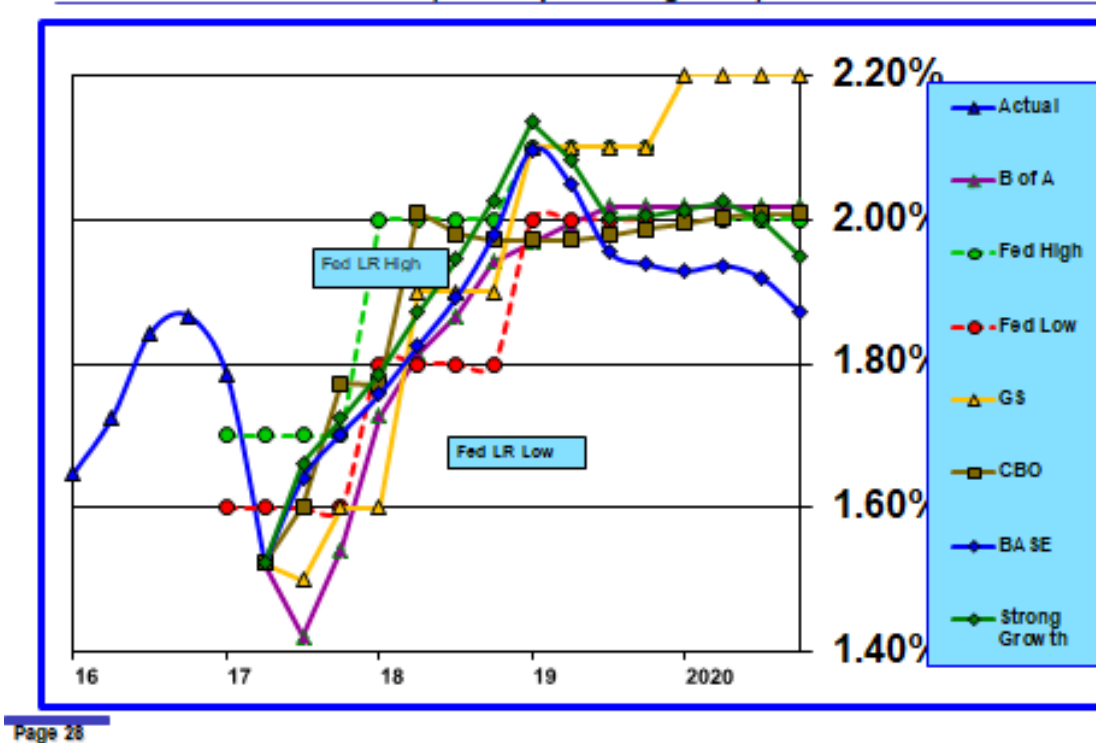
FOMC members remain confident that both core and total PCE inflation will return to the 2.0 percent target level by 2018 or 2019. In 2013 and 2014 **FOMC** members were premature in their expectation that inflation would rise quickly toward the target of 2.0 percent and were forced repeatedly to extend the time frame for achievement of the 2.0 percent target. Over the past two years as PCE inflation has risen slowly, **FOMC** projections have been stable. With core PCE inflation of 1.87 percent in 2016, **FOMC** members remain confident that the target of 2.0 percent will be reached in the next two years.

Core PCE inflation was 1.51 percent in June and has risen 26 basis points from its recent low of 1.25 percent in July 2015.

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 1.41 percent in June.

As can be seen in **Table 15** (**Chart 29** shows historical core PCE price index data and data from **Table 15** in graphical form), forecasts of the core PCE inflation index now indicate that inflation will not increase during 2017. 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 2019 and 2.2 percent in 2020 before dropping back to 2.0 percent in following years. **FOMC** projections reflect a gradual rise to its 2.0 percent target during 2018 or 2019.

CHART 29 – Core PCE Inflation
(annual percentage rate)



Part of the unexpected 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. **GS** and **B of A** recently reduced their inflation forecasts for 2017 and to a lesser extent for 2018. Their revisions are now consistent with my forecasts rather than being about 20 basis points higher in 2017.

GS and **B of A** expect core PCE inflation to exceed 2.0 percent in 2019. Based upon the recent **BEA** data revisions, as can be seen in **Chart 29**, my econometric model indicates core PCE inflation will closely track the estimates of others over the next 18 months. During 2019 and 2020 years core PCE inflation in the “**BASE**” and “**Strong Growth**” scenarios stays in the vicinity of 2.0 percent and then declines below 2.0 percent gradually reaching 1.5 percent by 2027.

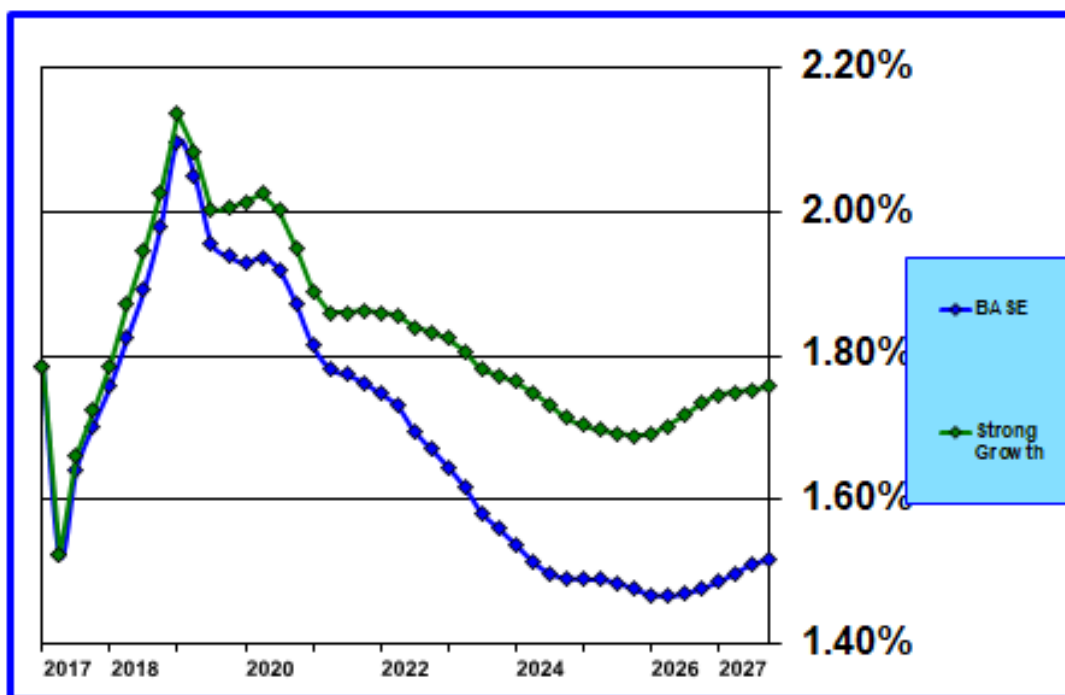
Table 15
Core PCE Inflation Forecasts — B of A, GS, Bill’s “BASE”, Bill’s “Strong Growth” and FOMC High and Low

Core CPE	2013	2014	2015	2016	2017	2018	2019	2020
Actual	1.55	1.48	1.37	1.87				
B of A					1.54	1.94	2.02	2.02
GS					1.60	1.90	2.10	2.20
Global Insight*					2.30	1.80	2.20	2.70
Economy.com*					2.60	2.50	2.90	
Blue Chip Average*					2.40	2.20	2.30	2.40
Bill’s BASE					1.73	2.02	1.93	1.85
Bill’s Strong Growth					1.76	2.06	2.01	1.93
FOMC High					1.7	2.0	2.1	
FOMC Low					1.6	1.8	2.0	

*CPI — total index

Chart 30 shows core PCE inflation estimates for my “**BASE**” and “**Strong Growth**” scenarios from 2017 to 2027. What is notable in **Chart 30** is that inflation moves up to the **FOMC’s** 2.0 percent target in 2018 and 2019 but falls well below that target after that.

CHART 30 – Core PCE Inflation
(annual percentage rate)



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While one should never discount the possibility of a sea-change in the economic environment in the future that would set inflation on a different course, there is evidence that core PCE inflation will remain

modestly below 2.0 percent in coming years, notwithstanding an economy that is operating near full employment and which might benefit from additional fiscal stimulus in the coming year.

VII. Interest Rates

1. Interest Rates — Federal Funds Rate

The **FOMC** raised the federal funds rate 25 basis points at its June meeting to a range of 1.00 to 1.25 percent. The **FOMC**'s projections indicate that there will be one more increase of 25 basis points in 2017. Market sentiment agrees, but the probability is only slightly greater than 50 percent. The market expects the **FOMC** to delay this increase until its December meeting.

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 market forecasts embedded in TIPS securities. 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 16**.

Table 16

Number of Federal Funds Rate Increases of 25 Basis Points — FOMC, B of A, GS, Bill's "BASE", Bill's "Strong Growth"

	2017	2018	2019	2020	Total	Peak Rate
FOMC median	3	3	2.5	0.5	9	2.75-3.00*
B of A	3	3	3	0	9	2.75-3.00*
GS	3	4	4	0	11	3.25-3.50*
Market Forecast	3	1	0	0	4	1.50-1.75
Bill's BASE	2	3	4	3	13	3.75-4.00#
Bill's Strong Growth	2	4	4	4	18	5.00-5.25#

*FOMC, B of A and GS rates are equilibrium estimates

#Bill's estimates are forecasts which peak above the likely equilibrium rate

In its June Summary of Economic Projections (SEP), the median **FOMC** member view is three 25 basis point increases in the federal funds rate in 2017 (1.25-1.50 percent), two of which have already occurred, three more in 2018 (2.00-2.25 percent), three more in 2019 and 2020 (2.75-3.00 percent), and a long-term equilibrium level of 2.75 to 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 2017 will see three increases, which is not a very risky call since two increases have already occurred, there is a wide divergence of opinion about the number of increases in 2018 and later years.

B of A and **GS** both expect three increases in 2017 with the remaining increase occurring in December. Over the longer run **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**.

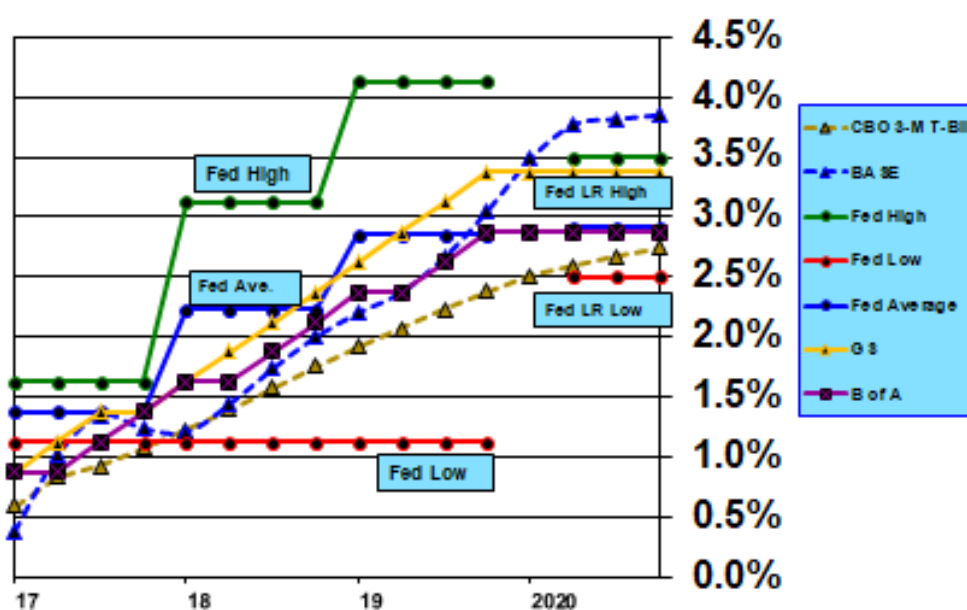
My federal funds rate forecast in my "**BASE**" scenario projects no further increase in 2017, three

increases in 2018, followed by four increases in 2019 and three more in 2020. My “**BASE**” case peak rate reaches 3.75 to 4.00 percent between 2022 and 2025. This is not an equilibrium rate but a forecast that reflects a cyclical peak of an economy operating slightly above full capacity.

In my “**Strong Growth**” scenario the federal funds rate rises to an even higher cyclical peak of 5.00 to 5.25 percent by late 2022. This high projected rate reflects the consequences of a tight monetary policy in an overheated economy — the unemployment rate falls gradually to 3.8 percent in this scenario by 2027, considerably below the NAIRU rate of approximately 4.7 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.

Chart 31 shows the quarterly progression in the federal funds rate from the present through 2020 implied by the **FOMC**’s high, low and average projections. It also shows forecasts for **B of A**, **GS** and my “**BASE**” scenario. My forecast pathway rises a bit more slowly in 2018 but by 2020 it is higher than **B of A**’s and **GS**’s projections.

CHART 31 – Federal Funds Rate Forecasts



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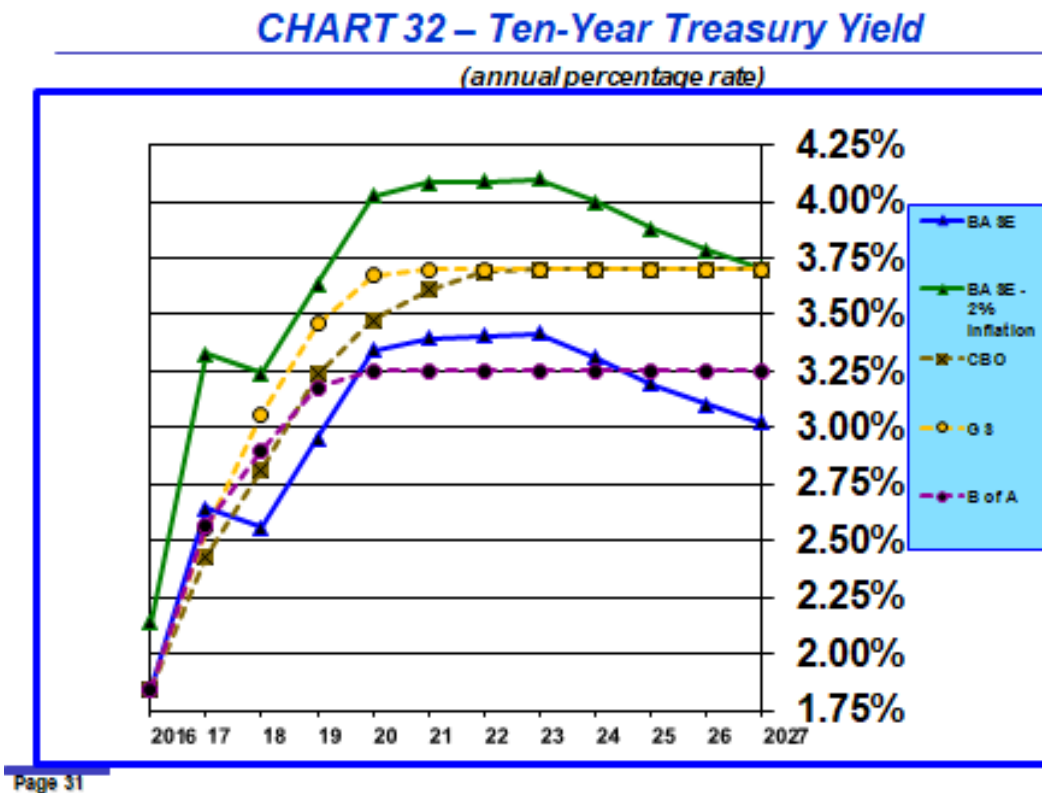
Until December 2016, **FOMC** members had steadily reduced the median estimate of the long-term nominal value of the federal funds rate from 4.25 percent to 2.875 percent — the median value rose to 3.00 percent in December and remained at that level in March and June. Based upon my model my sense is that the **FOMC**’s median projection for the federal funds rate is reasonable with its estimate of long-term real GDP growth of 1.8 to 2.0 percent. My “**BASE**” scenario, assuming 2.0 percent core PCE inflation, indicates that a long-term nominal federal funds rate of about 3.75 percent is a likely level for the long-term neutral federal funds rate, but it could be 3.50 percent or less, if productivity remains relatively weak. This also means that the real neutral interest rate, assuming inflation is 2.00 percent, would be 1.50 to 1.75

percent.

2. Interest Rates — 10-Year Treasury Note Yield

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

My forecasts for the 10-year yield in my “**BASE**” scenario, which are shown in **Chart 32**, are lower than those of other forecasters, except for **B of A**, because my forecasts of inflation are lower than 2.0 percent. The range in my average annual forecasts is 3.00 to 3.40 percent between 2021 and 2027, rather than 3.70 to 4.10 percent that my model says would prevail if inflation were 2.0 percent in the “**BASE**” scenario.



3. Real Rate of Interest and Natural Rate of Interest

The real rate of interest is the nominal rate of interest minus the rate of inflation. Over the economic cycle both the nominal rate of interest and the reported inflation rate vary. Thus, the real rate of interest also varies over the cycle.

The **natural rate of interest**, sometimes also referred to as the neutral rate of interest or the equilibrium rate of interest, is a specific value of the real rate of interest (nominal rate of interest less the monetary authority's target inflation rate) that occurs when an economy is operating at (not below or above, but at) its full potential. The value of the natural rate depends upon fundamental factors such as the rate of population growth, demographics (e.g., aging), productivity, and inflation expectations. Because these fundamental factors do not necessarily remain constant over time the value of the natural rate can vary.

The natural rate is not directly observable and thus, has to be teased out of messy data.

From a monetary policy perspective, the importance of knowing the value of the natural rate of interest is determining, when the monetary authority's inflation target rate is added, what the nominal value of the short-term interest rate — the federal funds rate — will be when the economy is operating at full capacity.

In the **FOMC's** Summary of Economic Projections (SEP), one of the data points members supply is an estimate of the long-run equilibrium federal funds rate. This is the same as the neutral or equilibrium rate of interest because the accepted assumption is that it is the rate that will prevail when the economy is operating at full capacity. In the June SEP the central tendency range for this rate was 2.75 to 3.00 percent. Given that the **FOMC's** inflation target is 2.0 percent, this means that the consensus of **FOMC** members believes that the neutral rate of interest is in a range of .75 to 1.00 percent.

This all seems to be very tidy. However, there are two big assumptions embedded in the long-run SEP equilibrium value of the federal funds rate. First, and obviously, is that the real rate of interest when the economy is operating at full capacity will be in a range of .75 to 1.00 percent. Second, and less obviously, is that the **FOMC** will be successful in achieving a 2.0 percent stable nominal inflation rate. Most assume that the FOMC has the power to engineer this outcome. But, neither assumption is absolutely guaranteed. Both could be wrong.

What evidence exists suggests that both of the **FOMC's** assumptions for the real rate of interest and inflation, when the economy is operating at full capacity, could be too high. Certainly, this is what the market believes currently. The market currently expect at most another 50 basis points increase in the federal funds rate to a range of 1.50 to 1.75 percent. This is 125 basis points lower than what the **FOMC** projects, which is a very large and significant difference. Of course the market could be wrong and the **FOMC** right; or vice versa, or "truth" could lie somewhere in between.

This is not a trivial issue. If the **FOMC** sticks to its guns and believes it knows best and forges ahead, but the market's assessment is the more correct one, the **FOMC** will commit a serious policy error by over tightening monetary policy and this will surely push the U.S. economy into recession.

There is no clear cut answer to who is correct or closer to being correct. But, because the consequence of an overaggressive monetary policy — recession — is greater than the consequence of too easy a monetary policy — economic overheating and higher inflation — good risk management principles argue for a more cautious monetary tightening approach than is currently spelled out in the **FOMC's** SEP. If inflation remains subdued and far short of the 2.0 percent target, expect the **FOMC** in the future to revise down its projections for the federal funds rate, even if the unemployment rate continues to fall.

Now some evidence does exist that sheds a modest amount of light on the two big assumptions about the level of the real rate of interest and the expected long-term level of inflation.

The market's five-year five-year forward inflation expectations rate was 1.95 percent on August 4th. Because the expected inflation rate is derived from TIPS securities which are indexed to the CPI, it is necessary to convert the market's estimate to a PCE basis. Over the last 10 years core CPI has averaged 1.81 percent and core PCE has averaged 1.57 percent, a difference of 24 basis points. This implies that the market's current long-term expected PCE inflation rate is 1.71 percent. Interestingly, this estimate is close to my long-term 1.56 percent core PCE inflation estimate. By itself, making a 50 basis points adjustment to the **FOMC**'s long-term equilibrium projection would bring the range down to 2.25 to 2.50 percent, which would imply only five more 25 basis point increases in the federal funds rate rather than the seven additional increases projected by **FOMC** members.

However, with the adjustment for expected inflation, there is still 75 basis points of difference between the **FOMC** and the market that is unaccounted for. This difference presumably has to do with the value of the expected long-run natural rate of interest. If the market is right, the long-run neutral rate would fall in a range of 0 to 25 basis points.

Jens Christensen and Glenn Rudebusch, both economists at the San Francisco Federal Reserve Bank, recently published a working paper entitled, "New Evidence for a Lower New Normal in Interest Rates."⁴ The neutral rate they calculate has fallen more than 200 basis points since the late 1990s and is currently about 25 basis points. The statistical methodology is quite complex but is based on a financial model using market prices of TIPS, which reflect in the authors' words "... financial market participants' views about the steady state of the economy including the equilibrium interest rate."

Others, most notably Thomas Laubach and John C. Williams, currently president of the San Francisco Federal Reserve Bank, have estimated the neutral rate of interest based on a macroeconomic approach that uses data from nominal short-term interest rates, consumer price inflation, and the GDP output gap.⁵ The statistical results from this very different analytical methodology closely parallel the decline in the neutral rate of interest over time shown by the financial market model. The macroeconomic model also estimated a neutral rate of approximately 25 basis points in 2016.

So, the fragmentary evidence that is available is more supportive of the market's current view of only two more federal funds rate increases. However, it is possible that as the economy steams ahead at full employment and perhaps overheats that both the long-term inflation rate and the long-term neutral rate of interest will rise. There is evidence in the historical statistical analysis that this has occurred to a limited extent.

And, one additional caveat is in order. The neutral rate assumes that the economy is operating at full capacity. But, if instead the economy is operating above full capacity, which is a definite possibility in coming quarters, then the **FOMC**'s policy rate should move to a level above the long-term neutral rate to contain the risk of an inflationary outbreak. A few **FOMC** members have SEP rate projections that anticipate this kind of outcome. But the bad news from history is that whenever the policy rate moves above the equilibrium rate, recession follows. That is why having a better sense of what the equilibrium rate is from a current perspective is so important. And, from that perspective, the **FOMC** should cool its jets.

⁴Jens H.E. Christensen and Glenn D. Rudebusch. "New Evidence for a Lower New Normal in Interest Rates," Federal Reserve Bank of San Francisco Economic Letter, 2017-17, June 19, 20117.

⁵Thomas Laubach and John C. Williams. "Measuring the Natural Rate of Interest Redux," *Business Economics*, Vo. 51, No.2, 2016, pp. 57-67.

4. BASE Scenario Estimates of Nominal and Real Short-Term and Long-Term Federal Funds and 10-Year Treasury Rates

My econometric model provides estimates of values of the short-term (2017) and long-term (2021-27) federal funds rate and the 10-year Treasury rate. These estimates are shown in **Table 17** for various assumed values of inflation, the growth rate in total hours worked and productivity. These estimates are forecasts based upon assumptions about the economy. As such my estimates do not ferret out the natural rate of interest. However, to the extent that my **BASE** scenario is structured to reflect how an economy operating at full capacity might look in the long run, the estimates of inflation and interest rates provide a check on the work of others.

Table 17

Short-Term and Long-Term Interest Rates for Federal Funds and 10-Year Treasury Rates (BASE Scenario)

	Short-Term (2017) Assumptions	Long-Term Assumptions (2021-27)		
Potential Real GDP	1.53%	1.31%	1.71%	1.86%
Inflation (core PCE)	1.73%	2.00%	2.00%	2.00%
Productivity	.91%	.90%	1.40%	1.60%
Labor Force	1.29%	.60%	.60%	.60%
		Nominal Rate		
Federal Funds	.96%	3.38%	3.74%	3.89%
10-Year Treasury	2.23%	3.19%	3.57%	3.72%
		Implied Real Rate		
Federal Funds	-.77%	1.38%	1.74%	1.89%
10-Year Treasury	.50%	1.19%	1.57%	1.72%
		Long-Term Assumptions (2021-27)		
Inflation (core PCE)		1.56%	1.56%	1.56%
Productivity		.90%	1.40%	1.60%
Labor Force		.60%	.60%	.60%
		Nominal Rate		
Federal Funds		3.02%	3.39%	3.54%
10-Year Treasury		2.51%	2.89%	3.04%
		Implied Real Rate		
Federal Funds		1.46%	1.83%	1.98%
10-Year Treasury		.95%	1.33%	1.48%

My estimates of the long-term federal funds rate are more consistent with the **FOMC**'s SEP projections than with current market expectations. My estimate of the long-run real rate of interest (not necessarily the natural rate) is in a range of 1.50 to 2.00 percent, depending upon the strength of productivity, compared with the **FOMC**'s range of 1.50 to 1.75 percent for the neutral rate.

In the top panel of **Table 17** it is assumed that growth in total hours worked remains constant at 0.6 percent annually in the long term and that core inflation remains anchored at 2.0 percent and shows the impact on the federal funds and the 10-year Treasury rates for assumed productivity values of 0.9, 1.4, and 1.6 percent. The only change in the bottom panel of **Table 17** is substituting my forecast of core inflation for an assumed target rate of 2.0 percent, which averages 1.56 percent over the 2021-27 period.

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. — July/August Assessment:** Strengthening growth; surging consumer, business, and investor optimism; increased political uncertainty stemming from new U.S. president and Republican-controlled Congress; survey data have been much stronger than hard economic data reports, but better economic data is expected to follow improved optimism

✓ Cascading scandals involving President Trump have diminished prospects for tax cuts and tax reform in 2017; the surge in confidence that followed Trump’s election is fading, but stronger global growth is supporting U.S. financial markets

✓ The Citi U.S. surprise index remains in negative territory but has improved to -31.4 on August 8

✓ The index of leading indicators continues to rise

- **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.

? *B of A’s Q3 forecast growth is 2.8%; GS’s Q3 forecast is 2.6% - both are above trend*

? *GS’s July U.S. Current Activity Indicator (CAI) was 3.1%, up from 2.8% in early June to 2.8%; the CAI is a proxy for real GDP growth; its high level so far in 2017 has been driven by strong survey data; hard data have been weaker*

+ *B of A’s 2017 forecast is 2.10% and GS’s is 2.07%; my “BASE” scenario forecast is 1.93% and my “Strong Growth” scenario is 1.97%; FOMC tightened its 2017 Q4/Q4 central tendency range in June to 2.1-2.2%*

- **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 positive*

+ *The second quarter output gap was 0.28%; growth over the remainder of 2017 should reduce the output gap to zero by the end of the year*

- **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 1.5%*
 - *Long-term potential real GDP growth has moved higher to a range of 1.9% to 2.2%*
- **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 0.77% in the second quarter and Q2/Q2 was 1.19%*
 - + *Y/Y productivity growth in 2017 is on a track to rise .9% and Q4/Q4 could be .5%*
- **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 184,300 over the first seven months of 2017*
 - *Household employment growth averaged 200,300 over the first seven months of 2017*
 - + *Labor force growth over the same period averaged 122,000 — eventually payroll and household employment growth will converge to labor force growth*
 - + *Evercore ISI temporary and permanent employment surveys remain strong, but have edged down from an average of 60.1 in December to 56.6 in early August but remain very strong (a value above 50 is favorable)*
 - *The Conference Board's labor market differential was +16.1 in July (the highest level since August 2001 just prior to 9/11) compared to +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*
 - ? *Indicative of a tight labor market, total job openings exceeded 6 million for the first time ever in May and reached a new high in June*
- **Employment participation** will resume a gradual decline during 2017 due to demographically-embedded retirements of baby boomers.
 - *Participation grew slightly from 62.67% in December to 62.90% in July*
- **Unemployment rate** should edge down slightly to between 4.3% and 4.5%.
 - + *U3 unemployment rate in July was 4.35%; 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 slightly slower than expected*
 - + *BLS Y/Y hourly wage growth for all employees in July was 2.62%*
 - *The employment cost index grew a disappointing 2.37% in the second quarter*
 - + *GS's wage tracker was 2.3% in August, GS still expects wage growth to approach 3.0% by the end of 2017*

+ *Evercore ISI's composite index of temporary and permanent placement wage pressures were a relatively strong 64.0 in the week ending August 4 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 June nominal consumer income growth over the past 12 months was 2.78%; growth in 2017 appears likely to be near the top end 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 June nominal consumer spending growth over the past 12 months was 4.43%; growth in 2017 appears likely to be near the top end of the forecast range*

? *University of Michigan Survey of Consumers sentiment index has been edging down since the post-presidential election high: it was 93.1 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*

? *Conference Board consumer confidence index has been relatively stable at 121.1 in July, 117.3 in June, 117.9 in May and 119.4 in April after surging to 124.9 in March, the highest level since December 2000; this compares to 116.1 in February, 111.8 in January and 113.3 in December; since the election confidence has risen the most for those earning \$35,000 to \$100,000, the only category that has declined is those earning \$15,000 or less*

? *Bloomberg's U.S. Consumer Comfort index eased to 50.1 on July 1 from 51.3 on March 24, which was the highest level in 16 years*

? *Evercore ISI's index of company surveys was 53.2 on August 4 compared to 50.1 on December 30*

? *June retail core sales were fell 0.3% from the May level*

? *On line store sales have risen 5% over the past year; department store sales have declined 5% over the past year*

? *Auto sales slowed significantly in March to an annual rate of 16.7 million units in July compared to the recent annual average of about 18 million, a slowing trend, if continued, which will depress growth in consumer spending; U.S. vehicle production is expected to decline to 11.2 million units in Q3 from 11.7 million in Q2*

? *Consumer credit expansion continues to be relatively strong and increased 5.8% in the 12 months ending in May*

- **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 3.85% over the first six months of 2017 compared to 4.04% 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 10.5% as of August 9*
- **Manufacturing** will continue to be weak with the PMI index just slightly above or below 50, reflecting the negative consequences of dollar strength.
 - *The industrial production index rose to 105.2 in June from 103.5 in January; recent manufacturing strength reflects in part stronger global growth and a weakening dollar*
 - *89.5% of manufacturers were somewhat or very positive about business prospects for their companies in the second quarter compared to 93.3% in the first quarter and 56.6% a year ago — the first quarter index was an all-time high for this survey in its 20-year history*
 - *The NFIB optimism index skyrocketed to 105.8 in January and held at a high level of 105.3 in February, 104.7 in March, 104.5 in April and May, 103.6 in June, and 105.2 in July; these readings are the highest sustained level since 2004; however this high level of optimism has yet to translate into increased capital investment*
 - *ISM manufacturing index has been relatively stable so far in 2017: it was 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 has been relatively stable so far in 2017, although the July index was the lowest so far this year: it was 53.9 in July, 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)*
 - ? *Also reflecting the theme of stability, the GS analyst index decisively reversed April's decline to 47.1 by rising to 59.5 in May, 52.9 in June and 55.2 in July; it was 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 earnings growth has been very strong, but National Income accounting data, which adjusts profits for inflation and depreciation, are under downward pressure, the steady increase in the labor cost index to 78.9 in May will eventually add to profit pressures*
- **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% in the first half of 2017 and expected to rise 5% to 6% for the entire year*
 - ? *Capacity utilization (the U.S. operating rate) improved to 76.6% in June from 75.7% in January, but remains well below the 80.0% level that typically leads to a sustained acceleration in business investment spending*
 - ? *According to the NFIB survey, actual capital spending has been relatively stable during 2017 and "there is little evidence that capital spending is going to increase its contribution to growth any time soon;" however, plans for capital outlays have risen to the highest level since 2007, but that level only equals the long-term average*
 - ? *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 and accelerated from 50.0 in May to 59.0 in the week ending July 28 (a value above 50 indicates growth in activity)*
 - ? *EvercoreISI's second quarter company inventory survey indicated a significant increase in inventories; auto dealer inventories are very high (+43%); home builder inventories are low (-25%)*

? C&I lending credit standards have tightened some; after declining in recent months, C&I lending grew at an annual rate of 6.7% over the three-month period of March-May; the decline earlier this year probably reflected the passing of the impact of improving access to other sources of credit as the energy sector's financial difficulties receded

? Commercial real estate credit standards continued to tighten in the second quarter, reflecting regulatory pressures; commercial real estate lending growth is decelerating but is still positive

- **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 has been relatively stable so far in 2017; it was 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 June were 2.0% above the 2016 total

- Housing investment grew at an annual rate of 1.7% in the first half of 2017, and is projected to reach only 2.0% for the entire year

? Evercore ISI's homebuilders survey has risen from a strong 57.5 in December to an even stronger 60.8 on August 4 (a value above 50 is favorable)

? Homeownership averaged 63.4% during 2016, the lowest level in 50 years, but rose to 63.9% in the second quarter; GS expects homeownership to stability 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 Q1 survey, mortgage credit standards tightened slightly; there was no change in Q2

- **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 6.2% during 2016 and 6.0% Y/Y in Q1 2017

? According to the S&P Case-Shiller index, the year over year trend in housing prices was an increase of 5.9% in March, which is well above the rate of increase in nominal incomes and, thus, is not sustainable

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

+ The trade deficit in June, measured as a 12-month moving average, was 2.76%, slightly worse than December'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 -6.1% in July from December and is about the same level as prevailed in June 2016; the dollar has fallen because confidence in Trump economic stimulus has faded, greater than expected strength in European and emerging economic growth, and rising U.S. interest rates relative to interest rates in other developed countries

- **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 averaged about \$50 a barrel so far in 2017 and averaged \$49 in early August; downside risks to prices outweigh upside risks because of rapidly rising U.S. shale oil production, although a curtailment of Venezuela oil exports could lead to a price spike*
- **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 and again in June and reaffirmed its expectation to raise this rate one more time during 2017, probably in December; GS places the probability of a December increase at 70% but the market probability is barely above 50%*
 - + *The FOMC updated its guidelines for shrinking its balance sheet; most expect implementation to begin in September*
 - ? *Financial conditions have eased so far in 2017 and were 99.06 in early August compared to 100.05 in December and have now fallen 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 1.42% in June compared to June 2016; the index, which peaked in February at 2.18%, is now falling as the effects of the rebound from low oil prices experienced in early 2016 drop out of the index; the index now appears to be headed by year end to a level below the 1.7-2.0% range*
 - + *Conference Board 5-10 year inflation expectations fell slightly to 2.4% in April and May from 2.5% in February; inflation expectations for the next year fell from 2.7% in February to 2.5% in April*
 - + *5-year, 5-Year Forward Inflation Expectation rate derived from Treasury Inflation Protected Securities was 1.97% on August 8 compared to 2.08% on December 30, 2016; this translates into an expected long-run PCE inflation rate of approximately 1.7%*
- **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 1.50% in June compared to June 2016; it now appears that core PCE inflation will be near the bottom end of the forecast range by the end of the year or perhaps slightly below it; B of A's forecast for 2017 is 1.5%*
- 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 2.24% on August 9 compared to 2.45% on December 31, 2016*
- **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 is off to a very slow start; no significant legislation has yet been signed into law*
 - ? *President Trump's budget is a political document and is a nonstarter in Congress*

- *Congress failed to pass health care reform; this complicates prospects for tax reform legislation because the expected fiscal benefits from health care reform will not be available to offset tax cuts*
- *The odds of tax reform and infrastructure stimulus legislation are declining; enactment of legislation, if it occurs at all, increasingly is likely to be delayed until early 2018 and the impact may be smaller*
- *The U.S. debt ceiling will become binding on September 29; while Congress is likely to suspend the ceiling for a period of time, there is a small chance that default will occur*
- *Congress must pass a fiscal year 2018 budget resolution by September 30; if this does not occur, there will be a partial government shutdown; the most likely interim outcome is a temporary extension of fiscal year 2017 spending levels*

- 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.

+ *Through June 2017 the budget deficit for the prior 12 months is 3.69%*

+ *CBO's revised budget deficit projection for fiscal 2017 is 3.63%; my current estimate is 3.56%*

- **State and Local investment** spending growth should range between 1.0% and 1.5%.
 - *State and local spending rose at an annual rate of 0.1% in the first half of 2017; improvement is expected over the remainder of the year, but it is increasingly likely that state and local spending in 2017 will fall short of the 1.0% to 1.5% range*
 - ? *EvercoreISI's survey of state and local tax revenues rose to 48.2 in late July, but remains below 50, which indicates modest deceleration*

2. Rest of the World — July/August Assessment: Stronger economic activity and improving confidence

- ✓ *GS's global current activity indicator (CAI) was 4.3% in July, compared to 4.6% in May, 4.4% in April, 4.3% in March and 4.1% in February, indicating that global growth remains very strong but perhaps has passed the peak; global growth will probably exceed the forecast pace of 3.4% for 2017 and the 3.0% actual growth in 2016;*
- ✓ *CAI for major advanced economies has accelerated from 1.5% last summer to 2.9% in July*
- ✓ *CAI for emerging markets rose 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, and 5.4% in July*
- ✓ *OECD's global index of leading economic indicators has been rising over the past year and reached 100.2 in June, compared to 100.0 in March and 99.9 in April*
- ✓ *The Citi Global Surprise Index was -1.8 on July 5, but is expected to move back to a positive reading*
- ✓ *Annual growth in global trade was 3.4% in April compared to 6.2% in March, which was the fastest rate since 2011*
- ✓ *Inflation expectations in Europe and Japan are increasingly linked to realized inflation rather than to central bank policy rates, which are higher*

- **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 3.5%*
 - *GS has raised its 2017 forecast to 3.7%*
 - *Global growth has accelerated, political instability has been limited, and the dollar has weakened considerably*
 - ? *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*
- **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 best level of 56.0 since 2010 during the recovery from the Great Recession*
 - *B of A has increased its 2017 forecast to 1.7%*
 - *GS has raised its 2017 forecast to 1.9%*
 - *The euro has strengthened considerably*
- **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 1.4% (it was 1.3% in July); however, core inflation is stable at approximately 1% (it was 1.2% in July)*
- **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*
 - ? *Germany holds Bundestag elections on September 24; it is assumed that Angela Merkel will win and continue as Chancellor*
 - ? *The cyclical economic upturn in Europe has put the damper on the tides of populism for the time being*
 - ? *Italy is not scheduled to hold elections until 2018; while popular support for the euro is ebbing, Italy's recent return to tepid growth may limit support for Euroskeptic parties*

? Greece has faded from the news and appears to be complying, albeit grudgingly, with creditor bailout requirements; for now, no new crisis is expected in Greece

? 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 will develop 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 has ebbed

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

? Parliament initiated the two-year time frame for U.K. withdrawal from the European Union on March 29; negotiations began in late June but there have been no public statements about progress

? 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 1.7%; however, given the U.K.'s impending exit from the European Union, growth is expected to decelerate in future years

- **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; however, 2017 GDP growth is still tracking 6.6%, although GS's current estimate is 6.8%

- Growth momentum is strong and downside risks have diminished; however, GS's current activity indicator is edging lower and was 6.2% in June

? The yuan is down against the dollar over the last 12 months, but has strengthened slightly in recent months; foreign reserves have dropped below a still very hefty \$3 trillion

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

? The 19th Party Congress will be held in the fall of 2017; President Xi will receive a second term; however, there is no indication at this time that economic reforms will be a significant agenda matter

- **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.

- Expected 2017 inflation has been marked up to 1.6%, but core inflation is expected to be 0.3%

- GDP growth has been marked up to 1.6% by B of A and to 1.2% by GS

- GS's current activity indicator was above 2.0% in May and June

- **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; increasingly it is looking like India can sustain high GDP growth for a number of years, which will offset a probable slowing of growth in China*

+ *GDP growth is on track to reach 7.3% in 2017 and is expected to accelerate in 2018*

+ *GS's current activity indicator has been rising sharply since early in the year and reached nearly 12.0% in May and June*

- **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; the dollar's decline in value has diminished potential risks to growth*

+ *GS's current activity index for emerging markets countries rose from 4.3% in January to 4.7% in February, to 5.5% in March, 5.6% in April, 6.1% in May, and 5.4% in July*

+ *GDP growth is expected to be 3.5% in 2017 and 3.6% 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 0.7%; GS's current activity indicator has been modestly positive so far in 2017; however, the political situation is deteriorating once again*

- *Economic conditions are improving in Russia; GDP growth is expected to be 1.9% in 2017; GS's current activity indicator is hovering close to 4.0%*

+ *Economic and political conditions continue to deteriorate in Venezuela, but regime change does not appear to be imminent*

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

July/August Assessment: No significant positive or negative risks have surfaced so far in 2017

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

- *Risk not realized; however, updated forecasts for actual real GDP growth have edged toward the lower end 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 7 months of 2017 employment growth is significantly above the expected level*

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

+ *The participation rate has risen from 62.67% to 62.90%*

- **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 2.62% in July*

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

- *Risk not realized, the rate has fallen more than expected*
- **U.S. productivity** remains below 1%
 - + *Q2 2016 to Q2 2017 productivity increased 1.2%, but the 12-quarter moving average was 0.8%; the full year productivity increase is on track to fall below 1%*
- **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 slightly above the upper end of the expected range, but should be near the top end of the range by yearend*
- **U.S. stock prices** fall more than or rise more than the expected range of -10% to +5%
 - + *Growth in stock prices is 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 expected to be less than expected*
- **U.S. residential housing price increases** are less than expected
 - *Housing prices are rising more than expected*
- **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 grew much more than expected in the first half of 2017 and 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 but about the same as at the beginning of the year*
- **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
 - *Risk not realized, price volatility has been modest and prices have remained within the expected range*
- **U.S. monetary policy** tightens more than 75 basis points, spawns financial market uncertainty and contributes to global financial instability
 - *The FOMC has increased the federal funds rate 50 basis points and expects to increase that rate another 25 basis points, probably in December*
- **Financial conditions** tighten and cause financial market volatility
 - *Risk not realized, financial conditions have eased modestly so far in 2017 and are supportive of slightly greater real GDP growth in 2017*
- **U.S. inflation** falls or rises more than expected
 - + *Inflation is weaker than expected and is on a course to considerably lower than 2016's inflation rate*

- **U.S. interest rates** fall or rise more than expected
 - *Risk not realized; however, long-term rates have fallen modestly since the beginning of the year rather than rising slightly, as expected*
- **U.S. fiscal policy** is more expansionary than expected
 - *Risk not realized; however, the chances that tax reform and infrastructure stimulus will be delayed and smaller are rising*
- **Federal budget deficit** increases more than expected
 - *Risk not realized; according to CBO the deficit is likely to be within the expected range*
- **U.S. state and local spending** does not rise as fast as expected
 - + *Spending is likely to increase less than expected in 2017*
- **Global GDP growth** does not rise as fast as expected
 - *Risk not realized; growth is accelerating and is expected to be 3.5% in 2017 and 3.6% in 2018*
- **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*
- **European growth** is considerably less than expected
 - *Risk not realized, growth is accelerating and is expected to reach 1.9% in 2017*
- **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 to 1.4% in 2017, but the 2.0% target will be very hard to attain — the forecast for 2018 is 1.0%*
- **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*
 - ? *Germany's parliamentary elections in September are expected to return Angela Merkel as Chancellor*
 - *Populism is receding for the time being as a significant political force as European economies continue to improve*
- **Chinese** leaders have difficulty implementing economic reforms
 - ? *The word "difficulty" may be the wrong word choice, as leaders appear to lack resolve to pursue economic reforms*
 - ? *November marks the five-year point in President Xi's term; party officials will meet at the 19 Party Congress in November to consider policy and leadership changes*

- ***China's growth*** slows more than expected
 - *Risk not likely to be realized in 2017, but risks are building for a significant slowdown in future years; second quarter growth was 6.8% and is likely to be 6.6% or greater for all of 2017*
- ***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; Japan is expected to report a 2.5% annual rate of growth for the second quarter, which will be the 6 consecutive quarter of growth; growth for 2017 is forecast to be 1.6%*
 - *The inflation goal of 2% will not be met, but core inflation has moved up to 0.3% and is expected to be 0.5% for all of 2017*
- ***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
- ***New risk*** — North Korea's developing nuclear strike capability and potential for pre-emptive military intervention to neutralize that capability
 - + *Risk is simmering after 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."*

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