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

Barnett Sivon & Natter P.C.
ATTORNEYS at LAW
WASHINGTON, DC

The Longbrake Letter
Long-Run U.S. Economic Outlook — Scenarios*

Bill Longbrake

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This part of the ***December Longbrake Letter*** includes forecasts of key economic indicators for various economic scenarios. In addition to forecasts from Goldman Sachs (**GS**), Bank of America Merrill Lynch (**B of A**), and the Congressional Budget Office (**CBO**), I include three of my own scenarios — "**Steady Growth**," "**Strong Growth**," and "**Recession/Stagnation**."

"Steady Growth" scenario is characterized by slowing growth in total hours worked over time and growth in public and private investment that falls short of historical levels. ***"Strong Growth"*** scenario embodies faster employment and investment growth. ***"Recession/Stagnation"*** scenario assumes a near-term shallow recession followed by slow recovery.

In the following tables and charts the pathways of key economic measures for the time period 2015 to 2023 are illustrated for my three scenarios — "***Steady Growth***," "***Strong Growth***," and "***Recession/ Stagnation***," and for ***CBO, GS*** and **B of A**, to the extent data are available.

Generally, data for the near-term years are forecasts. Data for years farther into the future are scenarios based upon assumptions. None of my scenarios are forecasts; all are based on specific assumptions of different economic environments. Key assumptions are employment growth and productivity. Other economic variables, such as stock prices, oil prices and investment, for example, are assumed to vary in ways consistent with historical patterns in employment growth and productivity.

Two sets of charts are presented for most economic indicators. The **A** charts usually show quarterly detail from 2015 to 2019. The **B** charts show annual values from 2014 to 2023.

Some tables summarize data for two time periods: 2014-2017 and 2018-2023, as well as showing the projection for 2023 and the average for the entire period 2014-2023. Other tables show annual values for each year from 2014 or 2015 to 2023.

*The information contained in this newsletter does not constitute legal advice. This newsletter is intended for educational and informational purposes only.

Tables and charts in the first five sections focus on employment growth and productivity assumptions, which are key inputs to real GDP forecast, potential and output gap projections.

Then in following pages forecasts/projections are included for the following economic indicators:

- Unemployment rate
- Nominal hourly wage rate
- Investment — private and government
- Housing starts
- Consumer spending — nominal and real
- Inflation
- Federal funds rate
- Natural rate of interest
- 10-year Treasury yield
- Federal budget — annual deficit and total federal public debt to nominal GDP

There is one unusual aspect of the projections I make for certain economic indicators in my three scenarios. That has to do with how inflation evolves over the next several years. The consensus believes that inflation has bottomed and will begin moving gradually back toward and reach the Federal Reserve's 2.0 percent target within approximately three years. My inflation forecast, which is based on my statistical models, projects a further decline in inflation over the next two years before inflation begins to rise; in my scenarios inflation does not reach the Federal Reserve's 2.0 percent target until 2022. Of course, there is no assurance that my scenarios are better than those of the consensus; however, they do point out that there are still downside risks to the inflation outlook in the near term. Such risks have been given short shrift by most analysts perhaps because of the widely-shared belief that the Federal Reserve's monetary policy will be successful in achieving the 2.0 percent inflation target. While there may be merit to this belief, it may take much longer to occur than the consensus expects. Certainly, that has already been the case over the past several years — each year for the last several years forecasters have expected inflation to begin rising. When that did not occur, forecasters generally kept the same forecasts but simply pushed them out another year. Will this continue to happen? Perhaps not, but it is a real possibility to be given serious consideration.

If inflation remains weaker than expected, this would impact projections of several other economic indicators such as nominal GDP growth, nominal wage rate growth, nominal consumer spending, interest rates, and the ratio of total federal debt held by the public to nominal GDP. Lower than expected inflation would not be a welcome development, especially since it would accentuate the financial pressures stemming from a still highly debt-leveraged economy.

1. Employment growth

Table 1 shows key values for labor growth. **Chart 1A** shows quarterly forecasts/projections for payroll employment growth from 2015 to 2019. Ideally, employment growth should be measured as total hours worked. However, **GS** and **B of A** only provide forecasts for total payroll employment, which is an incomplete measure if average weekly hours change systematically over time. **Chart 1B** presents projections for growth in total hours worked from 2015 to 2023.

Table 1
Employment Growth Projections for 2014-2017, 2018-2023 and 2014-2023 (percentages)

	Steady Growth	Strong Growth	Recession/Stagnation	GS	B of A	CBO
A. Payroll Growth						
2015	1.78	1.78	1.64	1.80	1.81	1.66
2016	1.39	1.40	-.54	1.10	1.33	1.40
2017	.94	1.12	2.43	.80	.83	.94
2018	.53	.83	.91	.77		.53
2019	.48	.75	.41	.69		.48
B. Hours Worked						
2014-2017	1.50	1.56	1.43			1.00*
2018-2023	.36	.50	.24			.53*
2023	.45	.46	.26			.59*
2014-2023	.82	.93	.71			.72*
*CBO — data for hours worked is potential rather than forecast actual						

Employment growth declines over time in all scenarios toward a level consistent with demographic trends. My "***Steady Growth***" scenario intentionally tracks ***CBO's*** forecast in terms of payroll employment but diverges on the assumption of average weekly hours. My scenarios embed an assumption that the trend over time toward a greater proportion of part-time jobs continues and drives down average weekly hours. Thus, my scenarios project slower growth in total hours worked compared to ***CBO*** over the longer term.

Differences in my scenarios over the forecast period depend on assumptions about labor force participation and average weekly hours.

Over 2016 and 2017, both ***GS*** and ***B of A*** are slightly more pessimistic about payroll employment growth. Then ***GS's*** forecast is slightly more optimistic in 2018 and 2019.

CHART 1A – Payroll Employment Growth

(rate of change)

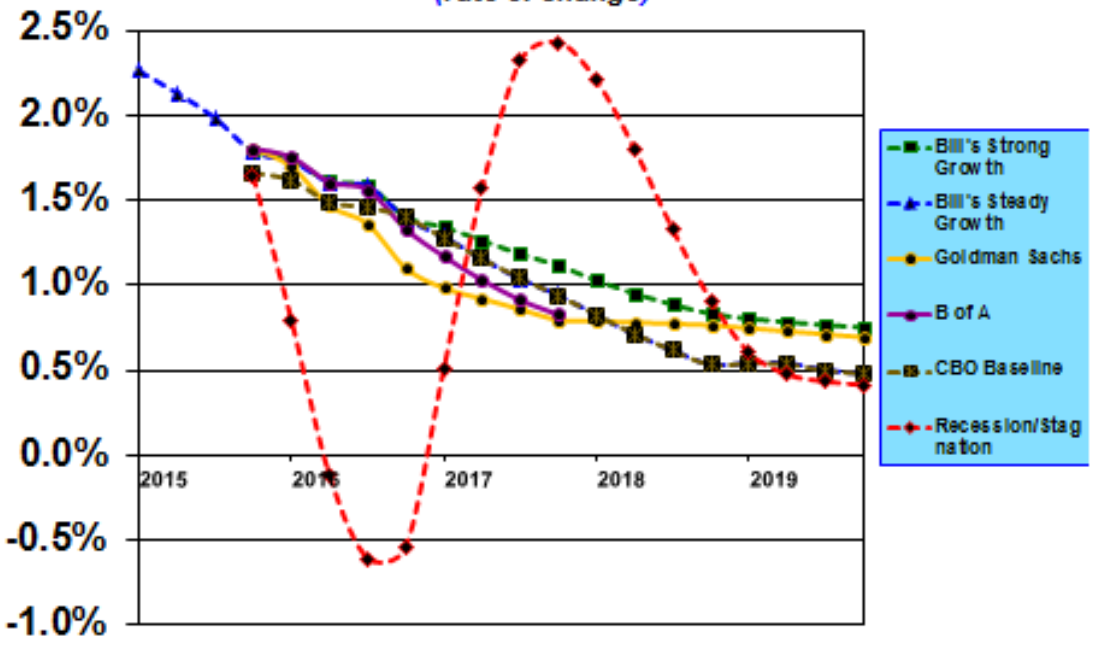

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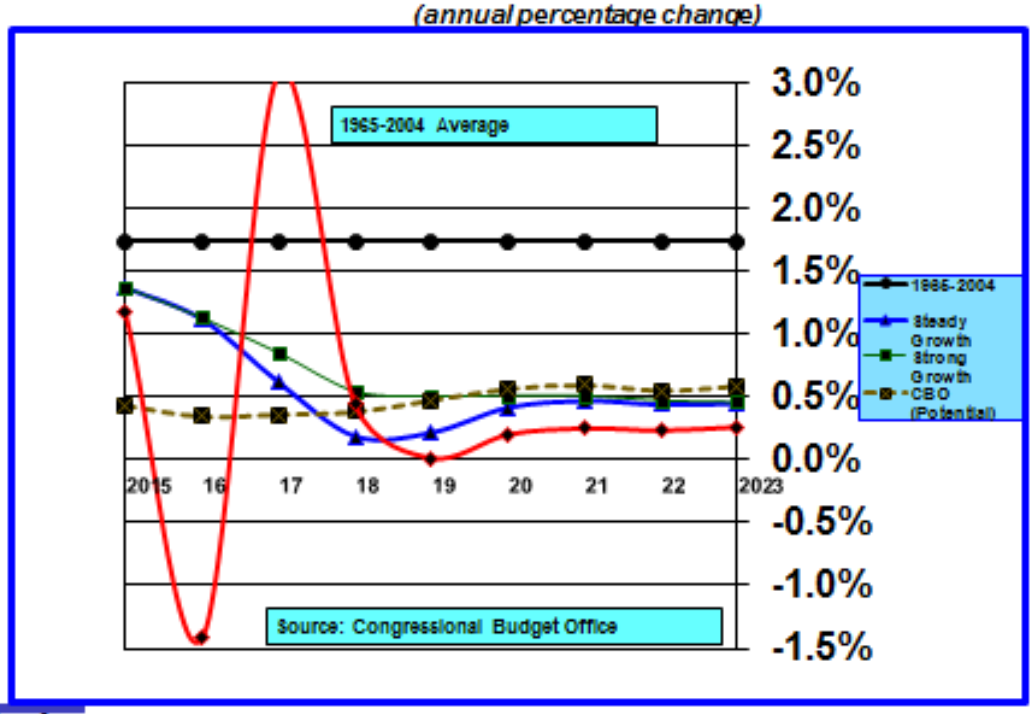
CHART 1B – Employment Growth (Hours Worked)

(annual percentage change)



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2. Productivity

Table 2 shows key values for productivity. **Chart 2A** shows quarterly forecasts/projections from 2015 to 2019. **Chart 2B** presents annual projections for 2015 to 2023.

Table 2
Productivity for 2014-2017, 2018-2023 and 2014-2023 (percentages)

	Steady Growth	Strong Growth	Recession/Stagnation	GS	B of A	CBO
A. Productivity						
2015	1.31	1.37	.97		1.10	1.17
2016	.70	.84	1.51		.95	1.42
2017	1.38	1.39	-.36		.90	1.61
2018	1.30	1.26	.78			1.75
2019	1.60	1.64	1.66			1.72
B. Productivity						
2014-2017	.94	.99	.90	1.30	.87	1.22
2018-2023	1.48	1.65	1.29	1.50		1.66
2023	1.52	1.89	1.68	1.50		1.56
2014-2023	1.27	1.38	1.13	1.42		1.49

Productivity has been very depressed by historical standards in recent years. Most analysts expect productivity to improve in coming years but not to reach the historical average of approximately 2.1 percent. Slower productivity growth stems from reduced investment growth. Reduced investment growth is caused by slower employment and real income growth. But, some argue that it is also the consequence of monetary policy that has depressed rates of return and encouraged financial engineering in lieu of investment in productive activity.

CBO expects productivity to peak in 2018 and then gradually decline. The long-run differences in productivity in my scenarios depend on the strength of government and private investment spending.

The rise in productivity in 2016 followed by a fall in 2017 in my "***Recession/Stagnation***" scenario follows a traditional cyclical pattern.

CHART 2A – Productivity

(four-quarter average rate of change)

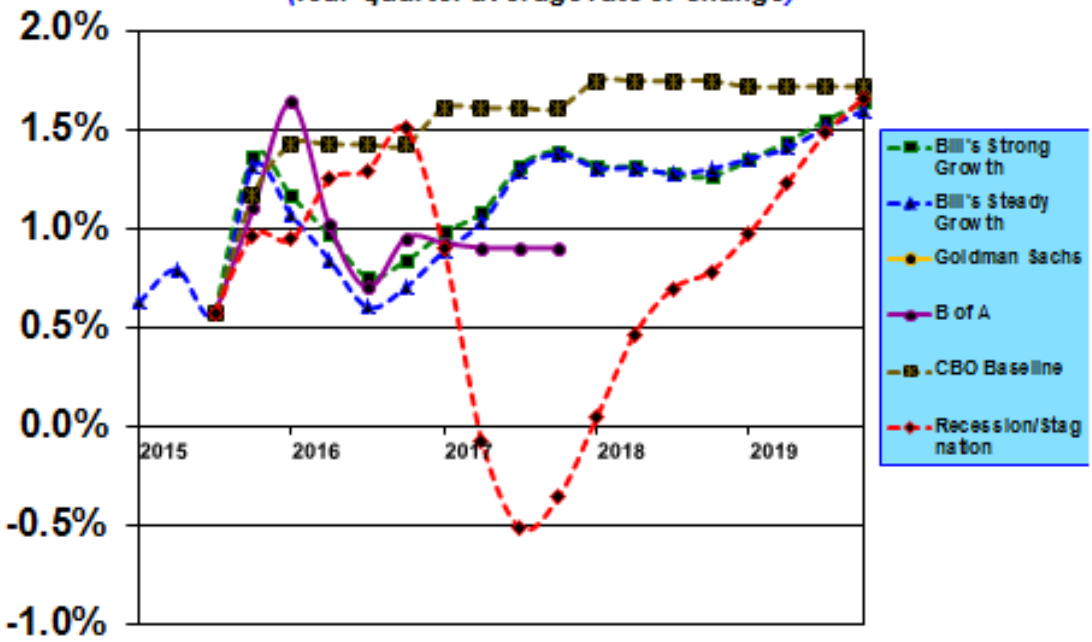

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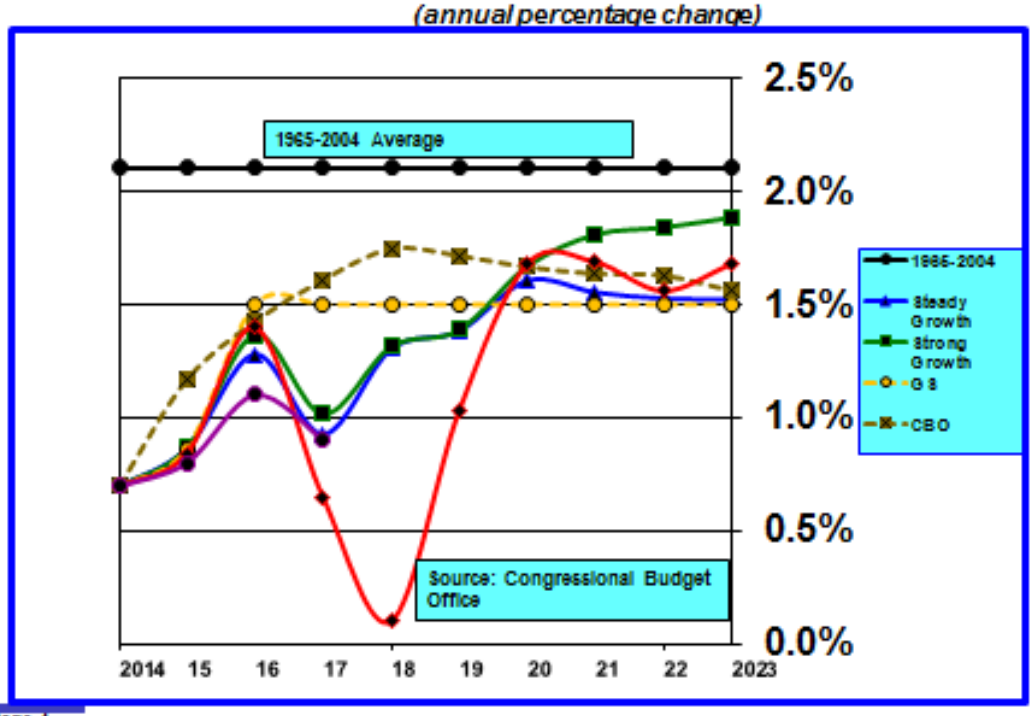
CHART 2B – Productivity

(annual percentage change)



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3. Potential real GDP

Table 3 shows key values for potential real GDP growth. **Chart 3A** shows quarterly forecasts/projections from 2015 to 2019. **Chart 3B** presents annual projections for 2015 to 2023.

Table 3
Potential Real GDP Growth for 2014-2017, 2018-2023 and 2014-2023 (percentages)

	Steady Growth	Strong Growth	Recession/Stagnation	GS	B of A	CBO
A. Potential Real GDP						
2015	1.55	1.55	1.54	1.73	2.00	1.66
2016	1.38	1.40	1.40	1.75	2.00	1.83
2017	1.60	1.64	1.56	1.75	2.00	2.02
2018	1.74	1.74	1.11	1.75	2.00	2.17
2019	1.87	1.90	1.73	1.75	2.00	2.22
B. Potential Real GDP						
2014-2017	1.50	1.51	1.50	1.69		1.75
2018-2023	1.82	2.00	1.73	1.75		2.18
2023	1.79	2.14	1.86	1.75		2.11
2014-2023	1.69	1.80	1.64	1.72		2.01

Potential real GDP growth is derived directly from assumptions about growth in total hours worked and productivity.

In the aftermath of the Great Recession, potential real GDP growth has been severely depressed relative to historical experience. ***CBO*** expects a slight improvement in potential real GDP, peaking at 2.2 percent in 2019 and then beginning a gradual decline to 2.1 percent by 2023, essentially because of slowing productivity. **GS** and **B of A** and other analysts are less optimistic. The Federal Open Market Committee (FOMC) expects long-run potential real GDP growth to settle at an uninspiring level of 2.0 percent.

My estimates of long-run potential real GDP growth generally are slightly lower because both expected hours and productivity grow a little more slowly. However, ***GS's*** long-run assumption of 1.75 percent potential real GDP growth is consistent with the assumption in my "***Steady Growth***" scenario.

CHART 3A – Potential Real GDP Growth

(four-quarter average rate of change)

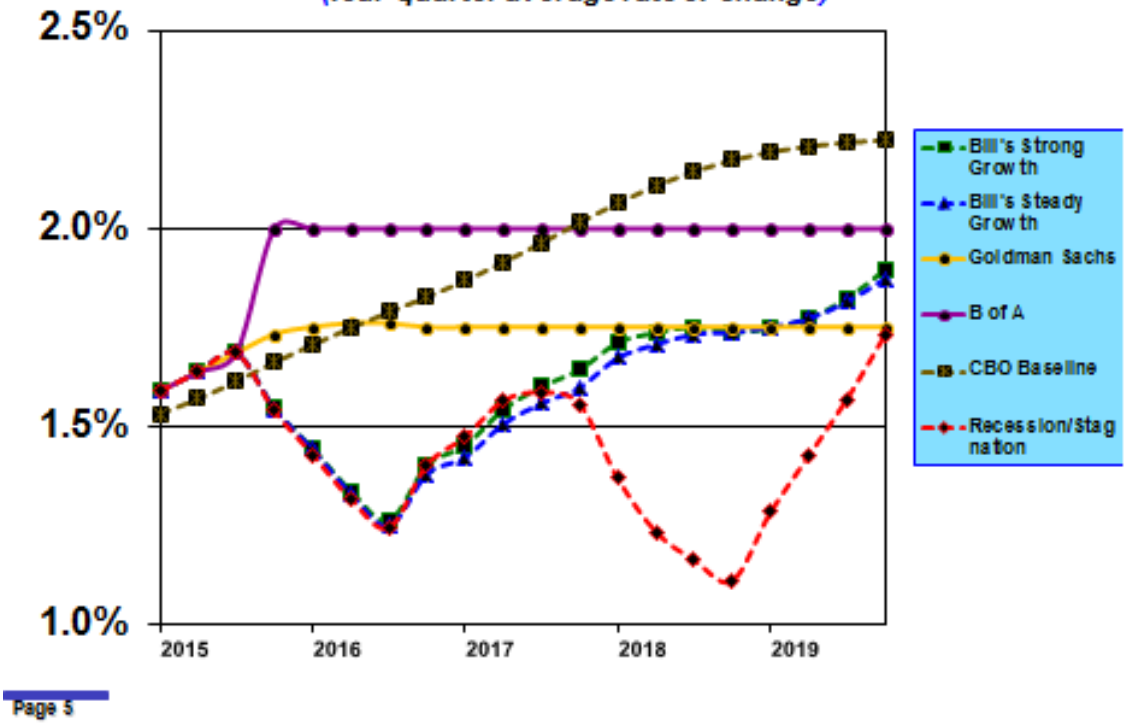

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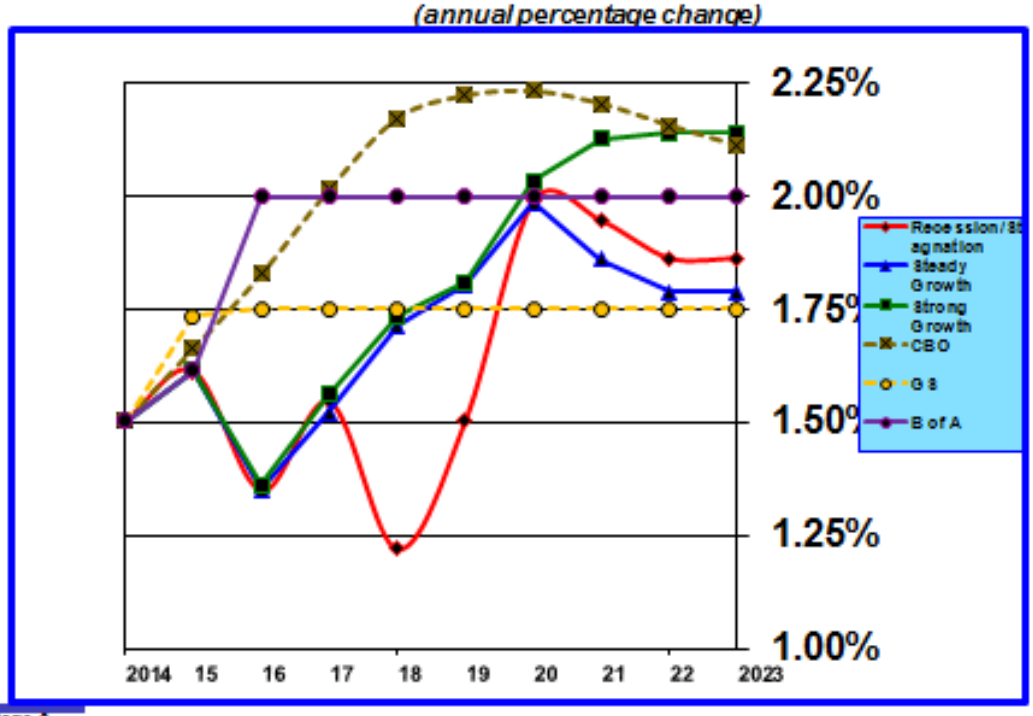
CHART 3B – Potential Real GDP Growth

(annual percentage change)



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4. Forecast real GDP

Table 4 shows key values for forecast real GDP growth. **Chart 4A** shows quarterly forecasts/projections from 2015 to 2019. **Chart 4B** presents annual projections for 2015 to 2023.

Table 4
Forecast Real GDP Growth for 2014-2017, 2018-2023 and 2014-2023 (percentages)

	Steady Growth	Strong Growth	Recession/Stagnation	GS	B of A	CBO
A. Forecast Real GDP						
2015	2.45	2.49	2.06	2.20	2.13	2.81
2016	1.93	2.05	.54	2.30	2.49	3.67
2017	1.79	1.99	2.31	2.20	2.30	2.68
2018	1.43	1.70	1.15	1.99	2.00	2.21
2019	1.68	1.95	1.46	1.79	2.00	2.23
B. Forecast Real GDP						
2014-2017	2.26	2.33	1.90	2.38	2.42	2.90
2018-2023	1.68	1.97	1.59	1.82	2.02	2.17
2023	1.69	2.03	1.79	1.75	2.00	2.14
2014-2023	1.91	2.11	1.71	2.04	2.18	2.46

With the exception of CBO, most analysts, as well as the Federal Reserve, have come around to the conclusion that actual real GDP growth will not accelerate much in coming years. Indeed, the trend will in the direction of somewhat slower actual growth over time as employment growth slows.

Overall, my scenarios are slightly more pessimistic than others, primarily because I expect growth to be slower sooner than later. By 2023 there is not much difference between my "***Steady Growth***" and "***Strong Growth***" scenarios from **GS** and **B of A**.

There seems little doubt in my mind that **CBO** will scale back its real GDP forecast in its next update. I expect that **CBO** will also scale back its estimate of potential real GDP growth at the same time. If it does not do so, the arithmetic would result in a fairly large real GDP output gap (see **Chart 5**, which shows large output gaps that do not close over time because the denominator in most cases is **CBO's** estimate of potential real GDP, but the numerator is lower real growth than assumed by **CBO**).

CHART 4A – Real GDP Growth Forecasts

(four-quarter average rate of change)

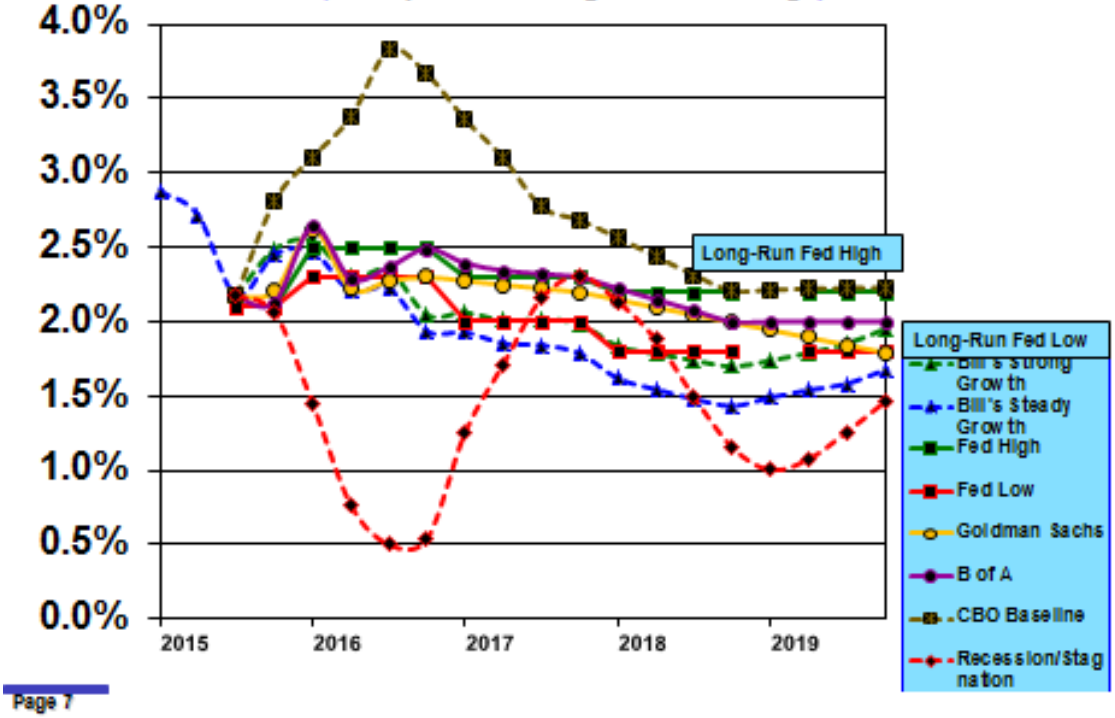

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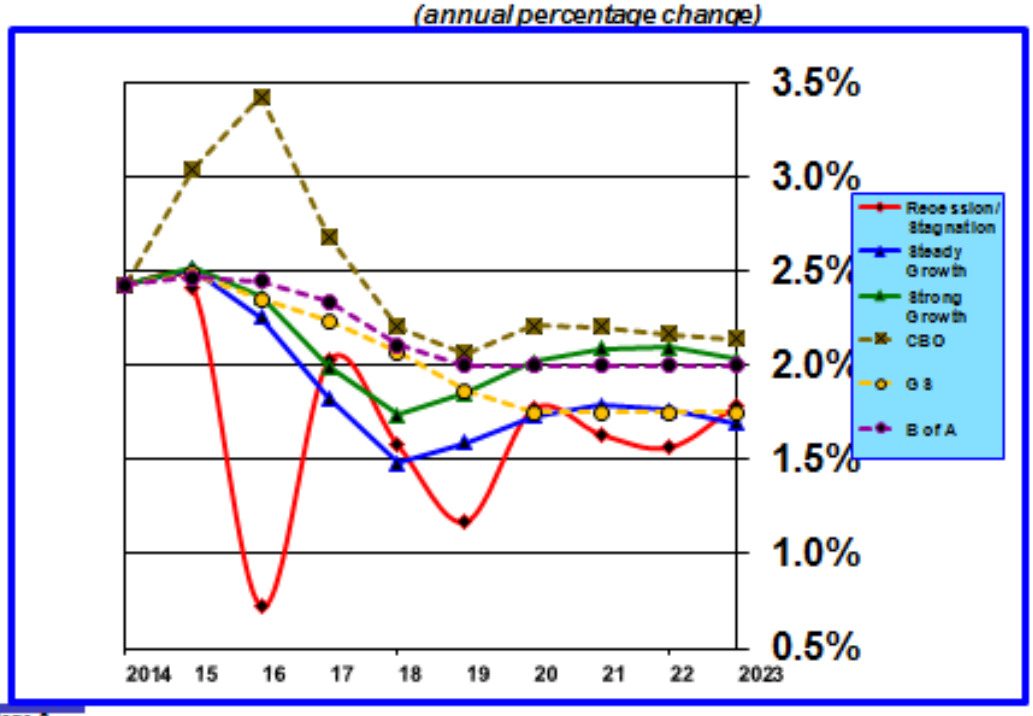
CHART 4B – Real GDP Growth Forecasts

(annual percentage change)



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5. Real GDP Output Gap

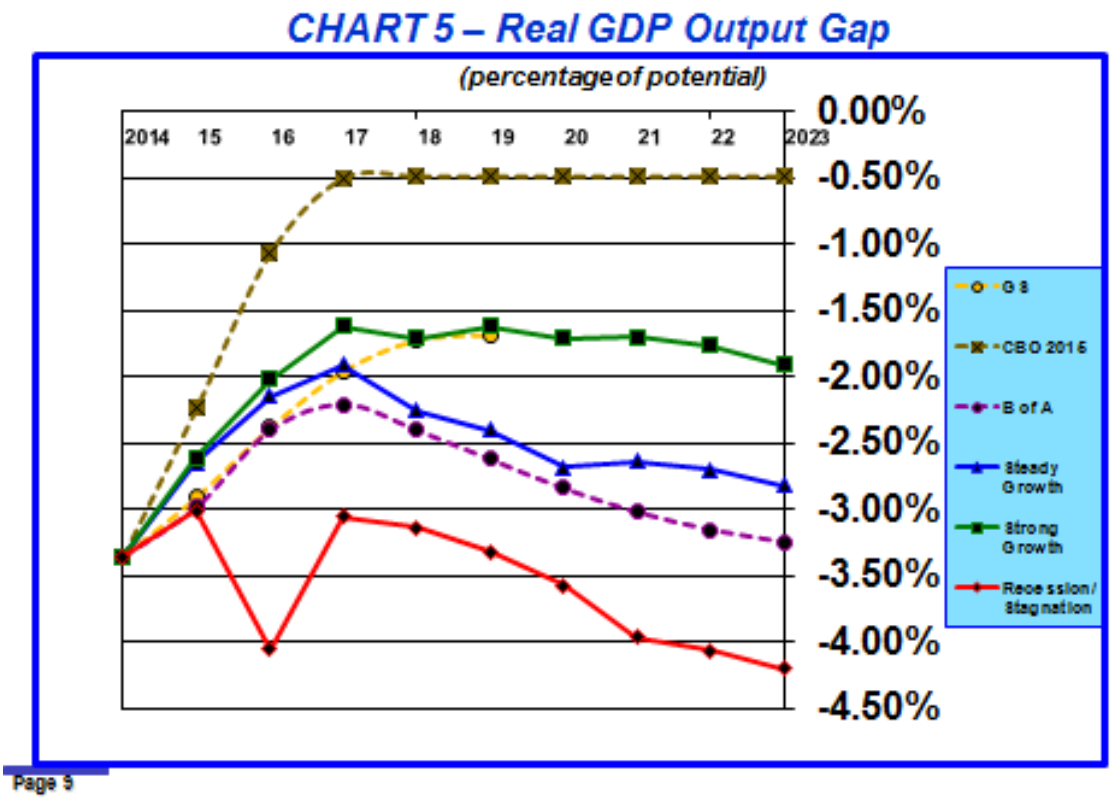
Table 5 shows key values for the real GDP output gap. **Chart 5** presents annual projections for 2015 to 2023.

Table 5
Real GDP Output Gap for 2014-2023 (percentages)

	Steady Growth	Strong Growth	Recession/Stagnation	GS	B of A	CBO
Real GDP Output Gap						
2014	-3.35*	-3.35*	-3.35*	-3.35	-3.35*	-3.35
2015	-2.64*	-2.61*	-3.01*	-2.91	-2.98*	-2.23
2016	-2.14*	-2.01*	-4.05*	-2.39	-2.40*	-1.07
2017	-1.91*	-1.62*	-3.06*	-1.96	-2.21*	-.50
2018	-2.26*	-1.70*	-3.14*	-1.72	-2.40*	-.48
2019	-2.40*	-1.61*	-3.32*	-1.68	-2.62*	-.48
2020	-2.68*	-1.70*	-3.58*		-2.84*	-.48
2021	-2.63*	-1.70*	-3.96*		-3.02*	-.48
2022	-2.70*	-1.76*	-4.07*		-3.15*	-.48
2023	-2.82*	-1.90*	-4.20*		-3.24*	-.48

*Real GDP Output Gap = forecast real GDP/CBO potential real GDP

Table 5 and **Chart 5** don't make a whole lot of sense. That is because **CBO** has been too optimistic about potential real GDP and is likely to reduce its estimates at the time of its next revision. The revision could be very large because **CBO** is also probably too optimistic about actual real GDP growth. **GS's** estimate of the output gap appears more reasonable since the estimate is based on **GS's** own values for potential real GDP rather than on **CBO's** estimates. **GS's** output gap, while diminishing over time, remains and this implies limited pressure on inflation for a long time to come.

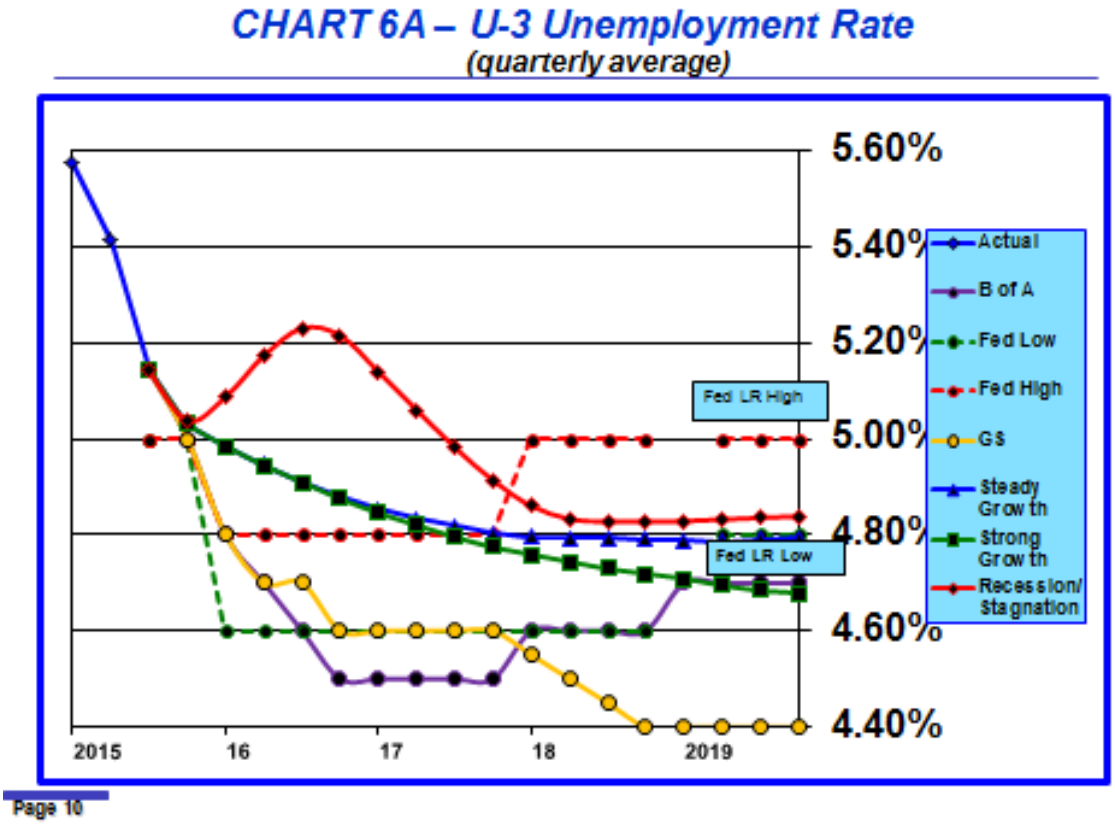


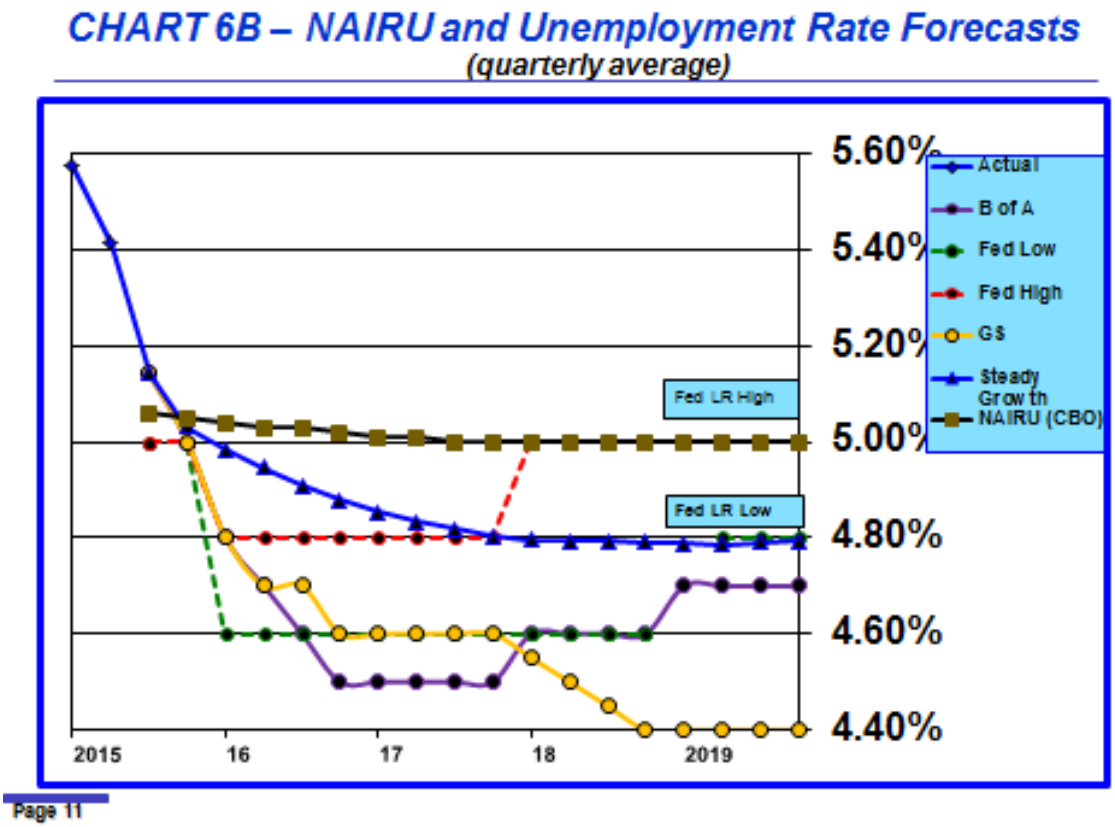
6. Unemployment Rate

Table 6 shows key values for the U-3 unemployment rate. **Chart 6A** shows quarterly forecasts/projections from 2015 to 2019. **Chart 6B** shows CBO's estimate of NAIRU, the non-accelerating inflation rate of unemployment. NAIRU is the estimate of "full employment." When actual unemployment is above this rate, an unemployment gap is believed to exist and there is downward pressure on inflation. The reverse is true when the actual unemployment rate is below NAIRU.

Table 6
U-3 Unemployment Rate for 2014-2019 (percentages)

	Steady Growth	Strong Growth	Recession-Stagnation	GS	B of A	CBO	NAIRU
Unemployment Rate							
2014	5.70	5.70	5.70	5.70	5.70	5.70	5.08
2015	5.03	5.03	5.04	5.00	5.00	5.25	5.05
2016	4.88	4.88	5.21	4.60	4.50	5.06	5.02
2017	4.80	4.77	4.91	4.60	4.50	5.02	5.00
2018	4.79	4.72	4.83	4.40	4.60	5.02	5.00
2019	4.79	4.68	4.84	4.40	4.70	5.09	5.00





Currently, the U-3 unemployment rate and NAIRU are both approximately 5.0 percent, which indicates that the employment gap has been eliminated. However, other labor market measures indicate that some slack remains in the labor market, but most analysts believe that what little slack remains is rapidly disappearing.

All forecasts, with the exception of **CBO's**, fall slightly below NAIRU over the next few years. This expectation and the historical relationship between NAIRU and inflation, referred to by economists as the Phillip's curve, provides a certain amount of comfort that inflation is more likely to rise than to fall in coming months. However, there are other forces that impact inflation and many of these at the moment are pushing in the opposite direction. Thus, it remains to be seen whether a tightening labor market will have any material upward impact on inflation in the near future.

7. Nominal Hourly Wage Rate Growth

Table 7A shows values for forecast hourly nominal wage-rate growth for the Bureau of Labor Statistics' (BLS) measure for production and nonsupervisory workers. **Chart 7** presents annual projections for 2015 to 2023.

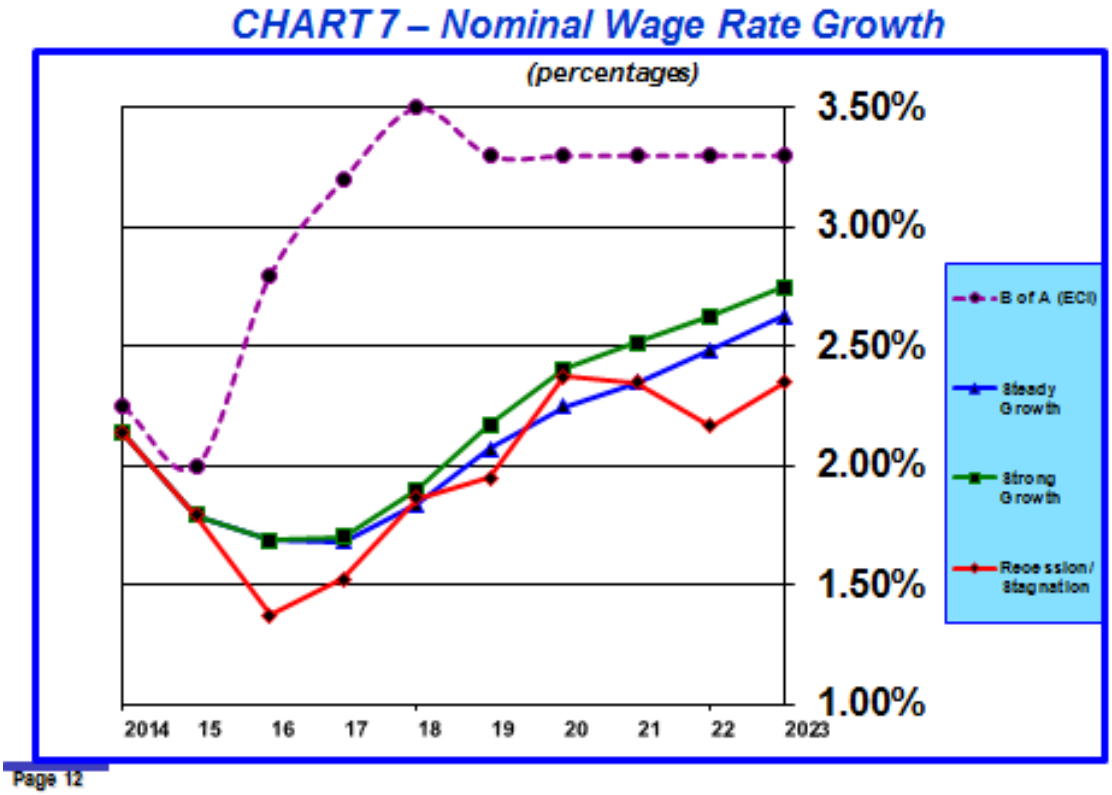
Table 7A
Hourly Wage Rate Growth for Production and Nonsupervisory Workers 2014-2023
(percentages)

	Steady Growth	Steady Growth Stable Dollar	Strong Growth	Recession-Stagnation	GS	B of A*	CBO
Wage Rate Growth							
2014	2.13	2.13	2.13	2.13		2.25	
2015	1.79	1.79	1.79	1.79		2.00	
2016	1.69	1.70	1.69	1.37		2.80	
2017	1.68	1.69	1.70	1.52		3.20	
2018	1.84	1.89	1.90	1.87		3.50	
2019	2.07	2.15	2.17	1.95		3.30	
2020	2.25	2.32	2.41	2.37		3.30	
2021	2.35	2.43	2.51	2.35		3.30	
2022	2.49	2.53	2.63	2.17		3.30	
2023	2.63	2.61	2.75	2.35		3.30	

*B of A's forecast is for the wages component of the Employment Cost Index

There are three primary broad-based measures of labor compensation that provide information about compensation trends. Both are compiled by the BLS. Two are released monthly as part of the monthly labor situation report. One includes hourly and weekly wage rates for all workers and a second contains hourly and weekly wage rates for production and nonsupervisory workers. Neither includes information about benefits which comprise approximately 30 percent of total compensation. The third measure, the employment cost index (ECI), is released quarterly and consists of wage and salary, benefits, and total compensation indices.

Although all three sets of measures are highly correlated over time, because compilation methodologies differ for each set of measures, percentage changes over fixed time periods will not necessarily be in sync. This is the case currently. Hourly wages for all employees are rising 2.19 percent annually, but this is only 12 basis points higher than the 2.07 percent rate of increase that prevailed 12 months ago. However, hourly wages for production and nonsupervisory workers are rising 1.95 percent annually, but are down 40 basis points from 2.35 percent a year ago. This divergence appears to be related to compositional effects of production and nonsupervisory workers involving faster growth in the low hourly wage segment over the last year. Over time, compositional effects should wash out but can lead to trend divergences over short



periods of time.

The wage and salary component of ECI, which had been relatively stable at a 1.5 percent annual rate of growth between 2009 and 2013, began edging up in 2014 and was 2.07 percent in the third quarter of 2015. The more comprehensive measure of ECI, which includes benefits, has risen only 1.88 percent over the last year. In fact, growth in the wages and salaries component of ECI has been stable over the last year while growth in benefits has fallen considerably.

Data for production and supervisory workers cover a very large portion of all employees but leave out higher paid workers. However, I use that data series for statistical purposes because it has the longest historical record. Because the various measures of wage rates are highly correlated over long periods of time, forecast trends will be similar, even if the specific forecast values for nominal wage rate growth vary for each measure.

As the labor market continues to tighten, economists continue to expect wage rate growth to accelerate. The laws of supply and demand support this expectation. So, the real question is one of just how much faster wages should grow in an economy at full employment.

As can be seen in **Chart 7**, **B of A** expects the nominal wage growth component of ECI to move up from its recent level of 2.1 percent in the third quarter of 2015 to 3.5 percent in 2018 before stabilizing at 3.3 percent thereafter. This projected increase is consistent with the historical record which indicates that growth in wages peaked at 3.6 percent in 2007 just prior to the Great Recession. However, the question

that should be asked is whether this apparently moderate increase, which emulates the historical pattern, is likely to occur. My own statistical analysis suggests otherwise and is graphically very apparent in **Chart 7**.

Contrary to consensus expectations my statistical analysis suggests wage rate growth for production and nonsupervisory workers will slow to about 1.7 percent by 2017 and then rise gradually to 2.6 percent by 2023, based on assumptions embedded in my "***Slow Growth***" scenario. The projected level is a slightly higher 2.8 percent in 2023 in my "***Strong Growth***" scenario.

Forecast wage rate growth for production and nonsupervisory workers is based on four variables: core PCE inflation rate, productivity, the long-term U-3 unemployment rate (greater than 26 weeks), and the rate of growth in total hours worked. The short-term U-3 unemployment rate and the unemployment gap (difference between total U-3 unemployment rate and CBO's full-employment rate) were not statistically significant. **Table 7B** shows the coefficients of each of these four variables and the average lag time in months between a change in the value of each variable and a change in the rate of growth in wages.

Table 7B
Factors Affecting Growth in Nominal Wage Rates for Production and Nonsupervisory Employee

			ASSUMPTIONS		
	Coefficient	Average Lag in Months	Slow Growth 2017	Slow Growth 2023	CBO 2023
Core PCE	.371	9.4	.99%	1.93%	1.97%
Productivity	.231	58.9	.42%	1.39%	1.52%
Long-Term Unemployment Rate (>26 weeks)	-.633	56.4	2.90%	.97%	0.82%
Growth Rate in Total Hours Worked	.627	27.2	1.76%	.39%	.59%

Table 7B also shows the assumed values in the right three columns for each of the four variables for three scenarios: "***Slow Growth-2017***," "***Slow Growth-2023***," and CBO-2023. **Table 7C** shows the contributions of each of these four variables to for each of the three scenarios, as well as the total estimated rate of growth in nominal wages.

The last line in **Table 7C** contains an estimate of wage rate growth if the value of the traded-weighted dollar remains unchanged at the November 2015 level. As is explained in the section discussing the core PCE inflation forecasts, a rising value of the trade-weighted dollar depresses inflation. My model forecasts an increase in the value over the next several months; however, most recent dollar forecasts do not project the dollar to rise any further. If the dollar's value remains stable instead of rising, inflation will be slightly higher in the next few years. However, as the last line in **Table 7C** indicates, changing the dollar assumption has a negligible impact on the nominal hourly wage rate growth forecasts.

The coefficients in **Table 7B** indicate that the nominal wage rate increases as inflation, productivity, and growth in total hours worked rises and falls as long-term unemployment rises. The lagged impacts of productivity and long-term unemployment take nearly five years to impact wage rate growth which explains

Table 7C
Nominal Wage Rate Growth Forecasts for Production and Nonsupervisory Employees

		CONTRIBUTIONS		
	Coefficient	Slow Growth 2017	Slow Growth 2023	CBO 2023
Constant		1.97%	1.97%	1.97%
Core PCE	.371	.37%	.72%	.74%
Productivity	.231	.10%	.32%	.35%
Long-Term Unemployment Rate (>26 weeks)	-.633	-1.84%	-.61%	-.51%
Growth Rate in Total Hours Worked	.627	1.10%	.24%	.37%
Wage Growth Rate Estimate		**1.71%**	**2.64%**	**2.92%**
Wage Growth Rate Estimate (Stable Dollar)		**1.72%**	**2.61%**	**2.92%**

why wage rates respond so slowly to improving economic conditions. The growth rate in total hours worked has a very significant impact which takes a little over two years to take effect. A one percentage point increase in the rate of growth in total hours worked will increase wage rate growth by about 63 basis points with a 27 month average lag.

Wage rate growth approaches 3.0 percent in 2023 if CBO's assumptions prevail on a sustained basis. My sense is that CBO's assumptions are more likely to be too optimistic rather than too pessimistic. That is especially my view with respect to the forecast core PCE inflation rate over the next few years.

Based on this analysis, B of A's forecast ECI wage and salary growth rates appear not only to be too high but reach that high level too quickly. It is important to point out that my analysis includes only production and nonsupervisory workers which is a smaller population of workers who generally have lower incomes. Thus, there is an apples-to-oranges comparison risk, if wage rate growth behaves differently in the two populations. But, it appears that the risk goes in the direction of reinforcing the conclusion that **B of A's** ECI forecasts are too optimistic. During 2007, at the peak of the last business cycle, wages of production and nonsupervisory workers rose 4.0 percent while the ECI measure of wages and salaries rose 3.5 percent.

Research indicates that increases in the rate of growth in nominal wages ***follow*** increases in inflation; ***they do not lead***. Moreover, the relationship is a weak one and the lag between a change in the inflation rate and a change in wage growth rates is considerable. My analysis of changes in wage rates for production and nonsupervisory workers indicates that only 37 basis points of a 1.0 percent change in inflation pass through to a change in wage rate growth and this takes an average of 9.4 months to occur. Like others I find no significant relationship in which a rise in wage rates precedes an increase in inflation.

8. Investment — Private and Government

Table 8 shows key values for forecast real private and government investment growth. **Chart 8A** shows annual forecasts/projections from 2014 to 2023 for private real investment growth. **Chart 8B** presents annual forecasts/projections for 2014 to 2023 for government real investment growth.

Table 8
Private and Government Real Investment Growth for 2014-2023 (percentages)

	Steady Growth	Strong Growth	Recession-Stagnation	GS	B of A	CBO
Private Investment						
2014	5.31	5.31	5.31	5.31	5.31	5.31
2015	4.15	4.17	4.04	4.16	4.11	
2016	2.79	3.19	-.07	4.14	4.42	
2017	2.08	2.65	-.18	4.70	4.23	
2018	1.93	2.55	3.74	4.50	3.95	
2019	1.82	2.55	2.42	3.71	3.49	
2020	1.79	2.51	2.02			
2021	1.77	2.43	1.94			
2022	1.77	2.32	1.79			
2023	1.77	2.29	1.72			
1947-2015 Average	3.81	3.81	3.81	3.81	3.81	3.81
Government Investment						
2014	-.58	-.58	-.58	-.58	-.58	-.58
2015	.78	.78	.61	.74	.69	
2016	1.39	1.43	-.63	2.41	1.44	
2017	1.26	1.34	.50	1.14	.85	
2018	1.26	1.40	1.63	.73		
2019	1.26	1.47	1.28			
2020	1.23	1.57	1.21			
2021	1.21	1.70	1.21			
2022	1.21	1.71	1.22			
2023	1.21	1.72	1.26			
1947-2015 Average	2.65	2.65	2.65	2.65	2.65	2.65

Private real business investment includes residential, nonresidential investment and changes in inventories.

CHART 8A – Real Private Investment Growth

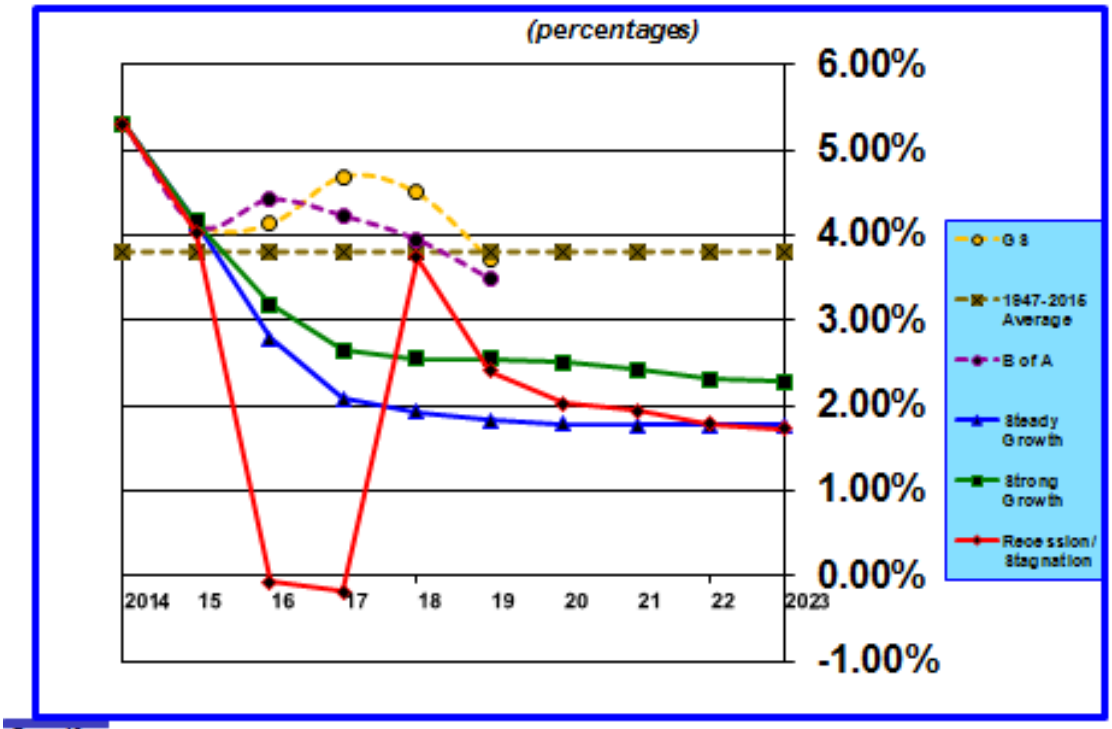


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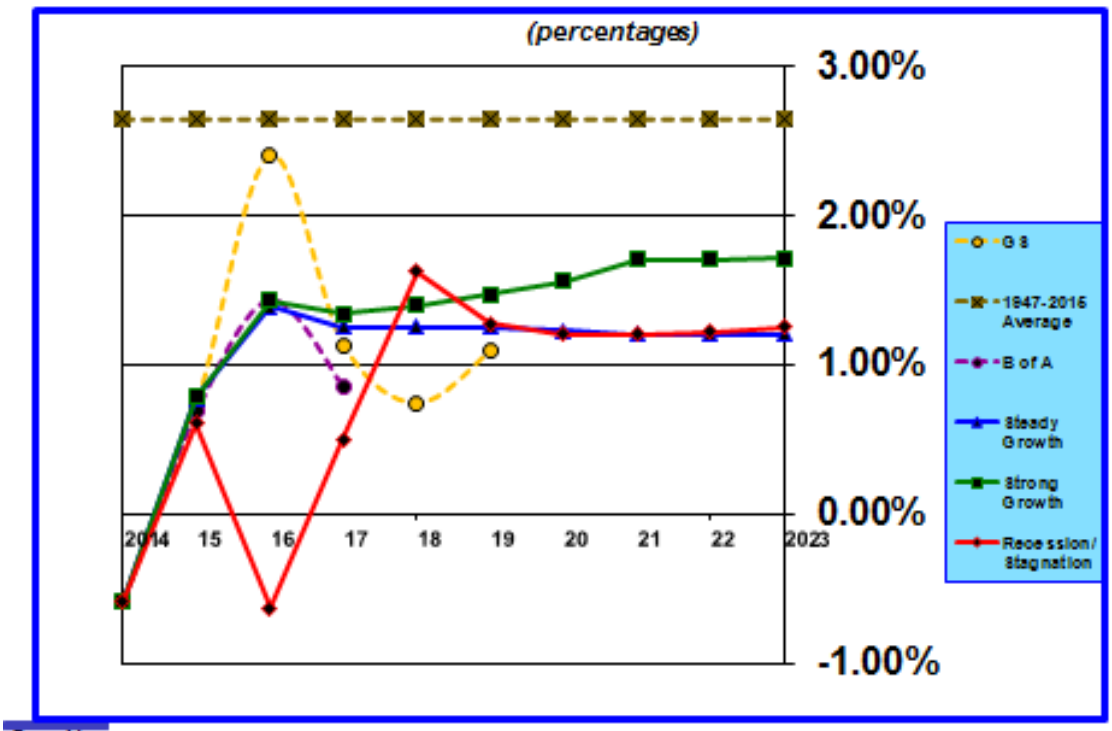
CHART 8B – Real Government Investment Growth



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In the near term, real private investment growth is being bolstered by ongoing, albeit slow, recovery in housing construction. However, over the longer run, real private investment spending is likely to be depressed below its long-term 69-year average of 3.81 percent because of slower population growth and, therefore, slower growth in aggregate demand. The 69-year average would be a lot higher were it not for the fact that real private investment growth has averaged only 1.49 percent annual growth from 2000 to 2015. In that context, as can be seen in **Chart 8A**, a decline in real private investment growth from recent levels to approximately 2.0 percent does not seem overly pessimistic.

Also, as commented in the section on productivity, monetary policy's intentional focus on maintaining very low interest rates may be diverting monetary liquidity into financial engineering and asset price speculation and away from riskier long-term investments in productive activity.

Government real investment spending is divided between federal and state/local investment spending. State and local government spending accounts for 61.2 percent of the total.

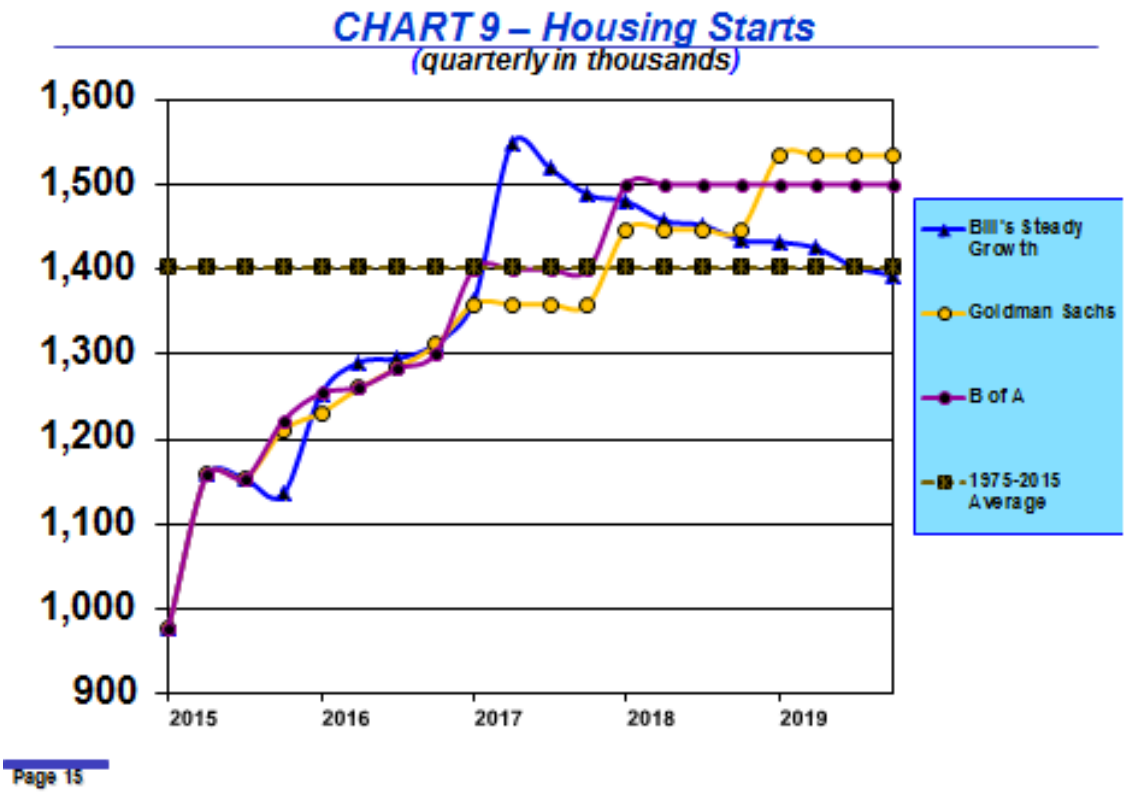
As can be seen in **Chart 8B**, relative to the 69-year average growth of 2.65 percent annually the actual results and forecasts for real government investment are quite pessimistic. But the pessimism is warranted by the political constraints that have been imposed on government spending in recent years. Forecasts for 2015-2023, including my own, assume a modest increase over the 0.94 percent annual real rate of growth in government investment spending that has prevailed over the last 16 years.

9. Housing Starts

Table 9 shows annual average housing starts. **Chart 9** shows quarterly forecasts/projections from 2015 to 2019.

Table 9
Housing Starts for 2014-2019 (thousands)

	Steady Growth	GS	B of A	CBO
Housing Starts				
2014	1,001	1,001	1,001	1,001
2015	1,106	1,125	1,127	
2016	1,288	1,272	1,275	
2017	1,479	1,359	1,400	
2018	1,456	1.447	1.500	
2019	1,413	1,534	1,500	
Average 1975-2015	1,402	1,402	1,402	1,402



Although housing investment has recovered very slowly from the housing bubble and the Great Recession, strong growth in the next few years is warranted because of the shortage of housing that now

exists and the surge in new household formation. Strong household growth should support construction of about 1.4 million units annually for the next several years, which coincidentally is the same as the 41-year historical average. Housing starts are running about 1.15 million annually currently, so there is still room for above average growth in housing investment.

Notwithstanding the recent strength in residential housing investment, it would probably be stronger were it not for the persistence of tight mortgage underwriting standards and the absence of a fully-functioning market for private mortgages. Except for jumbo mortgages, nearly all mortgages today are guaranteed by FHA, Fannie Mae and Freddie Mac.

There are not significant differences between my forecast for housing starts in the next few years and those of **GS** and **B of A**.

Census Bureau housing vacancy data suggest that there is a shortage of multi-family housing and a slight surplus of single family housing. Multi-family housing starts have been growing much faster than single-family housing starts and that is likely to continue and to be reinforced by demographic trends and cultural changes. As the population ages, apartments and condominiums are becoming relatively more attractive. Cultural shifts involve the increasing attractiveness of in-city living for younger people and declining interest in commuting from suburban locations.

There is a consequence for residential investment spending because of these demographic and cultural secular trends because the unit cost of a multi-family unit is considerably less than a free-standing single-family home. This shift in the composition of housing demand means that real residential investment in the future will be less for the expected annual average construction of 1.4 million units than it would have been had the composition of housing demand remained unchanged from the historical pattern.

10. Consumer Spending

Table 10A shows values for forecast nominal consumer spending growth and **Table 10B** shows estimates for forecast real consumer spending growth. **Chart 10A** shows quarterly forecasts/projections from 2015 to 2019 for nominal consumer spending growth. **Chart 10B** shows quarterly forecasts/projections from 2015 to 2019 for real consumer spending growth. **Chart 10C** presents annual projections for nominal consumer spending growth from 2015 to 2023. **Chart 10D** presents annual projections for real consumer spending growth from 2015 to 2023.

Table 10A
Nominal in Consumer Spending for 2014-2023 (percentages)

	Steady Growth	Steady Growth Stable Dollar	Strong Growth	Recession-Stagnation	GS	B of A	CBO
Nominal Consumer Spending Growth							
2014-2017	3.39	3.40	3.48	3.06			
2018-2023	3.16	3.27	3.60	2.92			
2023	3.77	3.63	4.27	3.51			
2014-2023	3.25	3.32	3.55	2.98			
Nominal Consumer Spending Growth							
2014	4.13	4.13	4.13	4.13	4.13	4.13	
2015	3.40	3.40	3.41	3.38			
2016	3.29	3.31	3.44	1.96			
2017	2.72	2.75	2.93	2.78			
2018	2.43	2.59	2.84	2.70			
2019	2.64	2.90	3.16	2.12			
2020	3.13	3.26	3.55	2.58			
2021	3.34	3.58	3.71	3.12			
2022	3.65	3.69	4.09	3.47			
2023	3.77	3.63	4.27	3.52			

Forecasts of the nominal rate of consumer spending depend heavily on underlying estimates of PCE consumer price inflation. As described in discussion of inflation below, projected inflation depends on to a certain extent on changes in the value of the trade-weighted dollar. A rising value of the dollar depresses economic activity by making prices of exports more expensive and it reduces the prices of imports. Both phenomena contribute to depressing inflation. The opposite occurs when the trade-weighted value of the dollar declines.

My statistical analysis projects the value of the dollar to continue rising through 2019 before falling.

CHART 10A – Nominal Consumer Spending Forecasts

(annual rate of change)

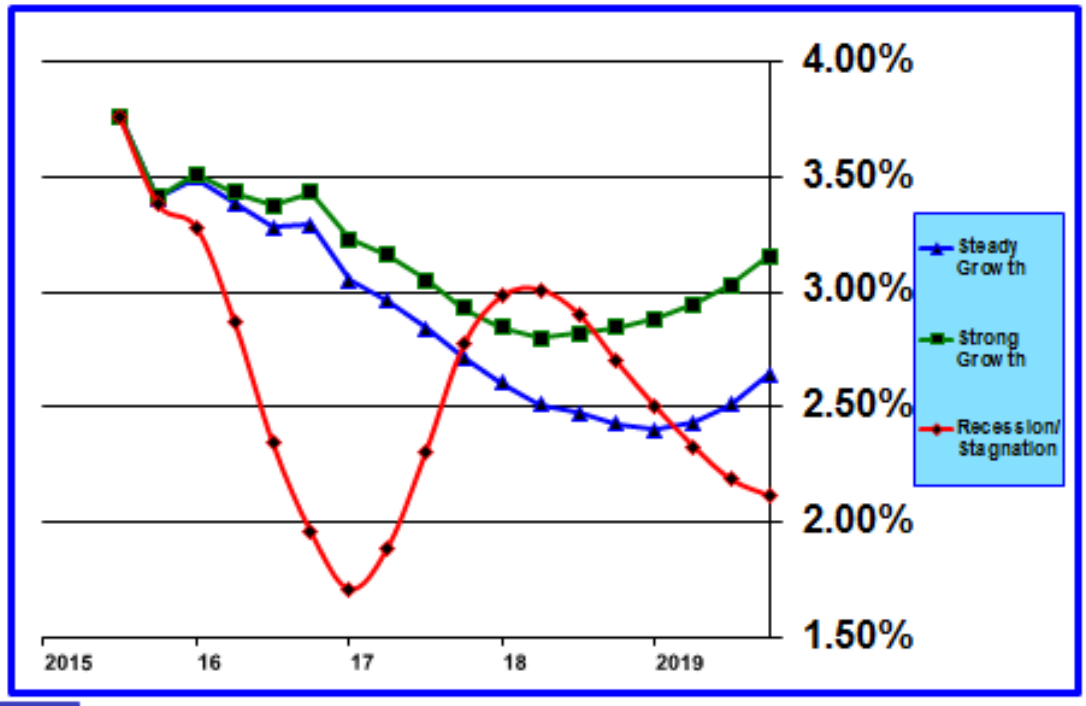


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CHART 10B – Nominal Consumer Spending Forecasts

(annual percentage change)

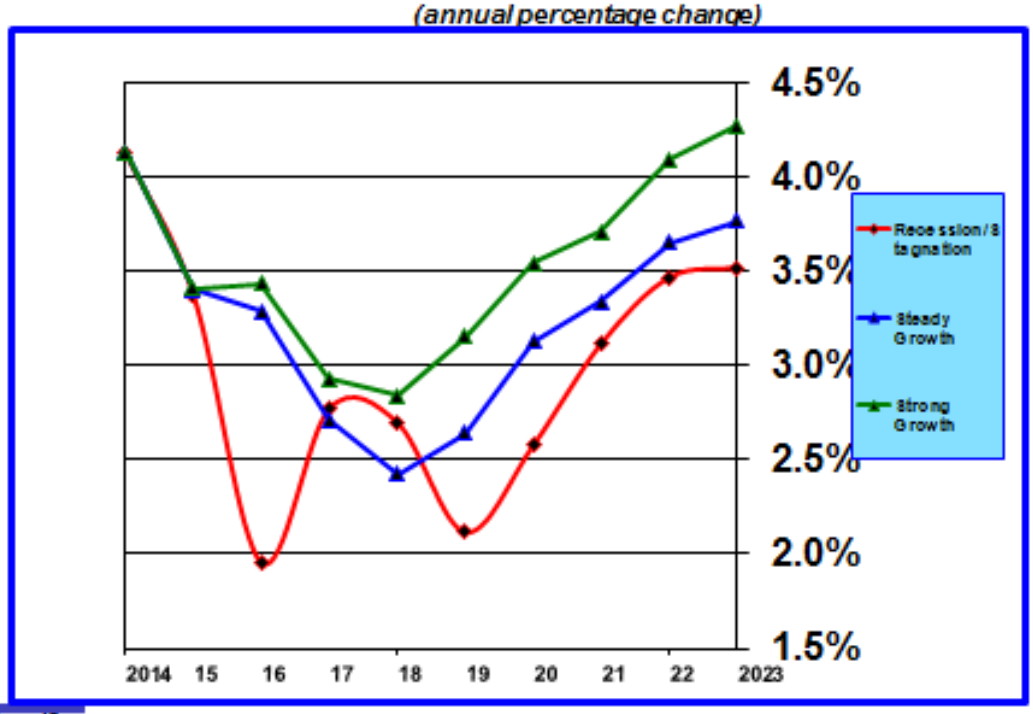

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CHART 10C – Real Consumer Spending Forecasts

(annual rate of change)

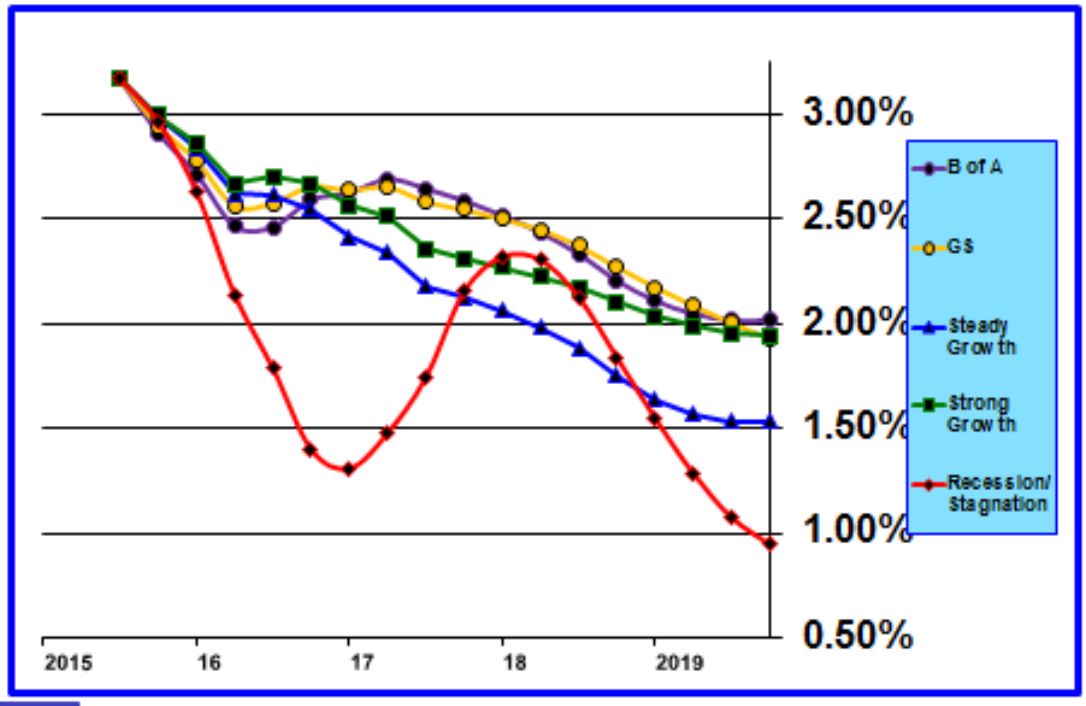

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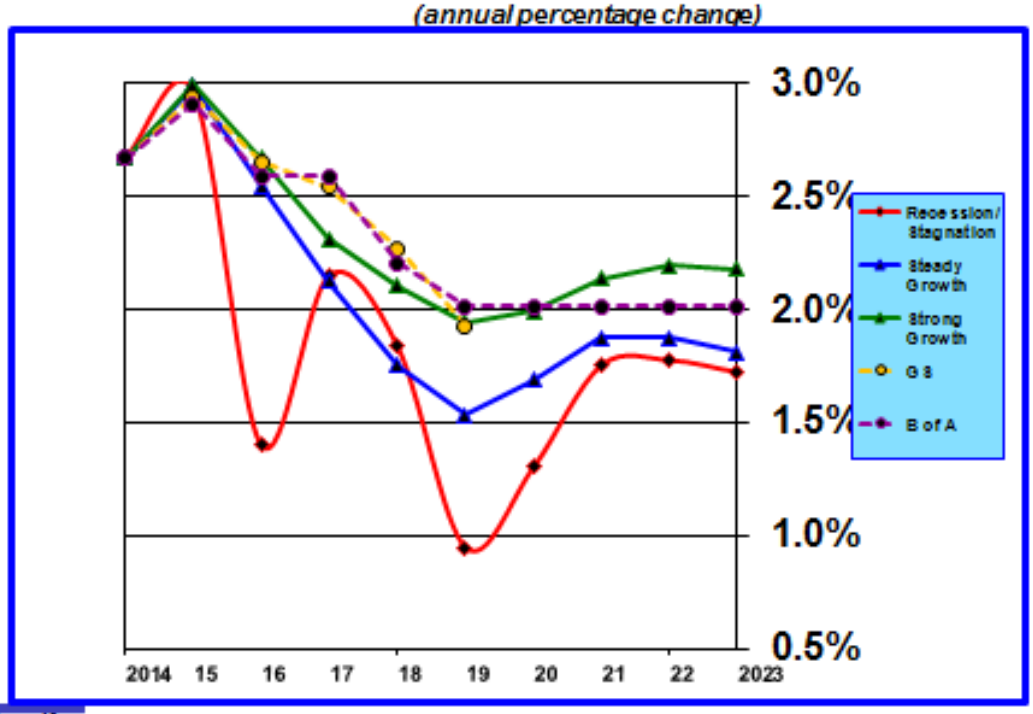
CHART 10D – Real Consumer Spending Forecasts

(annual percentage change)



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However, many believe that the value of the dollar has already peaked and will either remain at recent levels or decline somewhat. To show the effect of a stable trade-weighted value for the dollar, as opposed to a rising value, an extra column is included in **Table 10A** for the "***Steady Growth***" scenario. It turns out that changing the assumption about the future pathway for the dollar's trade-weighted value does not have a particularly significant impact on nominal consumer spending growth rate projections. No comparison for a stable traded-weighted dollar is shown in **Table 10B** for the real rate of growth in consumer spending because the differences are virtually immaterial.

Forecasters generally only provide estimates for the real rate of growth in consumer spending and not the nominal growth rate. However, the nominal rate of growth can be derived by combining the consumer spending inflation rate forecast with real spending growth data. **Chart 10A** shows quarterly projections from 2015 to 2019 for the nominal rate of growth in consumer spending for my three scenarios. In general, the rate of growth declines over the first few years, but then begins to rise as inflation accelerates. If data could be showed for other forecasters, it would indicate a higher rate of nominal growth because my inflation forecasts are considerably lower than most others until toward the end of the forecast period.

Chart 10B presents annual forecasts for the nominal growth rate in consumer spending. Again, other forecasters do not prepare nominal growth rate estimates. It is even clearer that the nominal growth rate in consumer spending accelerates after bottoming in 2018 and approaches approximately 4.0 percent by 2023.

Table 10B shows forecasts for the real rate of growth in consumer spending. **GS** and **B of A** provide forecasts in addition to those for my three scenarios.

It should come as no surprise that the real rate of growth in consumer spending converges toward 2.0 percent over time in all cases. That is because consumer spending is a fixed proportion of real GDP and, thus, it should grow at the same rate as real GDP. Most all forecasters expect the potential and actual real rate of growth in GDP to settle near 2.0 percent over time and, if this occurs, the rate of growth for consumer spending should be virtually the same.

During the next year or two as the economy returns to full employment and the output gap diminishes, real GDP and real consumer spending should grow faster than the long-term potential rate. But once the output gap has closed, growth will converge quickly to the long-run 2.0 percent expected annual overall growth rate for the economy. Both **Charts 10C** and **10D** indicate this pattern. Of course, the growth rate will gyrate somewhat around the long-run 2.0 percent potential rate of growth, depending upon cyclical oscillations in the economy. That is evident in the "**Recession-Stagnation**" scenario.

Table 10B
Real Growth in Consumer Spending for 2014-2023 (percentages)

	Steady Growth	Strong Growth	Recession-Stagnation	GS	B of A	CBO
Real Consumer Spending Growth						
2014-2017	2.58	2.66	2.30	2.70	2.69	
2018-2023	1.76	2.09	1.56	2.10	2.05	
2023	1.81	2.18	1.72		2.02	
2014-2023	2.09	2.32	1.85		2.30	
Real Consumer Spending Growth						
2014	2.67	2.67	2.67	2.67	2.67	
2015	2.99	2.99	2.96	2.94	2.91	
2016	2.55	2.67	1.40	2.65	2.59	
2017	2.12	2.31	2.15	2.54	2.59	
2018	1.75	2.10	1.84	2.27	2.20	
2019	1.53	1.94	.95	1.93	2.02	
2020	1.68	1.99	1.30		2.02	
2021	1.88	2.14	1.75		2.02	
2022	1.88	2.19	1.78		2.02	
2023	1.81	2.18	1.72		2.02	

11. Inflation

Table 11A shows key forecast values for core PCE inflation. **Chart 11A** shows quarterly forecasts/projections from 2015 to 2019. **Chart 11B** presents annual projections for 2015 to 2023.

Table 11A
Core PCE Inflation for 2014-2023 (percentages)

	Steady Growth	Steady Growth Stable Dollar	Strong Growth	Recession-Stagnation	GS	B of A	CBO
Core PCE Inflation							
2014-2017	1.15	1.18	1.15	1.12	1.52	1.55	1.69
2018-2023	1.59	1.69	1.63	1.55	2.00	2.02	1.97
2023	2.04	1.86	2.11	1.89	2.00	2.02	1.97
2014-2023	1.41	1.49	1.44	1.38	1.81	1.83	1.86
Core PCE Inflation							
2014	1.37	1.37	1.37	1.37	1.37	1.37	1.37
2015	1.39	1.39	1.39	1.40	1.30	1.42	1.59
2016	1.16	1.21	1.15	1.04	1.60	1.59	1.84
2017	.69	.74	.69	.66	1.80	1.81	1.97
2018	1.05	1.36	1.07	1.21	2.00	2.02	1.98
2019	1.39	1.56	1.42	1.33	2.00	2.02	1.97
2020	1.47	1.67	1.51	1.45	2.00	2.02	1.96
2021	1.61	1.83	1.66	1.55	2.00	2.02	1.97
2022	1.96	1.86	2.01	1.89	2.00	2.02	1.97
2023	2.04	1.86	2.11	1.89	2.00	2.02	1.97

Factors influencing inflation include:

- **Employment and output gaps** — large gaps depress inflation; both gaps were very large following the Great Recession but are now closing
- **Employment Growth Rate** — more rapid growth in employment accelerates the growth rate in aggregate demand and could place upward pressure on inflation (statistical analysis indicates there is a very weak link between the rate of employment growth and inflation)
- **Monetary policy** — highly stimulative policy should boost inflation, but the opposite outcome may be occurring if policy is encouraging asset price speculation and depressing capital investment spending

CHART 11A – Core PCE Inflation

(annual percentage rate)

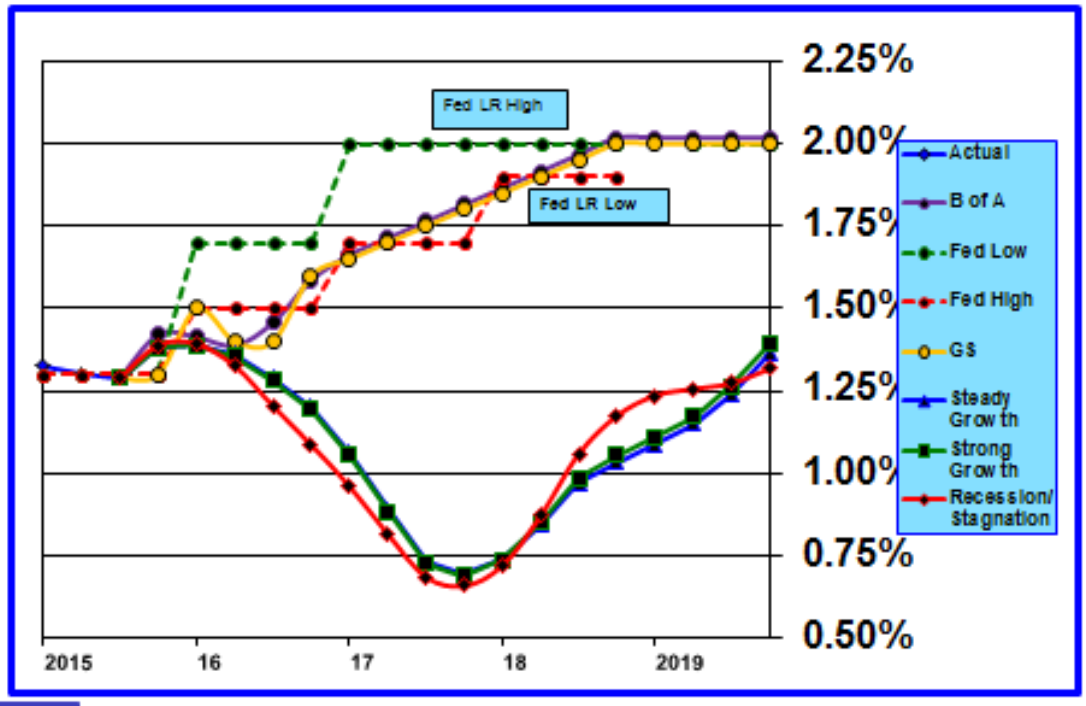

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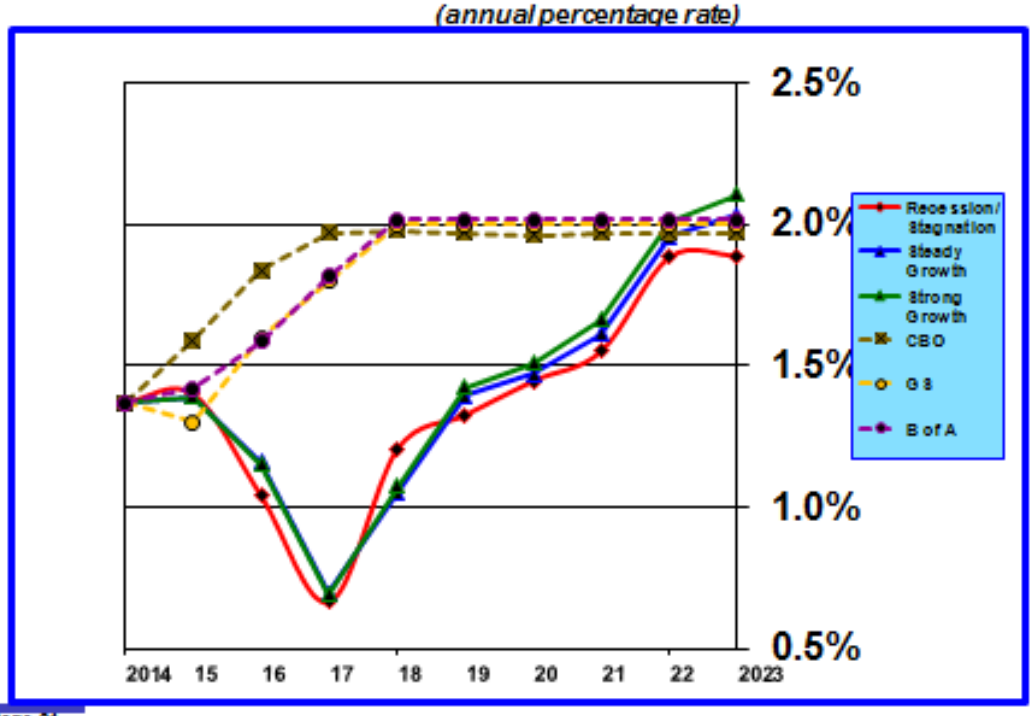
CHART 11B – Core PCE Inflation

(annual percentage rate)



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- **Fiscal policy** — depressed federal, state and local investment spending reduces aggregate demand and puts downward pressure on inflation
- **Trade-weighted value of the dollar** — a rising value depresses economic activity by making exports more expensive but reduces the prices of imports — both phenomena serve to depress inflation; the opposite occurs when the trade-weighted value of the dollar falls
- **Productivity** — increased investment spending, both public and private, should raise productivity and depress inflation
- **Global excess supply** — the explosion of investment in China and other emerging economies in recent years has created enormous supply relative to demand, which is inherently deflationary, i.e., supply exceeds demand and depresses prices

Reflecting all of these factors, core PCE inflation is currently very depressed at an annual rate of 1.3 percent. As can be seen in **Table 11A** and **Charts 11A** and **11B**, **CBO**, the Federal Reserve, **GS** and **B of A** all expect PCE inflation to return to the Federal Reserve's 2.0 percent target level over the next three years. This expectation seems to fall more in the realm of wishful thinking rather than hard analysis. This belief appears to be embedded in faith that monetary policy can control inflation over time and produce the desired outcome of 2.0 percent. This line of thinking neglects to consider that there are other economic forces that influence inflation and presumes that these are unimportant because monetary policy can offset whatever they might be. This seems overly simplistic and the failure of PCE inflation to meet the Federal Reserve's 2.0 percent target for 20 years is not a ringing endorsement of a belief in an all-powerful Fed.

In any event, my forecasts indicate that inflation should fall over the next two years and they begin to rise very gradually, not reaching the magic 2.0 percent target level until 2022.

Because the trade-weighted value of the dollar historically has had a significant impact on the core PCE inflation rate, its impact in my forecasts deserves special attention. My statistical model projects further increases in the trade-weighted value of the dollar over the next three years of approximately 17 percent. However, most analysts believe that the trade-weighted value of the dollar peaked in November and going forward the value of the dollar should remain stable or even decline somewhat. To test the impact of this alternative assumption, I include in **Table 11A** an additional forecast for the "***Slow Growth***" scenario in which the value of the trade-weighted dollar is assumed to remain constant throughout the 2016-2023 period. This change in assumption has virtually no impact on the projected significant decline in the core PCE inflation rate over the next two years. This is because the lagged effects of the factors influencing core PCE inflation are still filtering through. As can be seen in **Table 11B**, average lags range from 2 to 3 years and is 3 years for the impact of the dollar. In short, there is far more residual downward pressure in the system that has yet to be realized than is acknowledged by others.

Once past 2017 the alternative assumption of a stable value for the trade-weighted dollar boosts core PCE inflation from 2018 to 2021. Thereafter, core PCE inflation is lower than in the main "***Slow Growth***" scenario. That occurs because my model forecasts the value of the trade-weighted dollar to decline 20 percent between 2019 and 2023.

Of course, forecasts based upon historical economic relationships are only dependable if two conditions are met. The first condition is that no significant structural change in economic relationships has occurred

Table 11B
Factors Affecting Core PCE Inflation

			ASSUMPTIONS		
	Coeffi-cient	Average Lag in Months	Slow Growth 2017	Slow Growth 2023	CBO 2023
Short-Term Unemployment Gap	1.364	32.0	-.71%	.23%	0.00%
Long-Term Unemployment Gap*	1.723	28.1			
Productivity	-.207	22.6	.89%	1.54%	1.56%
Growth Rate in Total Hours Worked	.012	12.6	1.20%	.45%	.59%
Dollar	-.078	35.7	9.96%	-2.29%	0.00%

*This variable includes a squared term to test for nonlinearity

so that the past impact of changes in economic variables on core PCE inflation can be relied upon to forecast future changes in core PCE inflation. The second condition is what economists refer to as model specification error. It could be that my statistical model does a good job of explaining historical changes in core PCE inflation but the presumed statistical relationships between changes in economic variables and changes in core PCE inflation is spurious and not causal.

We won't know for right away whether my out-of-consensus core PCE inflation forecast is on the mark or simply the misguided result of modeling anomalies.

Having said all of this, I would simply add that deflationary forces remain abundant globally. Thus, even if my inflation forecasts are overly pessimistic I believe skepticism about the rapid return to the target 2.0 percent core PCE inflation level is warranted. The Federal Reserve and other analysts have expected that the 2.0 percent level was just two to three years away now for several years and that still remains their time frame. Will it turn out that this practice of moving expected forecasts forward in time when they don't occur on the expected schedule will continue?

Table 11C shows the contributions of each economic factor to core PCE inflation in 2017 and 2023 for my "***Slow Growth***" scenario — with my dollar forecast and with the alternative of a stable trade-weighted value for the dollar. An estimate for 2023 is also provided using **CBO's** projections for key economic variables.

It is clear that the negative impact of the rise in the trade-weighted value of the dollar over the last several years has had a very significant impact on core PCE inflation, depressing it by more than 70 basis points from the level that would have prevailed had the trade-weighted value of the dollar remained stable. There is a swing of 95 basis points in the impact of this factor alone between 2017 and 2023.

The combined effects of the short-term employment gap (unemployed for less than 26 weeks) and he long-term employment gap (unemployed for 26 weeks or longer) swings from subtracting a collective 15 basis points from core PCE inflation in 2017 to adding 39 basis points in 2023 — an overall increase of

Table 11C
Core PCE Inflation Forecasts

	CONTRIBUTIONS				
	Slow Growth 2017	Slow Growth Stable Dollar 2017	Slow Growth 2023	Slow Growth Stable Dollar 2023	CBO 2023
Constant	1.78%	1.78%	1.78%	1.78%	1.78%
Short-Term Unemployment Gap	1.27%	1.27%	1.62%	1.62%	.29%
Long-Term Unemployment Gap*	-1.42%	-1.42%	-1.23%	-1.23%	
Productivity	-.18%	-.18%	-.32%	-.32%	-.32%
Growth Rate in Total Hours Worked	.01%	.01%	.01%	.01%	.01%
Dollar	-.77%	-.72%	.18%	.00%	.00%
Core PCE Inflation Estimate	.69%	.74%	2.04%	1.86%	1.76%
*This variable includes a squared term to test for nonlinearity					

54 basis points. Employment slack does matter but the impact, interestingly enough appears to be less consequential than fluctuations in the value of the dollar.

The rate of growth in employment has no effect on core PCE inflation.

Finally, slight improvements in productivity in coming years, should they occur, will reduce core PCE inflation. But, the impact is not particularly great and would not change much even if productivity improves much more than most expect. That is because the link between productivity and core PCE inflation, at least based upon the historical relationship, is a weak one.

12. Federal Funds Rate

Table 12 shows forecasts for the federal funds rate as well as the Federal Open Market Committee (FOMC) projections. **Chart 12A** shows quarterly forecasts/projections from 2015 to 2019. **Chart 12B** presents annual forecasts/projections for 2015 to 2023.

Table 12
Federal Funds Rate for 2014-2023 (percentage rate at year-end)

	Steady Growth	Strong Growth	Recession-Stagnation	GS	B of A	CBO*	FOMC
Federal Funds Rate							
2014-2017	-.27	-.22	-.92	1.06	.86		
2018-2023	2.11	2.77	1.84	3.38	3.21		
2023	3.04	3.72	2.21	3.38	3.25	3.40	
2014-2023	1.16	1.58	.74	1.83	2.27		
*CBO rate is the 3-month Treasury bill							
Federal Funds Rate							
2014	.06	.06	.06	.06	.06	.02	.00-.25
2015	.38	.38	.38	.38	.32	.13	.25-.50
2016	.07	.09	-1.82	1.38	1.00	1.05	1.38
2017	.42	.60	-.26	2.38	2.00	2.22	2.38
2018	.46	.91	1.05	3.38	3.00	3.16	3.25
2019	1.55	2.20	1.39	3.38	3.25	3.40	3.50
2020	2.22	2.97	2.35	3.38	3.25	3.40	3.50
2021	2.57	3.30	2.17	3.38	3.25	3.40	3.50
2022	2.85	3.55	1.84	3.38	3.25	3.40	3.50
2023	3.04	3.72	2.21	3.38	3.25	3.40	3.50

Unlike what has happened in Europe, the FOMC has chosen to maintain a positive value for the federal funds rate. Thus, negative rates shown in **Table 12** and **Charts 12A** and **12B** will not occur in reality. Instead, the FOMC's implied policy rate would be in a range of .00 to .25 percent.

At its December 16, 2015 meeting, the FOMC updated its projections for the federal funds rate through 2018. Generally, there were modest decreases in each year's projections. However, as can be seen in **Chart 12A**, the FOMC's projections remain higher than those of **GS** and **B of A** and most other forecasters. They are also higher than market expectations. The federal funds rate rises very gradually in my "***Slow Growth***" and "***Strong Growth***" scenarios but remains well below other forecasts and the FOMC's projections. This outcome depends primarily on my more pessimistic outlook for inflation.

Chart 12B shows that GS's and B of A's forecasts for the federal funds rate over the 2015 to 2023

CHART 12A – Federal Funds Rate Forecast

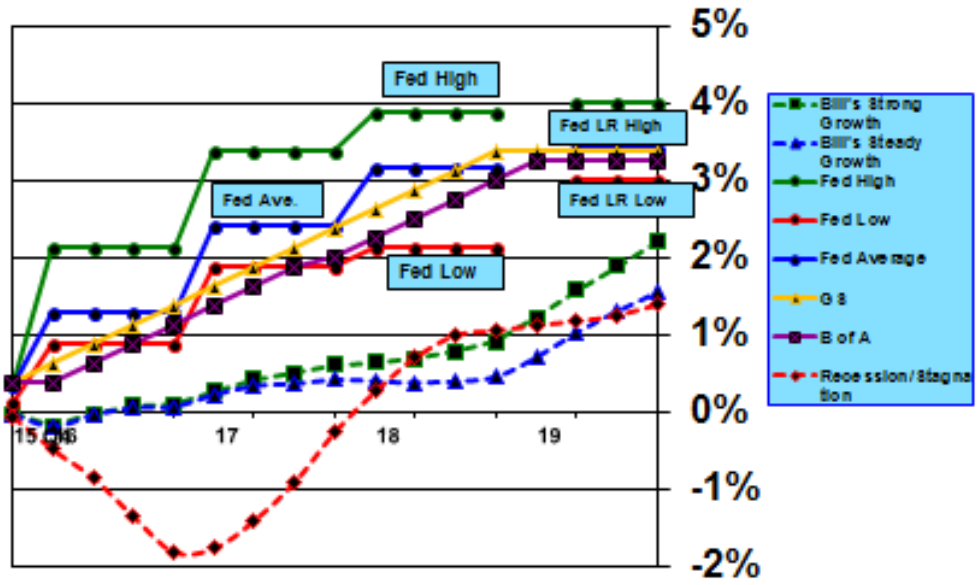

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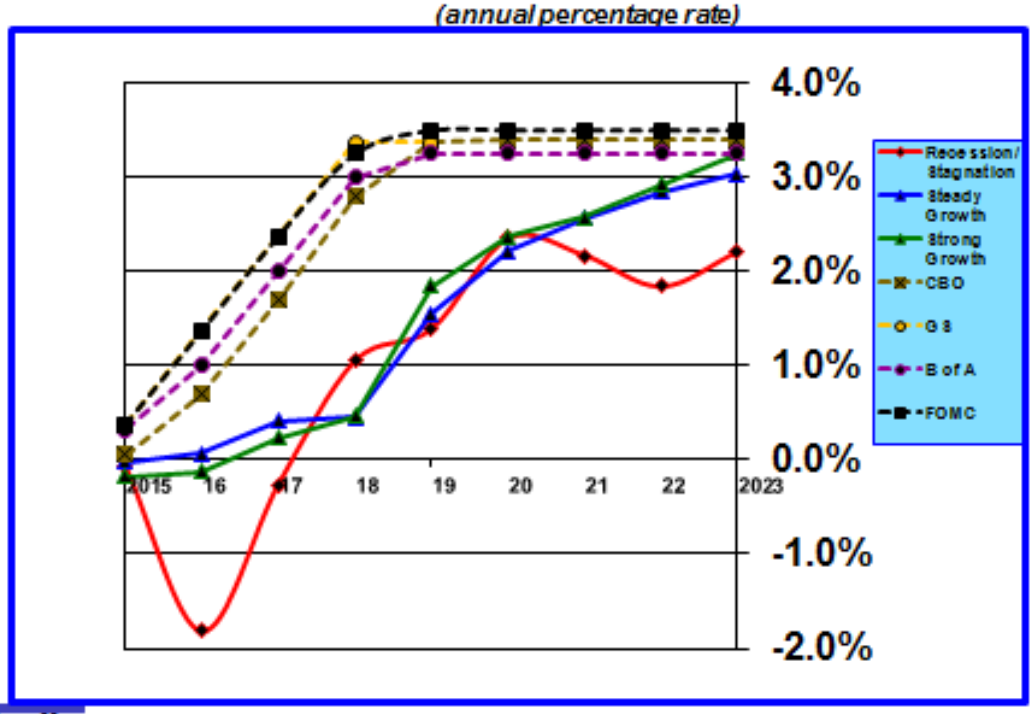
CHART 12B – Federal Funds Rate

(annual percentage rate)



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period are almost exactly identical to the combination of the FOMC's projections through 2018 and the FOMC's expected long-term equilibrium level for the federal funds rate. The long-term equilibrium rate is reached in 2018 and is in a narrow range of 3.25 to 3.50 percent.

Eventually my federal funds forecasts converge to the same equilibrium range, but this does not occur until 2023. Again, the more gradual increase in the federal funds rate in my scenarios is directly linked to a much slower increase in the rate of inflation.

13. Natural Rate of Interest

Table 13 shows values for the implied equilibrium natural rate of interest. **Chart 13** presents annual projections for 2015 to 2023.

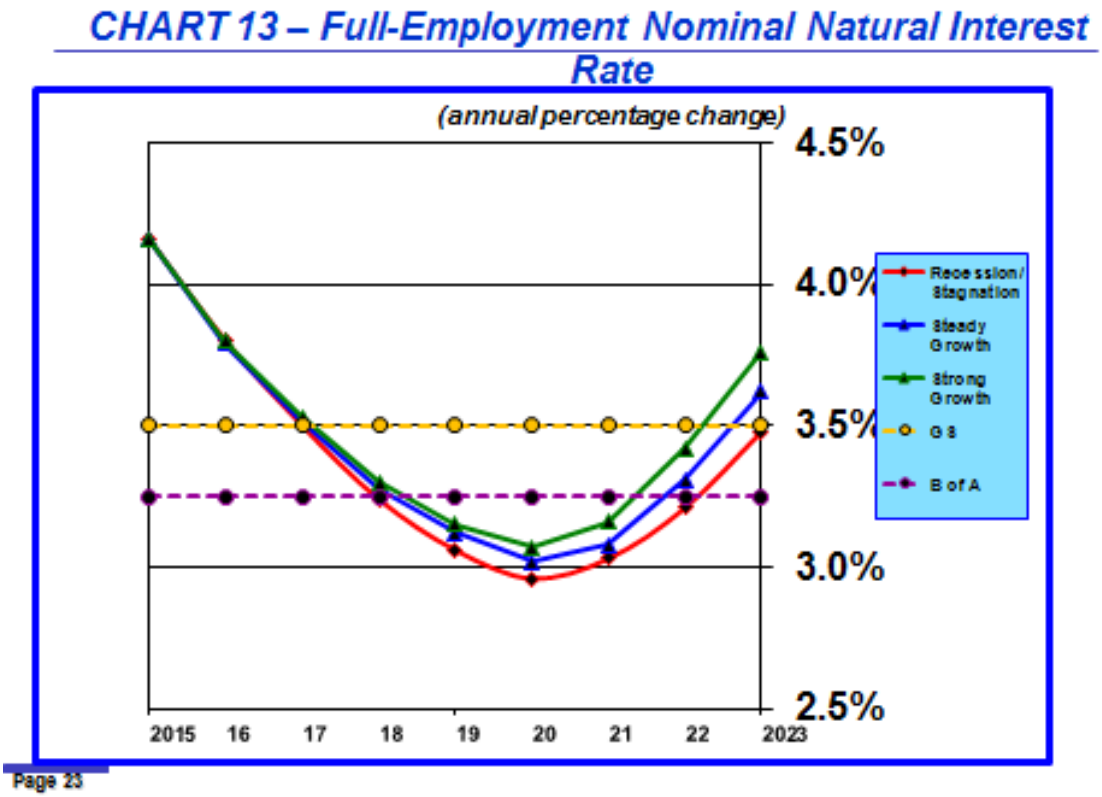
Table 13
Equilibrium Natural Rate of Interest for 2015-2023 (percentages)

	Steady Growth	Strong Growth	Recession-Stagnation	GS	B of A	Federal Reserve
Natural Rate						
2015	4.16	4.16	4.16			
2016	3.79	3.80	3.80			
2017	3.52	3.53	3.50			
2018	3.28	3.30	3.24			
2019	3.12	3.15	3.06			
2020	3.02	3.07	2.96			
2021	3.08	3.16	3.03			
2022	3.31	3.42	3.21			
2023	3.62	3.76	3.48			
Long-Run Nominal				3.50	3.25	3.50
Implied Long-Run Real				1.50	1.25	1.50

The equilibrium value of the natural rate assumes full employment and an economy that is functioning at its full potential. The equilibrium value of the natural rate equals an unobservable real rate of interest plus a long-run expected rate of inflation. The actual natural rate, at any particular time, usually differs from the equilibrium rate because employment and output may differ from their potential levels when the economy is operating at full capacity. Currently, the estimated real natural rate, according to the Williams-Laubach model, is -0.2 percent. The nominal natural rate currently would add to that value the expected rate of inflation. Of course, there are many different measures of the expected rate of inflation. If it is, say 2.0 percent, which would be consistent with the Federal Reserve's long-run inflation target, then the current nominal natural rate would be 1.8 percent. This value has to be considered as an approximate estimate because both the actual real rate of interest and the expected rate of inflation are not observable and have to be estimated. The estimates are at best approximations.

The theoretical importance of the current natural rate of interest has to do with whether monetary policy is easy or tight. Monetary policy is easy when the federal funds rate is less than the natural rate and tight when it is greater. Since the current federal funds policy rate is in a of .0.25 to 0.50 percent and the current natural rate is between 1.10 percent (assuming a current inflation rate of 1.3 percent) and 1.80 percent (assuming a long-term expected inflation rate of 2.0 percent), monetary policy is easy. Since the economy is still operating at less than full capacity, an easy monetary policy remains appropriate.

Because population growth and productivity have both declined and these developments are expected



to persist, the equilibrium value of the real rate of interest is believed to have declined to a range of 1.25 to 1.50 percent from an historical level in the vicinity of 2.00 to 2.25 percent. Then, assuming that expected inflation equals the Federal Reserve's long-term inflation target of 2.00 percent, the nominal equilibrium natural rate of interest would be 3.25 to 3.50 percent. If this analysis is a reasonable approximation of underlying unobservable phenomenon, it implies that the Federal Reserve will eventually raise the federal funds rate to between 3.25 and 3.50 percent. Of course, if the Federal Reserve determines in the future that the economy is operating above full capacity and inflation above the 2.00 percent target becomes a significant risk, the Federal Reserve would raise the federal funds rate above the full employment equilibrium level, thus instituting a tight monetary policy with the intent to slow the economy down and eliminate upward pressure on inflation.

As can be observed in **Chart 13**, the expected nominal equilibrium value of the natural rate of interest can change over time based on the expected levels of the real rate of interest and inflation.

14. 10-Year Treasury Yield

Table 14 shows forecasts for the ten-year Treasury yield. **Chart 14A** shows quarterly forecasts/projections from 2015 to 2019. **Chart 14B** presents annual projections for 2015 to 2023.

Table 14
Ten-Year Treasury Yield for 2014-2023 (percentage rate at year-end)

	Steady Growth	Steady Growth Stable Dollar	Strong Growth	Recession-Stagnation	GS	B of A	CBO
Ten-Year Treasury Yield							
2014-2017	2.90	2.90	2.96	2.69	2.72	2.62	3.00
2018-2023	3.43	3.53	3.79	3.25		3.63	4.24
2023	3.65	3.85	4.04	3.57		3.75	4.00
2014-2023	3.22	3.28	3.46	3.03		3.22	3.75
Ten-Year Treasury Yield							
2014	2.28	2.28	2.28	2.28	2.28	2.28	2.28
2015	2.77	2.77	2.78	2.74	2.30	2.35	2.53
2016	3.20	3.20	3.24	1.83	3.00	2.85	3.33
2017	3.35	3.35	3.52	3.92	3.30	3.00	3.87
2018	3.70	3.71	3.98	3.70	3.60	3.25	4.10
2019	3.33	3.34	3.67	3.19	3.75	3.50	4.21
2020	3.01	3.11	3.41	3.17		3.75	4.26
2021	3.29	3.48	3.69	2.75		3.75	4.28
2022	3.59	3.69	3.97	3.13		3.75	4.30
2023	3.65	3.85	4.04	3.57		3.75	4.30

If the trade-weighted value of the dollar remains stable over the forecast horizon, inflation will rise a little faster than projected in the "***Slow Growth***" scenario. That would lift the 10-year yield gradually over time. The effect is modest and only reaches an additional 20 basis points by 2023.

As can be seen in **Chart 14A**, all forecasts project a gradual rise in the 10-year Treasury yield from the recent level of 2.25 percent to a range of 3.25 to 3.75 percent by 2019. Projections in my "***Slow Growth***" and "***Strong Growth***" scenarios rise a little faster and a little more than **GS's** and **B of A's** forecasts.

After 2019 **Chart 14B**.indicates that the 10-year Treasury rate rises only another 25 basis points to a range of 3.5 to 4.0 percent by 2023. **CBO's** estimate of 4.3 percent is an outlier and probably will be revised downward when **CBO** updates its economic assumptions during 2016.

CHART 14A – Ten-Year Treasury Yield

(annual percentage rate)

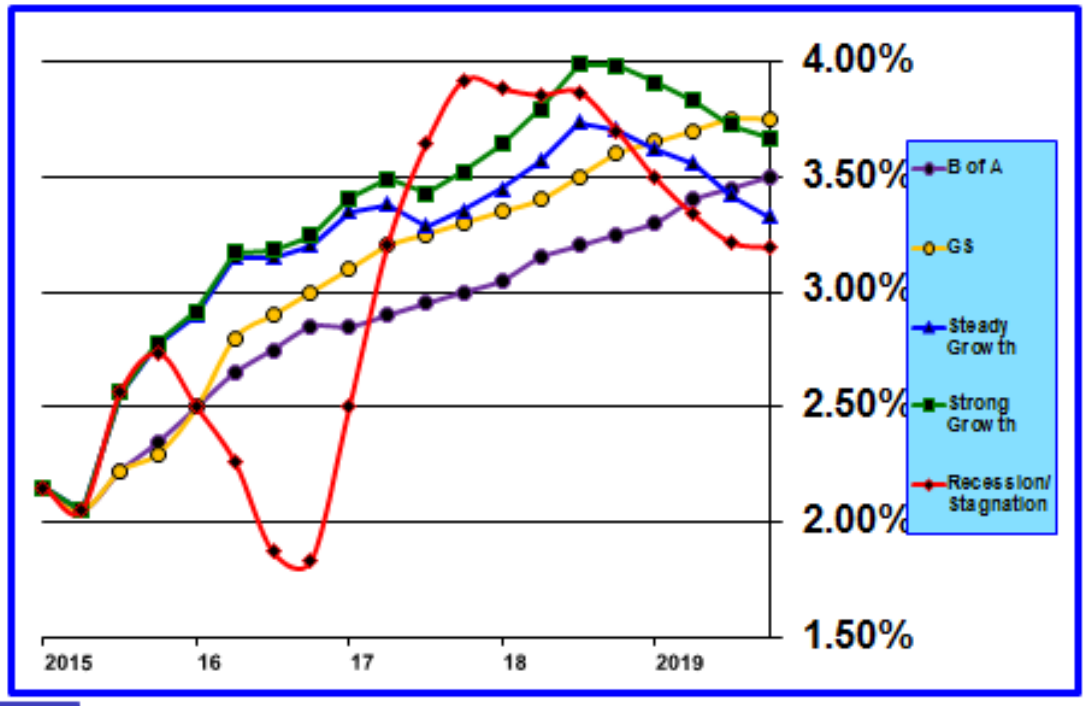


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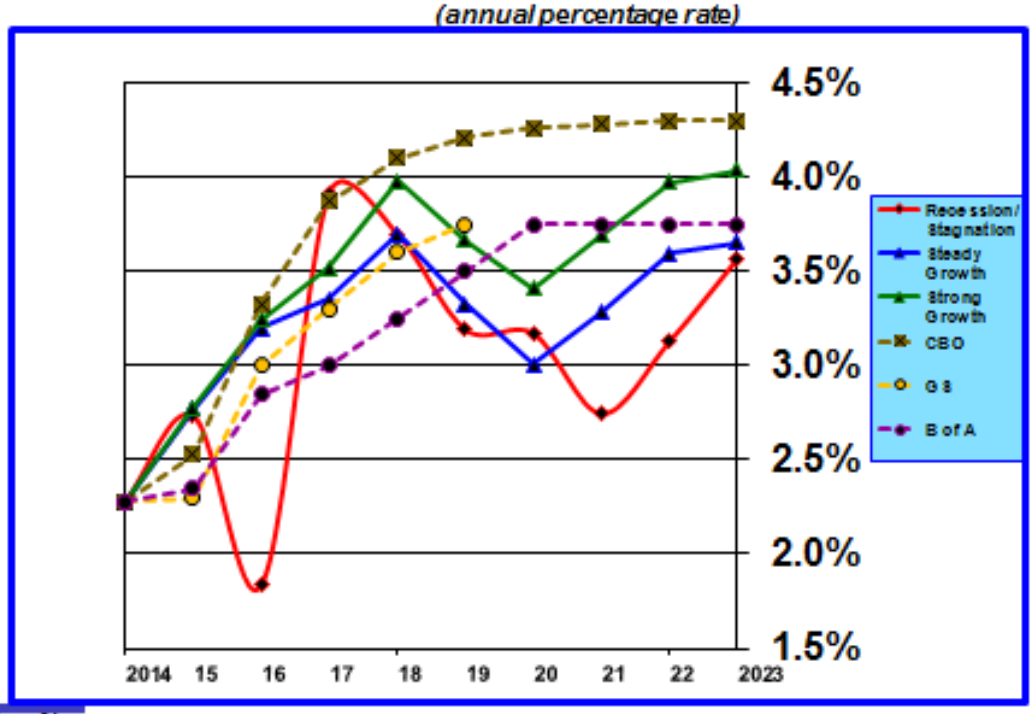
CHART 14B – Ten-Year Treasury Yield

(annual percentage rate)



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15. Federal Budget — Annual Deficit and Total Federal Public Debt to Nominal GDP

Table 15 shows forecast values for the annual federal budget deficit and the ratio of total federal public debt to nominal GDP. **Chart 15A** shows annual forecasts/projections for the federal budget deficit from 2015 to 2023. **Chart 15B** presents annual projections for the total federal public debt to nominal GDP ratio for 2015 to 2023.

Table 15
Annual Federal Budget Deficit and Total Federal Public Debt to Nominal GDP for 2015-2023 (percentages)

	Steady Growth	Strong Growth	Recession-Stagnation	GS	B of A	CBO
Annual Budget Deficit						
2015	-2.46	-2.46	-2.46	-2.46	-2.46	-2.46
2016	-2.58	-2.58	-2.92	-2.98	-2.37	-2.23
2017	-2.64	-2.62	-2.88	-2.72	-2.54	-2.14
2018	-2.72	-2.64	-2.77	-2.74		-2.23
2019	-3.04	-2.90	-3.10	-2.87		-2.81
2020	-3.38	-3.20	-3.45			-3.10
2021	-3.65	-3.46	-3.78			-3.32
2022	-4.08	-3.86	-4.24			.3.67
2023	-3.98	-3.75	-4.16			-3.56
Cumulative Budget Deficit						
2015	73.7	73.7	73.7	73.7	73.7	73.7
2016	75.9	75.8	76.9	74.2	73.3	72.8
2017	76.6	76.4	78.4	73.6	72.8	71.6
2018	77.6	77.1	79.1	73.4		70.8
2019	78.7	77.9	80.4	73.5		70.7
2020	79.6	78.3	81.4			70.8
2021	80.6	78.9	82.6			71.2
2022	81.8	79.6	84.2			71.9
2023	82.9	80.2	85.4			72.5

CBO's most recent deficit projection for fiscal year 2016, made in August, forecasts a further slight decrease in the size of the deficit to $414 billion. However, given the budget deal and congressional enactment of a series of tax extenders, many of which have been made permanent, it is much more likely that the fiscal year 2016 budget deficit will rise. **GS** estimates the deficit will be $550 billion. **B of A's** estimate of $439 billion and my estimate of $475 billion in the "***Slow Growth***" scenario will probably

CHART 15A – Federal Budget Deficit

(annual percentage rate)

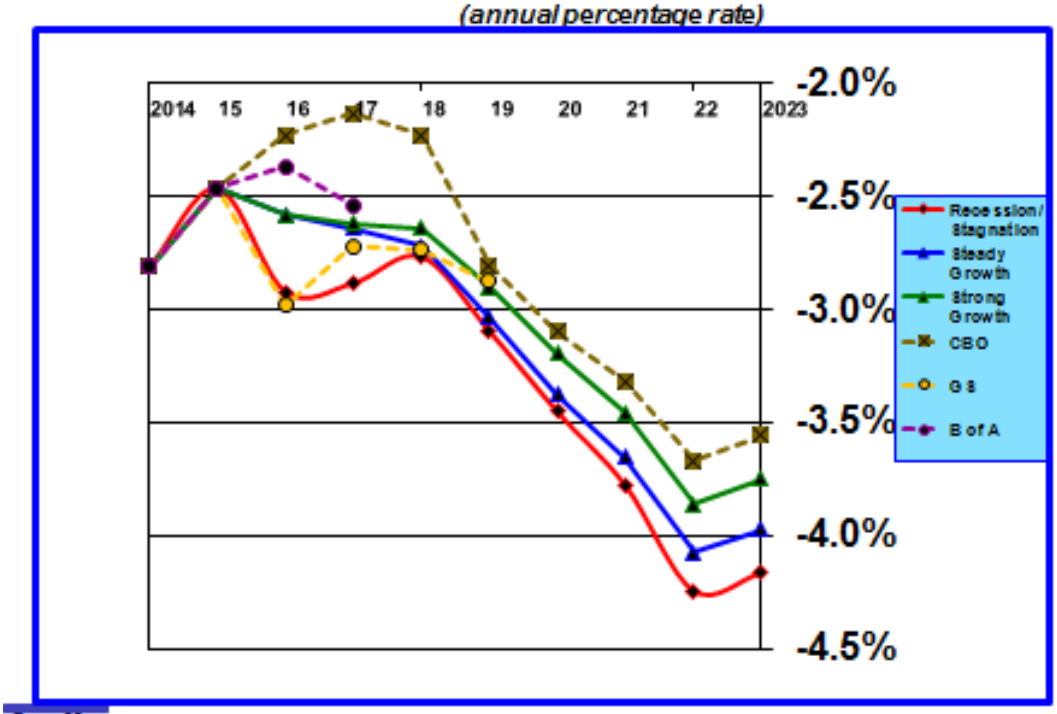

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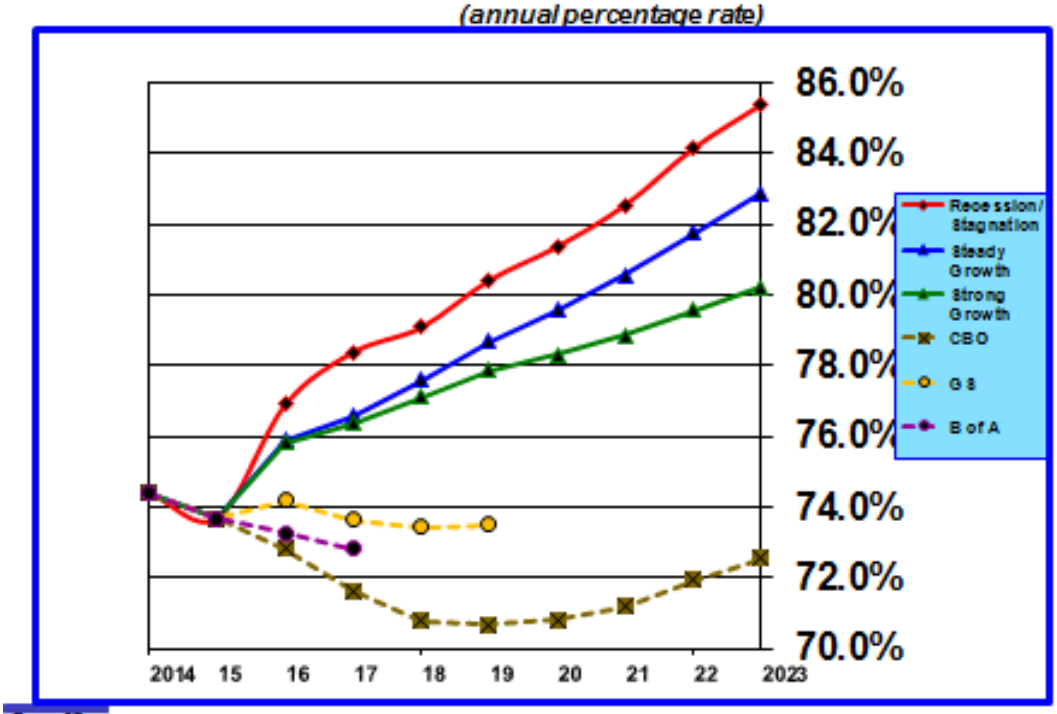
CHART 15B – Total Federal Public Debt to Nominal GDP

(annual percentage rate)



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need to be revised higher.

Deficits will begin creeping up going forward and within about three years the effects of demographic trends on social security and Medicare benefits will begin to increase the deficit and the debt-to-GDP ratio at an accelerating rate. This can be seen in **Charts 15A** and **15B.**

Chart 15A shows that the improvement in **CBO's** estimate of the size of the annual deficit will end by fiscal year 2017. That probably will not occur.

Chart 15B shows various forecasts of the public-debt-to-nominal-GDP ratio. In all of my scenarios this ratio rises steadily from 2015 to 2023. **GS's** projected ratio is stable through 2019. It is lower than in my scenarios primarily because **GS** expects nominal GDP to rise faster. **CBO's** more optimistic outlook stems from its assumption of strong GDP growth and probable underestimate of the size of annual budget deficits given recent congressional action to increase fiscal year 2016 and 2017 expenditures and conversion of many tax extenders to permanent status without any revenue offsets.

Bill Longbrake is an Executive in Residence at the Robert H. Smith School of Business at the University of Maryland.