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

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

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I. Introduction

This part of the ***January Longbrake Letter*** includes long-run forecasts and projections of key economic indicators for several 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 four of my own scenarios—"***BASE***," "***Strong Growth***," "***Recession-Stagnation***," and "***Low Productivity***."

Generally, I try to structure "***BASE***" scenario assumptions to reflect long-term full-employment economic activity, but adjust the assumptions to describe the most likely short-run trajectory which will lead to full employment economic activity. If the economy is operating below full capacity, the short-run assumptions will reflect closing the output gap over a reasonable period of time. However, as 2018 commences, economic activity is at full capacity and employment is very tight—the unemployment rate is below the natural rate (non-accelerating inflation rate of unemployment—NAIRU).

Tax cuts were enacted by Congress in December 2017 and because the cuts are front-loaded this will result in significant cuts in personal and corporate tax revenues in 2018 and 2019. In addition, Congress authorized substantial disaster spending in late 2017 and is expected to authorize additional disaster spending in January. Moreover, Congress seems likely to boost budget spending caps by as much as $90 billion annually. Collectively, this enormous fiscal stimulus is likely to amount to an additional fiscal impulse during 2018 of as much as $120 billion, which would be equal to about 0.6 percent of nominal GDP.

Fiscal stimulus will push the economy above full capacity during 2018 and even further above full capacity in 2019. Consequently, the "***BASE***" scenario begins with economic activity exceeding its equilibrium potential, builds and overheats further through 2019 before decelerating somewhat in later years. However, the output gap, based upon **CBO**'s analysis, remains well in excess of full capacity over the next ten years.

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

After 2019, employment growth slows considerably because of demographic trends. Federal fiscal stimulus boosts consumer spending and business and public investment in 2018 and 2019; however, consumption and investment spending growth decelerates during later years as fiscal stimulus dissipates and employment growth slows.

- "***Strong Growth***" scenario embodies faster employment and investment growth.
- "***Recession-Stagnation***" scenario assumes a near-term brief recession beginning in the second half of 2018, followed by slow recovery.
- "***Low Productivity***" scenario shows the consequences of stagnation in productivity growth at the recent historically low level rather than increasing, as is assumed in the "***BASE***" and "***Strong Growth***" scenarios.

In the tables and charts in this part of this month's letter, the pathways of key measures of economic activity for the time period 2017 to 2027 are illustrated for my four scenarios—"***BASE***," "***Strong Growth***," "***Recession-Stagnation***," and "***Low Productivity***," 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. The anchor assumption is employment growth. Other economic variables, such as stock prices, oil prices, housing prices and private and government investment growth are assumed to vary in ways consistent with historical patterns in employment growth and productivity. All other economic measures are estimated statistically based upon historical relationships with values of the assumed economic variables. Estimates are derived for potential GDP, forecast realized GDP, the output gap, productivity, the unemployment rate, wage rates, housing starts, inflation, consumer spending, interest rates, and federal budget deficit.

Two sets of charts are presented for most economic indicators. In the **A charts**, annual values from 2017 to 2027 for the "***BASE***" scenario are compared to annual forecasts prepared by **CBO**, **GS**, **B of A**, and in some instances projections compiled by members of the Federal Open Market Committee (**FOMC**). The **B charts** compare annual projections from 2017 to 2027 for my four scenarios.

Tables and charts in the first six parts of **Section IV**, "**Individual Measures of Economic Activity**," begin with employment growth and productivity assumptions, which are key inputs to estimate projected values of potential GDP, realized real GDP, and the output gap.

Then in following pages in **Section IV** projections are included for the following measures of economic activity:

7. Unemployment rate
8. Hourly wage rate (nominal)
9. Investment—private (real)
10. Investment—government (real)
11. Housing starts
12. Consumer spending—nominal

13. Consumer spending—real
14. Inflation—core
15. Federal funds rate
16. 10-year Treasury yield
17. Federal budget—annual deficit
18. Ratio of total federal public debt to nominal GDP

II. Scenarios

Historical data come from a variety of sources, primarily the Bureau of Economic Analysis (**BEA**), the Bureau of Labor Statistics (**BLS**), and the Congressional Budget Office (**CBO**). Data and projections from **CBO** provide the starting (current) value of potential real GDP. In the past, I have also relied on **CBO**'s assumptions about employment growth, the non-accelerating inflation rate of unemployment (NAIRU), and base-line estimates of future federal budget deficits in constructing my "***BASE***" scenario. Even though **CBO** last updated its economic assumptions in June 2017, it is clear from what has happened since then that it will need to revise its assumptions substantially. Consequently, I have substituted my own assumptions for employment growth (faster), NAIRU (lower) and federal budget deficits (higher). When **CBO** updates its assumptions in the next couple of months, I will consider whether to use its assumptions for my "***BASE***" scenario as I have done in past years.

1. BASE Scenario

The "***BASE***" scenario starts with my assumptions for payroll employment growth and federal budget deficits from 2018–2027. My assumptions are informed by **CBO**'s outdated assumptions and those of **B of A** and **GS**. (See **Table A** for data comparisons.) Reflecting the benefits of tax reform, private investment grows at an annual rate of 2.29 percent over the next 10 years compared to 1.68 percent over the past 19 years. Growth is much faster over the next two years, but then slows down to the previous long-term trend. Government investment growth improves modestly from the average annual pace of 0.99 percent over the past 19 years to 1.06 percent over the next 10 years. The improvement, however, is concentrated in the early part of the next 10 years. In this scenario, at the outset the economy is already operating above full capacity and becomes steadily more overheated as time passes. This is probably not sustainable unless **CBO** determines that it has underestimated the economy's potential level by a considerable amount.

2. Strong Growth Scenario

Payroll employment is assumed to grow 1.12 million more over the next 10 years in this scenario compared to the "***BASE***" scenario. This spurs stronger private business investment growth—an annual rate of 2.61 percent compared to 2.29 percent in the "***BASE***" scenario. Government investment grows at an above trend rate of 1.38 percent. This scenario has a low probability of occurrence simply because it assumes the economy grows at an even faster pace than in the "***BASE***" scenario, which already assumes that the economy will operate well above full capacity over the next several years.

3. Recession-Stagnation Scenario

In this scenario a brief, but sharp, recession commences in the second half of 2018 and lasts about a year. Employment does not fully recover after the recession ends and growth is slower over the entire ten-year period. Compared to the "***BASE***" scenario, employment is 750,000 less by the end of 2027. Private investment growth decreases from an average annual growth rate of 2.29 percent to 1.98 percent and government investment growth declines from an average annual growth rate of 1.06 percent to 0.74 percent because government investment spending is curtailed as the budget deficit escalates. The likelihood of recession occurring sometime during the next few years is very high. That is because when the economy becomes overextended and imbalances build, as is currently occurring, eventually those imbalances will be resolved during a period of recession. Pinpointing the approximate timing for a recession to begin is a fool's errand. Thus, the assumption that a recession begins in the second half of 2018 is the earliest possible date and the more likely start date is up to two years later. Furthermore, there is no certainty that a period of stagnation would follow a recession. However, in recent cycles, recoveries from recessions have been slow and have extended over a long period of time.

4. Low Productivity Scenario

This scenario demonstrates how the economy could be affected by the failure of productivity to improve to the level that **CBO** and most others expect, even though that expected level of approximately 1.7 percent is below the long-term historical average of 2.1 percent. Productivity is assumed in this scenario to rise at an annual rate of 1.2 percent, which may turn out to be overly optimistic given that the average rate of growth in productivity over the past seven years has been 0.7 percent. Employment is 1.34 million lower by the end of 2027 in this scenario compared to the "***BASE***" scenario. Private business investment growth is even weaker because of weakness in consumer demand, falling to 1.68 percent annually compared to 2.29 percent in the "***BASE***" scenario and 1.98 percent in the "***Recession-Stagnation***" scenario. Government investment growth is 0.94 percent annually, which is also slower than in the "***BASE***" scenario and reflects minimal additional federal funding on infrastructure, but government investment is stronger than the dismal 0.74 percent in the "***Recession-Stagnation***" scenario.

III. Measures of Economic Activity—Summary

Table A includes summary statistics for my four scenarios as well as for **CBO**'s June 2017 data projections for many of the indicators of economic activity. The number in the first column of **Table A** cross-references the economic indicator in this summary with the individual detail for that indicator in **Section IV**.

Notice that the differences in economic outcomes for the three alternative scenarios compared to the "***BASE***" scenario are generally relatively small. Nonetheless, there are several observations that can be drawn from comparing the four scenarios and **CBO**'s projections.

- **Employment growth** is set to slow significantly regardless of scenario because of demographic trends—primarily the aging and retirement of the baby boomer generation. Population growth will slow from an annual rate of growth of 1.08 percent over the past 17 years to 0.80 percent from 2021 to 2027. However, because the employment participation rate is expected to decline due to demographic trends, growth in the labor force is expected to decrease from 0.69 percent to 0.47 percent. However, what matters is growth in total hours worked. **CBO** expects average hours worked weekly per

Table A

Comparison of Projections for Key Economic Indicators for CBO Projections and BASE, Strong Growth, Recession-Stagnation, and Low Productivity Scenarios

(Average for 2021–2027 unless otherwise specified)

		CBO	BASE	Strong Growth	Recession-Stagnation	Low Productivity
1	Payroll Employment (2027 in thousands)	154,200	156,288	157,403	155,538	154,943
1	Difference from BASE	-2,088	0	1,115	-750	-1.345
1	Payroll Growth	.49%	.49%	.57%	.55%	.44%
2	Hours Worked Growth	.41%	.68%	.74%	.69%	.65%
3	Productivity	1.69%	1.36%	1.54%	1.24%	1.21%
4	Real GDP Potential Growth	1.88%	1.75%	1.92%	1.57%	1.55%
	2027 (trillions)	$20.65	$20.39	$20.68	$20.04	$20.05
5	Real GDP Realized Growth	1.86%	1.89%	2.04%	2.02%	1.78%
	2027 (trillions)	$20.54	$20.98	$21.28	$20.78	$20.62
6	Output Gap	-.50%	2.84%	3.09%	3.14%	2.39%
7	Unemployment Rate	4.94%	4.08%	3.65%	4.40%	4.62%
8	Wage Rate Growth	3.12%	3.11%	3.47%	2.57%	2.71%
9	Government Investment Growth (2018–27)		1.06%	1.38%	.74%	.94%
10	Private Investment Growth (2018–27)		2.29%	2.61%	1.98%	1.68%
13	Real Consumer Spending		1.90%	2.13%	1.80%	1.68%
14	Core PCE Inflation	1.99%	1.86%	2.15%	1.80%	1.60%
15	Federal Funds Rate	2.80%	3.29%	4.16%	2.43%	2.33%
16	10-Year Treasury Rate	3.69%	3.58%	4.19%	2.55%	2.88%
17	Annual Budget Deficit/GDP (2027)	5.23%	5.31%	4.25%	6.74%	6.64%
18	Cumulative Deficit/GDP (2027)	88.5%	92.4%	85.6%	103.6%	101.2%
	Public Debt (2027-trillions)	$24.79	$26.47	$25.21	$28.83	$28.12

employee to decline while I assume a modest increase. Thus, **CBO** expects total hours worked to grow at an annual rate of 0.41 percent on average from 2021 to 2027 while I assume the growth rate will be 0.68 percent. Immigration has helped keep employment growth higher in recent years, but this is a downside risk factor given the nativism policies of the Trump Administration.

- All **productivity** projections are well above average growth of 0.7 percent over the past 7 years. If productivity growth tracks closer to recent experience, potential and actual growth will be much lower. Slower growth, in turn, leads to lower inflation, lower wage rate growth, lower interest rates and exacerbates annual budget deficits and the ratio of public debt to nominal GDP. ***This is a very significant downside risk that most have ignored.***

- **Potential and actual real GDP** growth are highly unlikely to exceed 2.0 percent and could be much lower if productivity is weak and immigration declines. Because slower real growth is linked to lower inflation, nominal GDP growth will probably fall well short of 4.0 percent. And, because annual budget deficits are likely to exceed 4.0 percent this means that the ratio of public-debt-to-nominal-GDP ratio will rise steadily. (Note that this ratio is stable when the nominal rates of growth in GDP and the public debt are identical.) Slow nominal growth coupled with population aging and rising health and income entitlements is a toxic combination in the longer run for financial and economic stability.

- Low productivity, which is linked to slower GDP growth, will foster a **higher unemployment rate** and **slower wage growth** over the longer run and will contribute to worsening income inequality. Unfortunately, this is likely to reinforce class divisions that have built in recent years and could amplify political and social tensions.

- **Inflation** will be hard pressed to reach the FOMC's 2.0 percent target, even though the economy is assumed to operate above full capacity in all scenarios. The U.S. is not immune from the kinds of economic forces that have driven Japan's inflation down to near zero over the past 20 years. Although deflation is unlikely in the U.S. anytime soon, an average inflation rate slightly below 2.0 percent over the next several years is likely, except in the "***Strong Growth***" scenario and even in that scenario the increase in inflation above 2.0 percent is very modest. As I explained in the ***December Longbrake Letter***, if NAIRU has declined significantly from **CBO**'s estimated level, inflation could average 20 to 50 basis points lower annually.

- Weak employment growth and slow growth in wages at 3.0 percent or less means **slow growth in nominal consumer income** and relatively **weak consumer spending growth**. Weak nominal consumer spending depresses private business investment. Unfortunately, this is a self-reinforcing negative feedback loop.

- Both short-term and long-term **interest rates** are likely to rise modestly in coming years, but to a very limited extent in the "***Recession-Stagnation***" and "***Low Productivity***" scenarios. This outcome is likely both because inflation will fall short of the FOMC's 2.0 percent target, but also because the real rate of interest is likely to remain at a historically depressed level.

- There is no prospect that the **ratio of public debt to nominal GDP** will decrease. The risks are in the direction of potential large increases over time, particularly if growth is slow and fiscal stimulus takes the form of low multiplier (significantly less than 1) tax cuts for the wealthy and transfer payments. Unfortunately, this is exactly what is likely to happen as a consequence of the key features of the "Tax Cuts and Jobs Act." It is estimated that only about one-third of the $1.5 trillion in tax cuts over the next 10 years will be recovered from new tax revenues stemming from greater economic growth. Thus, the accumulated budget deficit will grow at a faster rate. Infrastructure spending historically has had a multiplier greater than one but the favorable impacts generally do not show up for a long time. Only modest increases in infrastructure spending seem likely when Congress eventually passes the fiscal 2018 budget. While the day of reckoning is probably more than a decade in the future, eventually some combination of painful increases in taxes, cuts in spending, and reduced entitlement benefits appears to be inevitable.

IV. Individual Measures of Economic Activity

1. Payroll Employment Growth

Table 1 shows projections for growth in payroll employment. **Charts 1A** and **1B** show annual projections for payroll employment growth from 2017 to 2027. **Chart 1A** compares my "***BASE***" scenario payroll employment growth projections with those of **CBO**, **B of A**, and **GS**. **Chart 1B** compares payroll employment growth projections for my four scenarios.

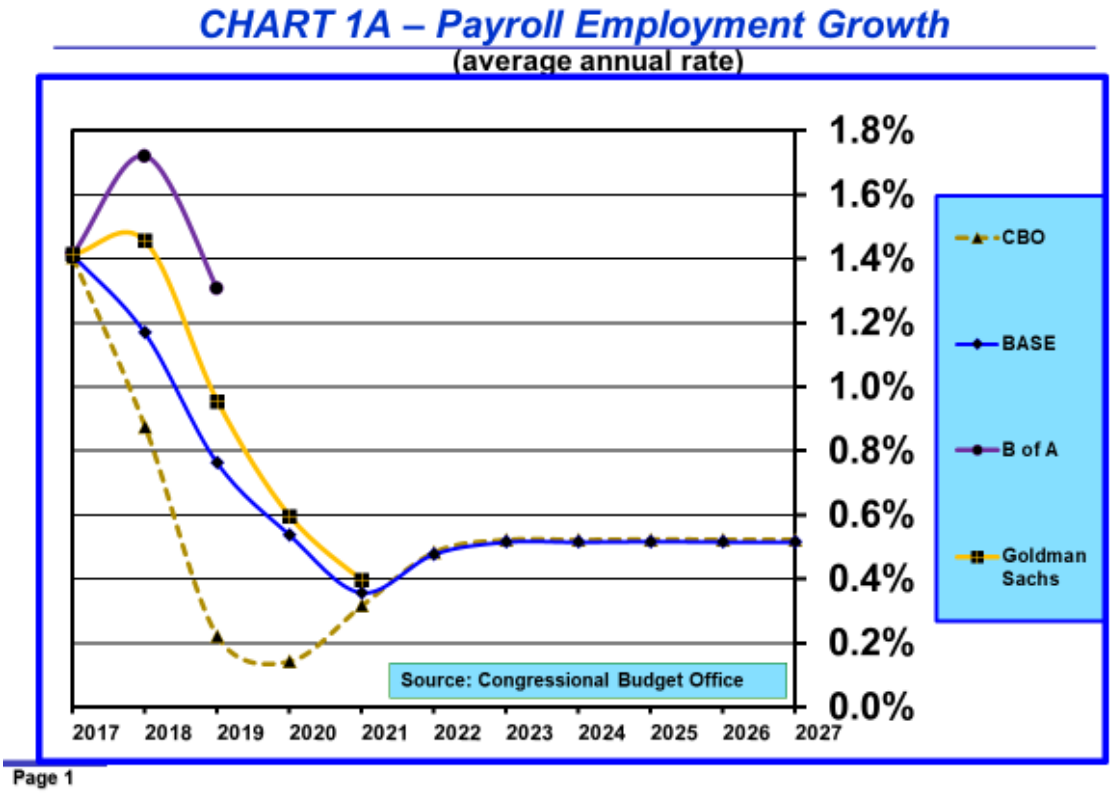
Employment growth declines over time in all scenarios toward a level consistent with demographic trends.

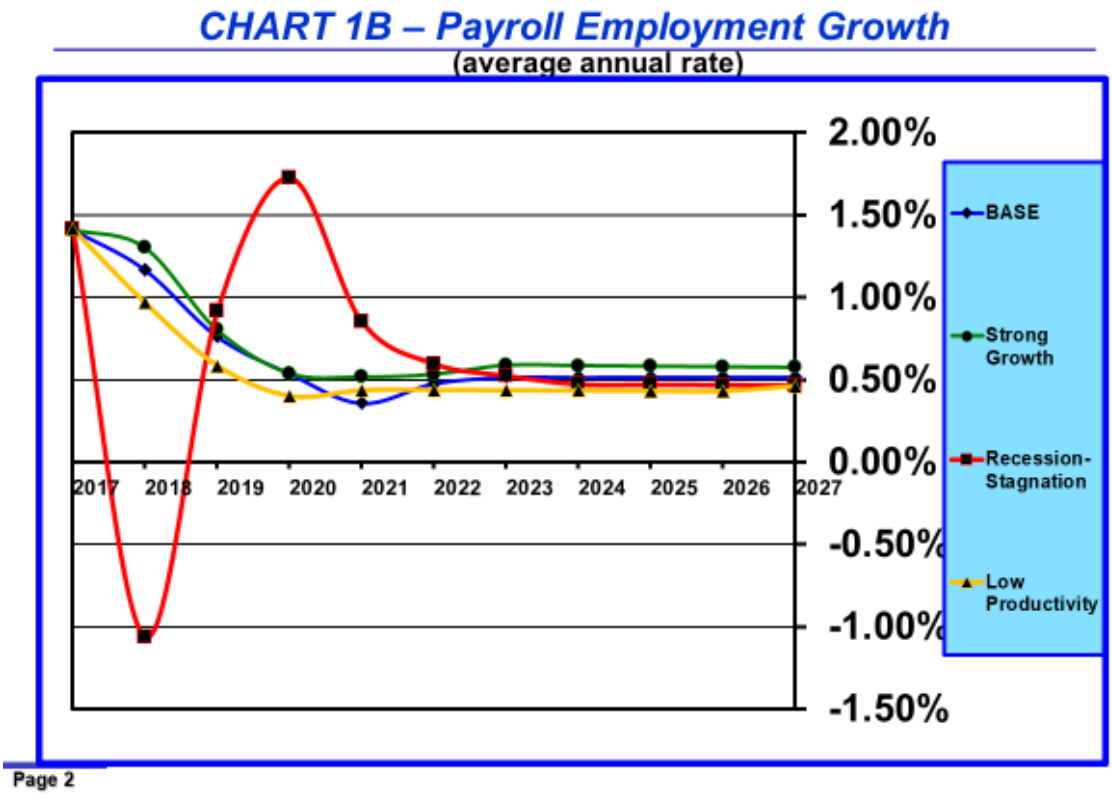
Table 1

Growth in Payroll Employment: 2017–2027

(percentages)

	BASE	Strong Growth	Recession-Stagnation	Low Productivity	GS	B of A	CBO
Payroll Growth							
2017	1.41	1.41	1.41	1.41	1.41	1.41	1.40
2018	1.17	1.31	-1.06	.97	1.46	1.72	.87
2019	.76	.80	.91	.59	.96	1.30	.22
2020	.54	.54	1.73	.40	.60		.14
2021	.36	.52	.85	.44	.40		.32
2022	.48	.53	.60	.44			.48
2023	.52	.59	.52	.44			.52
2024	.52	.59	.47	.43			.52
2025	.52	.58	.47	.43			.52
2026	.52	.58	.47	.43			.52
2027	.52	.58	.47	.46			.52
2017–2020	.97	1.02	.75	.84	1.11		.66
2021–2027	.49	.57	.55	.44			.49
2017–2027	.66	.73	.62	.58			.55





CBO assumes a very significant decline in payroll employment growth in 2019 and 2020 but then growth rebounds to the long-run steady-state level consistent with demographic trends. It is not clear to me why **CBO** has made this assumption, although it is consistent with its assumption that the GDP output gap widens and then stabilizes at -.5 percent.

Both **GS** and **B of A** are optimistic that fiscal stimulus will accelerate payroll employment growth, even though the labor market is already tight and operating above its potential NAIRU level. Both are also bullish about further declines in the unemployment rate and increases in employment participation. Given the current optimism and economic momentum, **B of A**'s and **GS**'s assumptions certainly are possible but employment growth well above the underlying growth in the labor force is not sustainable over the longer run. As participation stabilizes and then begins to fall in line with demographic trends, employment growth will quickly slow to about 0.5 percent. **GS** acknowledges that this will happen by 2020 and 2021.

In **GS**'s and **B of A**'s defense for their optimistic payroll growth assumptions, payroll growth has exceeded most all expectations over the last two years, and in that regard it might seem reasonable to extrapolate recent trends. The problem is that with limitations on immigration, demographic aging and an economy at full employment it is not at all clear where this higher payroll employment growth can come from for much longer.

2. Growth in Total Hours Worked

Table 2 shows projections for growth in total hours worked. 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 per employee change systematically over time. **Chart 2** presents annual projections for growth in total hours worked from 2017 to 2027 for **CBO** and my four scenarios.

Table 2

Growth in Total Hours Worked: 2017–2027

(percentages)

	BASE	Strong Growth	Recession-Stagnation	Low Productivity	GS	B of A	CBO*
Hours Worked							
2017	1.80	1.80	1.79	1.79			.37*
2018	.73	.89	-2.36	.47			.40*
2019	.51	.53	1.78	.34			.39*
2020	.58	.56	1.97	.47			.38*
2021	.55	.75	.94	.70			.39*
2022	.68	.70	.62	.61			.40*
2023	.67	.73	.79	.60			.42*
2024	.65	.70	.80	.60			.43*
2025	.69	.74	.43	.63			.42*
2026	.74	.78	.56	.65			.40*
2027	.76	.79	.66	.72			.41*
2017–2020	.90	.95	.79	.77			.38*
2021–2027	.68	.74	.69	.65			.41*
2017–2027	.76	.82	.73	.69			.40*

*CBO — data for hours worked is potential rather than forecast actual

Total hours worked is a more accurate measure of the contribution of labor to economic growth than payroll growth is. Payroll employment counts numbers of people employed and does not distinguish between full-time and part-time employment. This would not be a problem in measuring growth rates if the ratio of full and part-time employment were constant. But over the past several years average hours worked per employee have been trending downward slowly. This is what accounts for **CBO**'s lower growth rate for total hours worked than for payroll employment growth. However, my scenarios flip this relationship going forward. That is because average weekly hours per employee tend to increase when the labor market is tight and that is exactly the assumption that is embedded in my scenarios, particularly for the "***BASE***" and "***Strong Growth***" scenarios.

That said, in the 2021–2027 time frame, both measures of employment growth are very similar, although generally growth in total hours worked is slightly faster.

3. Productivity

Table 3 shows projections for productivity. **Chart 3A** compares my "***BASE***" scenario productivity projections with those of **CBO**, **B of A**, and **GS**. **Chart 3B** compares productivity projections for my four scenarios.

In recent years, productivity has been very depressed by historical standards. Most analysts expect productivity to improve in coming years but not to reach the long-term historical average of approximately 2.1 percent. Slower productivity growth stems from reduced investment growth. Reduced investment

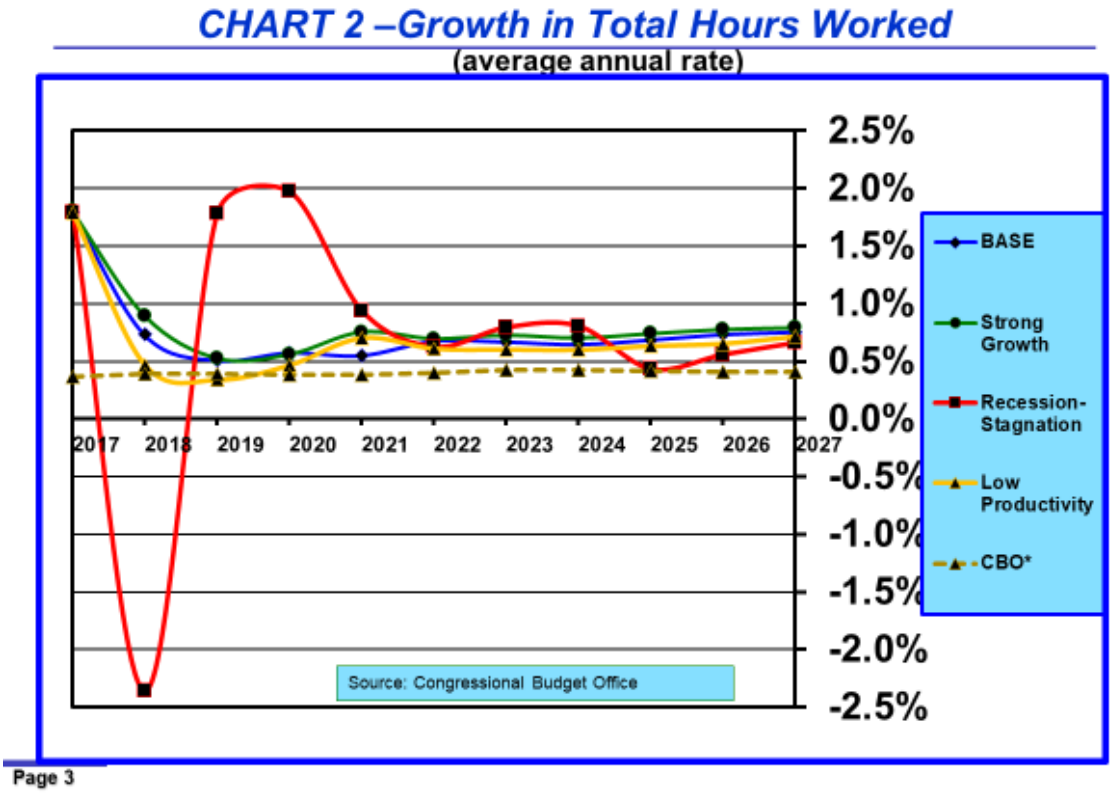


Table 3

Productivity Projections: 2017–2027

(percentages)

	BASE	Strong Growth	Recession-Stagnation	Low Productivity	GS	B of A	CBO
2017	1.21	1.21	1.21	1.21	1.21	1.21	1.40
2018	1.19	1.24	1.38	1.12	1.50	.92	1.51
2019	1.66	1.77	2.65	1.33	1.50	.94	1.64
2020	1.94	2.02	-.53	1.56	1.50		1.70
2021	1.57	1.70	.37	1.39	1.50		1.74
2022	1.41	1.52	1.27	1.17	1.50		1.77
2023	1.27	1.47	1.44	1.17	1.50		1.77
2024	1.31	1.51	1.23	1.19	1.50		1.76
2025	1.37	1.56	1.31	1.22	1.50		1.77
2026	1.33	1.51	1.55	1.18	1.50		1.78
2027	1.29	1.49	1.48	1.12	1.50		1.79
2017–2020	1.50	1.56	1.18	1.31	1.50		1.56
2021–2017	1.36	1.54	1.24	1.21	1.50		1.77
2017–2027	1.41	1.55	1.22	1.24	1.50		1.69

CHART 3A – Productivity

(average annual rate)

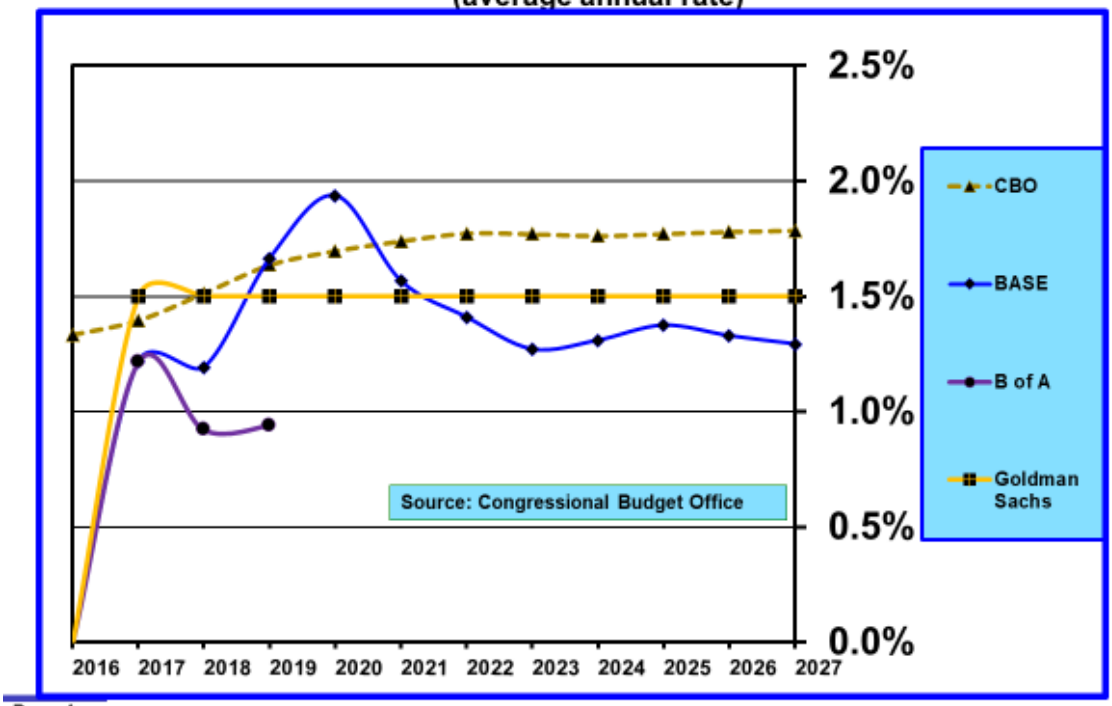


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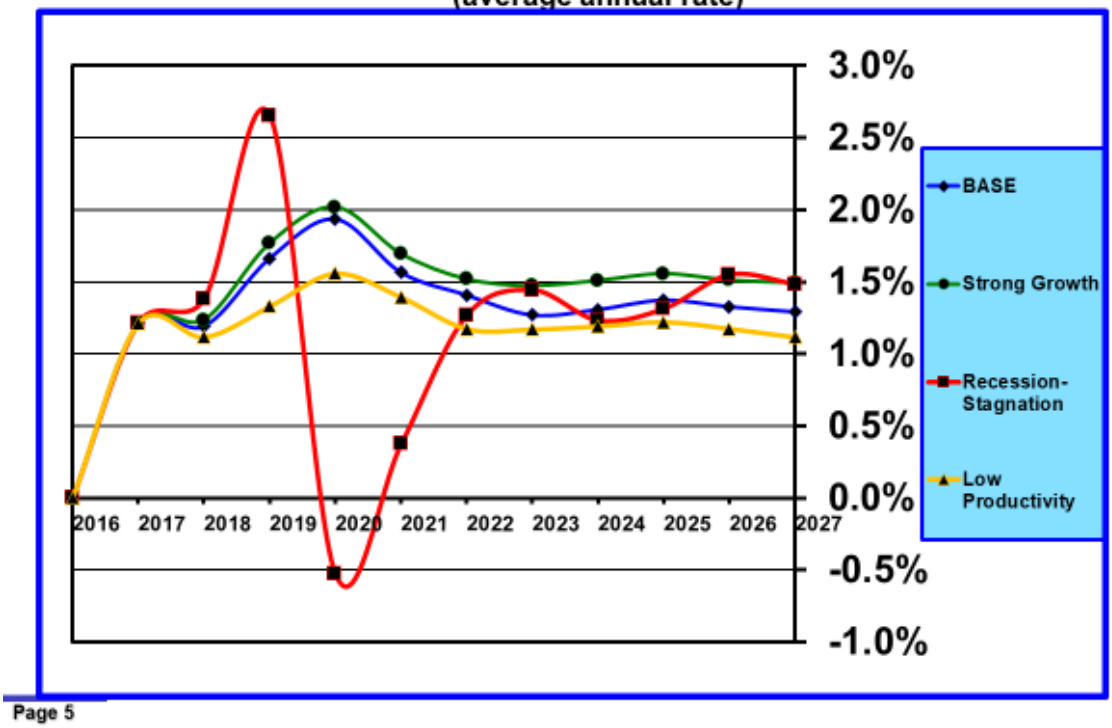
CHART 3B – Productivity

(average annual rate)



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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. Others argue that productivity is underreported because technological change is mismeasured.

CBO expects productivity to rise to 1.7 percent by 2020 and remain near that level after that. The long-run differences in productivity in my scenarios depend on the strength of government and private investment spending. The "Tax Cuts and Jobs Act" tax cuts should benefit investment and productivity with a bit of a lag in 2019 and 2020.

The rise in productivity in 2019 in my "***Recession-Stagnation***" scenario relative to my other scenarios, then followed by a fall in 2020, follows a traditional cyclical pattern.

Overall, there is not much analytical substantiation for the kind of rebound in productivity that is assumed in all scenarios including my own. The decline in productivity in recent years has been a global phenomenon which suggests that there are underlying reasons that weigh against an uncritical presumption that productivity can't remain at such a low level, so surely it has to rise. Of all economic forecasts, the forecast of the level of productivity is probably one of the most critical and definitely one of the least understood.

4. Potential Real GDP

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

Table 4 shows projections for potential real GDP growth. **Chart 4A** compares my "***BASE***" scenario potential real GDP growth projections with those of **CBO**, **B of A**, and **GS**. **Chart 4B** compares potential real GDP growth projections for my four scenarios.

Table 4

Potential Real GDP Growth for 2017–2027

(percentages)

	BASE	Strong Growth	Recession-Stagnation	Low Productivity	GS	B of A	CBO
2017	1.54	1.54	1.54	1.54	1.61	1.60	1.54
2018	1.53	1.54	1.54	1.52	1.75	1.70	1.66
2019	1.55	1.58	1.78	1.48	1.75	1.70	1.76
2020	1.82	1.88	1.10	1.65	1.75	1.70	1.80
2021	1.82	1.92	.84	1.66	1.75	1.70	1.84
2022	1.72	1.81	1.50	1.52	1.75	1.70	1.88
2023	1.71	1.90	1.70	1.53	1.75	1.70	1.89
2024	1.75	1.96	1.74	1.54	1.75	1.70	1.90
2025	1.75	1.96	1.74	1.54	1.75	1.70	1.88
2026	1.75	1.96	1.74	1.54	1.75	1.70	1.87
2027	1.75	1.96	1.74	1.54	1.75	1.70	1.87
2017–2020	1.61	1.64	1.49	1.55	1.71	1.67	1.69
2021–2027	1.75	1.92	1.57	1.55	1.75	1.70	1.88
2017–2027	1.70	1.82	1.54	1.55	1.74	1.69	1.81

CHART 4A – Potential Real GDP Growth

(average annual rate)

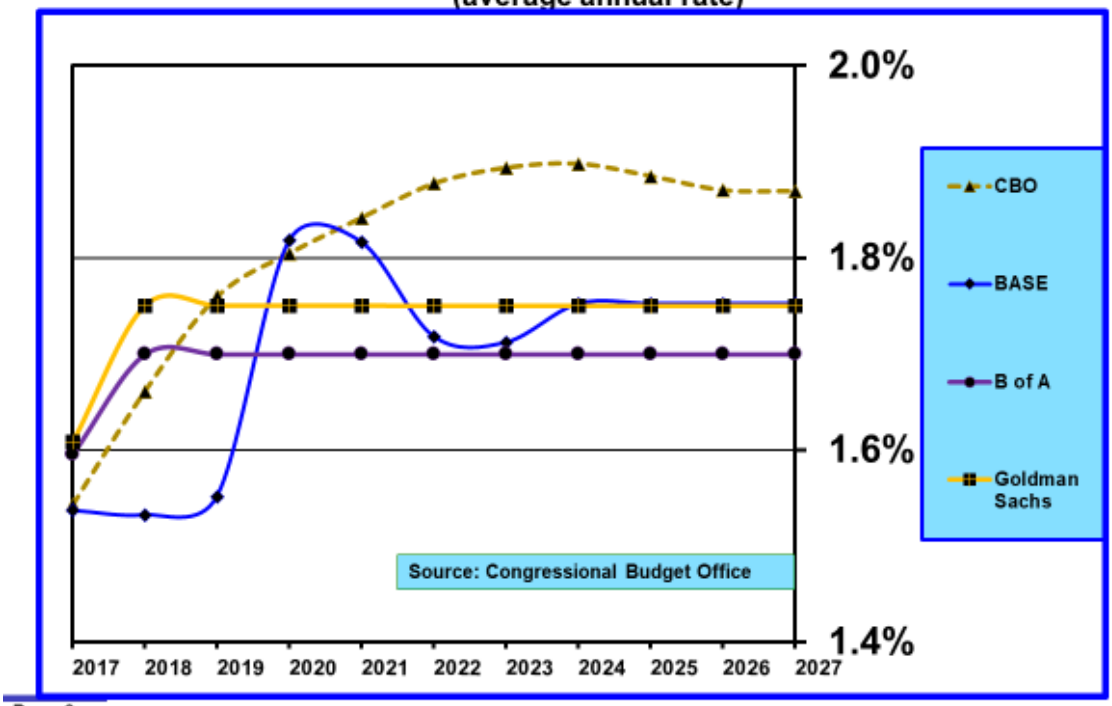

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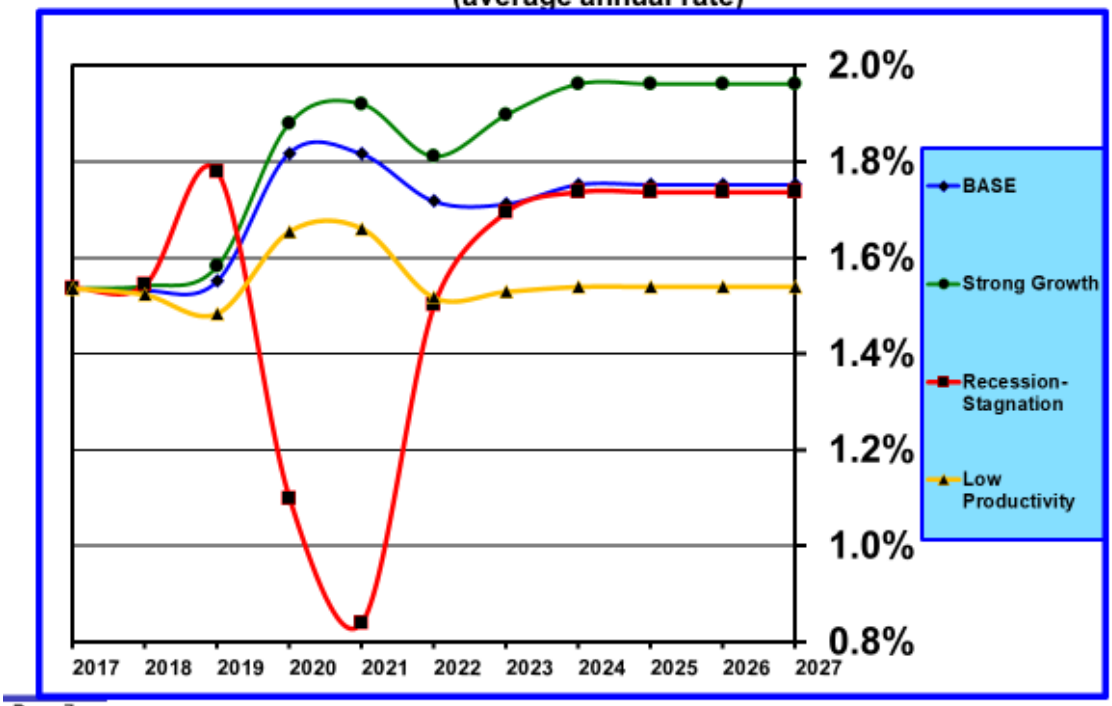
CHART 4B – Potential Real GDP Growth

(average annual rate)



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In the aftermath of the Great Recession, potential real GDP growth was severely depressed relative to historical experience. **CBO** expects a slight improvement in potential real GDP, rising to 1.9 percent by 2022 and then stabilizing at that level. **GS** and **B of A** and other analysts are less optimistic. The **FOMC** expects long-run potential real GDP growth to settle at an uninspiring level of 1.8 to 1.9 percent.

My "***BASE***" scenario matches **GS** and **B of A** and my "***Strong Growth***" scenario matches **CBO**'s projections. If productivity growth disappoints, then potential real GDP growth will be 1.6 percent or lower.

5. Forecast Real GDP

Table 5 shows projections for realized real GDP growth. **Chart 5A** compares my "***BASE***" scenario realized real GDP growth projections with those of **CBO**, **B of A**, and **GS**. **Chart 5B** compares realized real GDP growth projections for my four scenarios.

Table 5

Realized Real GDP Growth for 2017–2027

(percentages)

	BASE	Strong Growth	Recession-Stagnation	Low Productivity	GS	B of A	CBO
2017	2.25	2.25	2.25	2.25	2.27	2.27	2.25
2018	2.28	2.42	1.70	2.07	2.77	2.81	1.73
2019	2.39	2.48	1.59	1.90	2.31	2.42	1.68
2020	2.28	2.36	1.75	1.96	1.71	1.88	1.44
2021	2.06	2.24	2.18	1.94	1.36	1.69	1.70
2022	2.05	2.21	2.12	1.93	1.75	1.69	1.88
2023	1.98	2.16	2.42	1.88	1.75	1.69	1.89
2024	1.88	2.05	1.83	1.77	1.75	1.69	1.90
2025	1.80	1.95	1.79	1.72	1.75	1.69	1.88
2026	1.75	1.88	1.89	1.66	1.75	1.69	1.87
2027	1.69	1.82	1.88	1.59	1.75	1.69	1.87
2017–2020	2.30	2.38	1.82	2.04	2.15	2.33	1.78
2021–2027	1.89	2.04	2.02	1.78	1.69	1.69	1.86
2017–2027	2.04	2.16	1.94	1.88	1.86	1.92	1.83

Most analysts, as well as members of the **FOMC**, have come around to the conclusion that actual real GDP growth will not accelerate much in coming years. Indeed, the trend should be in the direction of somewhat slower actual growth over time as employment growth slows. Because of tax cuts and added fiscal spending, there should be a small but temporary increase in GDP growth in 2018 and 2019. Compared to **GS** and **B of A**, my model indicates that tax cuts should boost growth with about a year lag.

After 2019, my scenarios are more optimistic than others, primarily because I expect employment growth to be a little stronger. Average growth during 2021–2027 in my "***BASE***" scenario is approximately 15 basis points greater than the projections of **GS** and **B of A** and comparable to **CBO**'s. although, as is apparent in **Chart 5A**, growth in my "***BASE***" scenario decelerates steadily from 2021 to 2027 and matches **B of A**'s and **GS**'s growth estimates by 2027.

CHART 5A – Actual Real GDP Growth

(average annual rate)

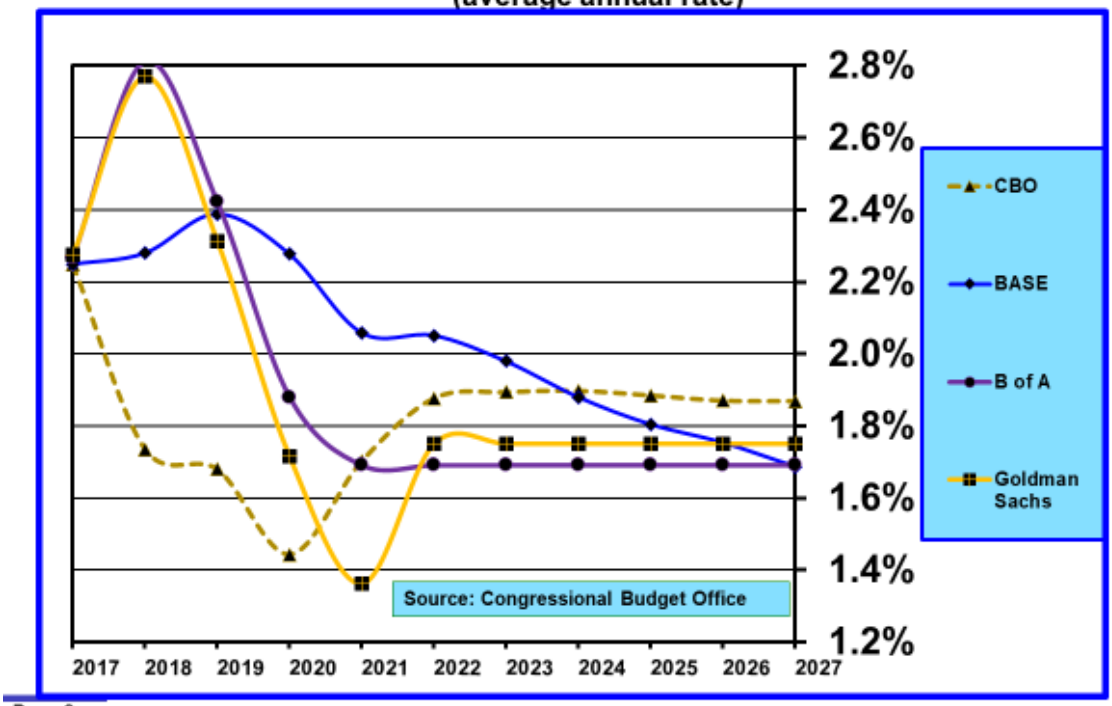

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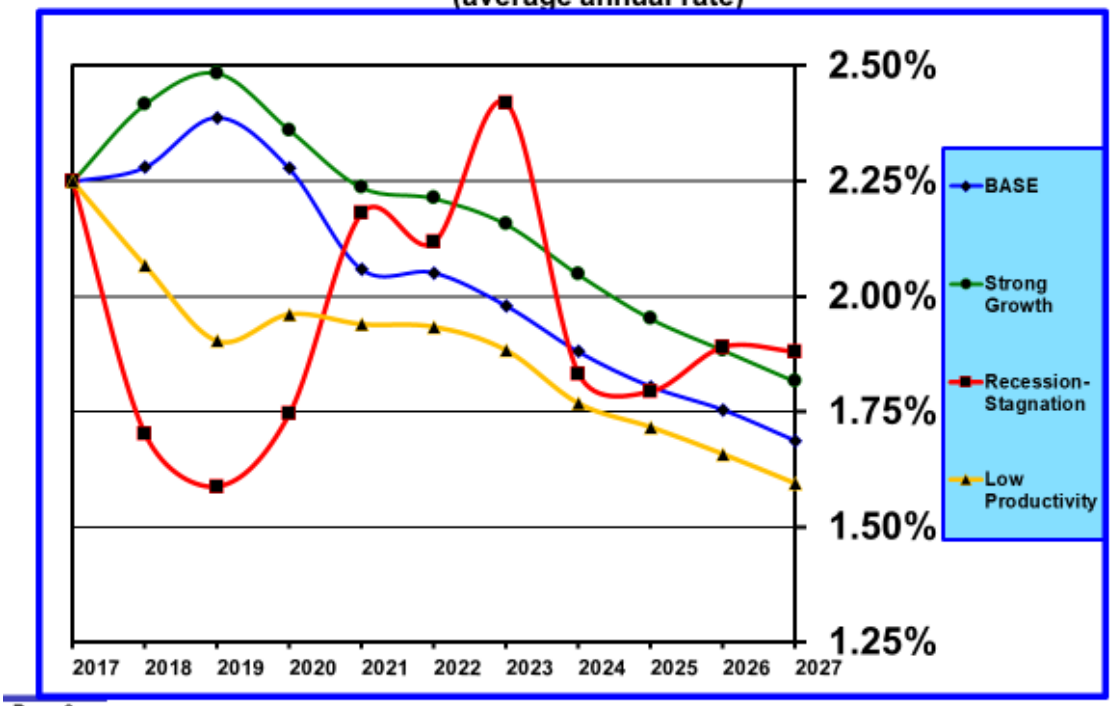
CHART 5B – Actual Real GDP Growth

(average annual rate)



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6. Real GDP Output Gap

Table 6 shows projections for the GDP output gap. **Chart 6A** compares my "***BASE***" scenario GDP output gap projections with those of **CBO**, **B of A**, and **GS**. **Chart 6B** compares GDP output gap projections for my four scenarios.

Table 6

Real GDP Output Gap: 2017–2027

(percentages)

	BASE	Strong Growth	Recession-Stagnation	Low Productivity	GS	B of A	CBO
2017	.00*	.00*	.00*	.00*	.00*	-.01*	.00
2018	.74	.86	.16	.54	.95	1.05	.07
2019	1.57	1.76	-.03	.95	1.33	1.77	-.01
2020	2.03	2.24	.61	1.26	1.12	1.95	-.36
2021	2.27	2.56	1.94	1.53	.73	1.94	-.50
2022	2.60	2.96	2.56	1.95		1.93	-.50
2023	2.87	3.22	3.29	2.30		1.92	-.50
2024	3.00	3.31	3.38	2.53		1.91	-.50
2025	3.06	3.30	3.44	2.71		1.90	-.50
2026	3.06	3.22	3.60	2.83		1.89	-.50
2027	2.99	3.07	3.74	2.89		1.88	-.50
2017–2020	1.08	1.22	.18	.69	.85	1.19	-.08
2021–2027	2.84	3.09	3.14	2.39		1.91	-.50
2017–2027	2.20	2.41	2.06	1.77		1.65	-.35

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

All estimates of the real GDP output gap in **Table 6** are anchored by **CBO**'s June 2017 estimate of potential real GDP. Potential real GDP is not a directly observable measure and thus must be estimated based on assumptions. Different analysts have varying estimates of the level of potential real GDP because of differences in their assumptions about growth in employment and productivity. For example, **GS**'s output gap is .95 percent in 2018 compared to CBO's estimate of .07 percent. This difference has two components: **GS** has a higher estimate of potential real GDP growth in 2018, which should result in a lower estimate of the output gap than **CBO**. But, **GS** has a much higher forecast of actual real GDP in 2018 than **CBO**, which results in a much larger positive real GDP gap overall. All forecasters now believe that the output gap will be positive in 2018 and will grow larger in later years than **CBO** projects. Of course, **CBO** can resolve this difference by increasing its forecasts of actual real GDP growth and this seems likely to be a probable outcome when **CBO** revises its economic assumptions.

CBO could all also raise its projections of potential real GDP growth and that would reduce the size of the projected positive GDP output gap. However, looking at **Table 4**, there are negligible differences in forecasters' estimates of future potential real GDP growth. Actually, **CBO**'s estimates are slightly greater after 2020.

If one accepts forecasters' projections of potential real GDP growth as reasonable, then a large positive output will occur in coming years, if forecasters' estimates of future real GDP growth prove accurate. In the past, the economy rarely has operated above full capacity very long before a substantial deceleration in growth or recession has occurred. It seems more likely than not that this is what will occur in future years and that the large positive output gaps projected in **Table 6** will not come to pass.

CHART 6A – Real GDP Output Gap

(percentage of potential GDP)

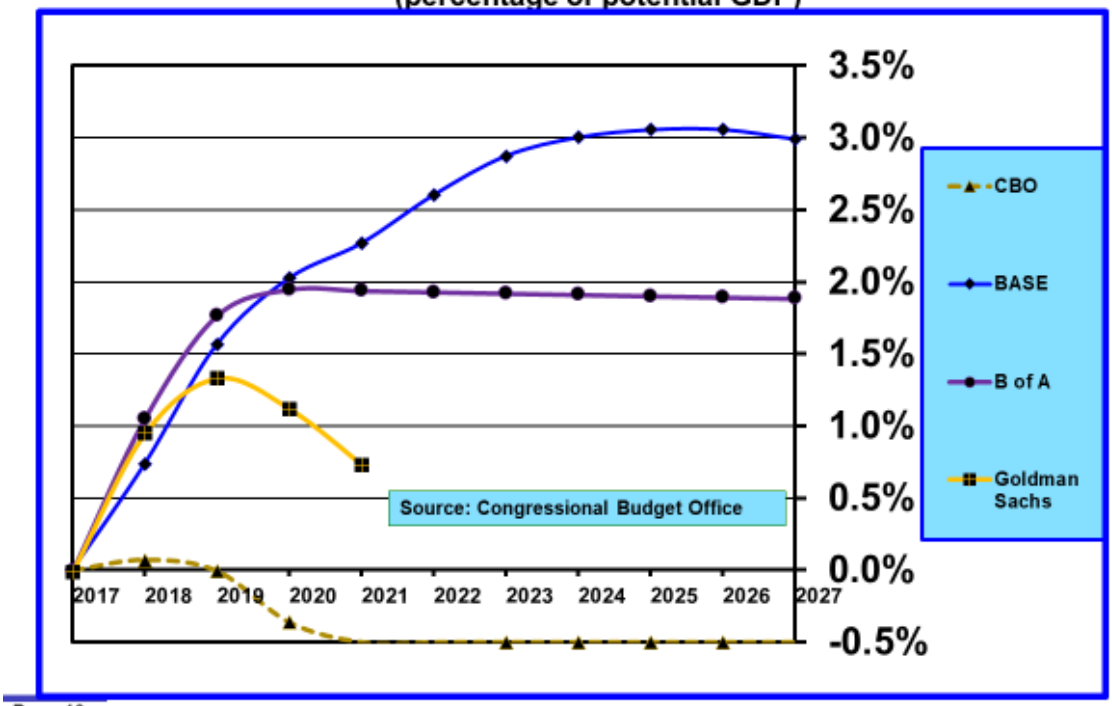

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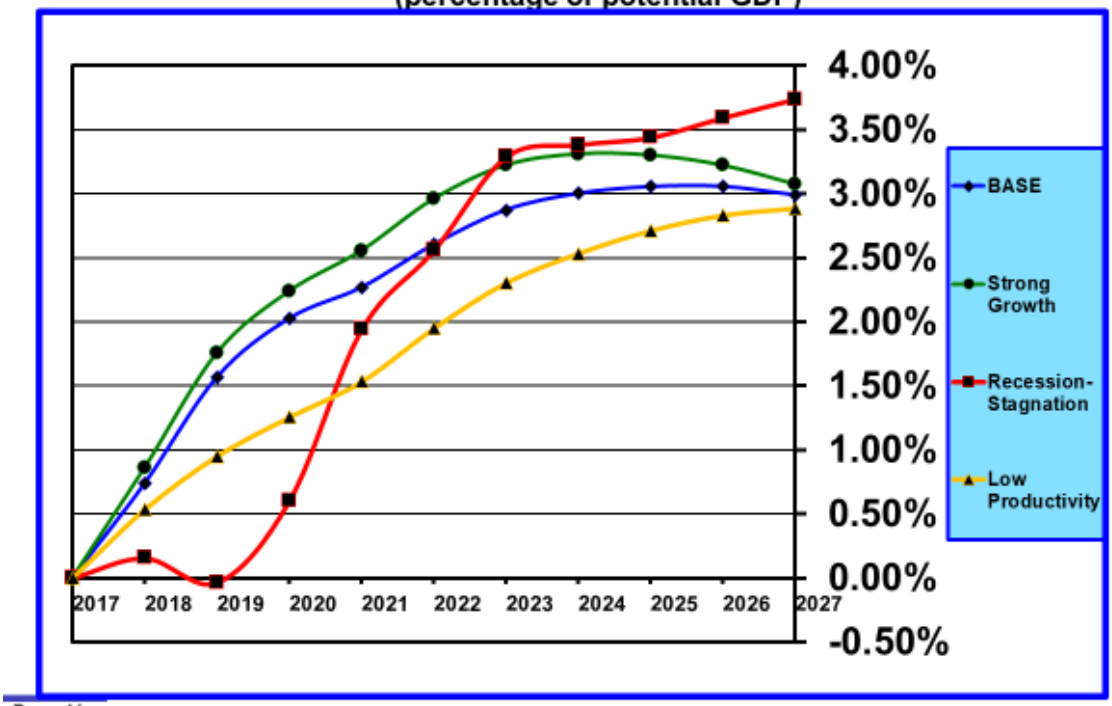
CHART 6B – Real GDP Output Gap

(percentage of potential GDP)



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The alternative, which is possible, is that stronger investment spending in the next few years leads to a burst of productivity growth and this propels potential real GDP growth above all current estimates. If this were to occur, then the output gap would not be as large as currently projected and deceleration in real GDP growth or recession would be less likely to occur. This hope, or perhaps expectation, is behind tax reform measures in the "Tax Cuts and Jobs Act," which are intended to encourage businesses to increase investment.

I derive projections of both potential and actual real GDP independently of **CBO**'s projections. However, I do use **CBO**'s third quarter 2017 estimate of potential real GDP as my starting point.

CBO's projection that the economy will always run at a -0.5 percent gap in the long run doesn't make a lot of sense. Now that the economy is at full potential, according to **CBO**'s estimate and above potential according to others, I anticipate that **CBO** will change this assumption in future updates of its projections.

Notice the seemingly odd rise in the output gap in the "***Recession-Stagnation***" scenario in **Chart 6B**. This is caused by my methodology for calculating potential real GDP growth and the robust recovery in actual real GDP following the assumed period of recession.

7. Unemployment Rate

Table 7 shows projections for the U-3 unemployment rate. **Chart 7A** compares my "***BASE***" scenario unemployment rate projections with those of **CBO**, **B of A**, and **GS**. **Chart 7A** also shows **CBO**'s estimate of NAIRU, the non-accelerating inflation rate of unemployment. NAIRU is **CBO**'s estimate of "full employment." When actual unemployment is above this rate, an unemployment gap exists and there is downward pressure on inflation. When the actual unemployment rate is below NAIRU, the labor market is operating above capacity and there is upward pressure on inflation.

Table 7

U-3 Unemployment Rate for 2017–2027

(percentages)

	BASE	Strong Growth	Recession-Stagnation	Low Productivity	GS	B of A	CBO	CBO NAIRU	B of A NAIRU	Bill's NAIRU
2017	4.09	4.09	4.09	4.09	4.09	4.09	4.28	4.74	4.32	4.54
2018	4.01	3.90	5.69	4.17	3.50	3.70	4.20	4.73	4.20	4.50
2019	3.83	3.69	5.67	4.14	3.40	3.50	4.53	4.72	4.20	4.50
2020	3.82	3.68	4.64	4.25	3.40	3.70	4.85	4.72	4.20	4.50
2021	3.97	3.71	4.35	4.35	3.60	3.90	4.96	4.71	4.20	4.50
2022	4.05	3.72	4.30	4.44		4.10	4.95	4.70	4.20	4.50
2023	4.10	3.72	4.34	4.56		4.30	4.95	4.70	4.20	4.50
2024	4.14	3.70	4.41	4.67		4.30	4.94	4.69	4.20	4.50
2025	4.14	3.64	4.46	4.74		4.30	4.93	4.69	4.20	4.50
2026	4.11	3.57	4.47	4.79		4.30	4.93	4.68	4.20	4.50
2027	4.08	3.49	4.49	4.81		4.30	4.90	4.65	4.20	4.50

Chart 7B compares unemployment rate projections for my four scenarios.

Currently, the U-3 unemployment rate of 4.1 percent is 0.6 percent below **CBO**'s estimate of NAIRU, which is 4.7 percent. This indicates that the employment gap has not only been eliminated, but that the labor market is operating well above full capacity.

CHART 7A – U-3 Unemployment Rate

(average annual rate)

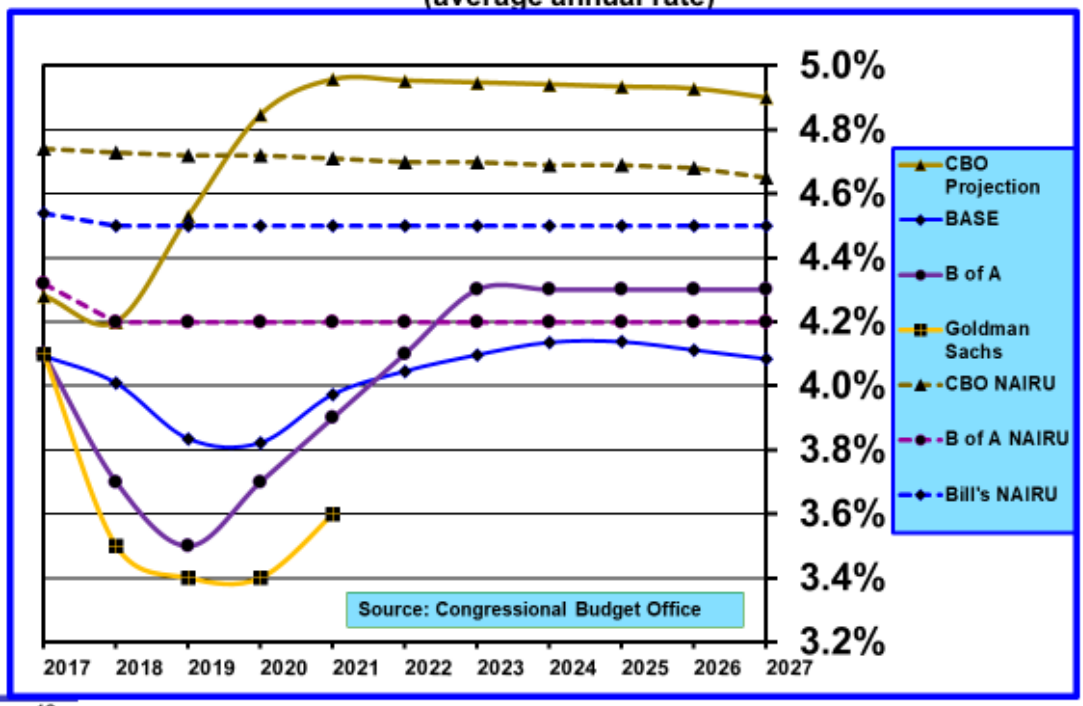

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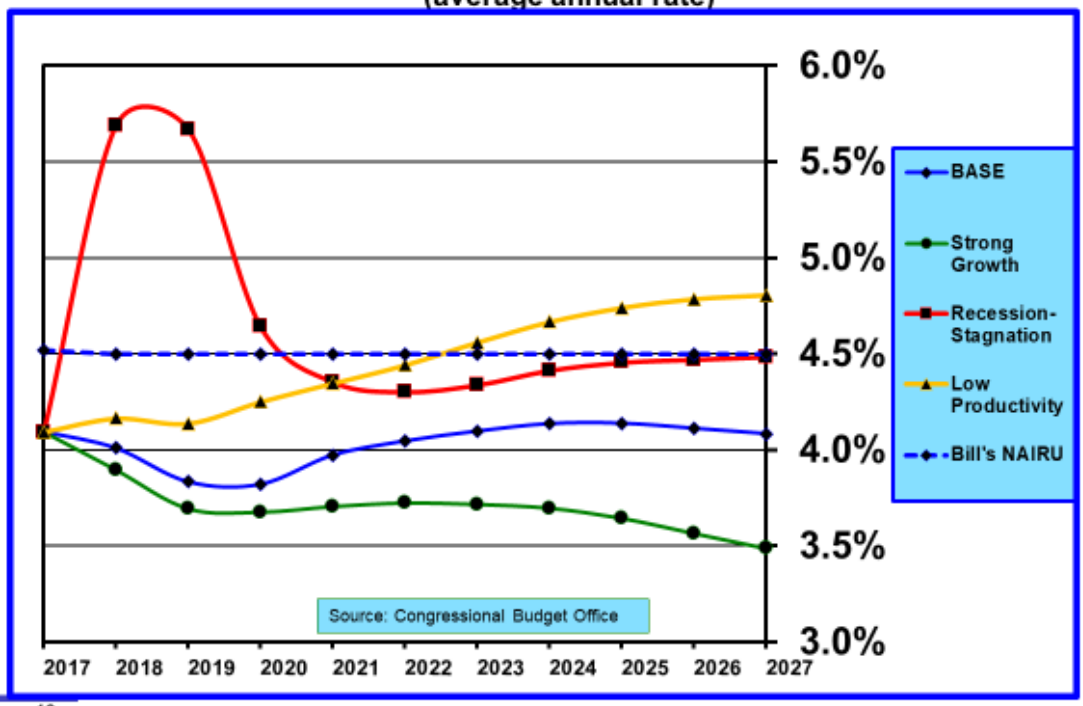
CHART 7B – U-3 Unemployment Rate

(average annual rate)



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Other forecasters now believe that NAIRU is considerably lower than **CBO**'s estimates. **B of A**'s estimate of NAIRU, for example is 4.2 percent. This still results in the labor market operating at full capacity, but to a much lesser extent. **B of A**'s estimate of NAIRU is at the low end of forecaster estimates. The consensus averages about 4.5 percent, which is the number I use in all my scenarios. The **FOMC**'s long-term forecast range for the natural rate of unemployment is 4.4 to 4.7 percent.

All forecasters' projections, with the exception of **CBO**'s and my "***Recession-Stagnation***" scenario, fall below **CBO**'s estimate of NAIRU. 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.

Unemployment rate projections in by "***BASE***" scenario are lower than **CBO**'s, but higher than those of **B of A** and, particularly, **GS**. The unemployment rate estimates in my "***Strong Growth***" scenario are closer to those of **B of A** and **GS**, but do not rise in later years as others expect. Weak productivity growth depresses employment growth and results in a rising unemployment rate, as can be seen in the "***Low Productivity***" scenario.

When **CBO** revises its economic assumptions, it is highly likely that it will decrease its forecasts of the unemployment rate in future years. It is less certain whether it will reduce its estimate of NAIRU.

8. Nominal Hourly Wage Rate Growth

There are four primary broad-based measures of labor compensation that provide information about compensation trends. All are compiled by **BLS**. Two are released monthly as part of the 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 of these measures include information about benefits which comprise approximately 30 percent of total compensation. A third measure, the employment cost index (**ECI**), is released quarterly and consists of wages and salaries, benefits, and total compensation indices. The fourth measure is also released quarterly in conjunction with **BLS**'s quarterly productivity report and is used to measure the productivity-adjusted impact on business labor costs.

Table 8 shows projections for the hourly nominal wage-rate growth for **BLS**'s measure for production and nonsupervisory workers for my four scenarios and **ECI** projections for **CBO**, **B of A**, and **GS** from 2017 to 2027. Also shown in **Table 8** are wage rate growth projections for my "***BASE***" scenario for alternative assumptions about NAIRU. **Chart 8A** compares my "***BASE***" scenario hourly wage growth rate projections with those of **CBO**, **B of A**, and **GS** and for the alternative NAIRU assumptions of 4.2 percent (**B of A**) and CBO. **Chart 8B** compares hourly wage rate projections for my four scenarios.

Although all wage rate growth measures are highly correlated over time, because compilation methodologies differ for **ECI** and nonsupervisory and production workers wages, percentage changes over fixed time periods will not necessarily be in sync.

Data for production and nonsupervisory 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.

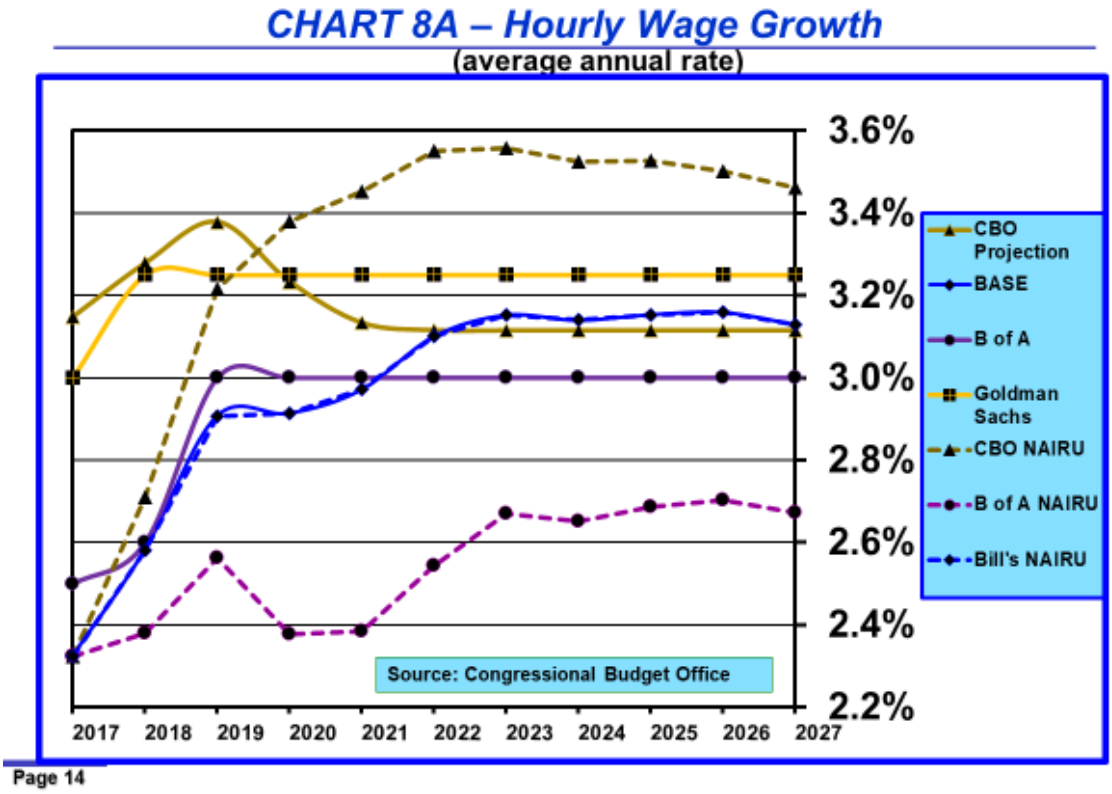
Table 8

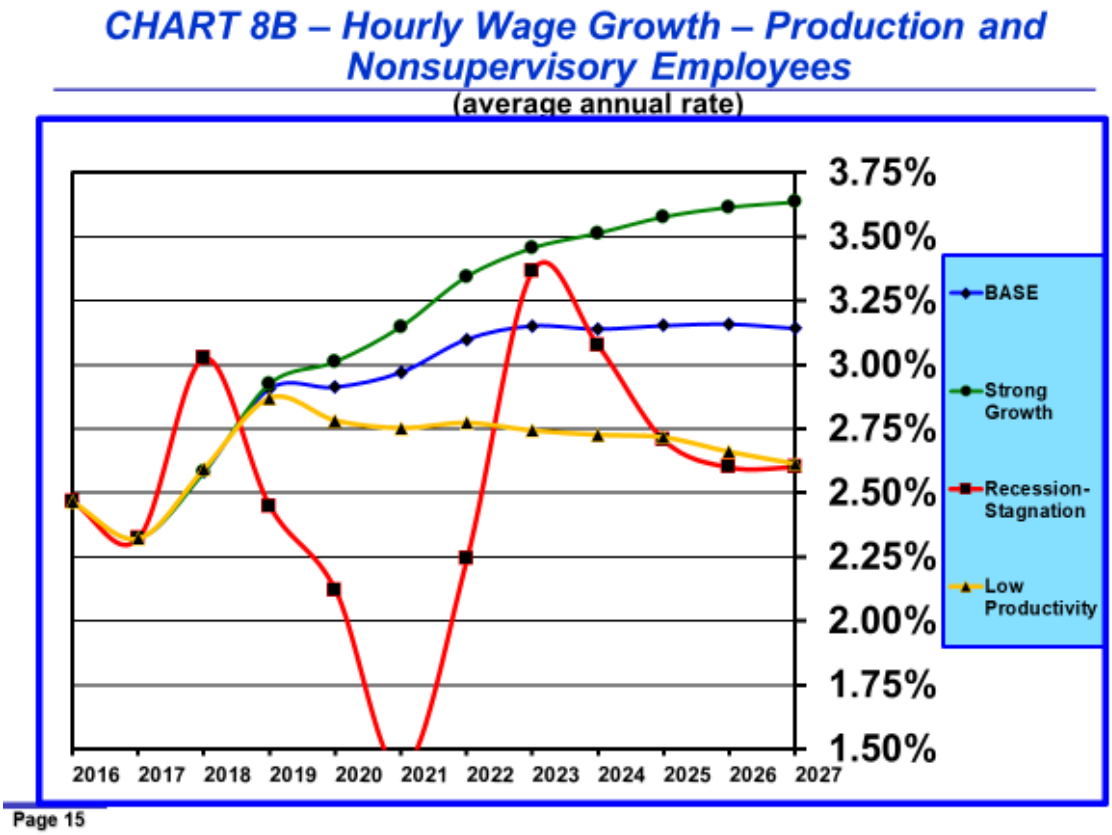
Hourly Wage Rate Growth for Production and Nonsupervisory Workers and ECI: 2017–2027

(percentages)

	BASE NAIRU B of A	BASE NAIRU 4.5%	BASE NAIRU CBO	Strong Growth	Recession-Stagnation	Low Productivity	GS ECI	B of A ECI*	CBO ECI
2017	2.32	2.32	2.32	2.32	2.32	2.32	3.00	2.50	3.15
2018	2.38	2.58	2.71	2.58	3.03	2.60	3.25	2.60	3.28
2019	2.56	2.91	3.22	2.93	2.45	2.87	3.25	3.00	3.38
2020	2.38	2.91	3.38	3.01	2.12	2.78	3.25	3.00	3.23
2021	2.38	2.97	3.45	3.15	1.42	2.75	3.25	3.00	3.13
2022	2.54	3.10	3.55	3.34	2.24	2.77	3.25	3.00	3.12
2023	2.67	3.15	3.56	3.46	3.37	2.74	3.25	3.00	3.11
2024	2.65	3.14	3.52	3.51	3.08	2.73	3.25	3.00	3.11
2025	2.69	3.15	3.53	3.58	2.71	2.72	3.25	3.00	3.11
2026	2.70	3.16	3.50	3.62	2.60	2.66	3.25	3.00	3.11
2027	2.67	3.14	3.46	3.64	2.60	2.61	3.25	3.00	3.12
2017–20	2.41	2.68	2.91	2.71	2.48	2.64	3.19	2.78	3.26
2021–27	2.62	3.12	3.51	3.47	2.57	2.71	3.25	3.00	3.12
2017–27	2.54	2.96	3.29	3.19	2.54	2.69	3.23	2.92	3.17

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





In the long run there is not a great deal of difference in nominal wage growth rates. In 2027 they range between 3.0 and 3.25 percent for my "***BASE***" scenario, **B of A**, **GS** and **CBO**. Strong employment growth in my "***Strong Growth***" drives inflation and wage growth higher with wage rate growth averaging 3.5 percent between 2021 and 2027. Weak productivity results in slower wage rate growth in the "***Low Productivity***" scenario, averaging 2.7 percent between 2021 and 2027. The difference between 3.5 percent and 2.7 percent over a ten-year period is not all that great, which reflects a lack of sensitivity of wage rates to economic fluctuations. An exception occurs in times of high and sustained unemployment, as can be seen in the "***Recession-Stagnation***" scenario.

Alternative assumptions about NAIRU matter a great deal. Average wage growth from 2021 to 2027 is 50 basis points lower when **B of A**'s 5.2 percent NAIRU is used to calculate projected wage rate growth and 39 basis points higher when **CBO**'s NAIRU assumption is used.

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. That said, recent wage rate growth data have fallen short of expectations. This could turn out to be a temporary anomaly, or it could be a harbinger that there has been a fundamental structural change in labor markets that limits upside pressure on wages as the labor market operates increasingly above NAIRU. A relevant and significant structural change would be a much lower NAIRU unemployment rate, as **B of A** assumes. Because **B of A** only projects growth rates only for **ECI**, it is difficult to assess whether **B of A** has incorporated its lower NAIRU assumption into its forecast. However, **B of A** does project lower **ECI** growth than other forecasters.

As can be seen in **Chart 8A**, **GS** expects the nominal wage growth component of **ECI** to move up

from its recent level of 2.3 percent in the third quarter of 2017 to 3.25 percent in 2018. **CBO** expects **ECI** growth to peak at 3.38 percent in 2019 before easing down to approximately 3.1 percent in later years. **B of A** expects **ECI** growth in the nominal wage to reach only 3.0 percent by 2019 and then stabilize at that level.

9. Investment—Private Business

Table 9 shows projections for forecast real private business investment growth. **Charts 9A** and **9B** show annual projections for real private investment growth from 2017 to 2027. **Chart 9A** compares my "***BASE***" scenario real private investment growth projections with those of **B of A**, and **GS**, as well as with the 19-year average growth from 1999 through the third quarter of 2017. **Chart 9B** compares real private investment growth projections for my four scenarios.

Table 9

Private Real Investment Growth: 2017–2027

(percentages)

	BASE	Strong Growth	Recession-Stagnation	Low Productivity	GS	B of A
Private Investment						
2017	3.90	3.97	3.84	3.84	4.23	4.03
2018	4.70	5.55	3.80	3.41	5.50	5.04
2019	4.44	4.83	-.57	1.89	3.61	5.17
2020	2.14	2.32	-2.26	1.32	2.81	3.62
2021	.86	1.25	4.96	1.03	2.39	3.03
2022	1.41	1.71	3.40	1.39		
2023	1.51	1.76	2.37	1.51		
2024	1.83	2.05	2.02	1.51		
2025	2.02	2.2	2.02	1.51		
2026	2.02	2.22	2.02	1.51		
2027	2.02	2.22	2.02	1.51		
2017–2020	3.80	4.16	1.20	2.61	4.04	4.46
2021–2027	1.67	1.92	2.68	1.42		
2017–2027	2.44	2.74	2.15	1.85		
1999–2017 Average	1.68	1.68	1.68	1.68	1.68	1.68

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

Note that all projections of growth in private business investment exceed the 1.68 percent annual rate of increase over the past 18.75 years. Greater growth in investment spurs greater increases in productivity. If investment growth does not break out of the doldrums as the projections in **Table 9** indicate, then productivity will disappoint, as indicated in the "***Low Productivity***" scenario. There is some cause for optimism, however, because major features of the "Tax Cuts and Jobs Act" are intended to stimulate private business investment.

Also, monetary policy's intentional focus on maintaining very low interest rates may be diverting

CHART 9A – Real Private Investment Growth

(average annual rate)

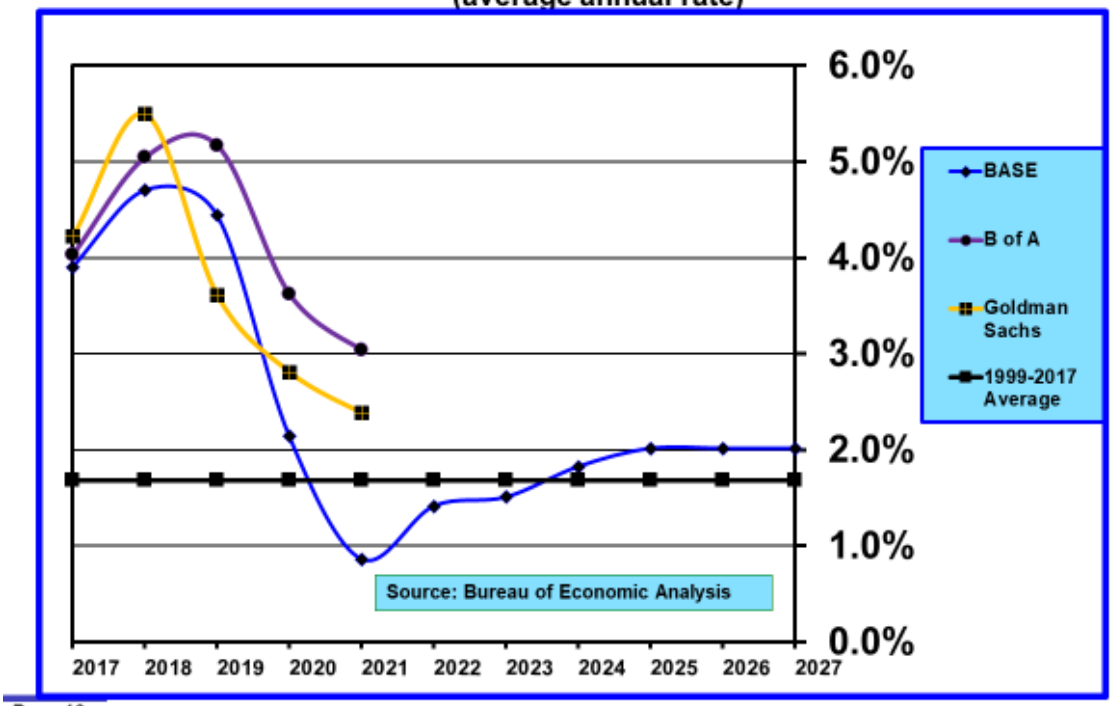


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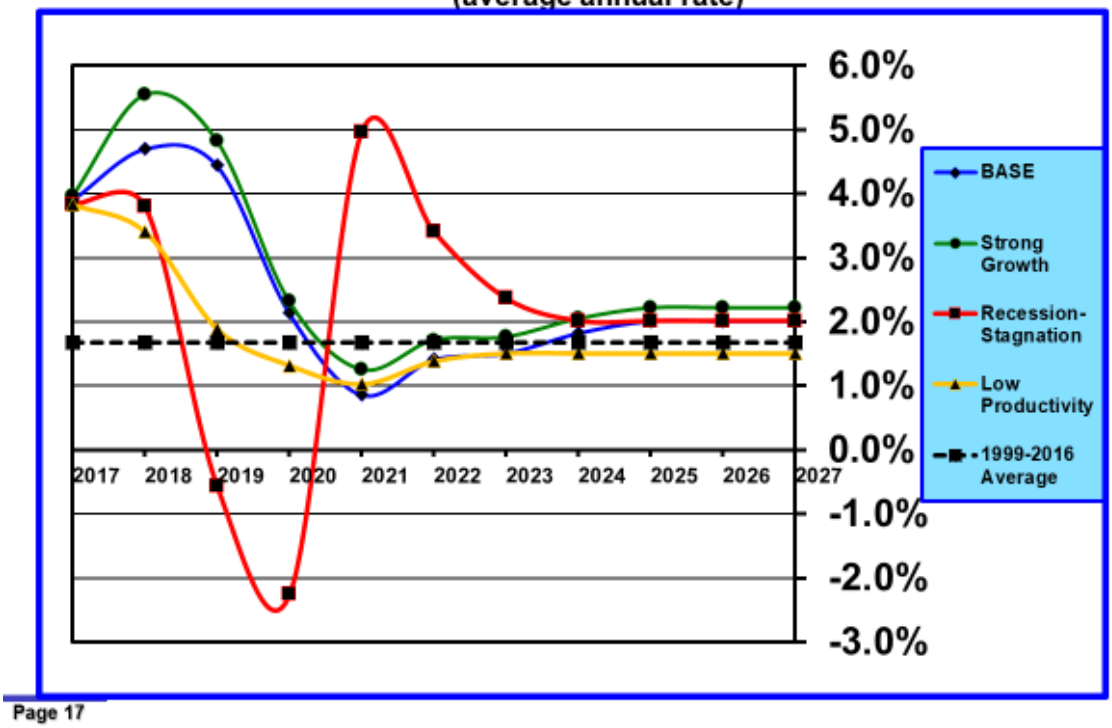
CHART 9B – Real Private Investment Growth

(average annual rate)



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monetary liquidity into financial engineering and asset price speculation and away from riskier long-term investments in productive activity. This may be a contributing to weak productivity growth.

10. Investment—Government

Table 10 shows projections for forecast real government investment growth. **Charts 10A** and **10B** show annual projections for real government investment growth from 2017 to 2027. **Chart 10A** compares my "***BASE***" scenario real government investment growth projections with those of **B of A**, and **GS**, as well as with the 19-year average growth from 1999 through the third quarter of 2017. **Chart 10B** compares real government investment growth projections for my four scenarios.

Table 10

Government Real Investment Growth: 2017–2027

(percentages)

	BASE	Strong Growth	Recession-Stagnation	Low Productivity	GS	B of A
Government Investment						
2017	-.06	-.06	-.06	-.06	.02	.00
2018	.90	.90	-.52	.90	1.58	.43
2019	1.57	1.57	.72	1.57	1.59	.53
2020	1.44	1.54	1.25	1.44	1.21	
2021	1.00	1.41	.90	1.00	.99	
2022	.88	1.41	.90	.75		
2023	.91	1.41	.89	.75		
2024	.94	1.41	.85	.75		
2025	.98	1.41	.81	.75		
2026	1.00	1.39	.80	.75		
2027	1.00	1.36	.80	.75		
2017–2020	.96	.99	.36	.96	1.10	
2021–2027	.96	1.40	.85	.79		
2017–2027	.96	1.25	.67	.85		
1999–2017 Average	.99	.99	.99	.99	.99	.99

Government real investment spending is divided between federal and state/local investment spending. State and local government spending accounts for 61.4 percent of the total.

In the past 19 years government real investment growth has averaged a disappointing 0.99 percent annually, less than half of its longer term average of 2.59 percent. The consequence has been aging and decaying infrastructure. But the lack of growth in government investment has also taken a toll on productivity. Anti-tax and anti-spending political pressures strongly suggest that increases in government investment growth, at least at the state and local level, are not very likely. However, there might be a small, but temporary, boost in government investment growth stemming from the "Tax Cuts and Jobs Act," and that assumption is shown in **Table 10** and **Charts 10A** and **10B**. But note that **B of A** is extremely pessimistic.

CHART 10A – Real Government Investment Growth

(average annual rate)

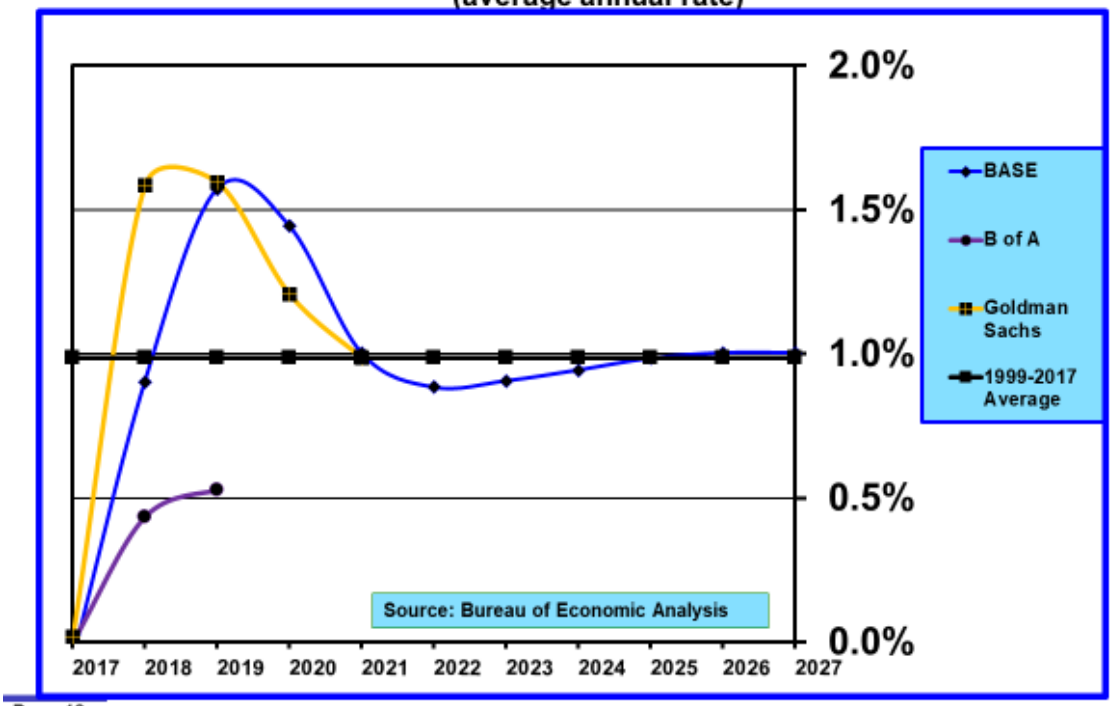

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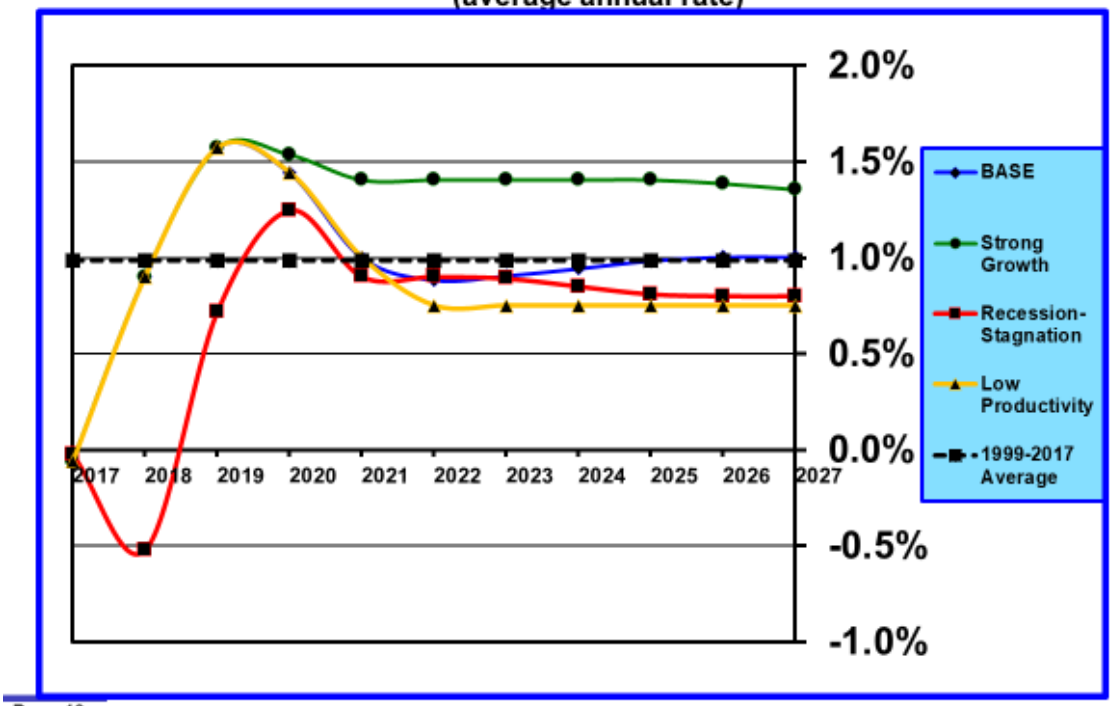
CHART 10B – Real Government Investment Growth

(average annual rate)



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11. Housing Starts

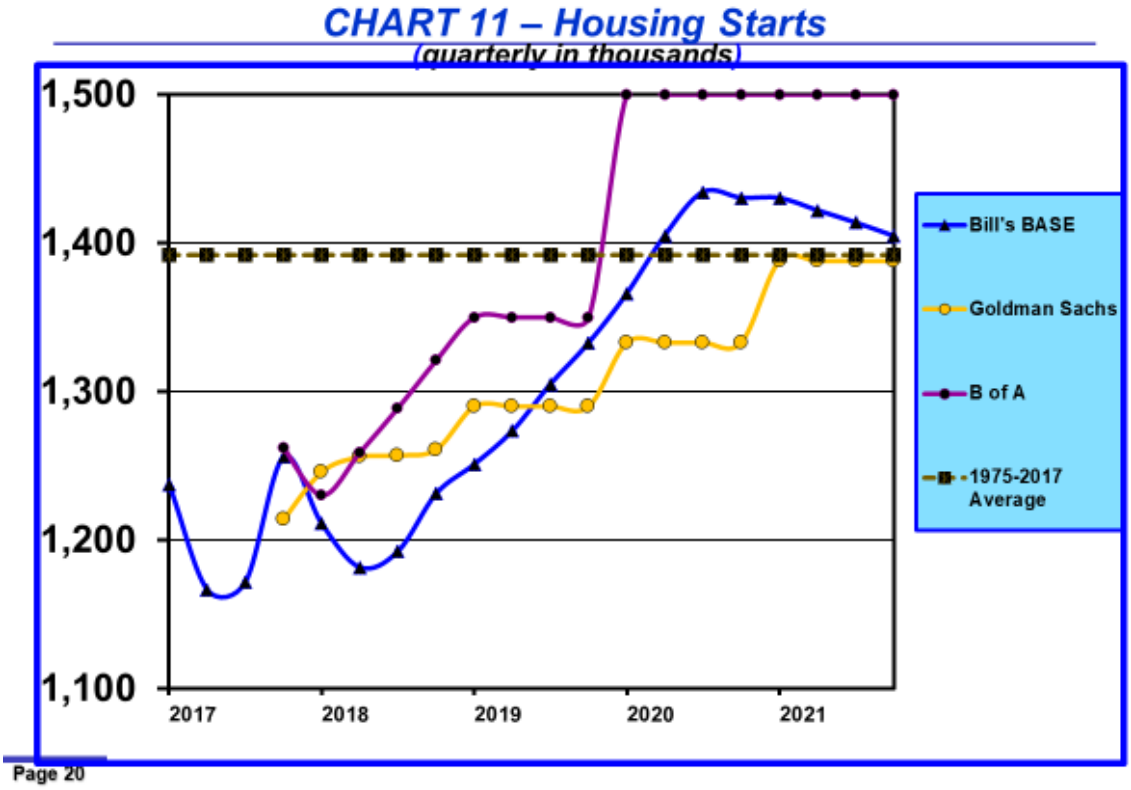
Table 11 and **Chart 11** show annual average housing starts from 2017 to 2021.

Table 11

Housing Starts for 2017–2021

(Q4 annual average in thousands)

	BASE	GS	B of A
2017	1,256	1,214	1,262
2018	1,231	1,261	1,321
2019	1,333	1,290	1,350
2020	1,430	1,333	1.500
2021	1,405	1,388	1,500
Average 1975–2017	1,392	1,392	1,392



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. Household growth should support construction of about 1.4 million units annually for the next several years, which coincidentally is the same as the 42-year historical average. Housing starts are running about 1.26 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**.

12. Consumer Spending—Nominal

Table 12 shows projections for nominal consumer spending growth. **Charts 12A** and **12B** show annual projections for nominal consumer spending growth from 2017 to 2027. **Chart 12A** compares my "***BASE***" scenario nominal spending growth projections with those of **B of A**, and **GS**. **Chart 12B** compares nominal spending growth projections for my four scenarios.

Table 12

Nominal Consumer Spending Growth: 2017–2027

(percentages)

	BASE	Strong Growth	Recession-Stagnation	Low Productivity	GS	B of A
2017	4.36	4.36	4.33	4.35	4.37	4.39
2018	3.84	4.03	1.85	3.61	4.03	4.57
2019	4.01	4.25	3.79	3.56	3.76	4.31
2020	4.25	4.54	3.02	3.69	3.67	4.01
2021	3.86	4.34	3.34	3.46	3.41	3.76
2022	3.64	4.09	3.82	3.23		3.76
2023	3.57	4.13	4.04	3.16		3.76
2024	3.72	4.25	3.76	3.22		3.76
2025	3.81	4.40	3.21	3.33		3.76
2026	3.90	4.46	3.40	3.36		3.76
2027	3.71	4.31	3.48	3.17		3.76
2017–2020	4.12	4.29	3.25	3.80	3.96	4.32
2021–2027	3.74	4.28	3.58	3.28		3.76
2017–2027	3.88	4.29	3.46	3.47		3.97

In the long run, projections of growth in the nominal rate of consumer spending depend heavily on underlying estimates of PCE consumer price inflation and employment growth. Over the forecast period slowing employment growth will depress the nominal rate of growth while higher inflation will increase it. Most forecasters expect slowing employment growth to dominate with the consequence that nominal consumer spending growth will decelerate slowly.

In the short run, other factors can push nominal growth above or below the long-term trend. Above trend growth in prices of stocks and houses will accelerate growth in household wealth, some of which will spill over into higher spending. Consumers can also boost spending for a period of time by drawing down savings or increasing borrowing. The consumer saving rate has declined from 6.0 percent two years ago to 3.3 percent in the third quarter of 2017. This phenomenon usually is correlated with favorable increases in consumer optimism. Both the wealth effect and high consumer optimism have lifted the nominal rate of consumer spending recently to an above long-term trend level. With the passage of the "Tax Cuts and Jobs Act" this pattern seems likely to continue for several more quarters. However, in the long-run, above trend wealth and high consumer optimism always revert to the mean. Indeed, the correction, when it

CHART 12A – Nominal Consumer Spending Growth

(average annual rate)

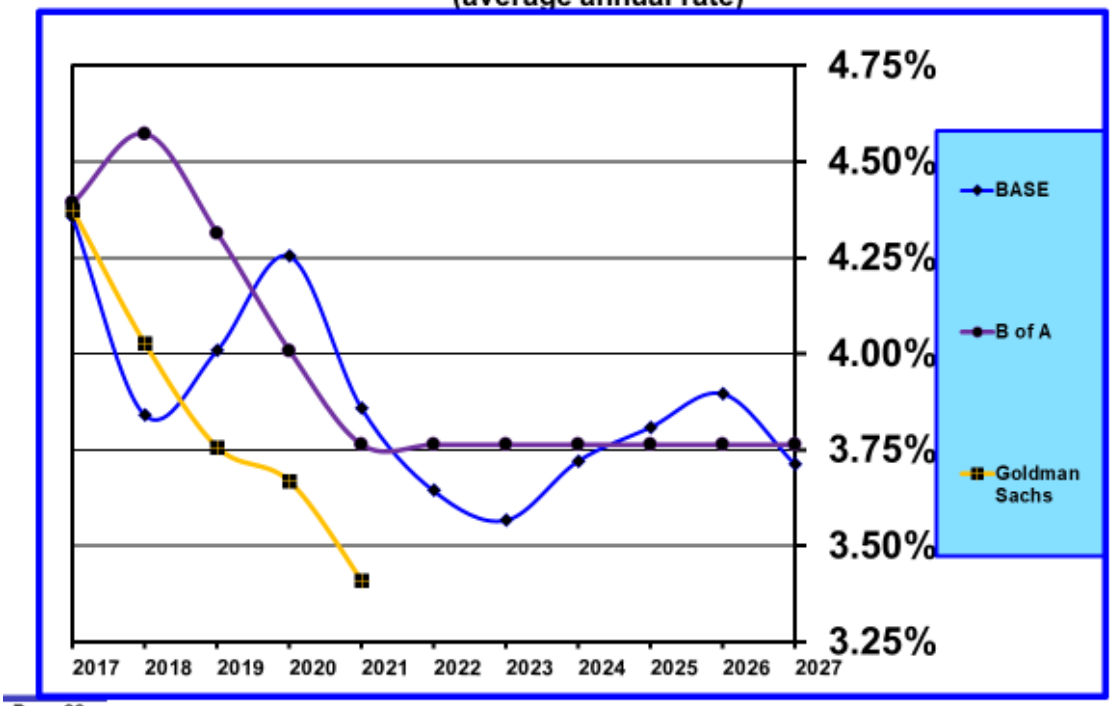


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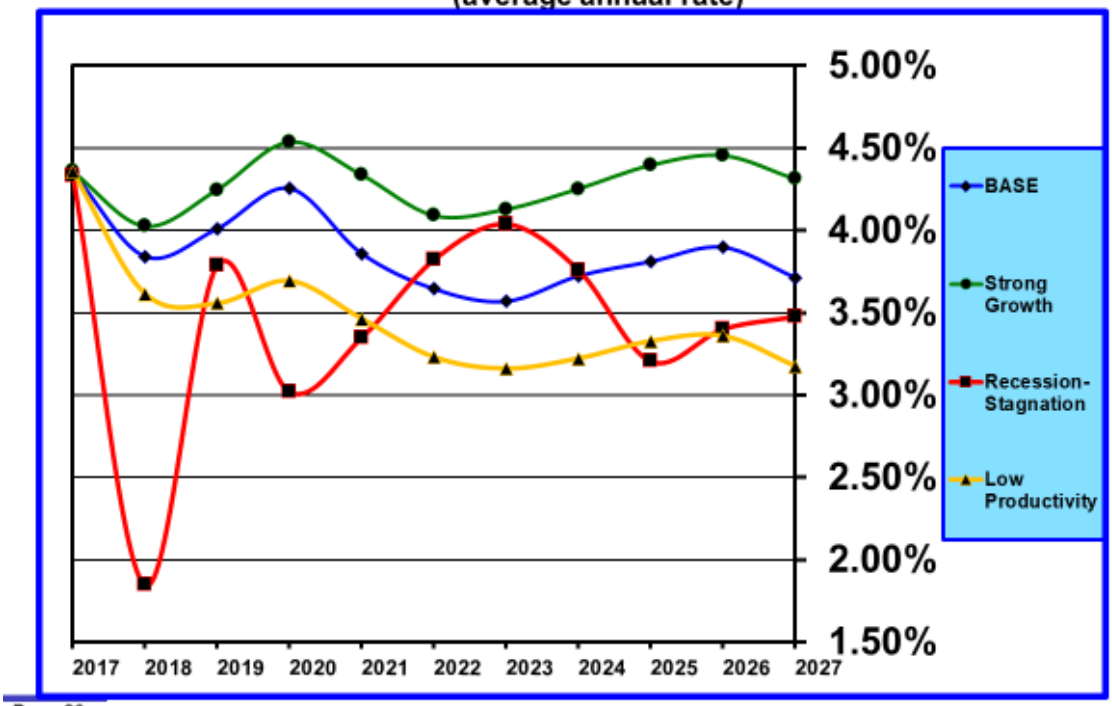
CHART 12B – Nominal Consumer Spending Growth

(average annual rate)



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occurs, usually results not just in reversion to the mean but to a below long-term trend growth in nominal consumer spending. You can see this pattern in the "*BASE*" scenario in 2022 and 2023 in **Table 12**.

Changes in the value of the dollar can also influence the growth rate in nominal consumer spending in the short run. The linkage is through the impact of the value of the dollar on domestic economic growth and the prices of imported goods and services. 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. The trade-weighted value of the dollar declined 7.0 percent in 2017. So, this short-term factor has also contributed in the past several quarters to an acceleration in nominal consumer spending above a sustainable long-term trend level.

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 12B** shows annual projections from 2017 to 2027 for the nominal rate of growth in consumer spending for my four scenarios. In general, the rate of growth is relatively stable over time, oscillating in a relatively narrow range of 3.6 percent to 4.3 percent in the "***BASE***" scenario. But a cyclical pattern is evident in the "BASE" scenario. Spending growth is currently at the high end of the range and should remain relatively high for the next two to three years. In the middle years, consumer spending growth falls to a below long-term trend level and then recovers a bit toward the end of the 10-year period. Overall, as is consistent with slowing potential employment growth, nominal consumer spending growth also slows gradually.

13. Consumer Spending—Real

Table 13 shows projections for real consumer spending growth. **Charts 13A** and **13B** show annual projections for real consumer spending growth from 2017 to 2027. **Chart 13A** compares my "***BASE***" scenario real spending growth projections with those of **B of A**, and **GS**. **Chart 13B** compares nominal spending growth projections for my four scenarios.

It should come as no surprise that the real rate of growth in consumer spending converges toward the long-term potential rate of growth in real GDP 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 in the long run. Most all forecasters expect the potential and actual real rate of growth in GDP to settle near or slightly below 2.0 percent over time and, if this occurs, the rate of growth in consumer spending should be virtually the same.

Over the next two years both **GS** and **B of A** expect real consumer spending to be relatively strong. This forecast is directly linked to their collective strong employment growth expectations and thus, their forecasts of strong real consumer spending growth are only as good as their forecasts of employment growth.

14. Core PCE Inflation

Table 14A shows projections for core PCE inflation. **Chart 14A** compares my "***BASE***" scenario core PCE inflation projections with those of **CBO**, **B of A**, and **GS**. **Chart 14B** compares core PCE inflation projections for my four scenarios.

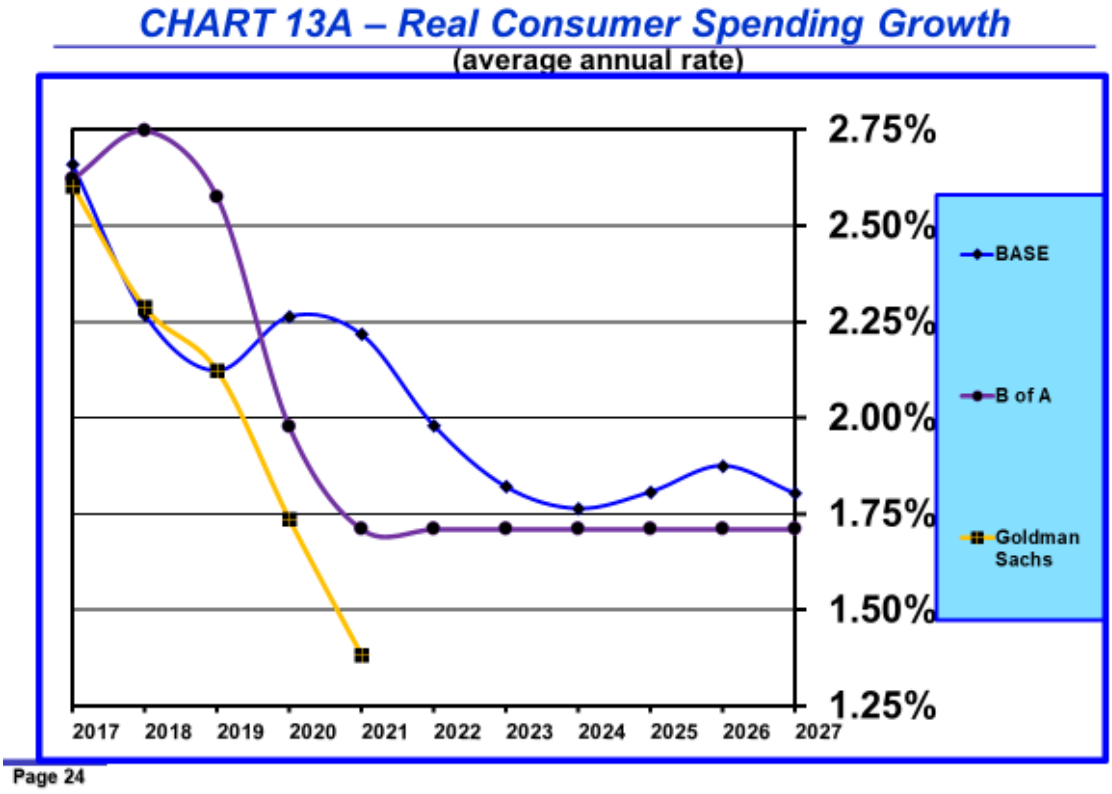
Factors influencing inflation include:

Table 13

Real Consumer Spending Growth: 2017–2027

(percentages)

	BASE	Strong Growth	Recession-Stagnation	Low Productivity	GS	B of A
2017	2.66	2.66	2.65	2.66	2.60	2.62
2018	2.27	2.39	.96	2.14	2.29	2.75
2019	2.12	2.27	1.50	1.81	2.12	2.57
2020	2.26	2.41	2.46	1.85	1.74	1.98
2021	2.22	2.42	1.94	1.94	1.38	1.71
2022	1.98	2.21	1.36	1.75		1.71
2023	1.82	2.05	1.83	1.59		1.71
2024	1.76	2.01	1.95	1.58		1.71
2025	1.81	2.07	1.85	1.64		1.71
2026	1.88	2.11	1.82	1.68		1.71
2027	1.80	2.01	1.84	1.61		1.71
2017–2020	2.33	2.43	1.89	2.12	2.19	2.48
2021–2027	1.90	2.13	1.80	1.68		1.71
2017–2027	2.05	2.24	1.83	1.84		1.99



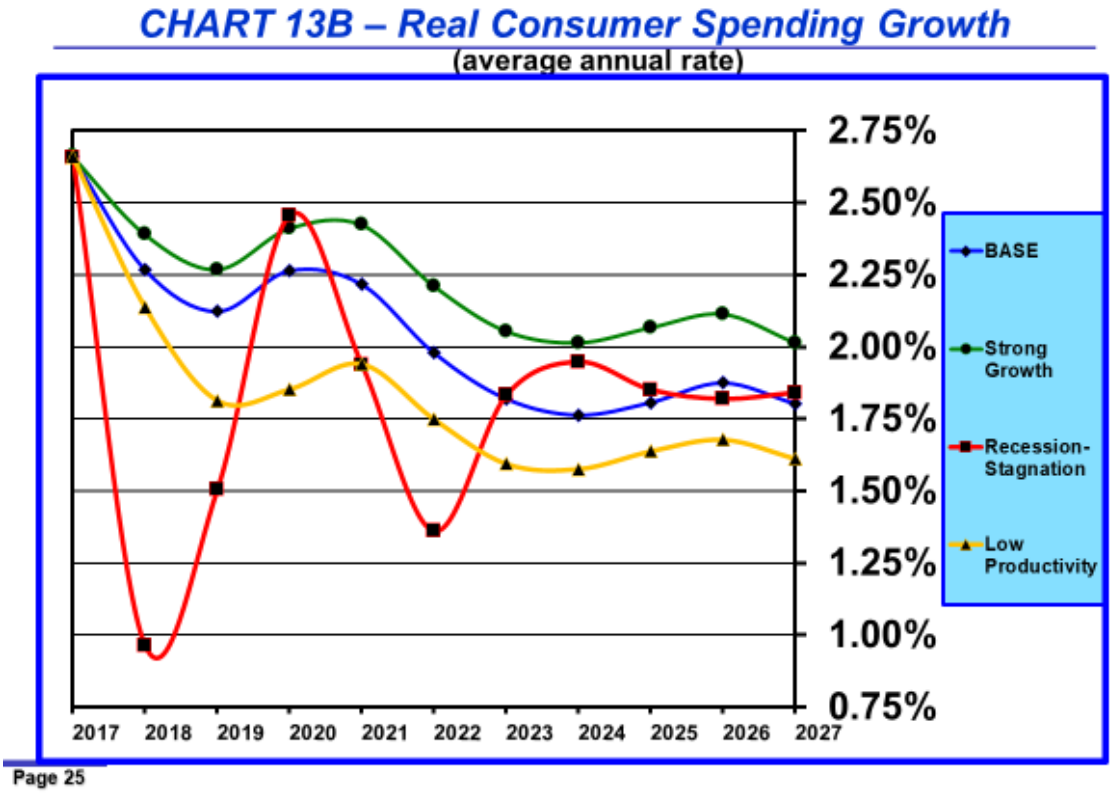


Table 14A

Core PCE Inflation: 2017–2027

(percentages—Q4)

	BASE	Strong Growth	Recession-Stagnation	Low Productivity	GS	B of A	CBO
2017	1.47	1.47	1.47	1.47	1.49	1.49	1.88
2018	1.86	1.90	1.51	1.83	1.80	1.81	1.98
2019	1.91	1.98	1.21	1.84	1.90	2.02	2.00
2020	1.80	1.95	.43	1.64	2.10	2.02	2.00
2021	1.68	1.88	1.63	1.52	2.10	2.02	1.99
2022	1.69	1.91	2.37	1.52	2.00	2.02	1.99
2023	1.74	2.06	2.20	1.58	2.00	2.02	1.99
2024	1.95	2.22	1.70	1.64	2.00	2.02	1.99
2025	1.96	2.29	1.39	1.66	2.00	2.02	1.99
2026	2.00	2.31	1.55	1.67	1.00	2.02	1.99
2027	1.96	2.36	1.66	1.60	2.00	2.02	1.98
2017–2020	1.76	1.82	1.15	1.70	1.82	1.83	1.97
2021–2027	1.85	2.15	1.79	1.60	2.01	2.02	1.99
2017–2027	1.82	2.03	1.56	1.63	1.94	1.95	1.98

CHART 14A – Core PCE Inflation

(average annual rate)

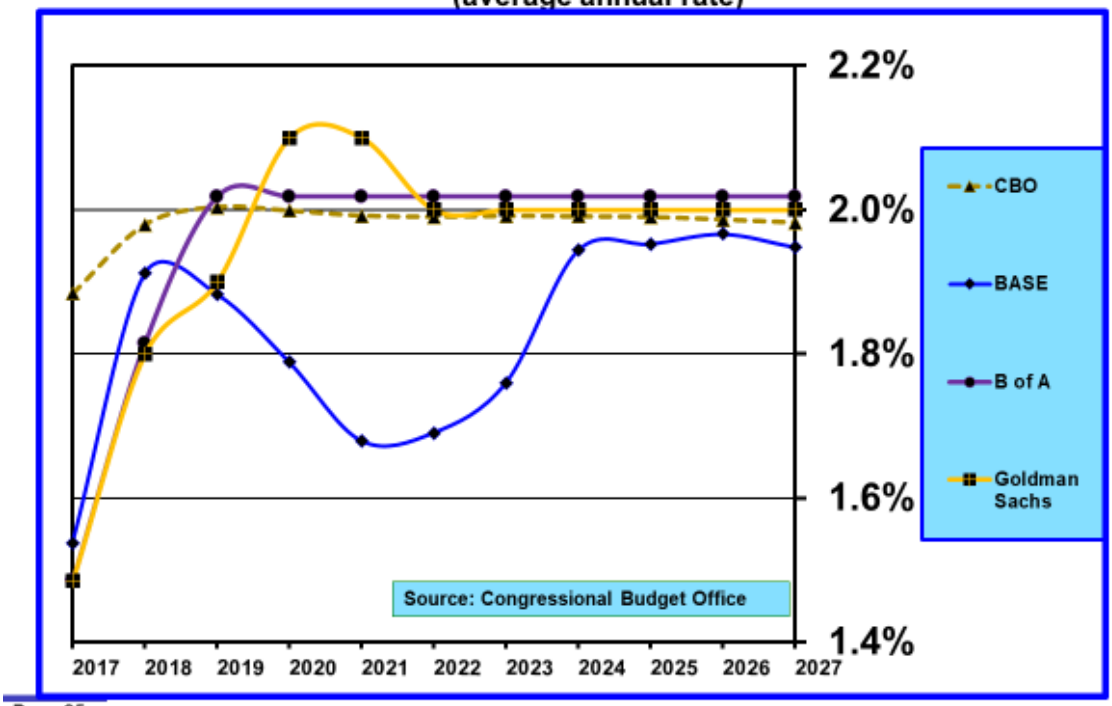


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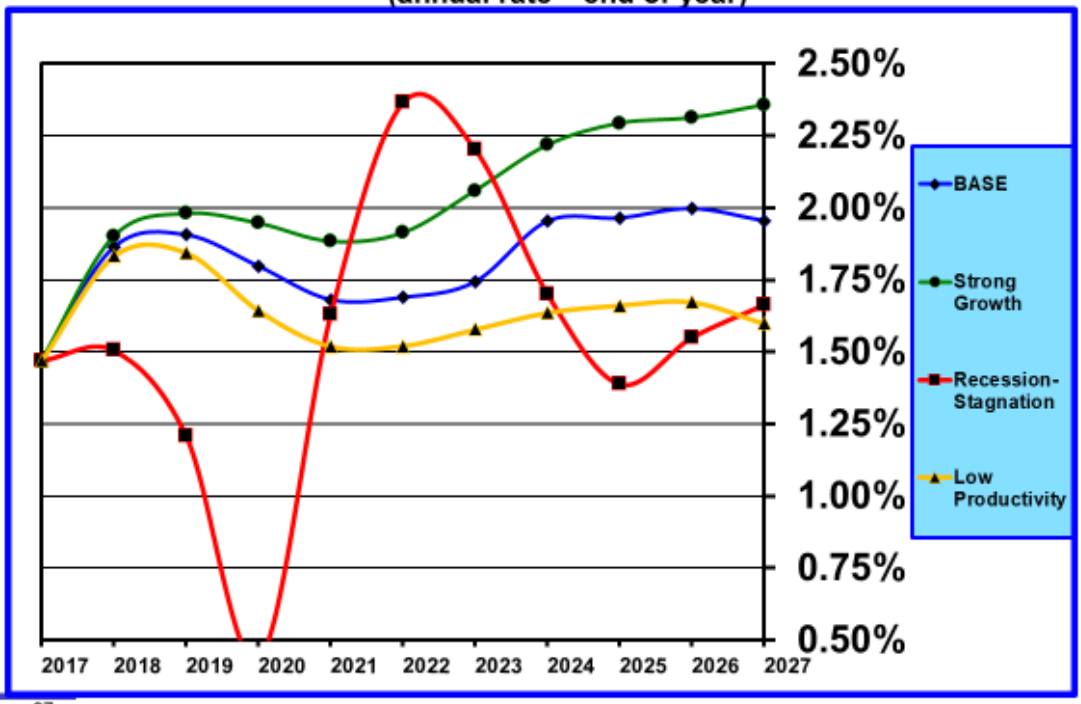
CHART 14B – Core PCE Inflation

(annual rate – end of year)



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- **Employment and output gaps**—large negative gaps depress inflation—large positive gaps increase inflation (see **Table 14C** and **Chart 14C** for an illustration of the impact of different assumptions about the non-accelerating inflation rate of unemployment—NAIRU); both the employment and output gaps were very large following the Great Recession but have now closed and are likely to be increasingly positive in the next few years unless recession intervenes.
- **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 the impact of employment growth on inflation is very weak and has the wrong sign).
- **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.
- **Fiscal policy**—depressed federal, state and local investment spending reduces aggregate demand and puts downward pressure on inflation; however, the "Tax Cuts and Jobs Act" will add considerable stimulus to an economy that is already operating at full capacity. This is likely to place upward 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. The dollar's trade-weighted value fell in 2017 and is likely to fall further in the next couple of years.
- **Productivity**—increased investment spending, both public and private, raises productivity and depresses 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., when supply exceeds demand, this depresses prices.

Reflecting all of these factors, core PCE inflation is currently 1.47 percent. As can be seen in **Table 14** and **Charts 14A** and **14B**, **CBO**, **FOMC**, **GS** and **B of A** all expect PCE inflation to return to the Federal Reserve's 2.0 percent target level within the next one to two years. These forecasts appear to be based to an extent on 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 reach the **FOMC**'s 2.0 percent target over the past 20 years is not a ringing endorsement of a belief in the ability of the **FOMC** to actually engineer a long-term inflation rate averaging 2.0 percent.

My projections indicate that inflation will continue to trend slightly below the 2.0 percent target over the next ten years. Lower productivity and a lower natural rate of unemployment will depress average inflation well below the 2.0 percent target.

Having said all of this, I would simply add that deflationary forces remain abundant globally. Thus, I believe skepticism about a sustained return to the target 2.0 percent core PCE inflation level, other when the economy is operating above full capacity, is warranted. The **FOMC** and other analysts have expected that the 2.0 percent level was just two to three years away now for several years and we are still not quite there even though the economy is operating at full capacity and the labor market is extremely tight.

As should be now be apparent, the level of NAIRU should matter when it comes to forecasting future inflation rates. A lower level of NAIRU means that the labor market is less tight and thus upward pressures

on inflation are more subdued. **Table 14C** shows core PCE inflation projections for my "***BASE***" scenario for three NAIRU assumptions—**B of A**'s 4.2 percent, the current emerging consensus of 4.5 percent, and **CBO**'s higher NAIRU assumptions.

Table 14C

Impact of NAIRU Assumptions on Core PCE Inflation: 2017–2027

(percentages—Q4)

NAIRU	BASE 4.2%	BASE 4.5%	BASE CBO	GS	B of A	CBO
2017	1.47	1.47	1.47	1.49	1.49	1.88
2018	1.72	1.86	1.97	1.80	1.81	1.98
2019	1.59	1.91	2.18	1.90	2.02	2.00
2020	1.50	1.80	2.04	2.10	2.02	2.00
2021	1.36	1.68	1.94	2.10	2.02	1.99
2022	1.29	1.69	2.00	2.00	2.02	1.99
2023	1.34	1.74	2.08	2.00	2.02	1.99
2024	1.55	1.95	2.23	2.00	2.02	1.99
2025	1.60	1.96	2.26	2.00	2.02	1.99
2026	1.64	2.00	2.22	2.00	2.02	1.99
2027	1.56	1.96	2.20	2.00	2.02	1.98
2017–2020	1.57	1.76	1.91	1.82	1.83	1.97
2021–2027	1.48	1.85	2.13	2.01	2.02	1.99
2017–2027	1.51	1.82	2.05	1.94	1.95	1.98

Differences in NAIRU assumptions are most easily compared for average core PCE inflation over the 2021 to 2027 period. Notice that **GS**, **B of A**, and **CBO** all expect average PCE core inflation to be 2.0 percent. At least in **B of A**'s case, this forecast is not consistent with its below consensus estimate of NAIRU. That is why I made the comment above about "faith" in the FOMC's ability to hit its 2.0 inflation target.

Average core PCE inflation from 2021 to 2027 is 52 basis points below 2.0 percent when NAIRU is 4.2 percent, 18 basis points below when NAIRU is 4.5 percent and 13 basis points *above* for **CBO**'s NAIRU assumptions. The differences in core PCE inflation depending upon the level of NAIRU are readily apparent in **Chart 14C**. Forecast core PCE inflation comes closest to the **FOMC**'s 2.0 target when NAIRU is 4.5 percent.

15. Federal Funds Rate

Table 15A shows average fourth quarter projections for the federal funds rate. **Chart 15A1** compares my "***BASE***" scenario fourth quarter (2017–2027) federal funds rate projections with those of **CBO**, **B of A**, **GS** and **FOMC**. **Chart 15A2** compares my "***BASE***" scenario quarterly (2017–2021) federal funds rate projections with those of **CBO**, **B of A**, **GS** and **FOMC**. **Chart 15A3** is a more detailed variant of **Chart 15A2** and includes **FOMC** high and low ranges and the market's federal funds rate futures forecast. **Chart 15B** compares federal funds rate projections for my four scenarios.

As can be seen in **Charts 15A1, 15A2** and **15A3**, **B of A**'s and **FOMC**'s federal funds rate projections are similar in the timing of increases and the terminal rate of 2.75 to 3.00 percent. **GS** expects the federal funds rate to increase faster and it forecast of the terminal rate is in a range of 3.25 to 3.50

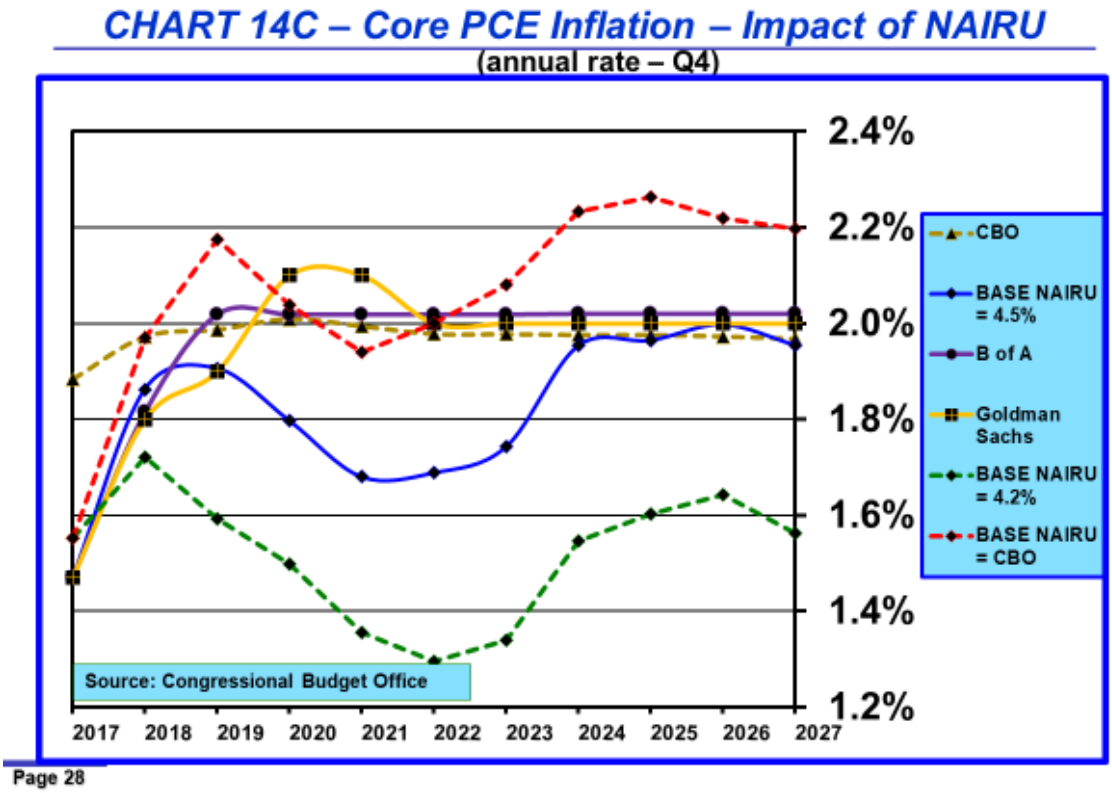

Table 15A

Federal Funds Rate: 2017–2027

(average percentage rate for fourth quarter)

	BASE	Strong Growth	Recession-Stagnation	Low Productivity	GS	B of A	CBO 3M - T*	FOMC	Market
2017	1.25	1.25	1.25	1.25	1.38	1.38	.86	1.37	1.20
2018	2.11	2.30	.34	1.87	2.38	2.13	1.49	2.04	1.86
2019	2.97	3.18	.00	2.48	3.38	2.88	2.15	2.70	2.07
2020	3.39	3.73	1.34	2.75	3.38	2.88	2.63	2.95	2.09
2021	3.26	3.80	1.80	2.63	3.38	2.88	2.80	2.85	
2022	3.06	3.73	2.87	2.32	3.38	2.88	2.80	2.78	
2023	3.14	3.98	2.92	2.32	3.38	2.88	2.80	2.78	
2024	3.29	4.23	2.54	2.27	3.38	2.88	2.80	2.78	
2025	3.39	4.42	2.54	2.17	3.38	2.88	2.80	2.78	
2026	3.44	4.60	2.36	2.15	3.38	2.88	2.80	2.78	
2027	3.51	4.76	2.35	2.11	3.38	2.88	2.80	2.78	
2017–20	2.43	2.61	.73	2.09	2.63	2.31	1.78	2.26	1.81
2021–27	3.30	4.22	2.48	2.29	3.38	2.88	2.80	2.79	
2017–27	2.98	3.63	1.85	2.22	3.10	2.67	2.43	2.60	

*CBO rate is the 3-month Treasury bill

CHART 15A1 – Federal Funds Rate

(rate at the end of the year)

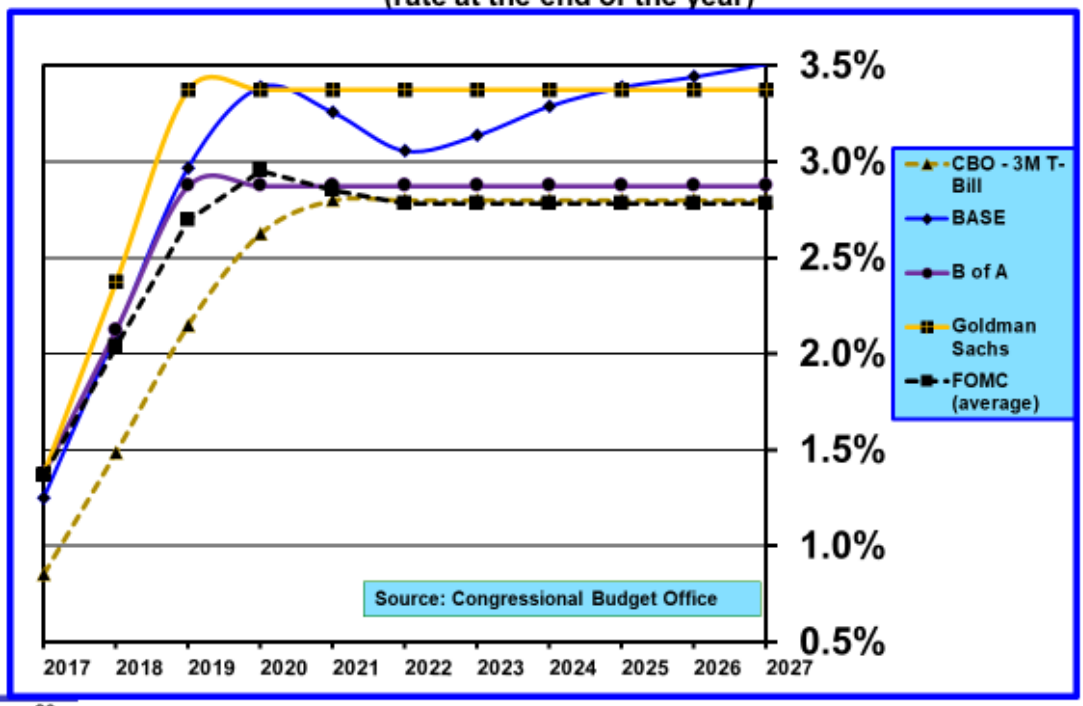

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CHART 15A2 – Federal Funds Rate

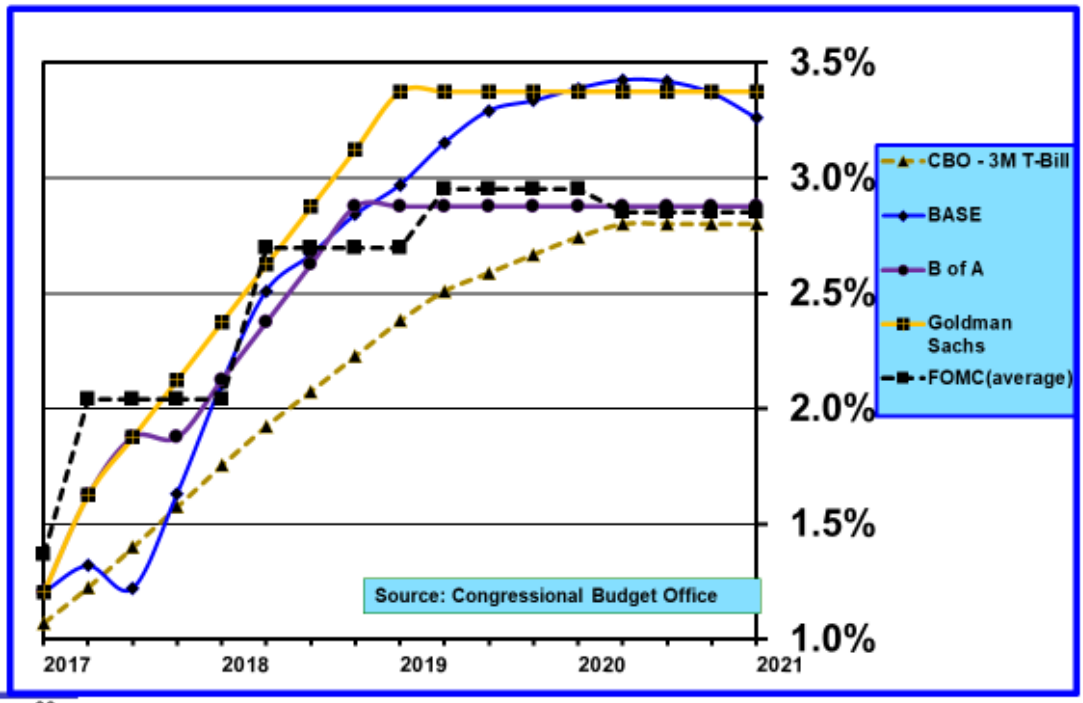

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CHART 15A3 – Federal Funds Rate Forecasts

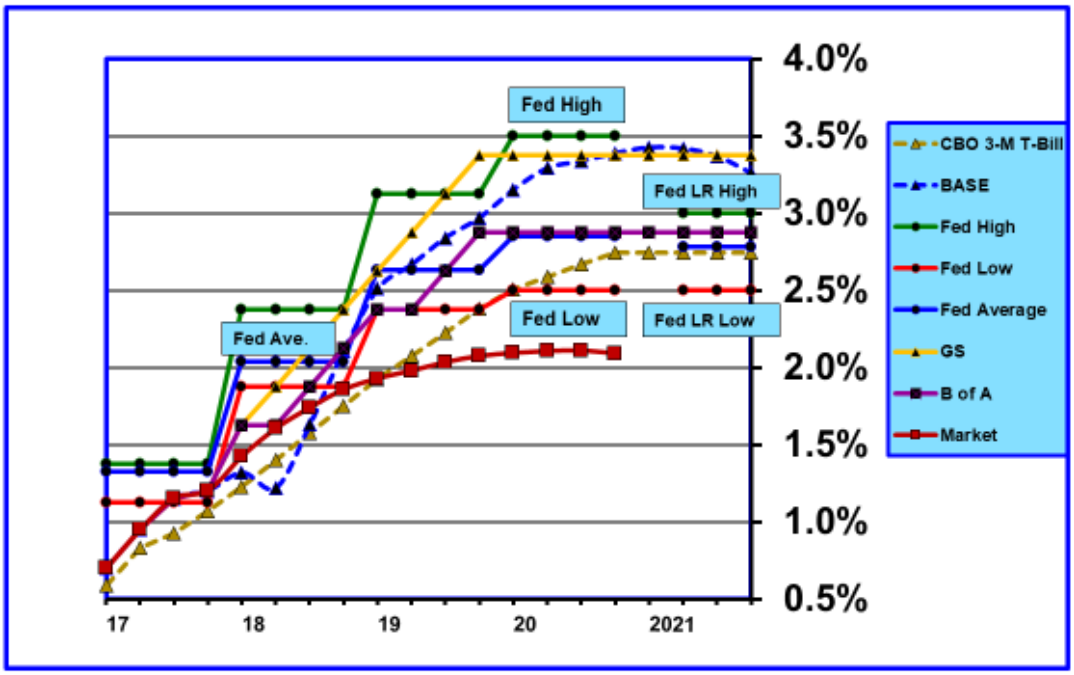

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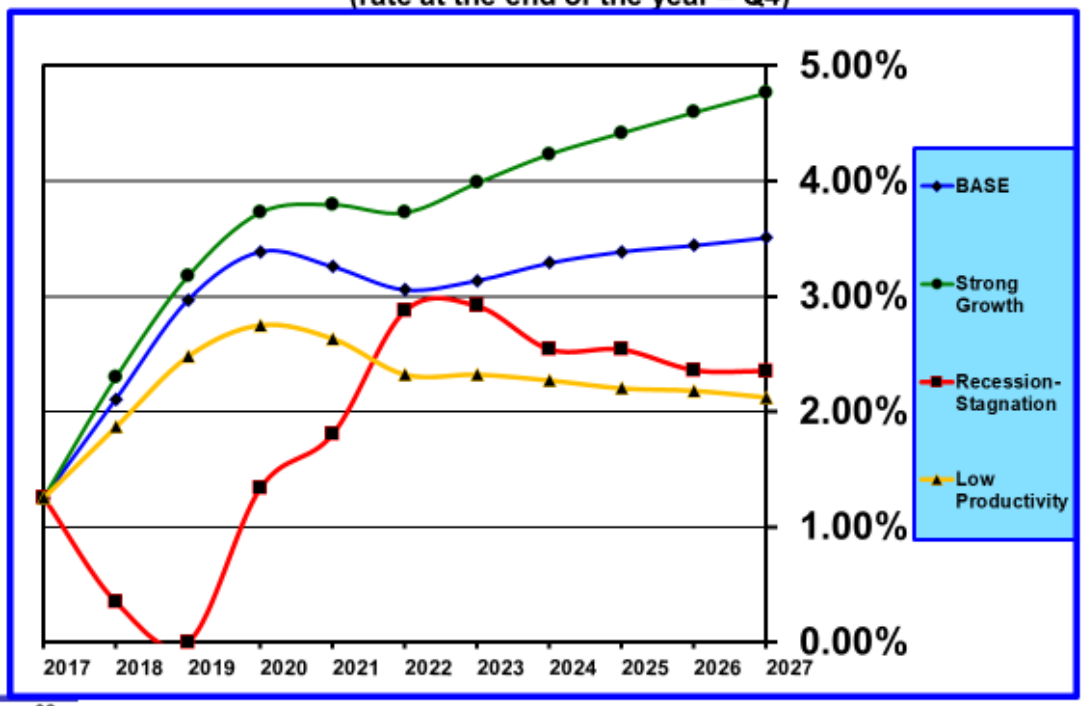
CHART 15B – Federal Funds Rate

(rate at the end of the year – Q4)



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percent. **GS**'s forecast tracks its view that the labor market will overheat and the **FOMC** will be forced to raise rates more often and to a higher level to forestall an inflationary breakout.

Chart 15B compares federal funds rate projections for my four scenarios. The federal funds in my "***BASE***" tracks **FOMC**'s projections closely during 2018 and 2019 but rises to a higher level in 2020 similar to **GS**'s forecast. The terminal rate in my "***BASE***" scenario is in a range of 3.25 to 3.50 percent, which is the same as **GS**'s forecast.

Federal funds rate projections in the "***Strong Growth***" scenario show what could happen if the economy overheats and the **FOMC** is slow to respond. This scenario has little chance of actually occurring as rates at the level projected surely would tip the economy into recession.

In the "***Recession-Stagnation***" scenario, the federal funds rate quickly retreats to the zero bound. Then as economic recovery sets in, the federal funds rates rises, but the terminal rate eventually settles in at a lower range of 2.25 to 2.50 percent.

Finally, the "***Low Productivity***" scenario shows what could happen if productivity growth remains persistently weak. The terminal federal funds rate stabilizes in a range of 2.00 to 2.25 percent.

Perhaps the most important take away is that the federal funds rate remains low in all scenarios. That is because all of the economic forces that determine the level of interest rates are likely to remain subdued in the future. Employment growth will be slow; inflation will have difficulty reaching 2.0 percent; productivity will remain weak relative to historical experience, and the real rate of interest will remain depressed.

Chart 15A3 shows the federal funds rate pathway forecast by the market. The terminal rate is 2.0 percent and is lower than all other forecasts, including my own. There may be technical reasons for the market's forecast linked to the FOMC's withdrawal of duration from the bond market through large scale asset purchases (quantitative easing). Or, the market, in its collective wisdom, may have determined that the federal funds rate cannot go above 2.0 percent without plunging the economy into recession. In a year or two we'll know what actually happened to the federal funds rate and the economy and we'll be able to unravel the reasons then, which are not apparent now.

You might recall that two years ago the **FOMC** expected to raise the federal funds rate four times during 2016. It ended up with only one increase and that did not occur until December. In 2017 the **FOMC** promised three rate increases and delivered three increases. The **FOMC** has stated repeatedly that monetary policy is data dependent and what happened during 2016 provides ample evidence that the **FOMC** will deviate from its projected path if the data is stronger or weaker than it expects.

Currently, the **FOMC** is projecting three increases during 2018. But, it doesn't pay to be too smug because conditions can change—the global economy is dynamic and strong synchronous growth is the order of the day—and a more aggressive rate increase pathway is quite possible. But on the other hand, in spite of anxieties about rising inflation, there is little evidence to support a significant upside breakout in inflation. Indeed, inflation was missing in action during 2017 and this was contrary to expectations at the start of the year.

As U.S. monetary policy tightens and U.S. fiscal policy eases, upward pressure on interest rates is probable, but that pressure is likely to be self-limiting.

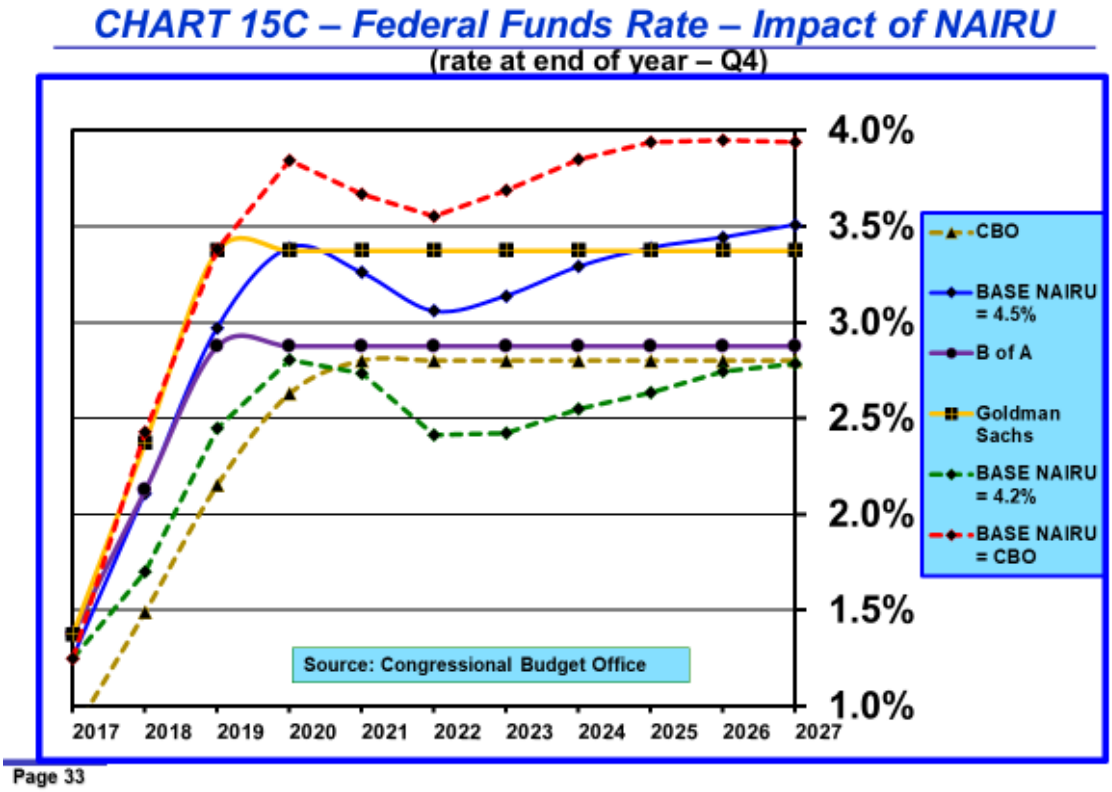
As I have shown in commentary above about inflation and wages, what the actual level of unobservable NAIRU is matters considerably. The same is also true for forecast levels of the federal funds rate. **Table 15C** and **Chart 15C** show forecasts for the federal funds rate, depending upon the NAIRU assumption.

Table 15C

Impact of NAIRU Assumption on Federal Funds Rate: 2017–2027

(average percentage rate for fourth quarter)

NAIRU	BASE 4.2%	BASE 4.5%	BASE CBO	GS	B of A	CBO 3M - T
2017	1.25	1.25	1.25	1.38	1.38	.86
2018	1.70	2.11	2.43	2.38	2.13	1.49
2019	2.45	2.97	3.38	3.38	2.88	2.15
2020	2.81	3.39	3.84	3.38	2.88	2.63
2021	2.73	3.26	3.67	3.38	2.88	2.80
2022	2.42	3.06	3.55	3.38	2.88	2.80
2023	2.42	3.14	3.69	3.38	2.88	2.80
2024	2.55	3.29	3.85	3.38	2.88	2.80
2025	2.63	3.39	3.94	3.38	2.88	2.80
2026	2.74	3.44	3.95	3.38	2.88	2.80
2027	2.78	3.51	3.94	3.38	2.88	2.80
2017–2020	2.05	2.43	2.73	2.63	2.31	1.78
2021–2027	2.61	3.29	3.80	3.38	2.88	2.80
2017–2027	2.41	2.97	3.41	3.10	2.67	2.43



As explained above, the terminal federal funds rate in the "BASE" scenario, which assumes NAIRU is 4.5 percent, is in a range of 3.25 to 3.50 percent.

If NAIRU turns out to be 4.2 percent, the terminal rate would be nearly 75 basis points lower in a range of 2.50 to 2.75 percent. Not surprisingly, this outcome is consistent with **B of A**'s federal funds forecast.

But, if **CBO**'s estimates of NAIRU are used, the terminal federal funds rate would be in a range of 3.75 to 4.00 percent.

16. 10-Year Treasury Yield

Table 16 shows average fourth quarter projections for the ten-year Treasury note yield. **Chart 16A** compares my "***BASE***" scenario ten-year Treasury yield projections with those of **CBO**, **B of A**, and **GS**. **Chart 16B** compares ten-year Treasury yield projections for my four scenarios.

Table 16

Ten-Year Treasury Yield: 2017–2027

(average percentage rate for Q4)

	BASE	Strong Growth	Recession-Stagnation	Low Productivity	GS	B of A	CBO
2017	2.37	2.37	2.37	2.37	2.37	2.37	2.43
2018	2.38	2.48	.98	2.20	3.00	2.90	3.10
2019	3.09	3.19	2.42	2.81	3.50	2.90	3.41
2020	3.31	3.42	2.90	3.04	3.60	3.25	3.56
2021	3.49	3.76	2.10	3.20	3.60	3.25	3.67
2022	3.63	4.03	1.59	3.10	3.60	3.25	3.70
2023	3.69	4.25	1.90	2.97	3.60	3.25	3.70
2024	3.62	4.27	2.52	2.79	3.60	3.25	3.70
2025	3.52	4.32	3.45	2.69	3.60	3.25	3.70
2026	3.59	4.48	3.42	2.64	3.60	3.25	3.70
2027	3.68	4.66	2.84	2.62	3.60	3.25	3.70
2017–20	2.79	2.75	2.17	2.61	3.12	2.86	3.11
2021–27	3.60	4.18	2.55	2.86	3.60	3.25	3.70
2017–27	3.31	3.66	2.41	2.77	3.42	3.11	3.48

As can be seen in **Table 16** and **Chart 16A**, all forecasts project a gradual rise in the 10-year Treasury yield from the 2017 fourth quarter average of 2.37 percent to a range of 2.90 to 3.60 percent by 2020. After 2020, with the exception of the "***Strong Growth***" scenario, projections in **Chart 16A**.indicate that the 10-year Treasury yield remains relatively stable.

My projections for the long-run stable 10-year Treasury yield in the "***BASE***" scenario are almost identical to those of **CBO** and **GS**, but about 35 basis points higher on average than **B of A**'s.

Because inflation is higher and the economy is overheated in the "***Strong Growth***" scenario, yields on 10-year Treasury notes are almost 100 basis points higher by 2027 compared to the "***BASE***" scenario. Conversely, lower inflation and weak productivity result in yields on 10-year Treasury notes being 100 basis points lower by 2027 in the "***Low Productivity***" scenario.

CHART 16A – 10-Year Treasury Yield

(rate at the end of the year)

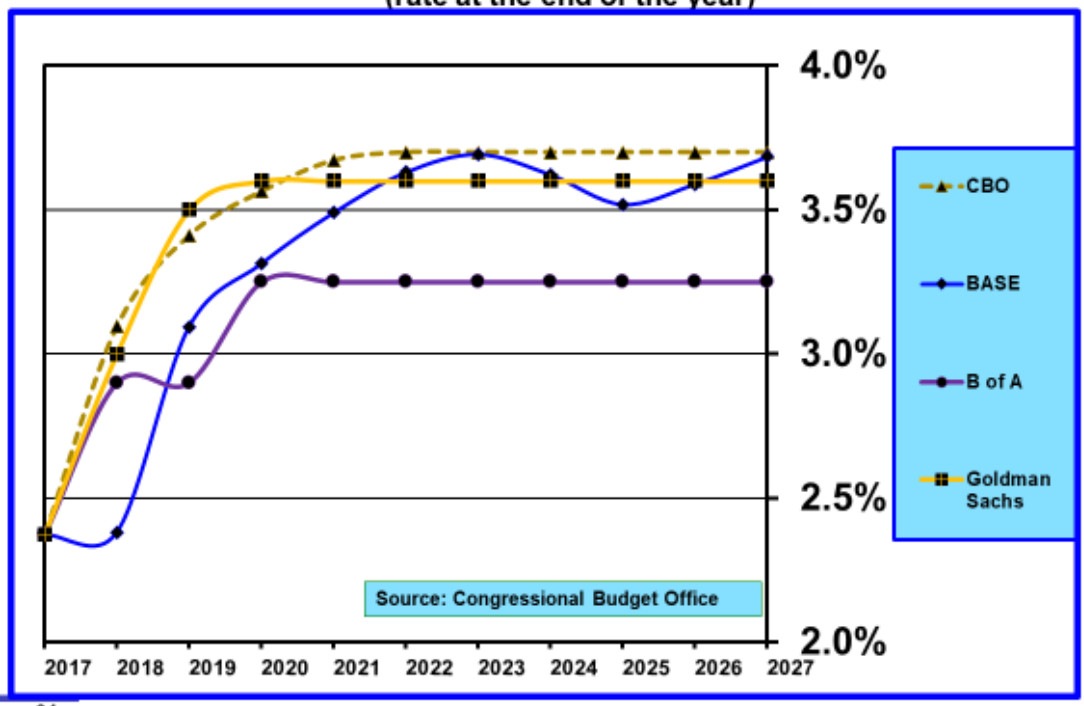


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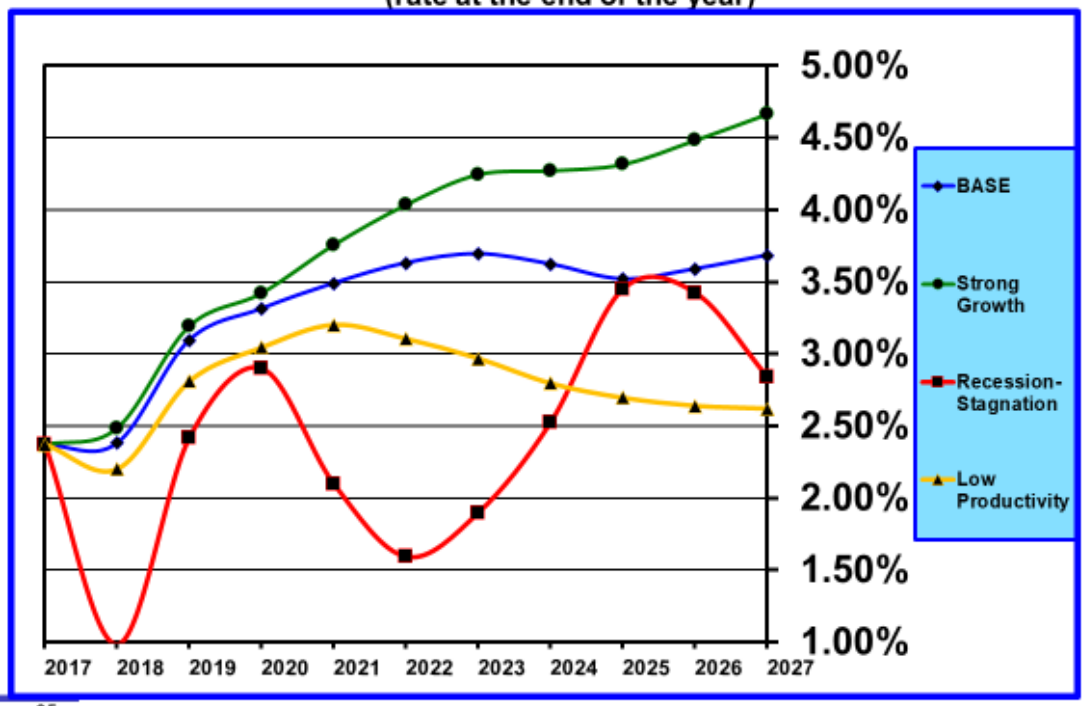
CHART 16B – 10-Year Treasury Yield

(rate at the end of the year)



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17. Federal Budget—Annual Deficit

Table 17 shows forecast values for the annual federal budget deficit. **Chart 17A** compares my "***BASE***" scenario annual federal deficit projections with those of **CBO**, **B of A**, and **GS**. **Chart 17B** compares the annual federal deficit projections for my four scenarios.

Table 17

Annual Federal Budget Deficit: Fiscal Years 2017–2027

(percentages)

	BASE	Strong Growth	Recession-Stagnation	Low Productivity	GS	B of A	CBO
Annual Budget Deficit							
2017	-3.47	-3.47	-3.47	-3.47	-3.47	-3.47	-3.61
2018	-3.57	-3.46	-4.40	-3.69	-3.74	-3.94	-2.82
2019	-4.60	-4.42	-7.76	-4.96	-4.90	-5.02	-3.33
2020	-4.98	-4.75	-6.86	-5.57	-5.20		-3.62
2021	-5.23	-4.86	-6.75	-5.91	-5.47		-3.97
2022	-5.03	-4.51	-6.61	-5.77			-4.46
2023	-4.85	-4.24	-5.59	-5.72			-4.41
2024	-4.68	-3.97	-4.73	-5.58			-4.35
2025	-4.88	-4.04	-4.98	-5.85			-4.73
2026	-5.07	-4.11	-5.72	-6.18			-5.02
2027	-5.23	-4.18	-6.65	-6.55			-5.23

CBO's most recent deficit projections for the next 10 years were made in June 2017 and are now out of date because of tax reform, disaster spending and prospective increases in federal spending. That is why **CBO**'s annual deficits are considerably lower than my projections and those of **GS** and **B of A**. However, notice that my "***BASE***" scenario deficit projections in 2025, 2026 and 2027 are only marginally higher than **CBO**'s outdated deficit estimates. This reflects the repeal of most individual tax cuts after 2025 in the "Tax Cuts and Jobs Act." Because tax cuts are front loaded in the early years, the annual deficit rises quickly over the next four years and then stabilizes. This pattern is evident in **Table 17** and **Chart 17A**.

If employment growth and productivity gains improve more, as is assumed in the "***Strong Growth***" scenario, the annual budget deficit, after rising through 2021, stabilizes in a range of 4.0 percent to 4.2 percent and is 105 basis points lower by 2027 compared to **CBO**'s outdated projections. While this is not exactly a wonderful outcome, it is not a terribly troublesome one. However, as a reminder, I believe the "***Strong Growth***" scenario has a low probability of occurrence because this scenario assumes persistently overheated economic activity, which a tight monetary policy is more than likely to interrupt.

Needless to say, annual deficits rise quickly and substantially in the "***Recession-Stagnation***" scenario. Increases in annual budget deficits occur because of automatic stabilizers, such as unemployment insurance, and reduced tax collections.

Finally, if productivity grows more slowly in coming years, as assumed in the "***Low Productivity***" scenario, annual budget deficits accelerate quickly and dangerously.

CHART 17A – Federal Budget Deficit

(annual deficit as a percentage of nominal GDP)

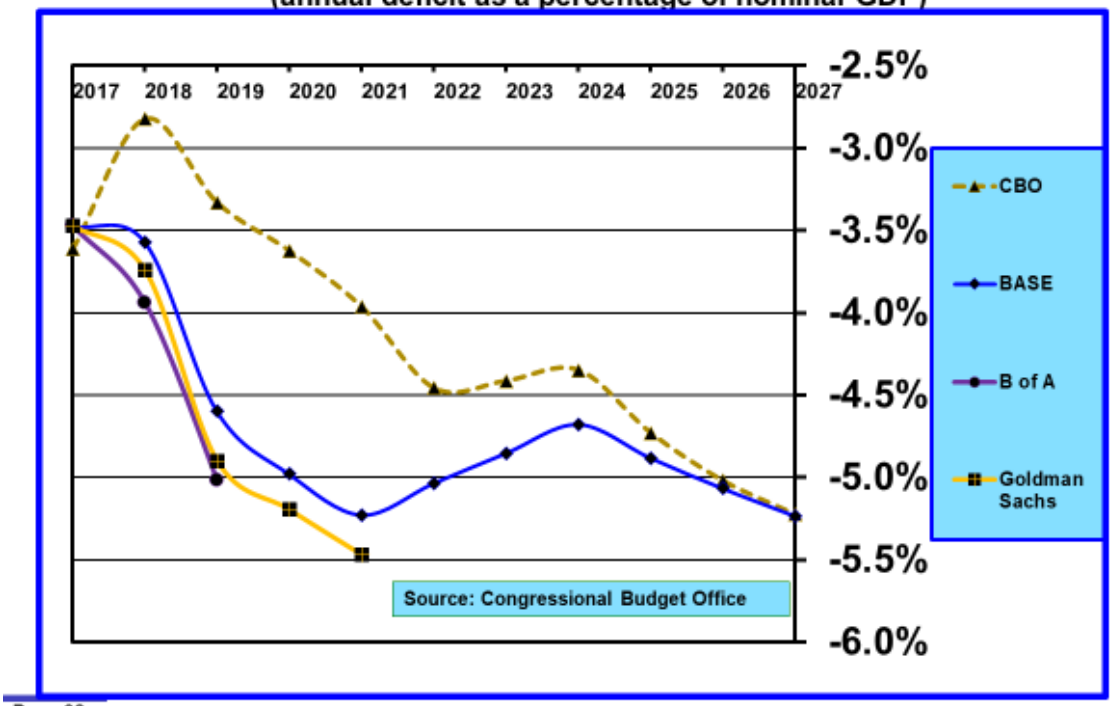

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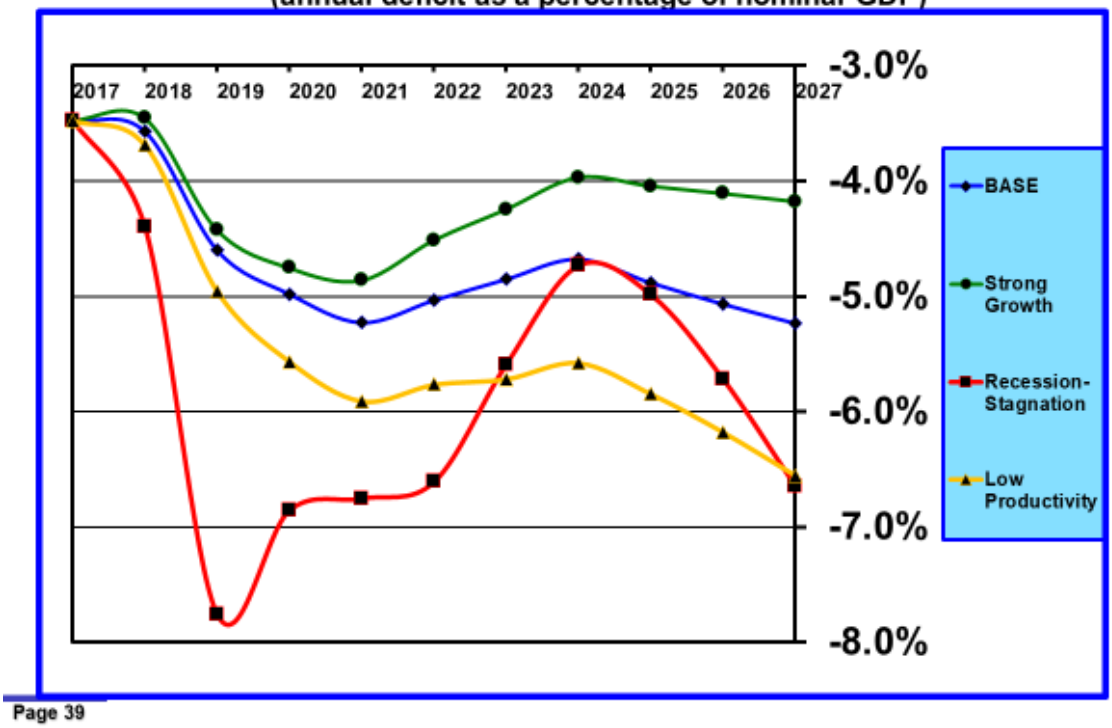
CHART 17B – Federal Budget Deficit

(annual deficit as a percentage of nominal GDP)



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18. Federal Budget—Total Federal Public Debt to Nominal GDP

Table 18 shows forecast values for the ratio of federal public debt to nominal GDP. **Chart 18A** compares my "***BASE***" scenario ratio of federal public debt to nominal GDP projections with those of **CBO**, **B of A**, and **GS**. **Chart 18B** compares the annual ratio of federal public debt to nominal GDP projections for my four scenarios.

Table 18

Total Federal Public Debt to Nominal GDP: Fiscal Years 2017–2027

(percentages)

	BASE	Strong Growth	Recession-Stagnation	Low Productivity	GS	B of A	CBO
Cumulative Budget Deficit							
2017	76.5	76.5	76.5	76.5	76.5	76.5	77.5
2018	76.8	76.6	77.2	76.9	76.9	77.1	76.4
2019	77.8	77.4	81.5	78.5	78.7	79.0	77.0
2020	79.3	78.7	86.5	80.9	81.2		78.1
2021	81.4	80.3	90.6	83.8	84.0		79.3
2022	83.6	81.7	94.1	86.8			80.8
2023	85.5	82.8	95.8	89.6			82.1
2024	87.2	83.5	97.2	92.3			83.3
2025	88.8	84.2	98.6	95.0			84.8
2026	90.5	84.8	100.8	97.9			86.6
2027	92.4	85.6	103.6	101.2			88.5

The fiscal year 2017 ratio of public debt to nominal GDP was 76.5 percent. This number may change a little in coming years as **BEA** revises its estimates of nominal GDP. This ratio is high relative to the pre-Great Recession ratio of 36.0 percent because unlike what has occurred in the past, Congress has intentionally permitted the annual deficit to equal or exceed the nominal rate of growth in GDP with the consequence that the ratio of public debt to nominal GDP has edged higher rather than diminishing. This outcome is largely due to tax cutting rather than spending increases. But it also is an unwelcome outcome of much slower nominal GDP growth.

CBO's June 2017 projections, which are now out of date, indicate that the public-debt-to-nominal-GDP ratio, under assumptions about economic activity and interest rates given current law, rise 11 percentage points over the next 10 years. This is not a good trend, but is one financial markets could probably handle.

In the "***BASE***" scenario, the ratio of public debt to nominal GDP incorporates the estimated impacts of tax cuts and spending increases and rises more rapidly to 92.4 percent by 2027 compared to 88.5 percent in **CBO**'s projections. In the "***Strong Growth***" scenario, by 2027 the ratio is 7 percentage points lower than in the "***BASE***" scenario, and 3 percentage points *less* than the outdated **CBO** projection.

Note that **GS**'s and **B of A**'s projections of the ratio of public debt to nominal GDP in **Chart 18A** track my **BASE** scenario relatively closely.

However, the ratio of public debt to nominal GDP accelerates to a troublesome level exceeding 100.0 percent by 2027 in the "***Recession-Stagnation***" and "***Low Productivity***" scenarios. Pretty clearly, given demographic trends and the current design of entitlement programs, the U.S. fiscal position, which

CHART 18A – Cumulative Federal Budget Deficit

(public debt as a percentage of nominal GDP)

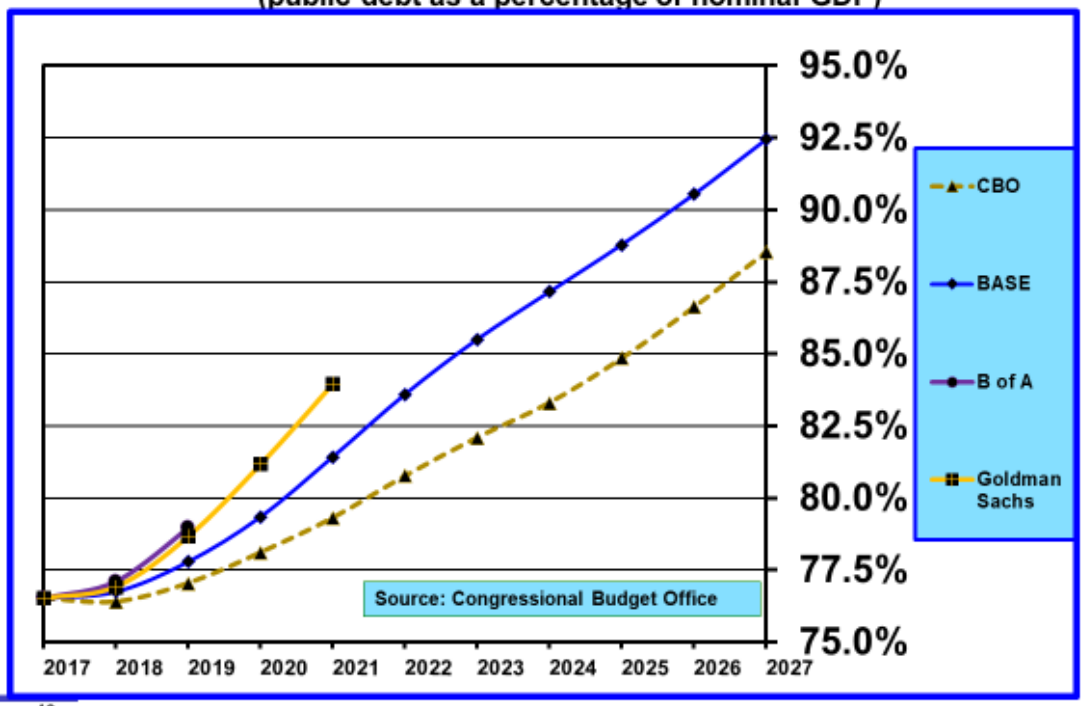

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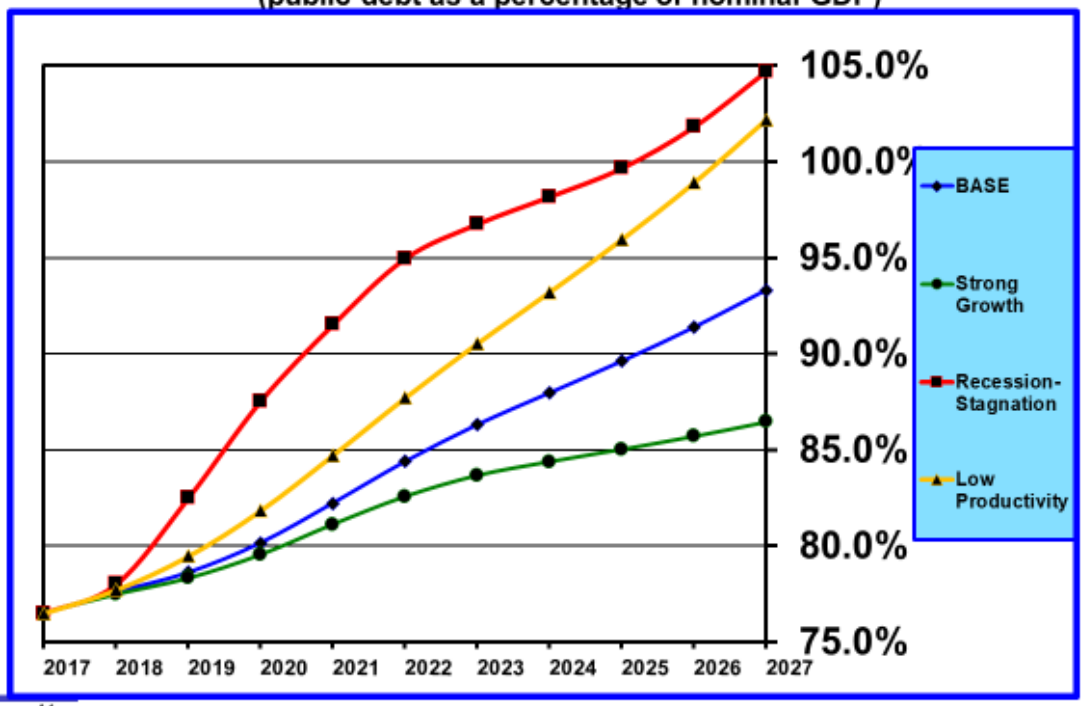
CHART 18B – Cumulative Federal Budget Deficit

(public debt as a percentage of nominal GDP)



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is already fragile, will deteriorate materially if recession occurs. Even if recession does not occur, the possibility of ongoing weak productivity growth is equally troubling.

It is interesting, in fact troubling, that concern about the long-term consequences of an ever-increasing ratio of public debt to GDP have faded from public discussion. That discussion probably will remain quiescent for as long as the economy continues to perform well, but will return with a vengeance when the next recession blows a gigantic hole in the federal deficit.

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