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

"BASE" 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 tables and charts in this part of this month's letter, the pathways of key measures of economic activity for the time period 2016 to 2026 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

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economic variables. Estimates are derived for potential GDP, forecast GDP, productivity, housing starts, wage rates, inflation, consumer spending, and interest rates.

Two sets of charts are presented for most economic indicators. In the **A charts**, annual values from 2016 to 2026 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 2016 to 2026 for my four scenarios.

Tables and charts in the first six sections 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 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. Neutral short-term rate of interest (federal funds)
18. Neutral long-term rate of interest (10-year Treasury yield)
19. Federal budget — annual deficit
20. 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, the Bureau of Labor Statistics, and the Congressional Budget Office (**CBO**). Data and projections from **CBO** guide assumptions about payroll employment growth and provide the starting (current) value of potential real GDP, the non-accelerating inflation rate of unemployment (NAIRU), and base-line estimates of future federal budget deficits.

1. BASE Scenario

The **BASE** scenario starts with **CBO**'s payroll employment growth and federal budget deficit assumptions from 2016-2026 which were published in August 2016. **CBO**'s assumptions are based on "current law."

This means that both sets of assumptions will be inaccurate if it is likely that Congress will change fiscal policy. With the election of Donald Trump and an all-Republican Congress, significant changes in fiscal policy are likely in coming months. Although we will not know the exact kinds of fiscal changes and their probable impacts on employment and the federal deficit for quite some time, the presidential campaign and the Republican Party platform provide some guidance. Because it is likely that Congress will enact significant changes in fiscal policy, it is appropriate to modify CBO's baseline assumptions in the **BASE** scenario.

Thus, the **BASE** scenario assumes $500 billion in additional infrastructure spending over ten years, much of which is front-loaded, and $100 billion in tax cuts annually split between $70 billion in personal income taxes and $30 billion in corporate income taxes. It is assumed that only half of the annual reduction in income taxes is implemented in 2017; however, Congress could make tax cuts retroactive for the entire calendar year. Additional infrastructure spending does not kick in until late 2017.

Table A shows the assumed timing of infrastructure investments and tax cuts. Initially, during 2017, 2018 and 2019, infrastructure spending boosts the rate of growth in government investment spending, but since the stimulus is assumed to be front loaded, the rate of growth falls below the long-term trend level until 2024 when it returns to a trend level of 1.15 percent, which is 10 basis points above the average growth of 1.05 percent that has prevailed over the past 17.5 years. A $500 billion one-time federal increase in investment spending would boost the average annual growth rate over the next 10 years from the recent historical trend growth rate of 1.05 percent to 1.32 percent.

Table A
Fiscal Stimulus — Infrastructure Spending and Tax Cut Scenarios
(***in billions of dollars***)

	Infrastructure Spending			Tax Cut
	Amount	**Growth — No Stimulus**	**Growth — Stimulus**	**Amount**
2017	$25	.82%	1.20%	$50
2018	$100	1.10%	3.56%	$100
2019	$100	1.03%	2.22%	$100
2020	$75	1.00%	.75%	$100
2021	$50	1.00%	.42%	$100
2022	$30	1.00%	.46%	$100
2023	$30	1.04%	.91%	$100
2024	$30	1.05%	1.15%	$100
2025	$30	1.05%	1.15%	$100
2026	$30	1.06%	1.15%	$100
TOTAL-AVERAGE	**$500**	**1.05%**	**1.32%**	**$950**
1999-2016 Average		**1.05%**		

This assumed $1.45 trillion fiscal stimulus lifts payroll employment by 664,000[1] over the next 10 years. The ratio of public debt to nominal GDP rises only $.54 trillion over 10 years because stronger growth generates an additional $910 billion in net tax revenues (see **Table B** below).

[1] **Table B** shows a difference of 988,000 rather that 664,000. That is because my original base case assumed 344,000 more employees by the end of 2026 than **CBO** assumed in its August 2016 projections.

2. Strong Growth

Payroll employment is assumed to grow 1.65 million more over the next 10 years compared to the **BASE** scenario. This spurs stronger private business investment growth — an annual rate of 2.63 percent compared to 1.93 percent in the **BASE** scenario.

3. Recession-Stagnation

In this scenario a brief, but sharp, recession commences in early 2017 and ends in early 2018. 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 1.14 million less by the end of 2026. Private investment growth decreases from an average annual growth rate of 1.93 percent to 1.84 percent and government investment growth declines from an average annual growth rate of 1.25 percent to 0.63 percent. The sharp decline in government investment stems from failure to enact the Trump fiscal stimulus plan, which is probably not particularly realistic, and congressional efforts to control the size of the federal budget deficit during the recovery similar to what occurred in the aftermath of the Great Recession.

4. Low Productivity

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 1.8 percent is below the long-term average of 2.1 percent. Productivity is assumed in this scenario to rise at an annual rate of 1.4 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 0.85 percent. Employment is 1.68 million lower by the end of 2026 in this scenario compared to the **BASE** scenario. Private business investment growth is even weaker because of weakness in consumer demand, falling to 1.56 percent annually compared to 1.93 percent in the **BASE** scenario and 1.84 percent in the **Recession-Stagnation** scenario. Government investment growth is 0.89 percent annually, which is also slower than in the **BASE** scenario, again because a Trump fiscal stimulus program is not enacted, but government investment is stronger than the dismal 0.63 percent in the **Recession-Stagnation** scenario.

III. Measures of Economic Activity — Summary

Table B includes summary statistics for my four scenarios as well as for **CBO**'s August 2016 data projections for many of the measures of economic activity. The number in the first column of **Table B** cross-references the economic measure in this summary with the individual detail 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

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

(***Average for 2021-2026 unless otherwise specified***)

		CBO	BASE	Strong Growth	Recession-Stagnation	Low Productivity
1	Payroll Employment(2026 in thousands)	151,982	152,970	154,617	151,825	151,289
1	Difference from BASE	-988	0	1,647	-1,145	-1.681
1	Payroll Growth		.51%	.64%	.47%	.41%
2	Hours Worked Growth	.49%	.52%	.62%	.44%	.44%
3	Productivity	1.78%	1.62%	1.83%	1.53%	1.42%
4	Real GDP Potential Growth	1.93%	1.74%	1.96%	1.66%	1.60%
	2026 (trillions)	$20.47	$19.91	$20.26	$19.73	$19.68
5	Real GDP Realized Growth	1.93%	1.79%	2.02%	1.80%	1.62%
	2026 (trillions)	$20.37	$20.00	$20.43	$19.70	$19.56
6	Output Gap	-.50%	.34%	.82%	-.34%	-.62%
7	Unemployment Rate	4.95%	4.96%	4.40%	5.35%	5.63%
8	Wage Rate Growth	3.06%	2.99%	3.20%	2.64%	2.71%
9	Government Investment Growth (2016-26)		1.25%	1.25%	.63%	.89%
10	Private Investment Growth (2016-26)		1.93%	2.63%	1.84%	1.56%
13	Real Consumer Spending		2.04%	2.37%	1.85%	1.73%
14	Core PCE Inflation	1.97%	1.68%	1.81%	1.46%	1.55%
15	Federal Funds Rate	2.84%	2.11%	3.07%	.68%	.87%
16	10-Year Treasury Rate	3.61%	2.33%	2.74%	1.65%	1.83%
19	Annual Budget Deficit/GDP (2026)	4.60%	4.81%	3.72%	5.58%	5.99%
20	Cumulative Deficit/GDP (2026)	84.2%	89.3%	83.5%	98.9%	97.2%
	Public Debt (2026-trillions)	$22.75	$23.29	$22.21	$25.35	$24.74

trends. Although population growth will remain close to 1.0 percent annually, employment growth will be considerably lower because of the declining labor force participation rate, due primarily to the consequences of an aging workforce. Immigration has helped keep employment growth higher, but this is a downside risk factor should the Trump Administration carry through on threats to restrict immigration.

- All **productivity** projections are well above recent experience. 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 is highly unlikely to exceed 2.0 percent and could be much lower. Because slower real growth is linked to lower inflation, nominal GDP growth will probably fall well short of 4.0 percent. Because annual budget deficits are likely to exceed 4.0 percent this means that the ratio of public debt to nominal GDP will rise steadily. Slow nominal growth coupled with population aging and 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 **higher unemployment and slower wage growth** over the longer run. 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. 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 below 2.0 percent over the next several years is likely.
- 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 in coming years, except in the **Recession-Stagnation** scenario, but to levels that are below consensus beliefs. 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 tax cuts for the wealthy and transfer payments. Infrastructure spending historically has had a multiplier greater than one but the favorable impacts generally do not show up for a long time. While the day of reckoning is probably more than a decade in the future, eventual painful cuts in benefits appear 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 2016 to 2026. **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.

CHART 1A – Payroll Employment Growth

(average annual rate)

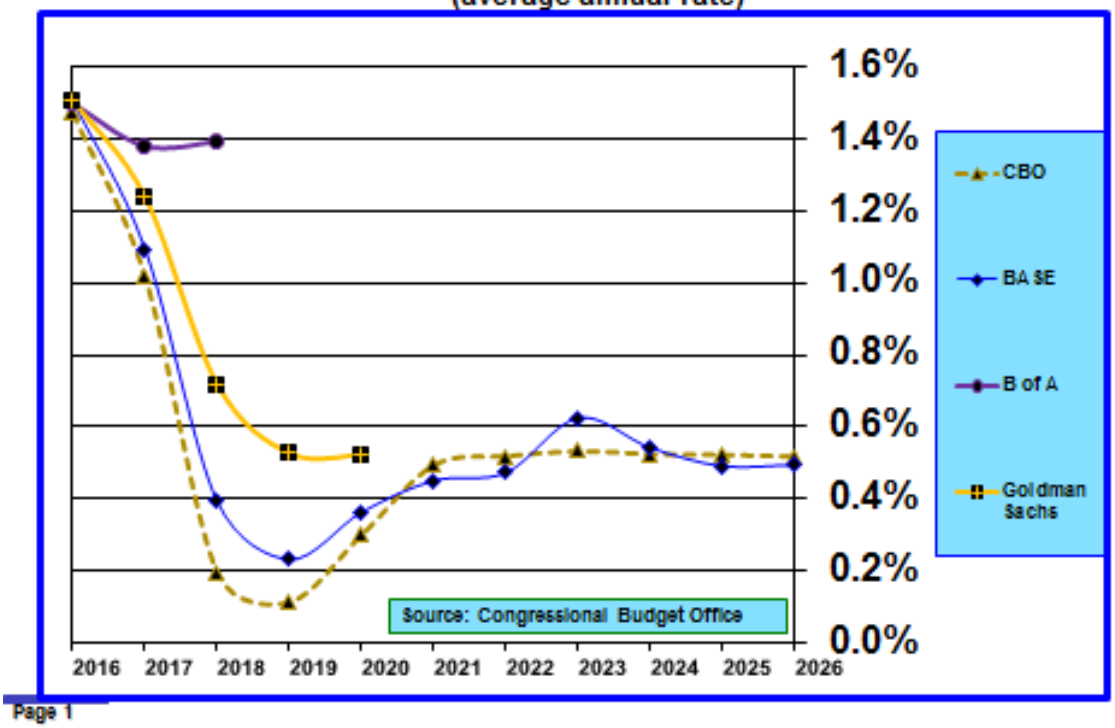

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CHART 1B – Payroll Employment Growth

(average annual rate)

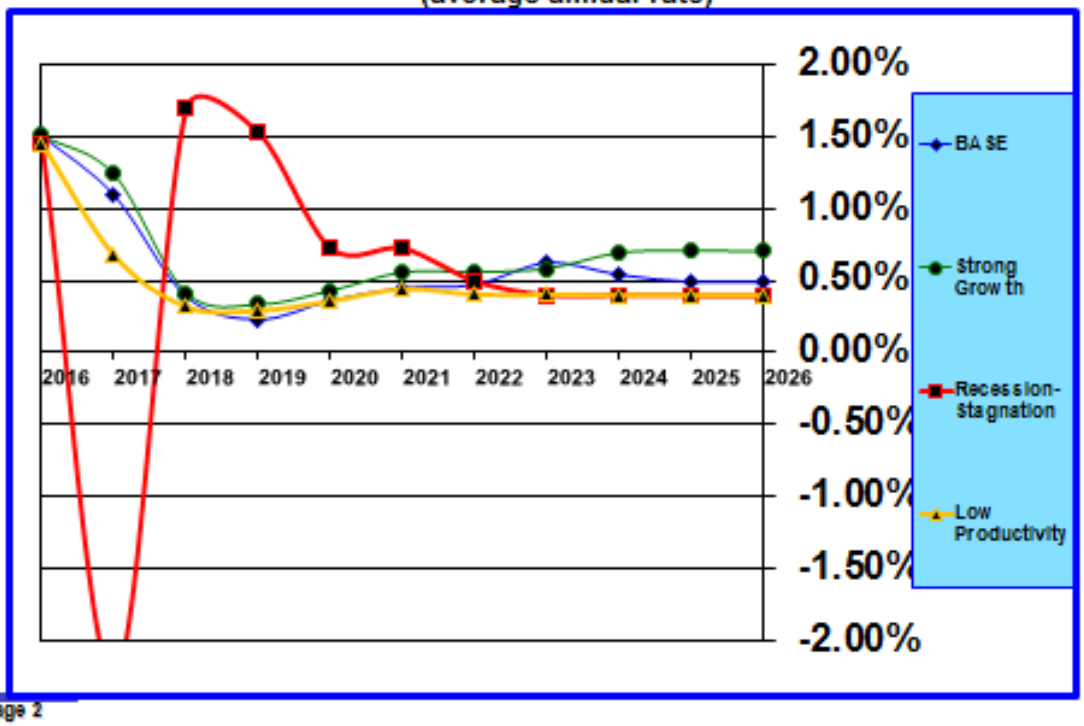

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Table 1
Growth in Payroll Employment: 2016-2026
(***percentages***)

	BASE	Strong Growth	Recession-Stagnation	Low Productivity	GS	B of A	CBO
Payroll Growth							
2016	1.51	1.51	1.45	1.45	1.51	1.50	1.47
2017	1.09	1.24	-2.26	.68	1.24	1.38	1.02
2018	.39	.42	1.69	.32	.72	1.39	.19
2019	.23	.34	1.53	.29	.53		.11
2020	.36	.43	.73	.36	.52		.30
2021	.45	.56	.72	.44			.49
2022	.47	.56	.50	.40			.52
2023	.63	.58	.40	.40			.53
2024	.54	.70	.40	.40			.52
2025	.49	.71	.40	.40			.52
2026	.49	.70	.40	.40			.52
2016-2020	.72	.79	.63	.62	.90		.62
2021-2026	.51	.64	.47	.41			.52
2016-2026	.61	.70	.54	.50			.56

CBO assumes a very significant decline in payroll employment growth in 2018 and 2019 but then rebounding 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. My **BASE** scenario matches CBO's in the 2021-2026 time frame.

Over 2017 and 2018, both ***GS*** and ***B of A*** appear to be too optimistic about payroll employment growth. Although both are bullish about further declines in the unemployment rate, for their payroll growth forecasts to be valid would require a sizable increase in the participation rate, an outcome that neither is forecasting. Thus, it appears that both have simply extrapolated recent employment gains with a very gradual tapering in a way that is inconsistent with an economy at full employment and already experiencing slow growth in the labor force. The three-year average rate of growth in the labor force was 0.88 percent in November and has been trending upward slightly over the course of 2016 because of rising participation. As participation stabilizes and then begins to fall in line with demographic trends, labor

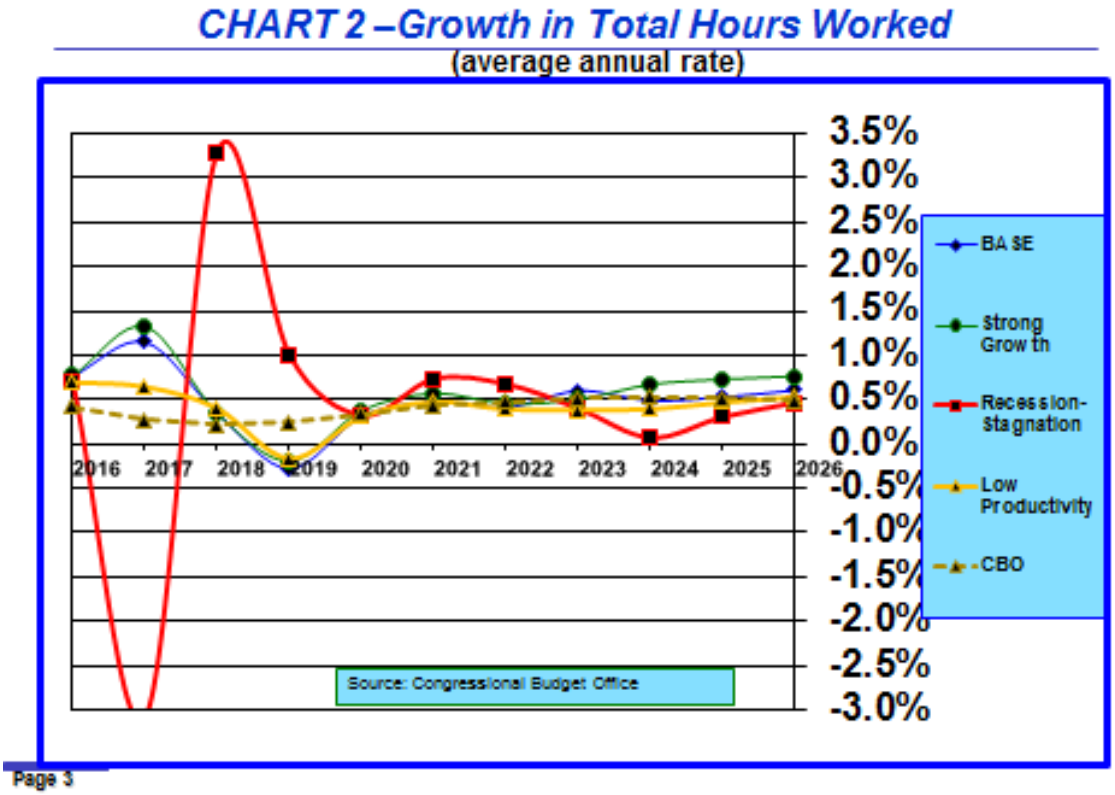
force growth will quickly slow to about 0.5 percent.

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 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.

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 change systematically over time. **Chart 2** presents annual projections for growth in total hours worked from 2016 to 2026 for **CBO** and my four scenarios.



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 average hours worked per employee have been trending

Table 2
Growth in Total Hours Worked: 2016-2026
(***percentages***)

	BASE	Strong Growth	Recession-Stagnation	Low Productivity	GS	B of A	CBO*
Hours Worked							
2016	.77	.77	.70	.70			.42*
2017	1.15	1.32	-3.09	.64			.27*
2018	.35	.35	3.30	.40			.22*
2019	-.28	-.19	1.00	-.17			.25*
2020	.31	.38	.32	.31			.34*
2021	.47	.57	.74	.47			.43*
2022	.41	.45	.68	.39			.47*
2023	.60	.50	.40	.38			.51*
2024	.49	.67	.07	.39			.52*
2025	.53	.73	.31	.47			.51*
2026	.61	.77	.47	.53			.48*
2016-2020	.46	.52	.45	.38			.30*
2021-2026	.52	.62	.44	.44			.49*
2016-2026	.49	.57	.44	.41			.40*
*CBO — data for hours worked is potential rather than forecast actual							

down. Thus, total hours worked is the more reliable measures.

That said, in the 2021-2026 time frame both measures of employment growth are very similar, although generally growth in total hours worked is slightly lower.

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.

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

CHART 3A – Productivity

(average annual rate)

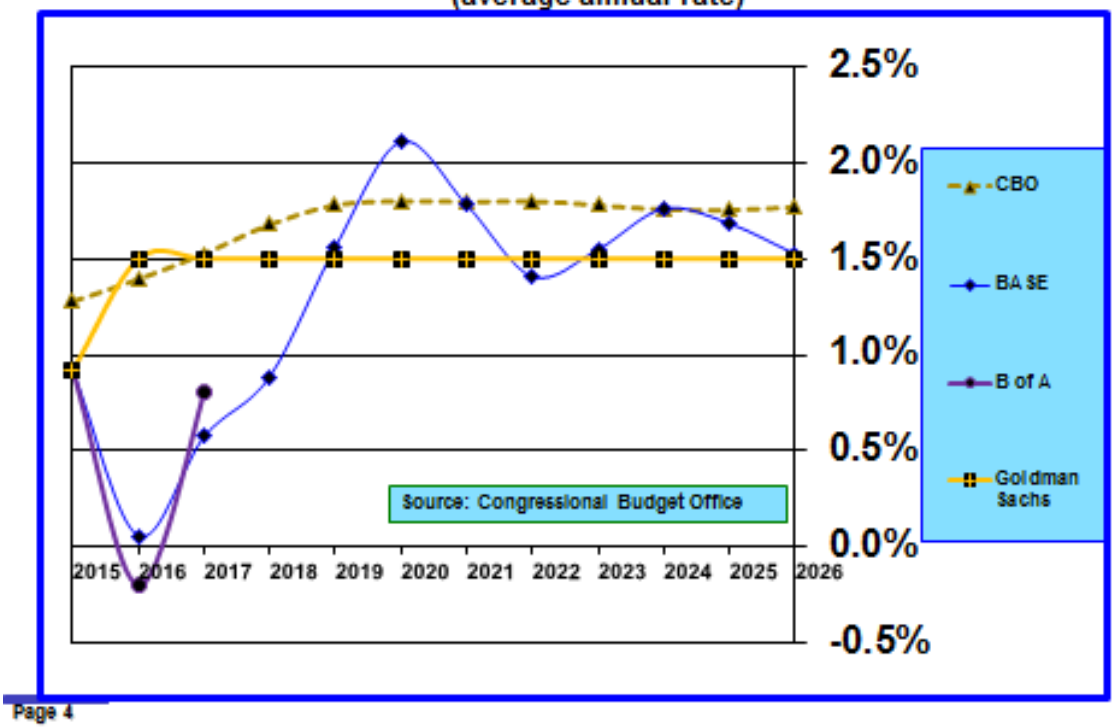


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CHART 3B – Productivity

(average annual rate)

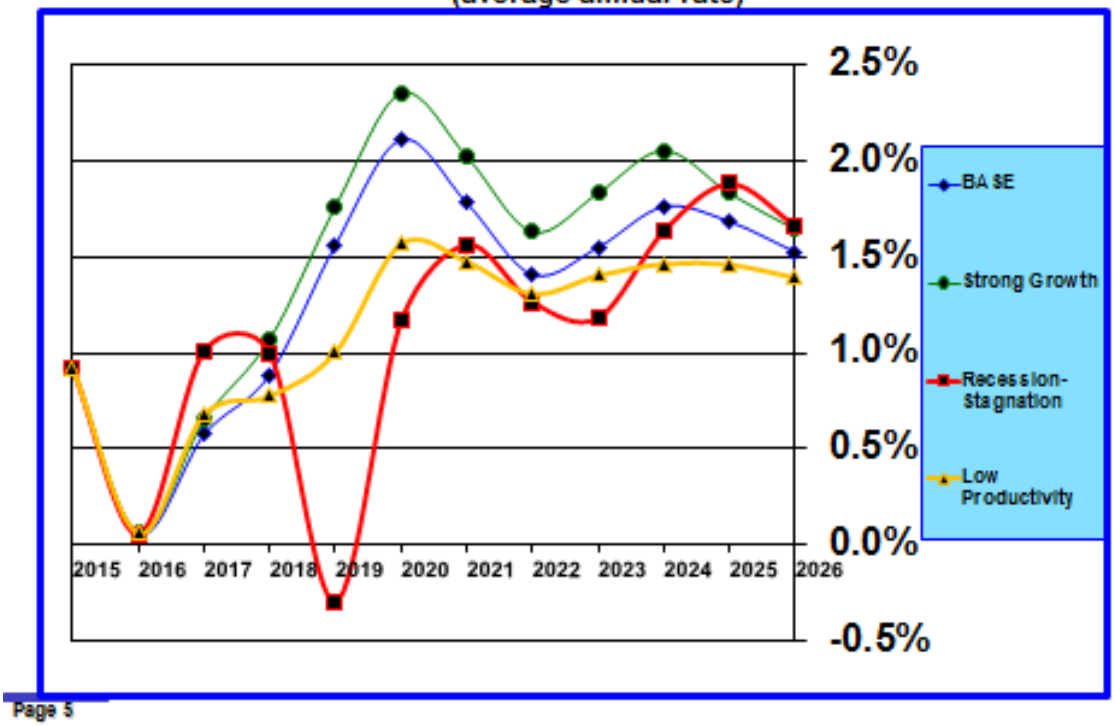

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Table 3
Productivity Projections: 2016-2026
(***percentages***)

	BASE	Strong Growth	Recession-Stagnation	Low Productivity	GS	B of A	CBO
2016	.06	.06	.06	.06		-.20	1.39
2017	.57	.65	1.01	.68	1.50	.80	1.53
2018	.89	1.07	1.00	.77	1.50		1.68
2019	1.56	1.76	-.29	1.00	1.50		1.78
2020	2.11	2.35	1.17	1.57	1.50		1.80
2021	1.78	2.02	1.56	1.47	1.50		1.80
2022	1.41	1.63	1.26	1.31	1.50		1.80
2023	1.55	1.83	1.18	1.40	1.50		1.78
2024	1.76	2.05	1.63	1.46	1.50		1.76
2025	1.68	1.83	1.88	1.46	1.50		1.75
2026	1.52	1.64	1.66	1.39	1.50		1.77
2016-2020	1.04	1.18	.59	.82	1.50		1.64
2021-2016	1.62	1.83	1.53	1.42	1.50		1.78
2016-2026	1.35	1.54	1.10	1.14	1.50		1.71

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 2020-2022 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 2017 in my **Recession-Stagnation** scenario relative to my other scenarios followed by a fall in 2019 follows a traditional cyclical pattern.

Overall, there is not much analytical substantiation for the kind of rebound in productivity that occurs 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 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 2016-2026

(***percentages***)

	BASE	Strong Growth	Recession-Stagnation	Low Productivity	GS	B of A	CBO
2016	1.56	1.56	1.56	1.56	1.60	1.58	1.57
2017	1.34	1.36	1.38	1.36	1.75	1.70	1.55
2018	1.22	1.27	1.41	1.24	1.75	1.70	1.63
2019	1.12	1.22	.96	1.03	1.75	1.70	1.74
2020	1.61	1.78	1.11	1.34	1.75	1.70	1.85
2021	1.86	2.06	1.61	1.60	1.75	1.70	1.92
2022	1.62	1.80	1.47	1.51	1.75	1.70	1.96
2023	1.70	1.93	1.61	1.60	1.75	1.70	1.98
2024	1.74	1.99	1.75	1.63	1.75	1.70	1.97
2025	1.74	1.99	1.75	1.63	1.75	1.70	1.95
2026	1.74	1.99	1.75	1.63	1.75	1.70	1.93
2016-2020	1.37	1.44	1.29	1.31	1.72	1.68	1.67
2021-2026	1.74	1.96	1.66	1.60	1.75	1.79	1.95
2016-2026	1.57	1.72	1.49	1.47	1.74	1.69	1.82

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 almost 2.0 percent in 2023 and then beginning a gradual decline. **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 2.0 percent.

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

CHART 4A – Potential Real GDP Growth

(average annual rate)

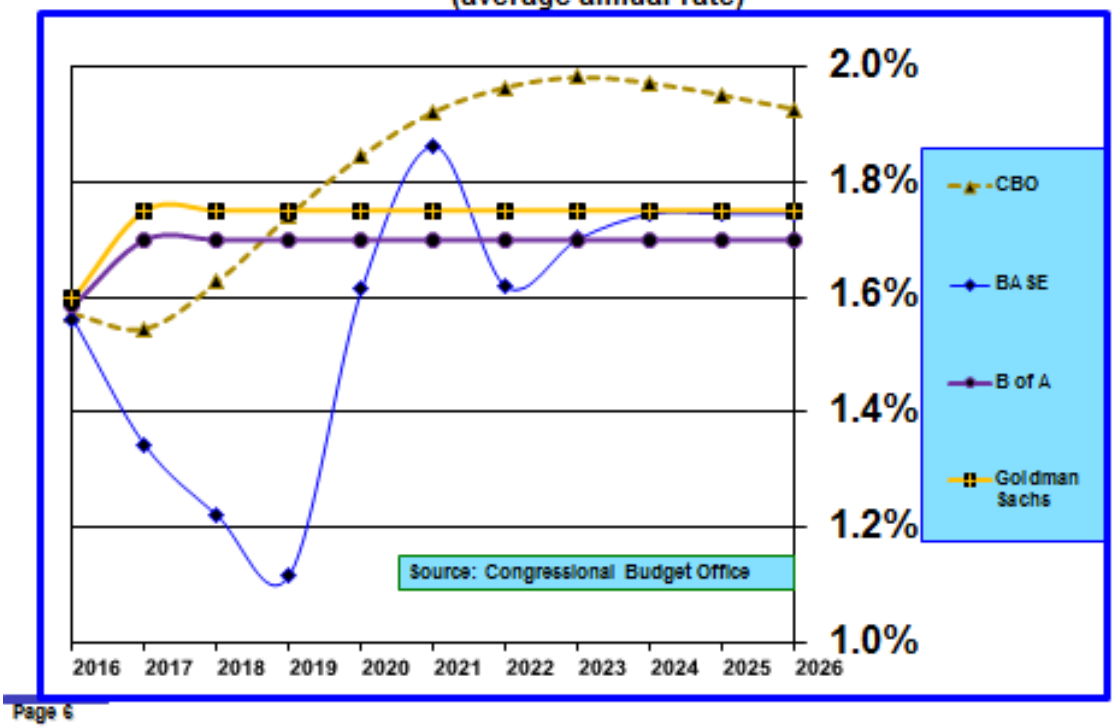

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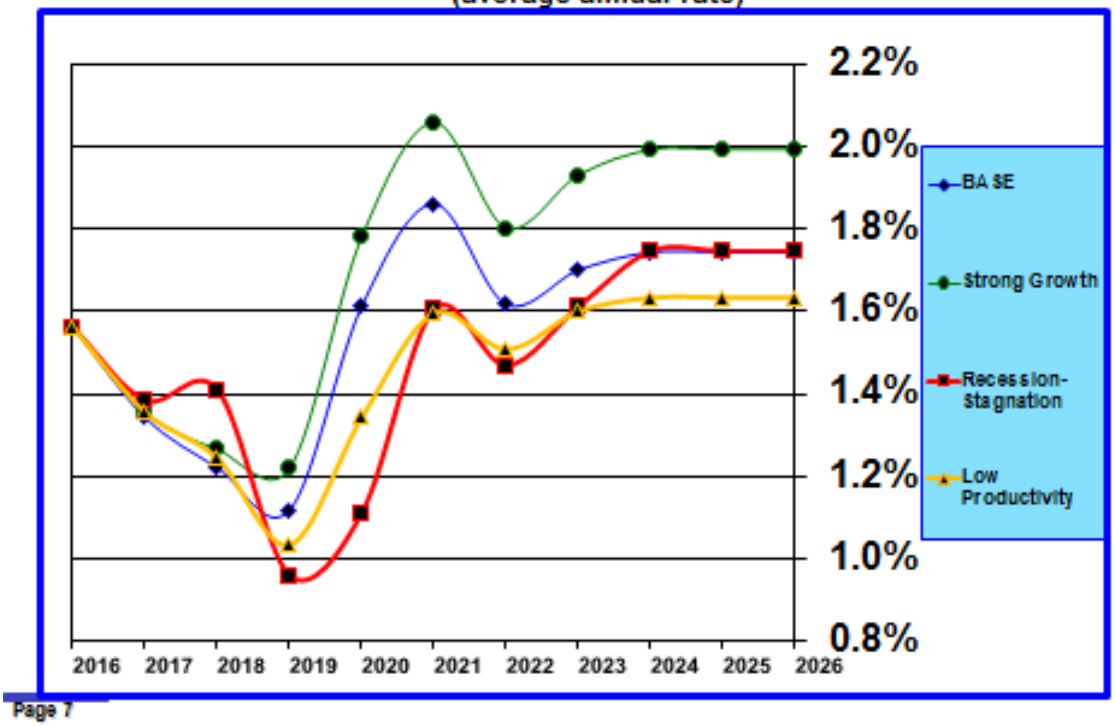
CHART 4B – Potential Real GDP Growth

(average annual rate)



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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 2016-2026
(***percentages***)

	BASE	Strong Growth	Recession-Stagnation	Low Productivity	GS	B of A	CBO
2016	1.60	1.60	1.60	1.60	1.58	1.60	1.57
2017	1.90	2.00	0.99	1.79	2.22	2.03	2.36
2018	1.53	1.70	1.02	1.17	2.09	2.37	2.21
2019	1.60	1.83	2.11	1.29	1.74	1.99	1.75
2020	1.91	2.15	1.64	1.53	1.75	1.69	1.63
2021	1.76	2.00	1.83	1.59	1.75	1.69	1.90
2022	1.64	1.88	1.82	1.58	1.75	1.69	1.96
2023	1.92	2.12	1.59	1.64	1.75	1.69	1.98
2024	1.96	2.20	1.86	1.65	1.75	1.69	1.97
2025	1.78	2.02	1.87	1.64	1.75	1.69	1.95
2026	1.69	1.88	1.80	1.62	1.75	1.69	1.93
2016-2020	1.71	1.86	1.47	1.48	1.88	1.94	1.90
2021-2026	1.79	2.02	1.80	1.62	1.75	1.69	1.95
2016-2026	1.75	1.94	1.65	1.55	1.81	1.80	1.93

With the exception of **CBO**, 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.

Overall, my scenarios are slightly more pessimistic than others, primarily because I expect employment growth to be slower and productivity to be lower. By 2021-2026 there is not much difference between my **BASE** scenario and the projections of **GS** and **B of A**. **CBO**'s projections are at the high end of the outlook range and are consistent with my **Strong Growth** scenario.

CHART 5A – Actual Real GDP Growth

(average annual rate)

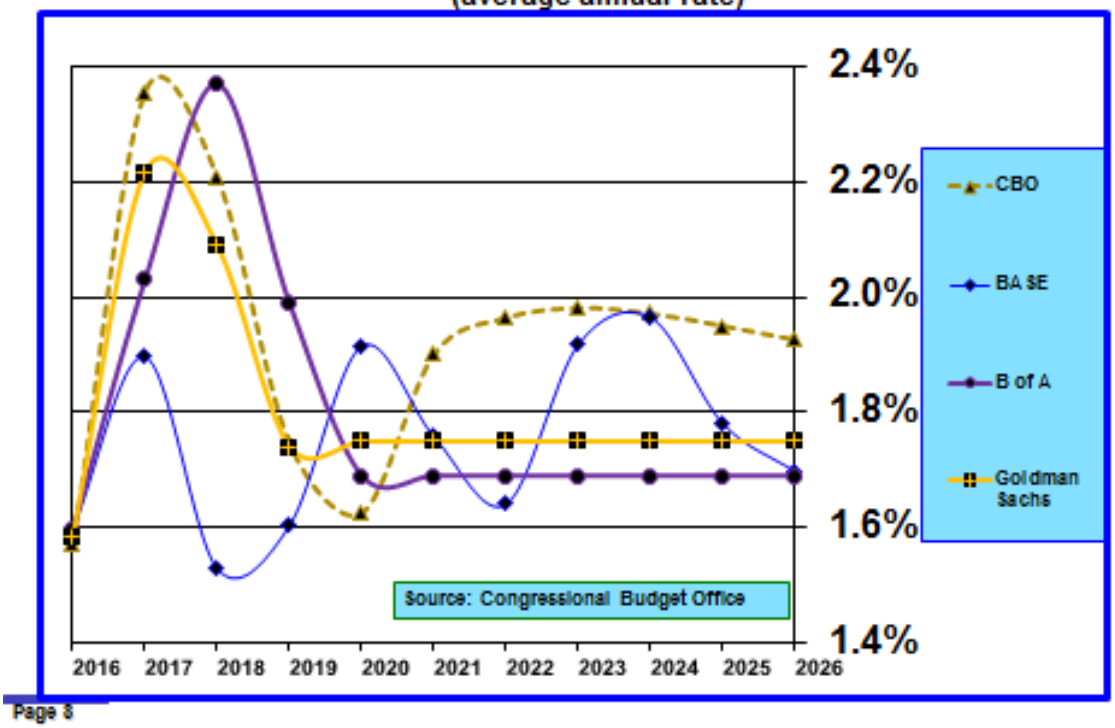

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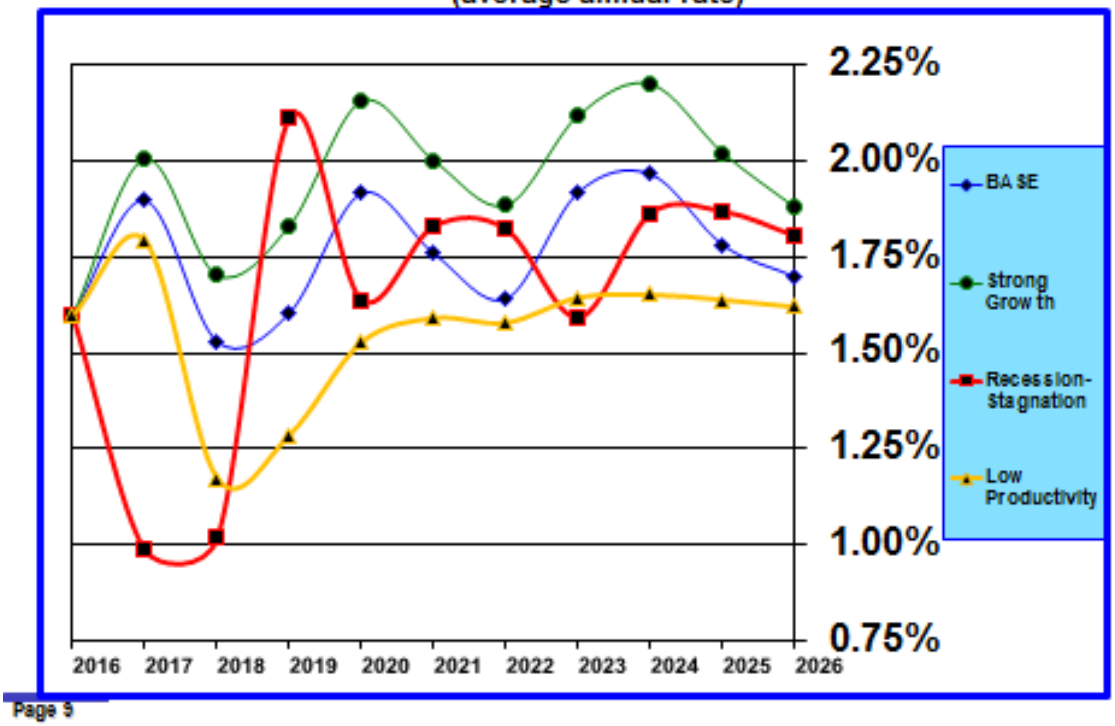
CHART 5B – Actual Real GDP Growth

(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: 2016-2026
(***percentages***)

	BASE	Strong Growth	Recession-Stagnation	Low Productivity	GS	B of A	CBO
2016	-1.20*	-1.20*	-1.20*	-1.20*	-1.33*	-1.27*	-1.34
2017	-.80	-.64	-2.80	-1.08	-.95	-1.09	-.55
2018	-.48	-.18	-2.35	-1.14	-.71	-.31	-.17
2019	.09	.49	-1.20	-.76	-.87	-.32	-.35
2020	.10	.54	-.93	-.74		-.33	-.50
2021	.03	.53	-.59	-.70		-.34	-.50
2022	.11	.66	-.40	-.63		-.35	-.50
2023	.40	.89	-.41	-.60		-.36	-.50
2024	.53	1.03	-.29	-.59		-.37	-.50
2025	.53	1.00	-.18	-.59		-.38	-.50
2026	.46	.84	-.15	-.61		-.39	-.50
2016-2020	-.46	-.20	-1.70	-.98	-.96	-.67	1.67
2021-2026	.34	.82	-0.34	-.62		-.36	1.95
2016-2026	-.02	.36	-.95	-.79		-.50	1.82

*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 August 2016 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. What this means is that a real output gap attributed to **GS** of -1.33 in 2016 is considerably worse than what **GS** believes to be the case. That is because **GS**'s estimate of potential real GDP is lower than **CBO**'s estimate. This means that differences in real GDP output gap projections among CBO, B of A and GS are due solely to

CHART 6A – Real GDP Output Gap

(percentage of potential GDP)

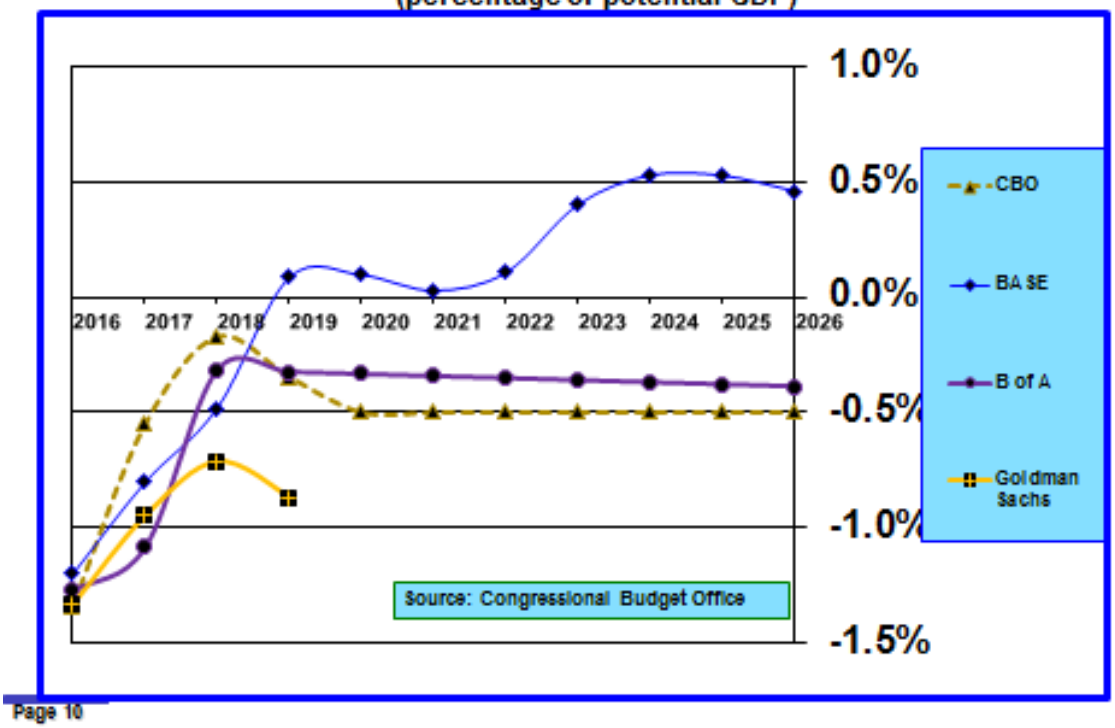

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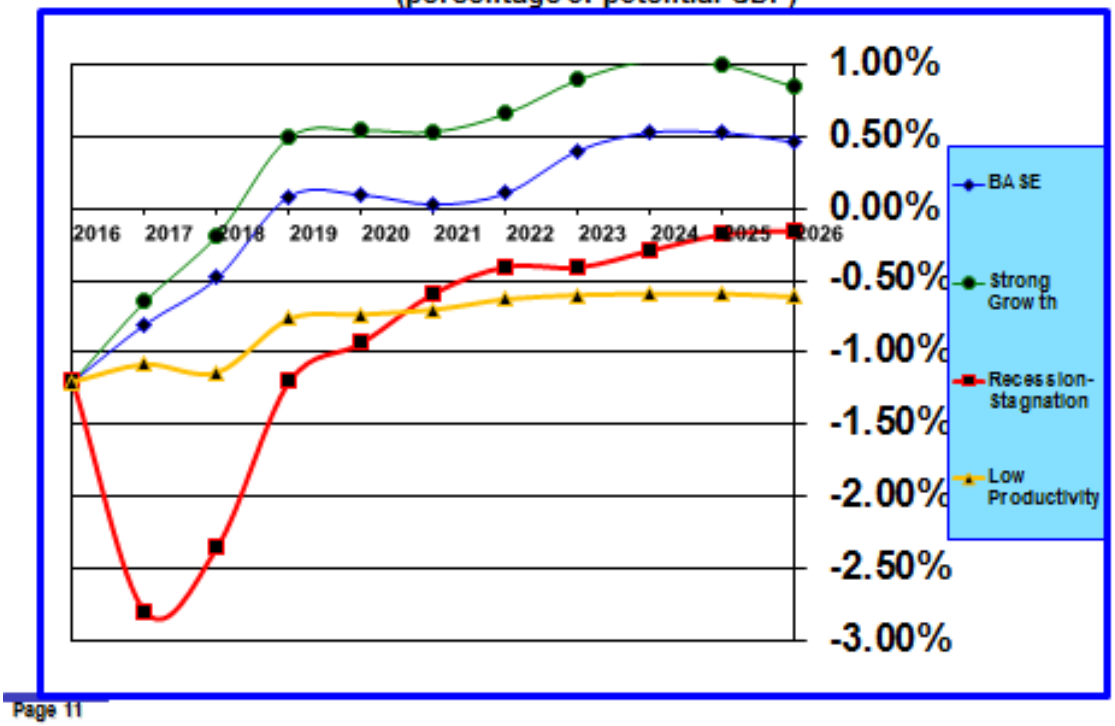
CHART 6B – Real GDP Output Gap

(percentage of potential GDP)



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differences in expected actual real GDP and not to differences in expected potential real GDP.

That is not the case for my estimates of the output gap. I derive projections of both potential and actual real GDP independently of **CBO**'s projections. However, I do use **CBO**'s second quarter 2016 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 near full potential, I anticipate that **CBO** will change this assumption in future updates of its projections.

In my **Strong Growth** scenario, the output gap reaches an over-capacity 1.0 percent by 2023. According to **CBO**'s historical estimates, the economy has operating beyond capacity for periods of time in the past, but the stresses this unleashes generally result in adjustments that push economic activity back to a zero or negative output gap.

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** it there is upward pressure on inflation.

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

Currently, the U-3 unemployment rate and **NAIRU** are both approximately 4.7 percent, which indicates that the employment gap has been eliminated. However, other labor market measures, particularly the U-6 measure of unemployment, indicate that a modest amount of slack remains in the labor market.

All projections, with the exception of **CBO**'s and my **Recession-Stagnation** and **Low Productivity** scenarios, fall slightly below NAIRU until 2021. 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.

8. Nominal Hourly Wage Rate Growth

There are three primary broad-based measures of labor compensation that provide information about compensation trends. All are compiled by the Bureau of Labor Statistics (**BLS**). 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 includes information about benefits which comprise approximately 30 percent of total compensation. The third

CHART 7A – U-3 Unemployment Rate

(average annual rate)

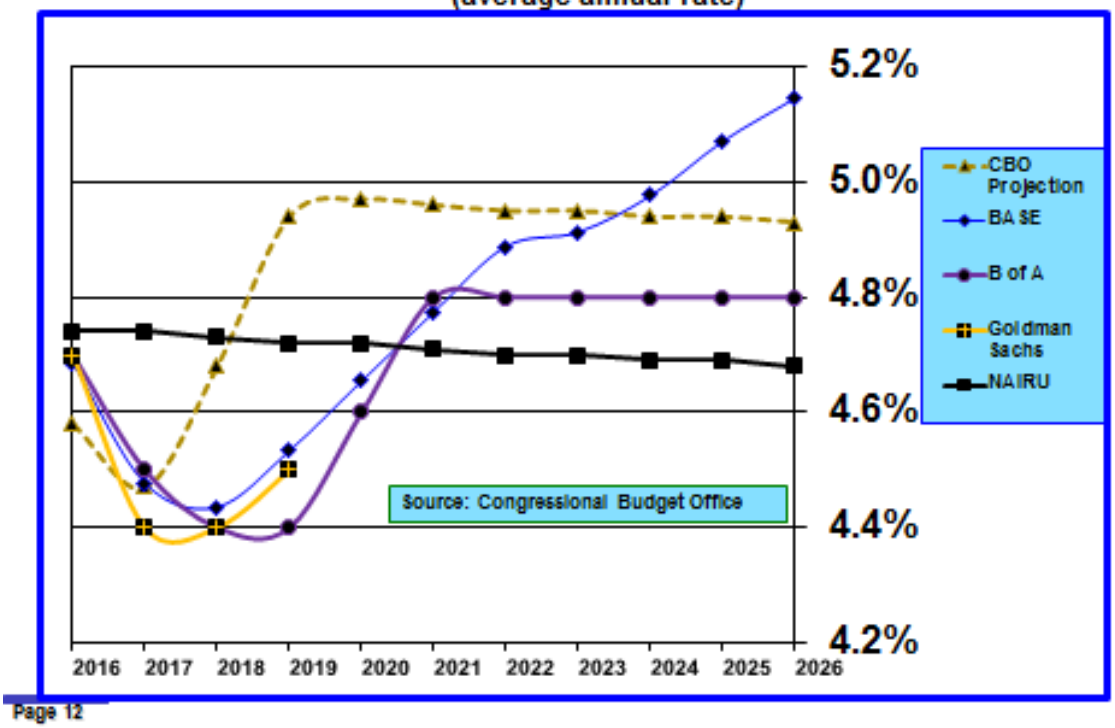

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CHART 7B – U-3 Unemployment Rate

(average annual rate)

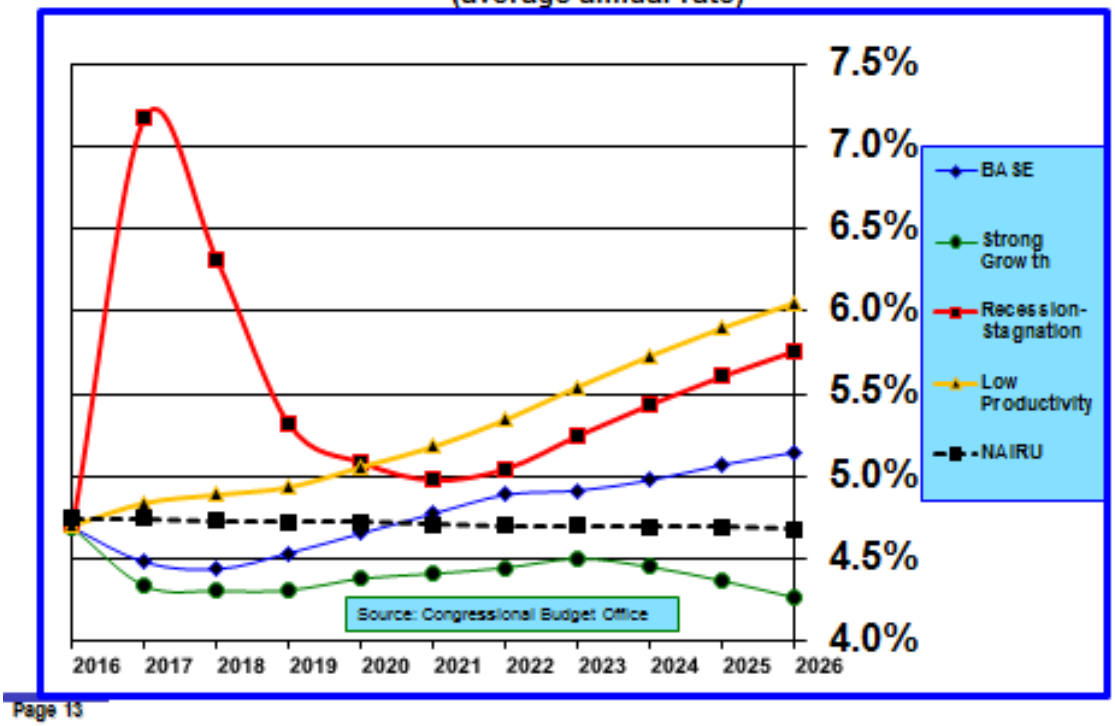

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Table 7
U-3 Unemployment Rate for 2016-2026
(***percentages***)

	BASE	Strong Growth	Recession-Stagnation	Low Productivity	GS	B of A	CBO	NAIRU
2016	4.69	4.69	4.70	4.70	4.70	4.70	4.58	4.74
2017	4.48	4.33	7.18	4.84	4.40	4.50	4.47	4.74
2018	4.44	4.30	6.31	4.89	4.40	4.40	4.68	4.73
2019	4.53	4.31	5.31	4.93	4.50	4.40	4.94	4.72
2020	4.65	4.38	5.08	5.06		4.60	4.97	4.72
2021	4.77	4.41	4.98	5.18		4.80	4.96	4.71
2022	4.89	4.44	5.05	5.35		4.80	4.95	4.70
2023	4.91	4.50	5.25	5.54		4.80	4.95	4.70
2024	4.98	4.45	5.44	5.73		4.80	4.94	4.69
2025	5.07	4.36	5.61	5.90		4.80	4.94	4.69
2026	5.15	4.26	5.76	6.05		4.80	4.93	4.68

measure, the employment cost index (**ECI**), is released quarterly and consists of wage and salary, benefits, and total compensation indices.

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**. **Chart 8A** compares my "**BASE**" scenario unemployment rate projections with those of **CBO**, **B of A**, and **GS**. **Chart 8B** compares hourly wage rate projections for my four scenarios.

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.

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.

In the long run there is not a great deal of difference in nominal wage growth rates. In 2026 they range from close to 3.0 percent for my **BASE** scenario and **CBO** to between 3.2 percent and 3.5 percent for my **Strong Growth** scenario and for **GS** and **B of A**. Weaker growth and productivity results in somewhat slower wage rate growth, but there is not a great deal of sensitivity of wage rates to economic fluctuations except in times of high and sustained unemployment.

CHART 8A – Hourly Wage Growth

(average annual rate)

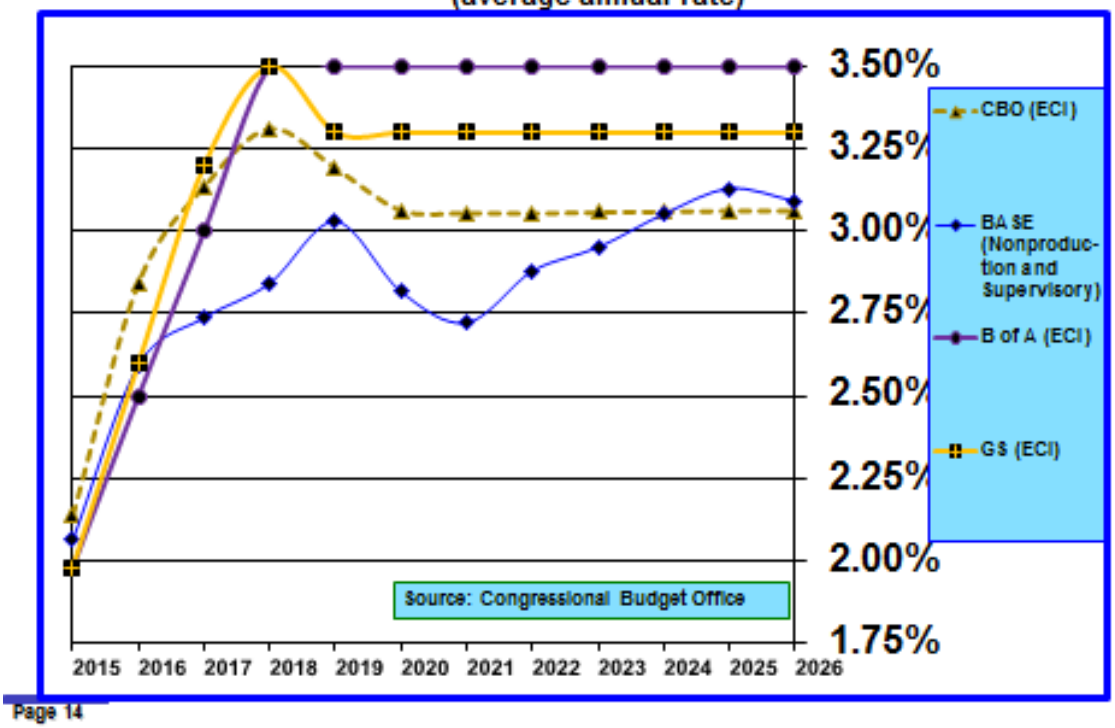

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CHART 8B – Hourly Wage Growth – Production and Nonsupervisory Employees

(average annual rate)

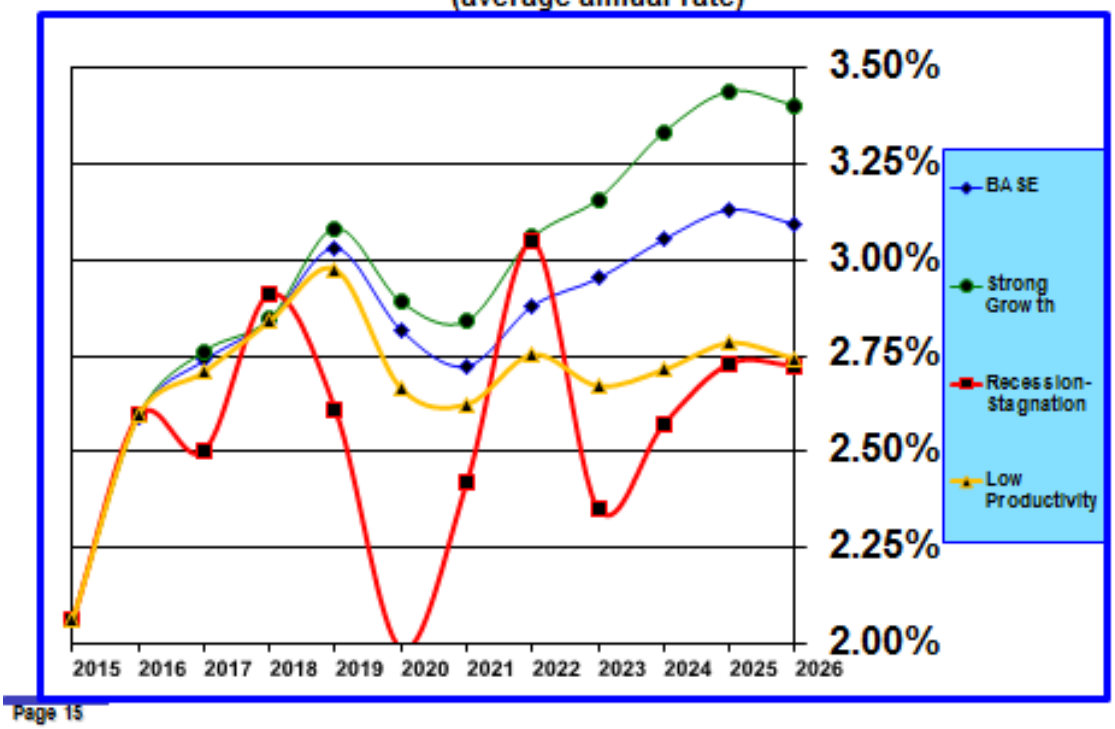

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Table 8
Hourly Wage Rate Growth for Production and Nonsupervisory Workers: 2016-2026
(***percentages***)

	BASE	Strong Growth	Recession-Stagnation	Low Productivity	GS ECI	B of A ECI*	CBO ECI
2016	2.59	2.59	2.59	2.59	2.50	2.60	2.84
2017	2.74	2.76	2.50	2.71	3.00	3.20	3.14
2018	2.84	2.85	2.91	2.84	3.50	3.50	3.31
2019	3.03	3.08	2.61	2.97	3.50	3.30	3.19
2020	2.82	2.89	1.99	2.66	3.50	3.30	3.06
2021	2.72	2.84	2.42	2.62	3.50	3.30	3.06
2022	2.88	3.06	3.05	2.75	3.50	3.30	3.05
2023	2.95	3.16	2.35	2.67	3.50	3.30	3.06
2024	3.05	3.33	2.57	2.71	3.50	3.30	3.06
2025	3.13	3.44	2.73	2.78	3.50	3.30	3.06
2026	3.09	3.40	2.72	2.74	3.50	3.30	3.06
2016-2020	2.80	2.83	2.52	2.76	3.20	3.18	3.11
2021-2026	2.97	3.20	2.64	2.71	3.50	3.30	3.06
2016-2026	2.90	3.04	2.59	2.73	3.36	3.25	3.08

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

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 8A**, **GS** and **B of A** expect the nominal wage growth component of ECI to move up from its recent level of 2.3 percent in the third quarter of 2016 to 3.5 percent in 2018. However, B of A expects growth in the nominal wage to slow to3.3 percent in 2019 and then stabilize at that level. 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 apparent in **Chart 8A**.

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 2016 to 2026. **Chart 9A** compares my "**BASE**" scenario real private investment growth projections with those of **B of A**, and **GS**, as well as with the 18-year average growth from 1999 through the third quarter of 2016. **Chart 9B** compares real private investment growth projections for my four scenarios.

Table 9
Private Real Investment Growth: 2016-2026
(***percentages***)

	BASE	Strong Growth	Recession-Stagnation	Low Productivity	GS	B of A
Private Investment						
2016	.34	.46	.30	.34	.61	.58
2017	1.28	2.26	-2.57	1.06	3.58	2.25
2018	2.17	3.03	-.26	1.76	4.11	4.73
2019	2.27	3.03	5.87	1.76	3.64	3.80
2020	2.20	3.02	3.78	1.76	3.13	3.03
2021	2.14	2.87	2.24	1.76		
2026	2.21	2.92	2.18	1.75		
2016-2020	1.65	2.36	1.42	1.34		
2021-2026	2.17	2.86	2.18	1.75		
2016-2026	1.93	2.63	1.84	1.56		
1999-2016 Average	1.42	1.42	1.42	1.42	1.42	1.42

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

Note that all projections of growth in private business investment exceed the 1.42 percent annual rate of increase over the past 17.5 years. Greater growth in investment spurs greater increases in productivity. I have already voiced skepticism about potentially optimistic productivity projections. If investment growth does not break out of the doldrums as the projections in Table 9 indicate, then productivity will definitely disappoint.

Also, 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

CHART 9A – Real Private Investment Growth

(average annual rate)

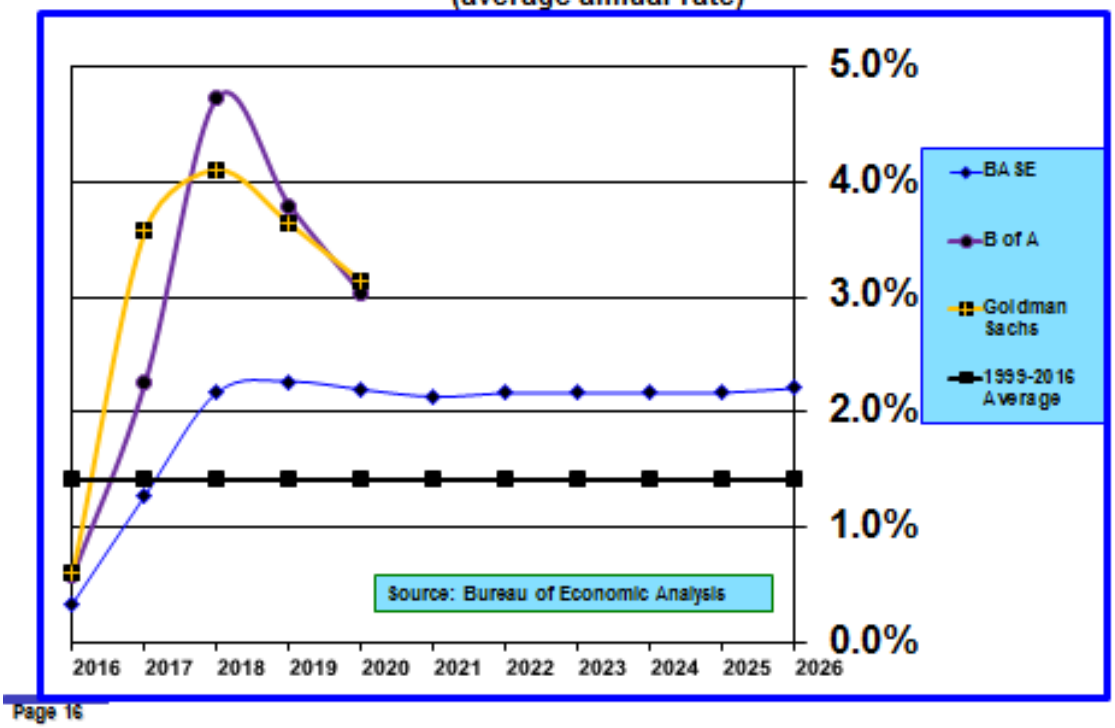

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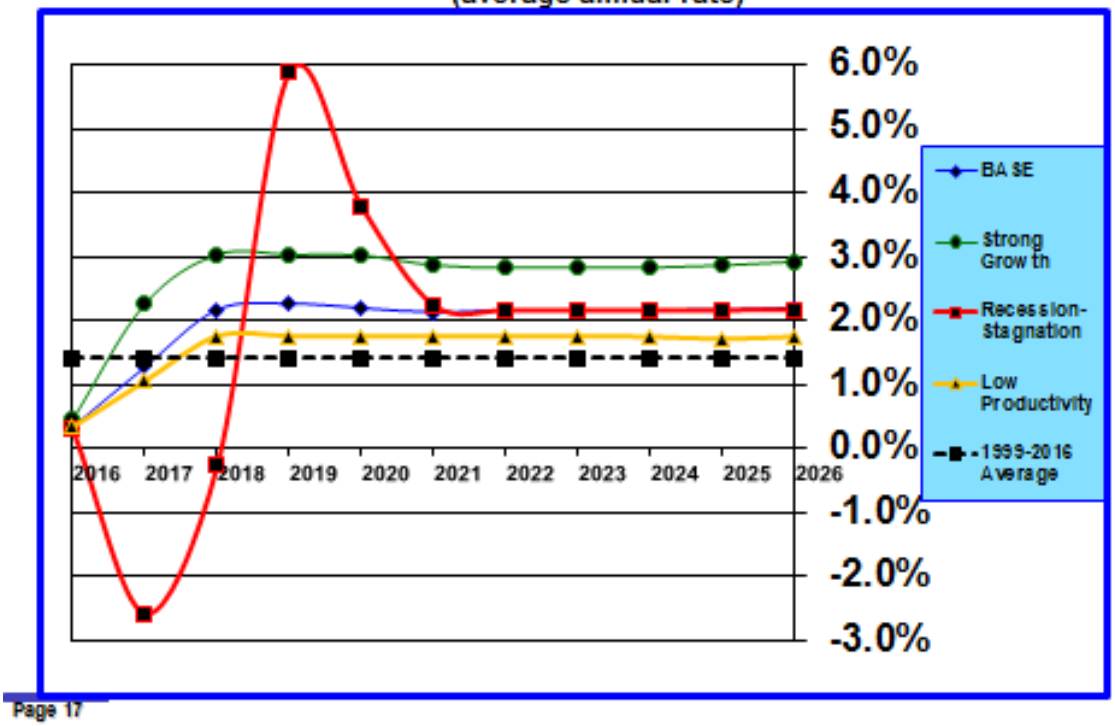
CHART 9B – Real Private Investment Growth

(average annual rate)



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investments in productive activity.

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 2016 to 2026. **Chart 10A** compares my "**BASE**" scenario real government investment growth projections with those of **B of A**, and **GS**, as well as with the 18-year average growth from 1999 through the third quarter of 2016. **Chart 10B** compares real government investment growth projections for my four scenarios.

Table 10
Government Real Investment Growth: 2016-2026
(***percentages***)

	BASE	Strong Growth	Recession-Stagnation	Low Productivity	GS	B of A
Government Investment						
2016	.82	.82	.73	.79	.82	.80
2017	1.20	1.20	-1.01	.66	1.14	.74
2018	3.56	3.56	.00	.90	2.05	
2019	2.22	2.22	1.76	.90	1.91	
2020	.75	.75	.95	.90	1.69	
2021	.42	.42	.75	.90		
2026	1.15	1.15	.76	.96		
2016-2020	1.71	1.71	.49	.83		
2021-2026	.88	.88	.74	.94		
2016-2026	1.25	1.25	.63	.89		
1999-2016 Average	1.05	1.05	1.05	1.05	1.05	1.05

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.

In recent years government real investment growth has averaged a disappointing 1.05 percent annually, less than half of its longer term average. 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. Even the prospect of a Trump-inspired federal infrastructure spending program seems unlikely to move the needle very much.

CHART 10A – Real Government Investment Growth

(average annual rate)

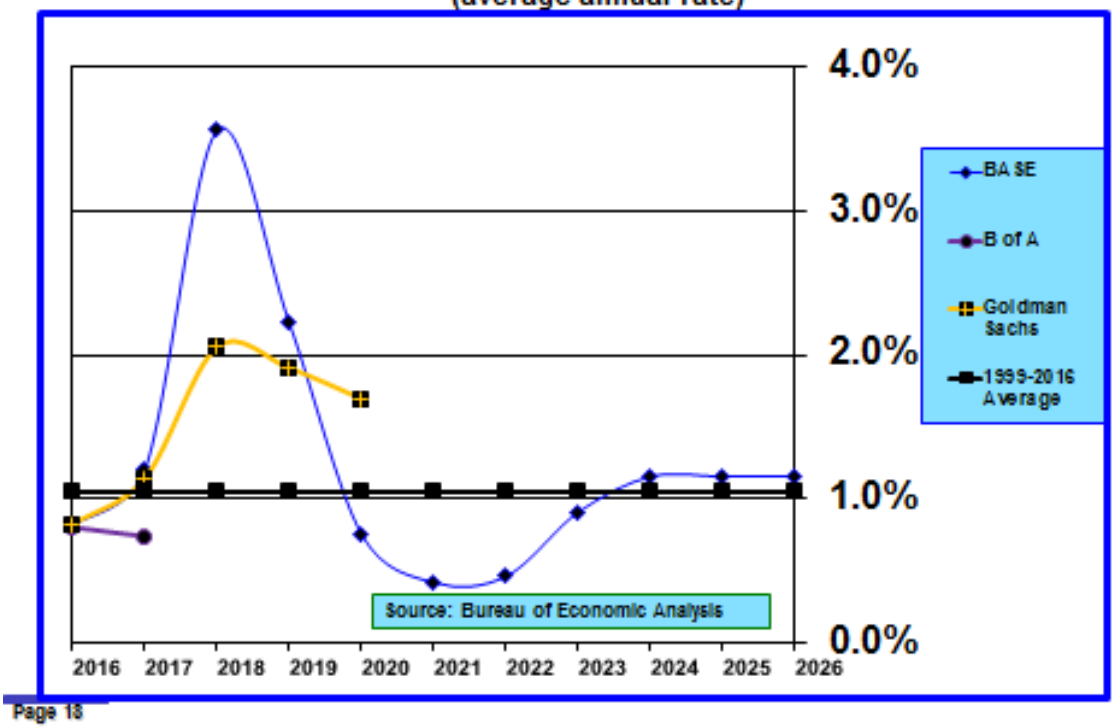

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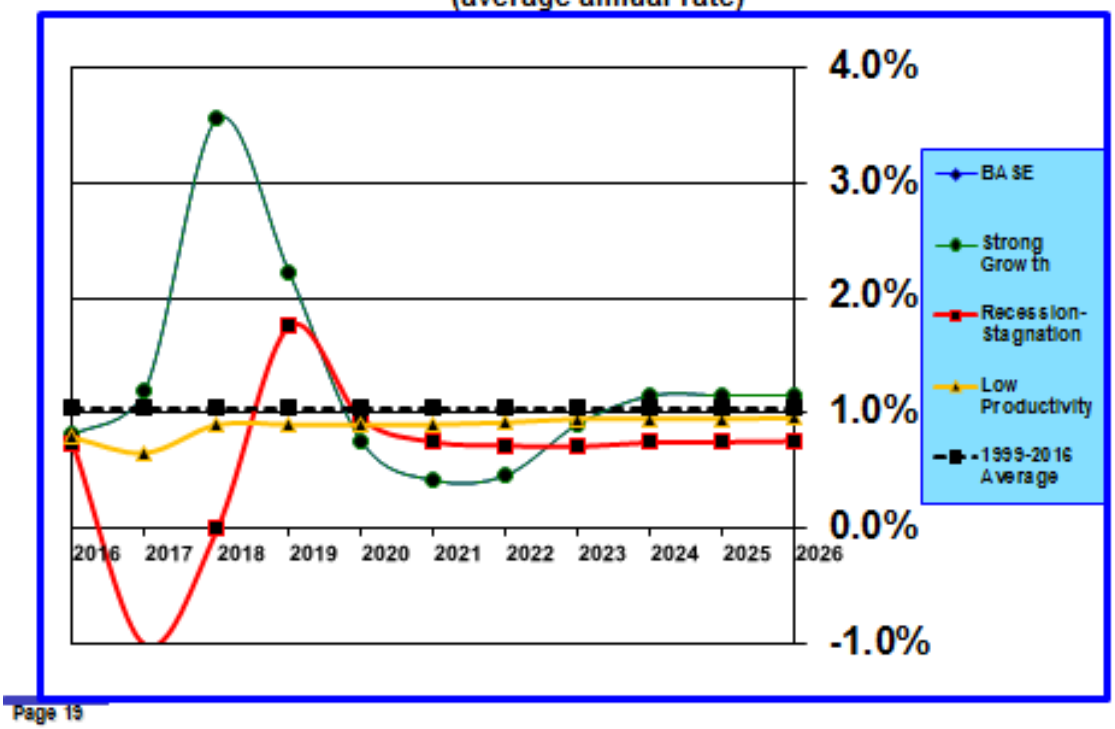
CHART 10B – Real Government Investment Growth

(average annual rate)



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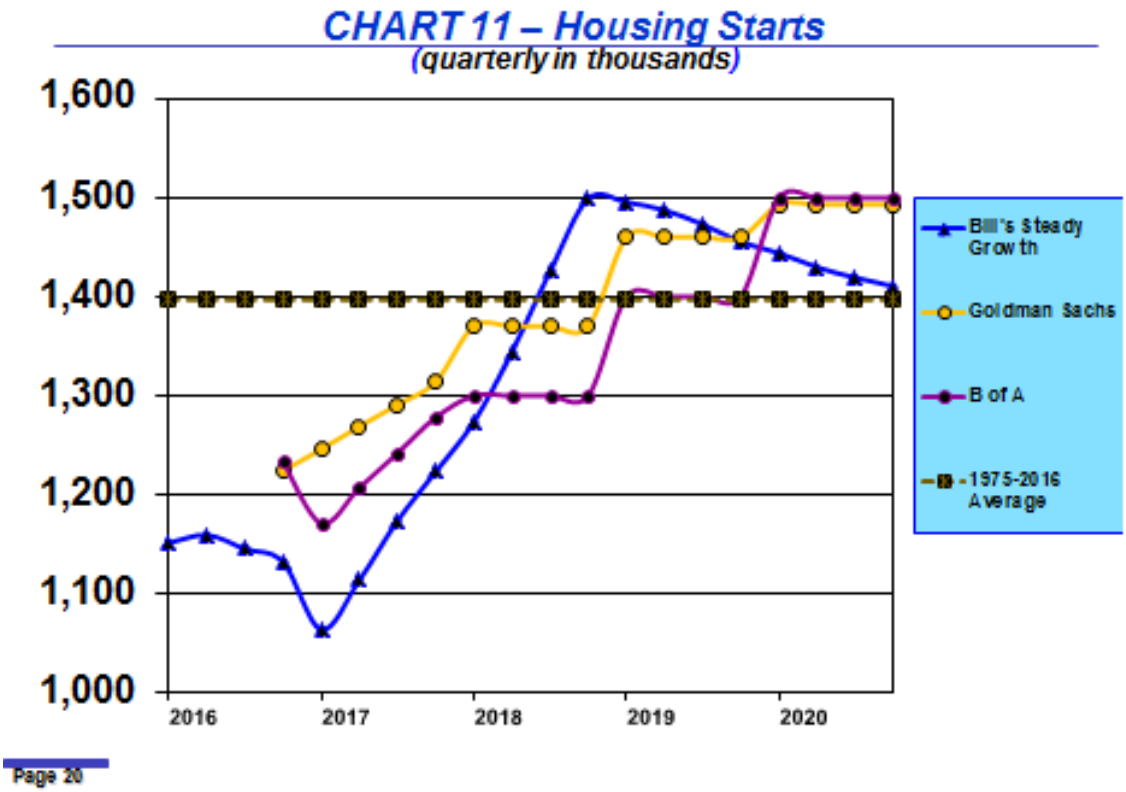
11. Housing Starts

Table 11 shows annual average housing starts. **Chart 11** shows annual projections from 2016 to 2021.

Table 11
Housing Starts for 2016-2021
(***thousands***)

	BASE	GS	B of A
2016	1,043	1,224	1,234
2017	1,238	1,314	1,278
2018	1,505	1,370	1,300
2019	1,453	1,460	1,400
2020	1,408	1.493	1.500
2021	1,407		1,500
Average 1975-2015	1,397	1,397	1,397



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 41-year historical average. Housing starts are running about 1.25 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 2016 to 2026. **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.

Projections of growth in the nominal rate of consumer spending depend heavily on underlying estimates of PCE consumer price inflation and employment growth. Projected inflation depends 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.

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 2016 to 2026 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 3.50 percent to 3.75 percent in the **BASE** scenario. Over the longer run other analysts converge to this range, although it takes them a while to get there. That is because they are more optimistic about employment growth than appears warranted by a careful analysis of labor market dynamics and trends.

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 2016 to 2026. **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 2.0 percent over time in all cases. That is because consumer spending is a fixed proportion of real GDP and,

CHART 12A – Nominal Consumer Spending Growth

(average annual rate)

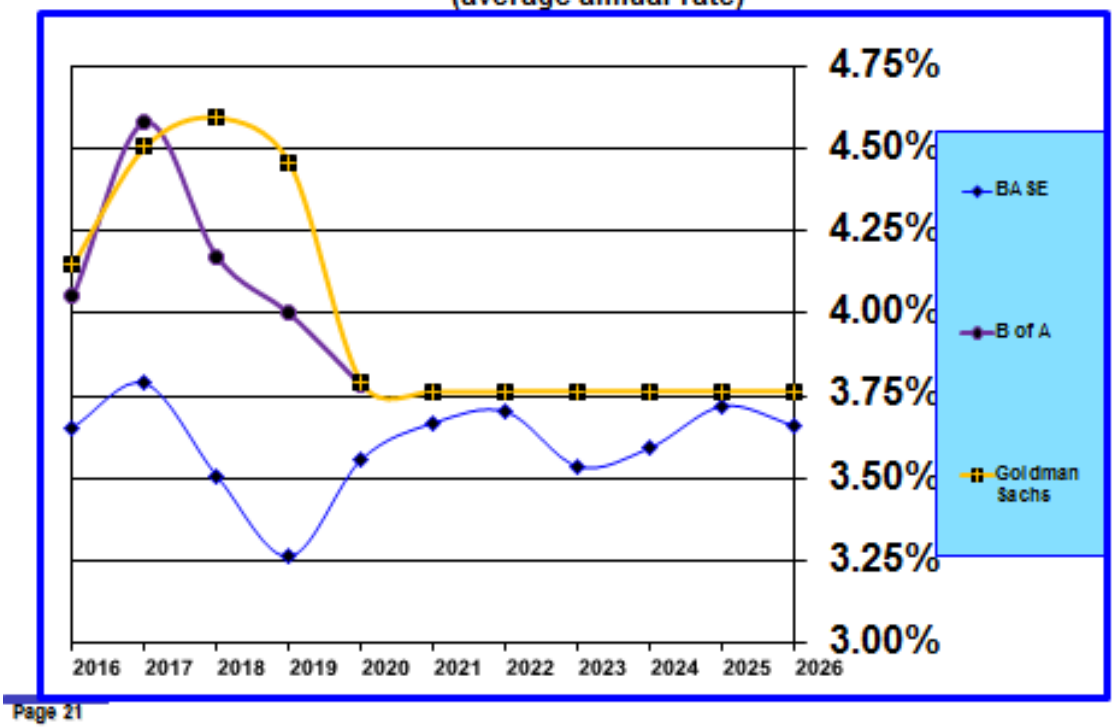


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CHART 12B – Nominal Consumer Spending Growth

(average annual rate)

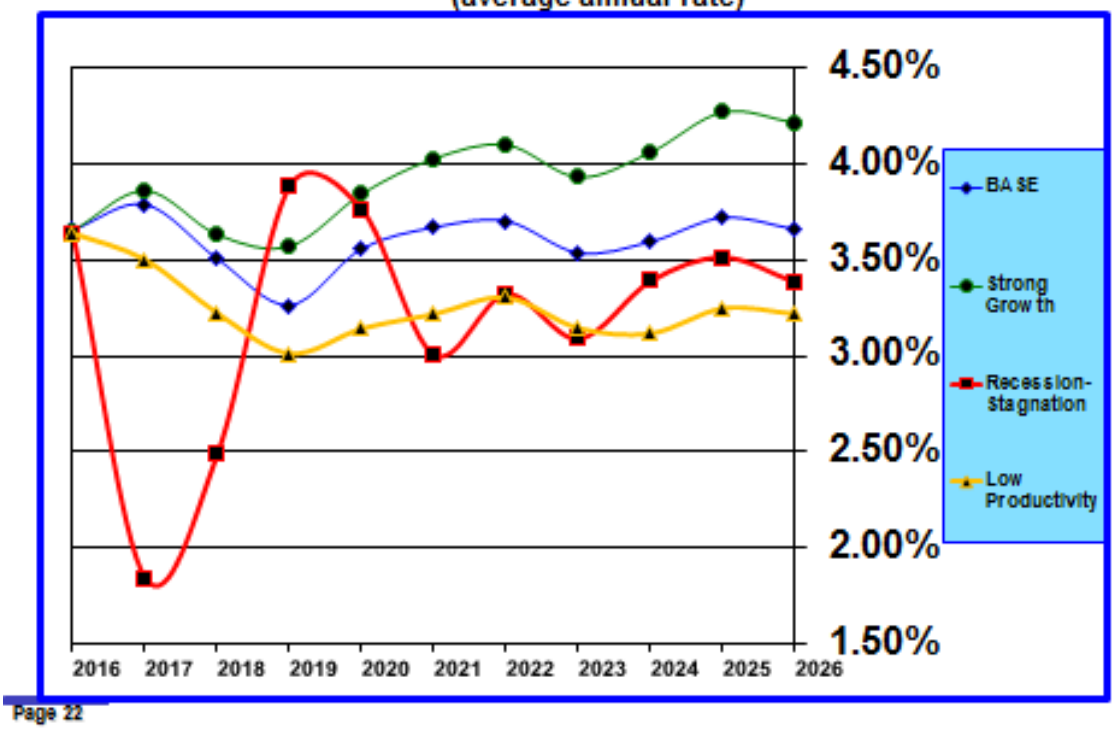

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CHART 13A – Real Consumer Spending Growth

(average annual rate)

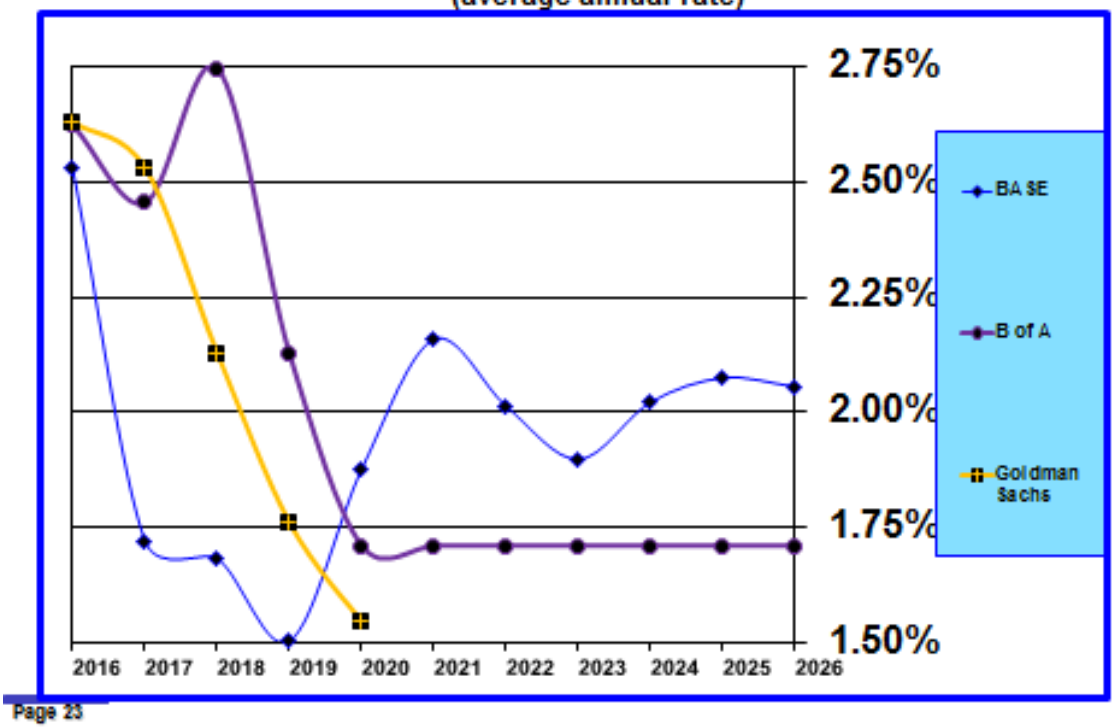

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CHART 13B – Real Consumer Spending Growth

(average annual rate)

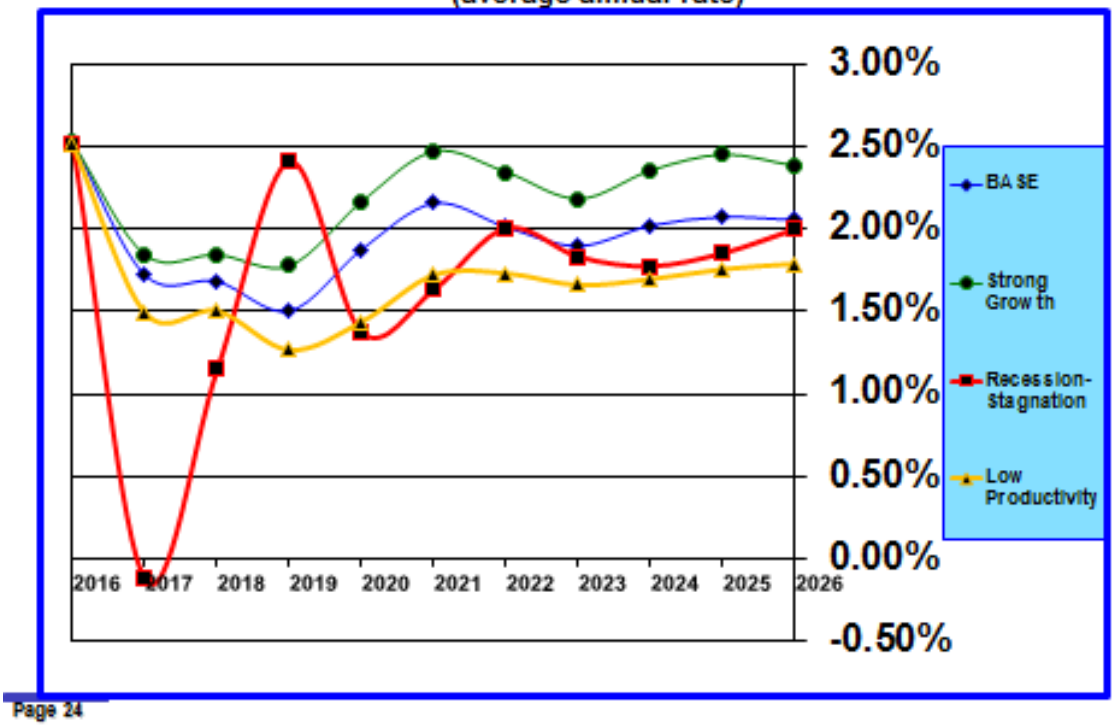

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Table 12
Nominal Consumer Spending Growth: 2016-2026
(***percentages***)

	BASE	Strong Growth	Recession-Stagnation	Low Productivity	GS	B of A
2016	3.65	3.65	3.64	3.64	4.05	4.15
2017	3.79	3.86	1.85	3.50	4.58	4.51
2018	3.51	3.63	2.49	3.22	4.17	4.59
2019	3.26	3.57	3.88	3.01	4.00	4.46
2020	3.56	3.84	3.76	3.14	3.78	3.79
2021	3.67	4.03	3.01	3.20		3.76
2022	3.70	4.10	3.32	3.30		3.76
2023	3.54	3.93	3.09	3.14		3.76
2024	3.59	4.06	3.39	3.12		3.76
2025	3.72	4.27	3.51	3.25		3.76
2026	3.66	4.21	3.38	3.22		3.76
2016-2020	3.55	3.71	3.12	3.30	4.12	4.30
2021-2026	3.65	4.10	3.28	3.21		3.76
2016-2026	3.60	3.92	3.21	3.25		4.01

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 or slightly below 2.0 percent over time and, if this occurs, the rate of growth for 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 14 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:

- **Employment and output gaps** — large gaps depress inflation; both gaps were very large following

CHART 14A – Core PCE Inflation

(average annual rate)

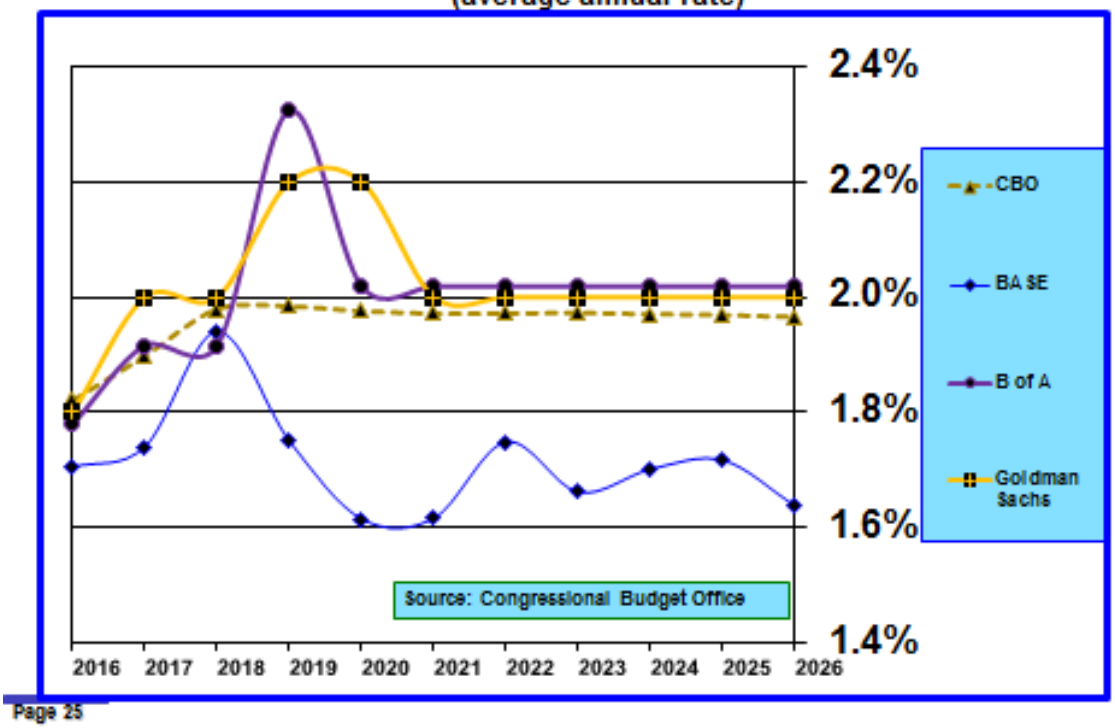

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CHART 14B – Core PCE Inflation

(average annual rate)

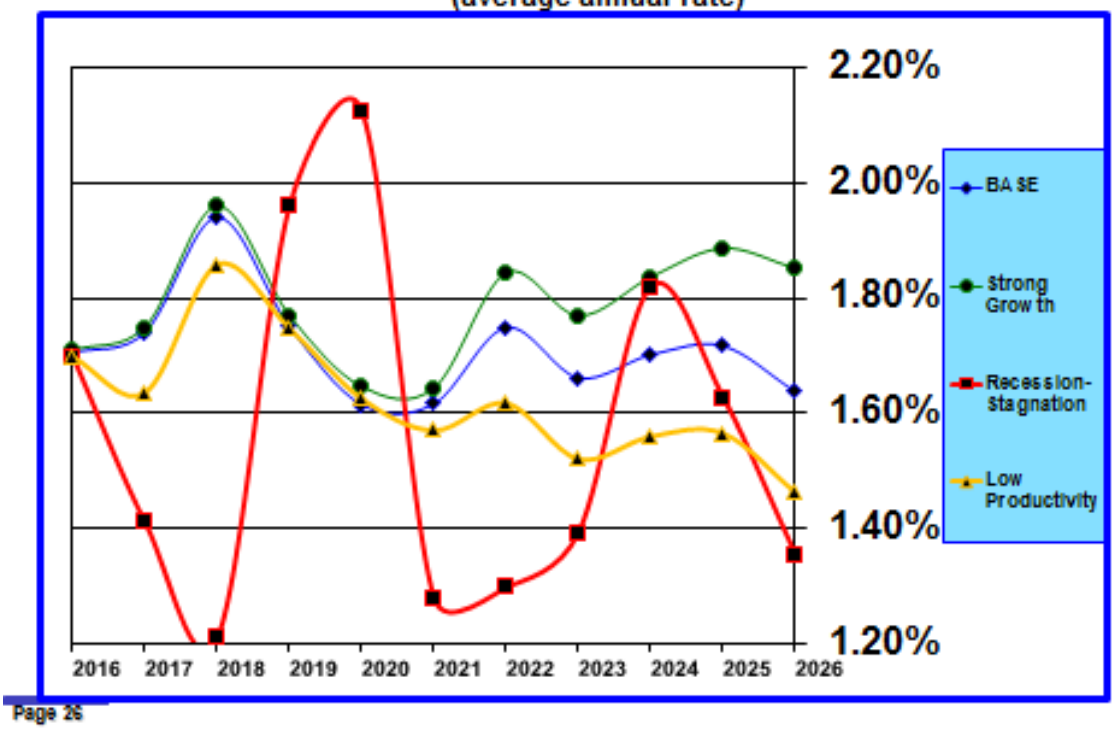

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Table 13
Real Consumer Spending Growth: 2016-2026
(***percentages***)

	BASE	Strong Growth	Recession-Stagnation	Low Productivity	GS	B of A
2016	2.53	2.52	2.51	2.51	2.63	2.62
2017	1.72	1.85	-.13	1.49	2.53	2.45
2018	1.68	1.85	1.15	1.50	2.13	2.75
2019	1.50	1.78	2.41	1.27	1.76	2.13
2020	1.88	2.17	1.37	1.44	1.55	1.71
2021	2.18	2.47	1.63	1.72		1.71
2022	2.01	2.35	2.01	1.73		1.71
2023	1.90	2.18	1.83	1.66		1.71
2024	2.02	2.36	1.78	1.70		1.71
2025	2.08	2.45	1.86	1.76		1.71
2026	2.06	2.39	2.00	1.79		1.71
2016-2020	1.86	2.03	1.46	1.64	2.12	2.33
2021-2026	2.04	2.37	1.85	1.73		1.71
2016-2026	1.96	2.22	1.68	1.69		1.99

the Great Recession but are now almost closed

- **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, but not statistically significant, 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

- **Fiscal policy** — depressed federal, state and local investment spending reduces aggregate demand and puts downward pressure on inflation; Trump Administration policies may reverse this, which is what the market seems to be expecting

- **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, raises productivity and

Table 14
Core PCE Inflation: 2016-2026
(***percentages***)

	BASE	Strong Growth	Recession-Stagnation	Low Productivity	GS	B of A	CBO
2016	1.71	1.71	1.70	1.70	1.80	1.78	1.82
2017	1.74	1.75	1.41	1.64	2.00	1.92	1.90
2018	1.94	1.96	1.21	1.86	2.00	1.92	1.98
2019	1.75	1.77	1.96	1.75	2.20	2.32	1.98
2020	1.62	1.65	2.13	1.63	2.20	2.02	1.98
2021	1.62	1.64	1.28	1.57	2.00	2.02	1.97
2022	1.75	1.84	1.30	1.62	2.00	2.02	1.97
2023	1.66	1.77	1.39	1.52	2.00	2.02	1.97
2024	1.70	1.84	1.82	1.56	2.00	2.02	1.97
2025	1.72	1.89	1.63	1.57	2.00	2.02	1.97
2026	1.64	1.85	1.36	1.46	2.00	2.02	1.97
2016-2020	1.75	1.77	1.68	1.71	2.04	1.99	1.93
2021-2026	1.68	1.82	1.46	1.55	2.00	2.02	1.97
2016-2026	1.71	1.80	1.56	1.62	2.02	2.00	1.95

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., supply exceeds demand and depresses prices

Reflecting all of these factors, core PCE inflation is currently 1.74 percent. As can be seen in **Table 14** and **Charts 14A** and **14B**, **CBO**, the **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 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 falling short of the **FOMC**'s 2.0 percent target for 20 years is not a ringing endorsement of a belief in the ability of the **FOMC** to actually engineer a long-term inflation rate of 2.0 percent.

My projections indicate that inflation will continue to trend slightly below the 2.0 percent target over

the next ten years.

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 **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 slack in the economy has largely disappeared.

15. Federal Funds Rate

Table 15 shows annual end-of-year projections for the federal funds rate. **Chart 15A1** compares my **BASE** scenario end-of-year (2016-2026) federal funds rate projections with those of **CBO**, **B of A**, **GS** and the Federal Open Market Committee (**FOMC**) projections. **Chart 15A2** compares my **BASE** scenario quarterly (2016-2020) federal funds rate projections with those of **CBO**, **B of A**, **GS** and **FOMC** projections. **Chart 15B** compares federal funds rate projections for my four scenarios.

As can be seen in **Charts 15A1** and **15A2**, **GS**'s and the **FOMC**'s federal funds rate projections are similar in the short-run but **GS** is about 25 basis points higher in the long run, which is really not a significant difference. **B of A**'s projections are a bit lower than the **FOMC**'s, particularly in the short run. Projections of the long-term equilibrium federal funds rate are tightly clustered for all three with **GS** at 3.25 percent, the **FOMC** at an average of 2.95 percent and **B of A** at 2.75 percent. **B of A** expects only one increase in the federal funds rate during 2017 while both the **FOMC** and **GS** are projecting three increases.

The federal funds rate rises very gradually over the next two years in my **BASE** and **Strong Growth** scenarios and is well below other forecasts and the **FOMC**'s projections — basically one to two increases in 2017 and one additional increase in 2018. This outcome depends primarily on my more pessimistic outlook for employment growth and inflation.

Chart 15B shows my long-term equilibrium level of the federal funds rate is between 2.00 percent and 2.25 percent in the **BASE** scenario, but this range rises to 3.25 percent to 3.50 percent in the **Strong Growth** scenario. The federal funds rate is mired at a very low level for the entire ten-year period in my two alternative **Recession-Stagnation** and **Low Productivity** scenarios.

You might recall that a year 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. The **FOMC** has stated repeatedly that monetary policy is data dependent and what happened during 2016 provides ample evidence. So, while my projections are more pessimistic than the consensus, they have been more accurate in the past and that might turn out to be the case again in 2017. But, it doesn't pay to be too smug because conditions can change — the global economy is dynamic — and a more aggressive rate increase pathway is quite possible. On the other hand, notwithstanding the rather limited recent improvement in the global economy, the balance of risks still seems to me to point in the direction of slower growth than expected and thus less pressure to increase interest rates. And, in spite of recent rekindled fears of rising inflation, there is little evidence to support an upside breakout in inflation anytime soon.

As U.S. monetary tightens and U.S. fiscal policy eases, upward pressure on interest rates is probable,

CHART 15A1 – Federal Funds Rate

(rate at the end of the year)

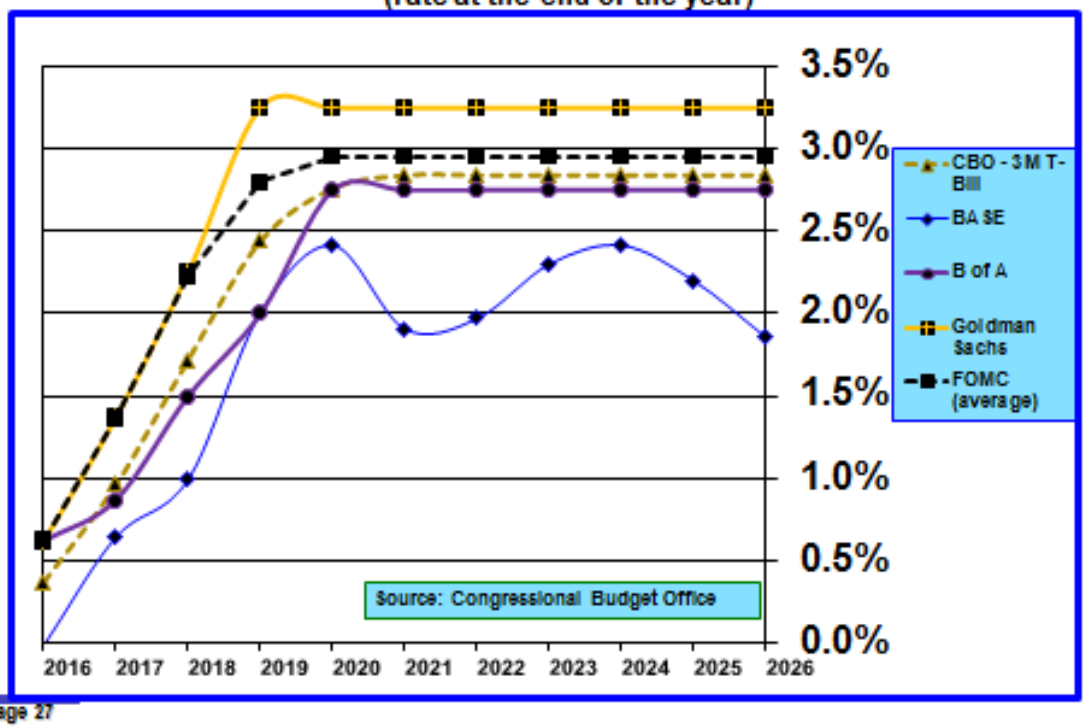

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CHART 15A2 – Federal Funds Rate Forecasts

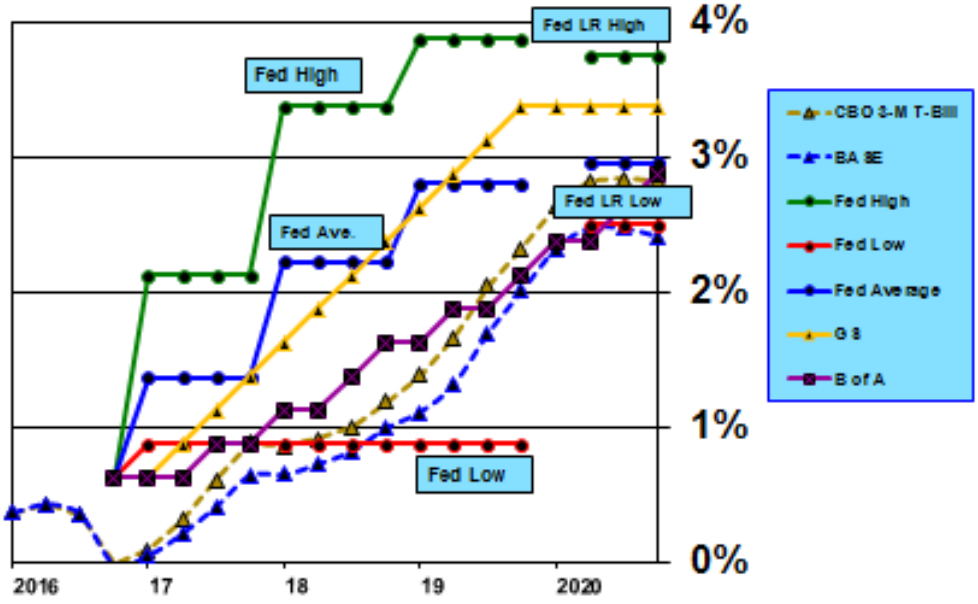

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Table 15
Federal Funds Rate: 2016-2026
(***percentage rate at year-end***)

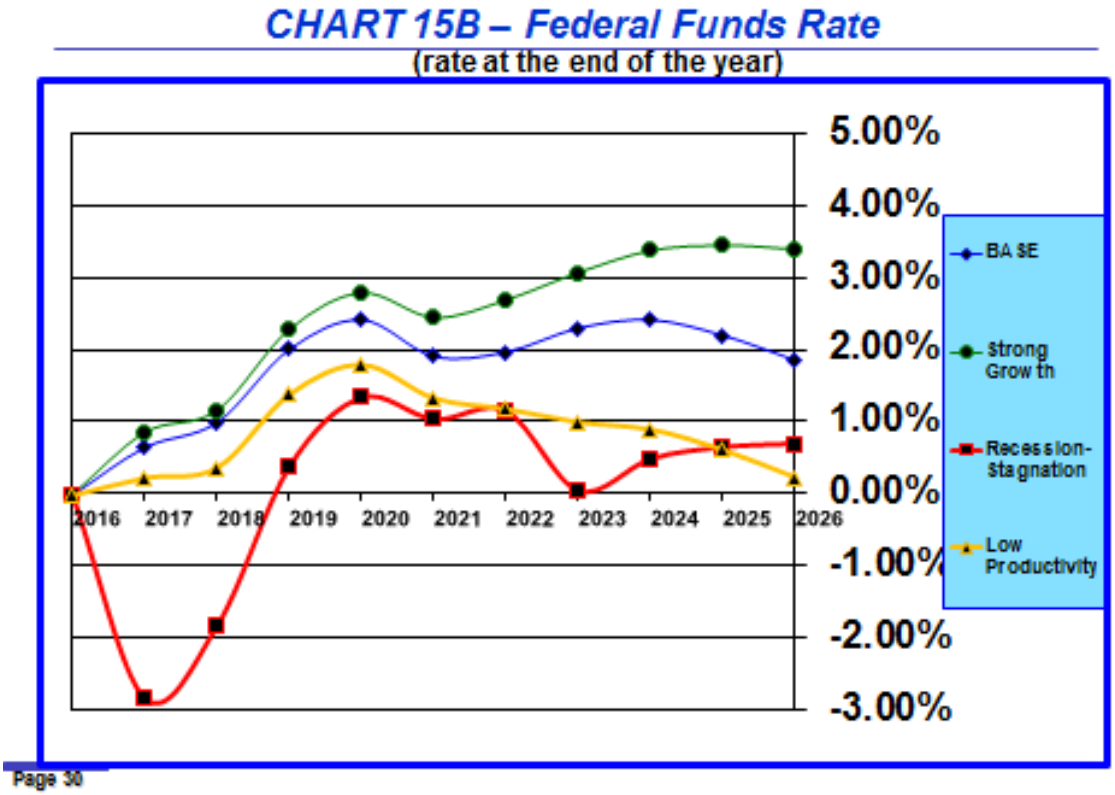
	BASE	Strong Growth	Recession-Stagnation	Low Productivity	GS	B of A	CBO*	FOMC
2016	-.02	-.01	-.03	-.02	.62	.62	.37	.62
2017	.64	.85	-2.84	.22	1.37	.87	.96	1.37
2018	.99	1.16	-1.83	.36	2.25	1.50	1.72	2.23
2019	2.01	2.29	.38	1.38	3.25	2.00	2.44	2.80
2020	2.41	2.79	1.34	1.79	3.25	2.75	2.76	2.95
2021	1.91	2.45	1.04	1.33	3.25	2.75	2.84	2.95
2022	1.97	2.69	1.15	1.18	3.25	2.75	2.84	2.95
2023	2.30	3.07	.04	1.00	3.25	2.75	2.84	2.95
2024	2.41	3.38	.49	.89	3.25	2.75	2.84	2.95
2025	2.20	3.45	.65	.61	3.25	2.75	2.84	2.95
2026	1.85	3.39	.70	.23	3.25	2.75	2.84	2.95
2016-20	1.21	1.42	-.60	.75	2.15	1.65	1.93	2.00
2021-26	2.11	3.07	.68	.87	3.25	2.84	1.97	2.95
2016-26	1.70	2.32	.10	.82	2.75	2.30	1.95	2.52
*CBO rate is the 3-month Treasury bill								

but that pressure is likely to be self-limiting because a strengthening dollar will set in motion negative feedback loops that limit inflation and contain growth potential.

16. 10-Year Treasury Yield

Table 16 shows projections for the end-of-year ten-year Treasury 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 inflation projections for my four scenarios.

As can be seen in **Table 16** and **Chart 16A**, all forecasts project a gradual rise in the 10-year Treasury yield from the recent level of 2.50 percent to a range of 2.75 to 3.75 percent by 2020. After 2020 projections in **Chart 16A**.indicate that the 10-year Treasury yield remains relatively stable.



Similar to my projections for the federal funds rate, my projections for the 10-year Treasury yield are 50 to 100 basis points lower than other analysts' estimates. There are two explanations for the difference. The first has to do with my inflation projections which are about 30 basis points lower in the long run than others expect. The second reason is that I expect the real rate of interest to be lower because of lower productivity growth. If inflation and productivity rise more than I project, then the higher long-term projections of the 10-year Treasury yield of others will turn out to be more accurate.

17. Short-Term Neutral Rate of Interest

Table 17 shows projections for the implied equilibrium neutral short-term rate of interest. **Chart 17** compares annual projections for my four scenarios. Equilibrium estimates of the neutral short-term rate of interest for **GS**, **B of A**, and **FOMC** are also shown in **Table 17** and **Chart 17**.

The equilibrium value of the short-term neutral rate assumes full employment and an economy that is functioning at its full potential. The equilibrium value of the short-run neutral rate equals an unobservable real rate of interest plus a long-run expected rate of inflation. The actual neutral 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. As can be seen in **Table 17** and **Chart 17**, it will take about another three years until 2020 to reach the equilibrium short-term rate, even though the employment gap has largely closed and the real GDP output gap is nearly closed. Or put a little differently, even though the economy is approaching full capacity, it is still fragile and vulnerable to adverse shocks.

CHART 16A – 10-Year Treasury Yield

(rate at the end of the year)

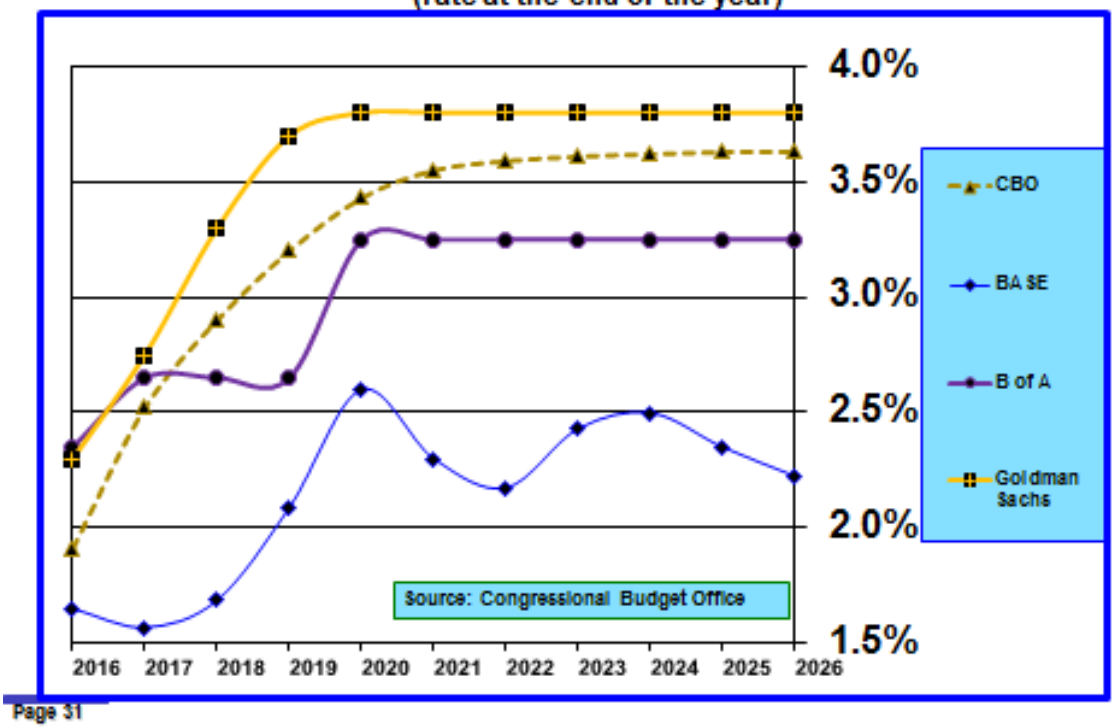


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CHART 16B – 10-Year Treasury Yield

(rate at the end of the year)

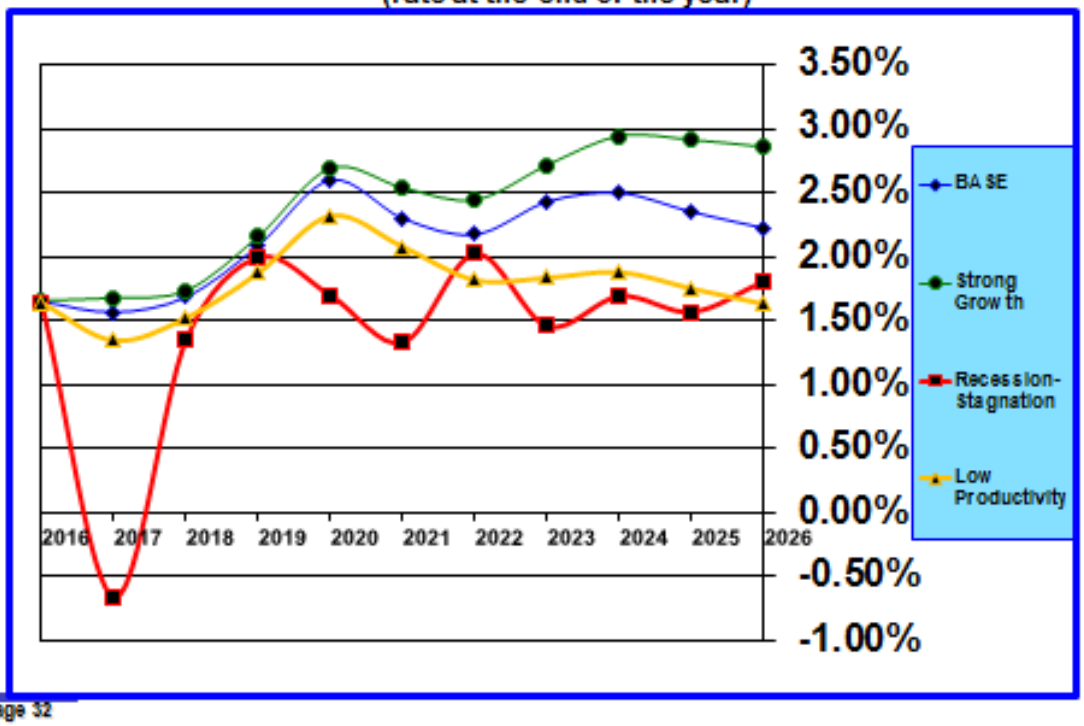

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Table 16
Ten-Year Treasury Yield: 2016-2026
(***percentage rate at year-end***)

	BASE	Strong Growth	Recession-Stagnation	Low Productivity	GS	B of A	CBO
2016	1.65	1.66	1.63	1.64	2.30	2.35	1.91
2017	1.57	1.68	-.66	1.35	2.75	2.65	2.52
2018	1.69	1.74	1.36	1.52	3.30	2.65	2.90
2019	2.09	2.16	2.00	1.87	3.70	2.65	3.20
2020	2.60	2.69	1.70	2.32	3.80	3.25	3.43
2021	2.30	2.54	1.33	2.08	3.80	3.25	3.55
2022	2.17	2.44	2.03	1.82	3.80	3.25	3.59
2023	2.43	2.72	1.46	1.84	3.80	3.25	3.61
2024	2.50	2.94	1.69	1.88	3.80	3.25	3.62
2025	2.35	2.91	1.57	1.75	3.80	3.25	3.63
2026	2.22	2.86	1.81	1.63	3.80	3.25	3.63
2016-20	1.92	1.99	1.21	1.74	3.17	2.71	2.79
2021-26	2.33	2.74	1.65	1.83	3.80	3.25	3.61
2016-26	2.14	2.39	1.45	1.79	3.51	3.00	3.24

Thus, the neutral short-term rate needs to rise towards its equilibrium level gradually over the next three years. This is the historical cyclical pattern and this is the intended **FOMC** policy, as revealed through the dot-plot in its Summary of Economic Projections.

A year ago the estimated real neutral short-term rate of interest, according to the Williams-Laubach model, was -0.2 percent. It is probably a little higher now but still close to zero. The nominal neutral short-term rate can be derived by adding the estimate of the real rate and the estimate of 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 **FOMC**'s long-run inflation target, then the current nominal neutral rate would be about 2.0 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 short-term neutral 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 neutral short-term rate and tight when it is greater. Since the current federal funds policy rate is .0.50 to 0.75 percent and the current neutral nominal rate is between 1.70 percent (assuming a current inflation rate of 1.7 percent) and 2.00 percent (assuming a long-term expected inflation rate of 2.0 percent), monetary

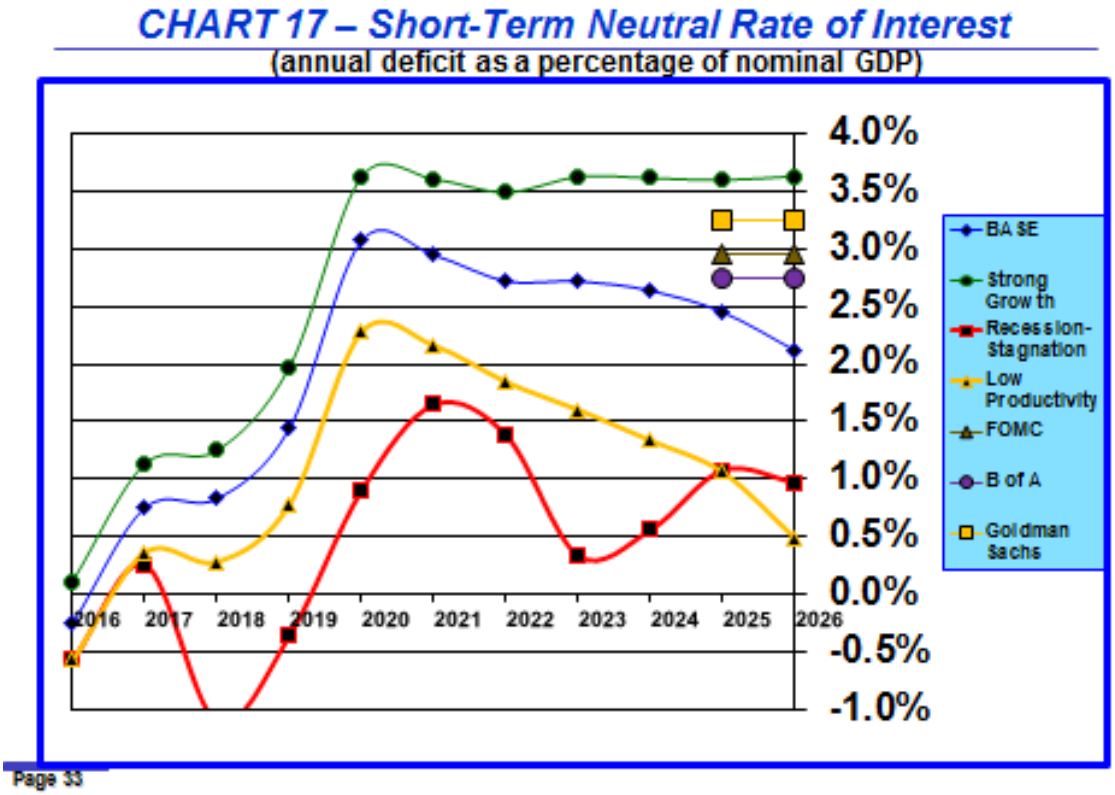
Table 17
Short-Term Neutral Rate of Interest for 2016-2026
(***percentages***)

	BASE	Strong Growth	Recession-Stagnation	Low Productivity	GS	B of A	FOMC
Assumptions							
Labor Growth	.52	.62	.44	.44			
Productivity	1.62	1.83	1.53	1.42			
Inflation	1.67	1.80	1.46	1.55			
2016	-.25	.12	-.57	-.57			
2017	.75	1.14	.26	.37			
2018	.83	1.25	-1.11	.28			
2019	1.44	1.97	-.36	.78			
2020	3.07	3.63	.91	2.28			
2021	2.95	3.61	1.65	2.16			
2022	2.72	3.49	1.38	1.84			
2023	2.72	3.63	.34	1.60			
2024	2.64	3.61	.56	1.34			
2025	2.45	3.60	1.08	1.06			
2026	2.12	3.63	.97	.49			
Average Nominal 2021-26	2.60	3.59*	1.00	1.42			
Average Real 2021-26	.93	1.79	-.46	-.13			
Neutral Nominal Inflation = 2.0	2.86	3.75	1.43	1.78	3.25	2.75	2.91
Neutral Real Inflation = 2.0	.86	1.75	-.57	-.22	1.25	.75	.91

***The neutral short-term interest rate in the **Strong Growth** scenario exceeds the neutral long-term interest rate for the same scenario shown in **Table 18** below. Normally, the reverse should be true as the long-term neutral rate includes an additional term premium. The result shown here is not a statistical fluke but the logical result of the economy operating almost 1 percent above full employment capacity in the **Strong Growth** scenario.

policy is easy. Because the economy is nearing full capacity but is still vulnerable to adverse shocks, an accommodative monetary policy remains appropriate. The **FOMC** is explicit in its statement of pointing this out.

Because population growth and productivity have both declined below their historical trend levels 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 .75 to 1.25 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 2.75 to 3.25 percent. If this analysis is a reasonable approximation of underlying unobservable phenomena, it implies that the **FOMC** will eventually raise the federal funds rate to between 2.75 and 3.25 percent. Of course, if the **FOMC** determines in the future that the economy is operating above full capacity and inflation above the 2.00 percent target becomes a significant and persistent risk, the **FOMC** would raise the federal funds rate above the full employment equilibrium level, thus instituting a tight monetary policy with the intent to slow economic activity and eliminate upward pressure on inflation.

You can see in Chart 17 that the projected short-term neutral rate converges over time to an equilibrium value between 2.75 percent and 3.25 percent. **B of A** is at 2.75 percent, **GS** projects 3.25 percent and the collective assumption of **FOMC** members is 2.95 percent.

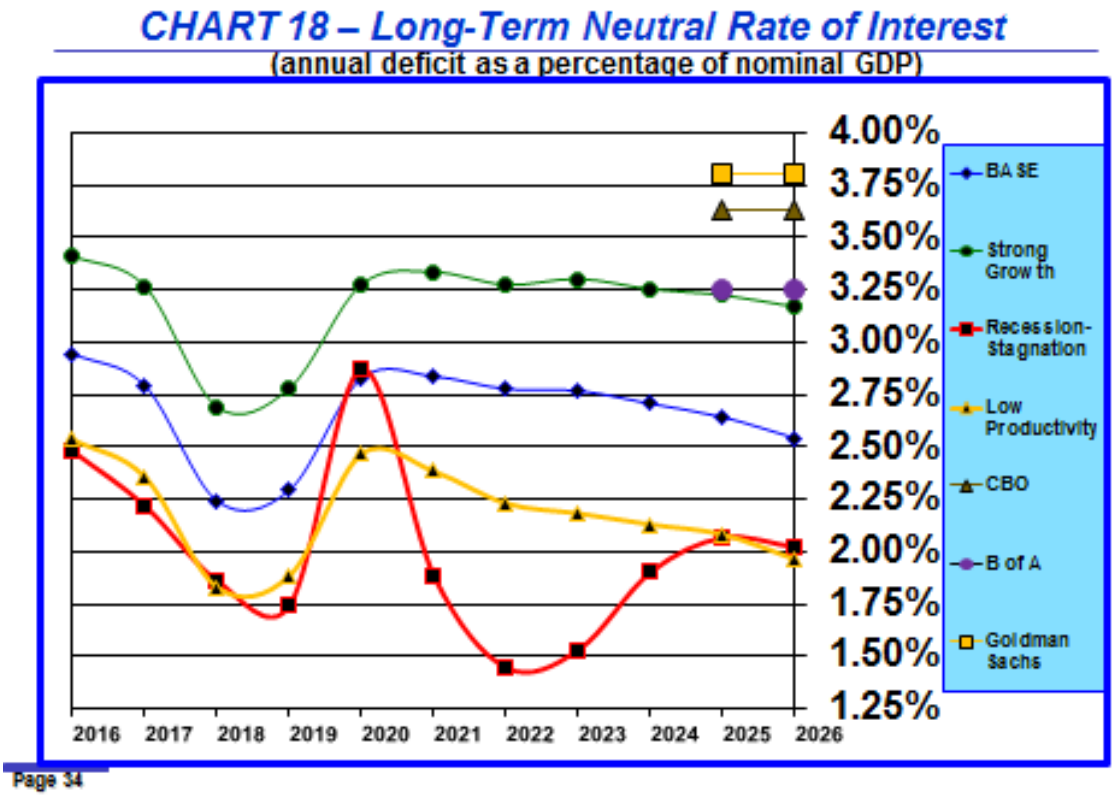
My **BASE** case scenario equilibrium short-term rate is about 2.6 percent because my long-term inflation projection falls short of 2.0 percent. The real rate component embedded in my projection of the equilibrium short-term rate is 93 basis points (it would be 86 basis points if inflation is higher at 2.0 percent), which differs little from **B of A**'s implicit estimate of 75 basis points.

Because **GS** and **B of A** both expect long-term inflation to be 2.0 percent, **GS**'s higher projection of the short-term equilibrium neutral rate is due solely to its expectation that the long-rate neutral real rate of interest will be 1.25 percent compared to **B of A**'s implicit assumption of 0.75 percent.

Following the same logic, the **FOMC**'s long-term equilibrium short-term federal funds rate of 2.95 percent and long-term inflation rate of 2.0 percent implies that the underlying real equilibrium value of the neutral federal funds rate is 95 basis points, which is somewhat but not a lot greater than the current level of approximately zero.

18. Long-Term Neutral Rate of Interest

Table 18 shows projections for the implied equilibrium neutral long-term rate of interest. **Chart 18** compares annual projections for my four scenarios. Equilibrium estimates of the neutral short-term rate of interest for **GS**, **B of A**, **CBO** are also shown in **Table 18** and **Chart 18**.



Both the short-term and long-term neutral rates of interest are determined by expected inflation and the real rate of interest. The long-term neutral rate is more stable over time because it embodies market expectations of the pathway and timing of adjustments in the short-term neutral rate as the economy evolves from a situation of slack to full capacity equilibrium. This is why the yield curve is steep when there is ample slack in the economy and flattens as the economy evolves toward realizing its full equilibrium potential. At the risk of oversimplifying a bit, when the economy reaches a sustainable full employment equilibrium, the long-term neutral rate should exceed the short-term neutral rate by the amount of the term premium, which compensates the holders of long-term assets for interest-rate volatility and uncertainty about the stability of inflation and productivity over long periods of time.

By comparing **Charts 17** and **18** you will see that **GS** and **B of A** believe the term-premium at

Table 18
Long-Term Neutral Rate of Interest for 2016-2026
(***percentages***)

	BASE	Strong Growth	Recession-Stagnation	Low Productivity	GS	B of A	CBO
Assumptions							
Labor Growth	.52	.62	.44	.44			
Productivity	1.62	1.83	1.53	1.42			
Inflation	1.67	1.80	1.46	1.55			
2016	2.95	3.41	2.48	2.54			
2017	2.79	3.27	2.22	2.36			
2018	2.24	2.69	1.86	1.83			
2019	2.29	2.78	1.74	1.89			
2020	2.83	3.28	2.87	2.47			
2021	2.84	3.34	1.88	2.38			
2022	2.78	3.27	1.45	2.23			
2023	2.77	3.30	1.53	2.18			
2024	2.71	3.25	1.90	2.13			
2025	2.64	3.23	2.07	2.08			
2026	2.54	3.17	2.02	1.96			
Average Nominal 2021-26	2.71	3.26*	1.81	2.16			
Average Real 2021-26	1.04	1.46	.35	.61			
Neutral Nominal Inflation = 2.0	2.87	3.57	2.65	2.87	3.80	3.25	3.63
Neutral Real Inflation = 2.0	1.23	1.57	.65	.87	1.80	1.25	1.66

*See note at the bottom of **Table 17**.

equilibrium is 50 to 55 basis points. However, they differ, as pointed out earlier, in their assumptions about the level of the unobservable short-term and long-term neutral rates. **GS** expects the long-term real rate to be 50 basis points higher.

My estimate of the long-term real neutral rate in the **BASE** scenario, assuming 2.0 percent inflation is about the same as **B of A**'s estimate. My estimate of the long-term real neutral rate is higher in the

Strong Growth scenario and is only slightly lower than **GS**'s higher estimate of the long-term neutral rate.

Persistently low productivity and weak employment growth depress the long-term neutral rate of interest in the **Recession-Stagnation** and **Low Productivity** scenarios by 50 basis points.

19. Federal Budget — Annual Deficit

Table 19 shows forecast values for the annual federal budget deficit. **Chart 19A** compares my **BASE** scenario annual federal deficit projections with those of **CBO**, **B of A**, and **GS**. **Chart 19B** compares the annual federal deficit projections for my four scenarios.

Table 19
Annual Federal Budget Deficit: 2016-2026
(***percentages***)

	BASE	Strong Growth	Recession-Stagnation	Low Productivity	GS	B of A	CBO
Annual Budget Deficit							
2016	-3.19	-3.19	-3.19	-3.19	-3.26	-3.21	-3.19
2017	-3.50	-3.34	-5.81	-3.82	-3.40	-4.24	-3.11
2018	-3.43	-3.30	-6.34	-3.99	-4.02	-4.07	-2.61
2019	-3.69	-3.41	-5.06	-4.20	-4.59	-3.60	-3.03
2020	-3.72	-3.39	-4.44	-4.25	-4.89	-3.80	-3.34
2021	-3.90	-3.47	-4.33	-4.44		-3.90	-3.63
2022	-4.38	-3.83	-4.66	-4.96		-4.00	-4.13
2023	-4.30	-3.75	-4.75	-5.07			-4.12
2024	-4.12	-3.49	-4.72	-5.09			-4.01
2025	-4.49	-3.64	-5.17	-5.57			-4.34
2026	-4.81	-3.72	-5.58	-5.99			-4.60

CBO's most recent deficit projections for the next 10 years, made in August, indicate that under current law the deficit should be relatively stable near 3.0 percent annually through fiscal year 2020 before gradually accelerating to 4.6 percent in 2026. Deficits begin creeping up in earnest after 2020 as the effects of demographic trends on social security and Medicare benefits payments accelerate. This pattern is evident in **Table 19** and **Chart 19A**.

The annual budget deficit in the **BASE** scenario, which adjusts **CBO**'s deficit projections to include

CHART 19A – Federal Budget Deficit

(annual deficit as a percentage of nominal GDP)

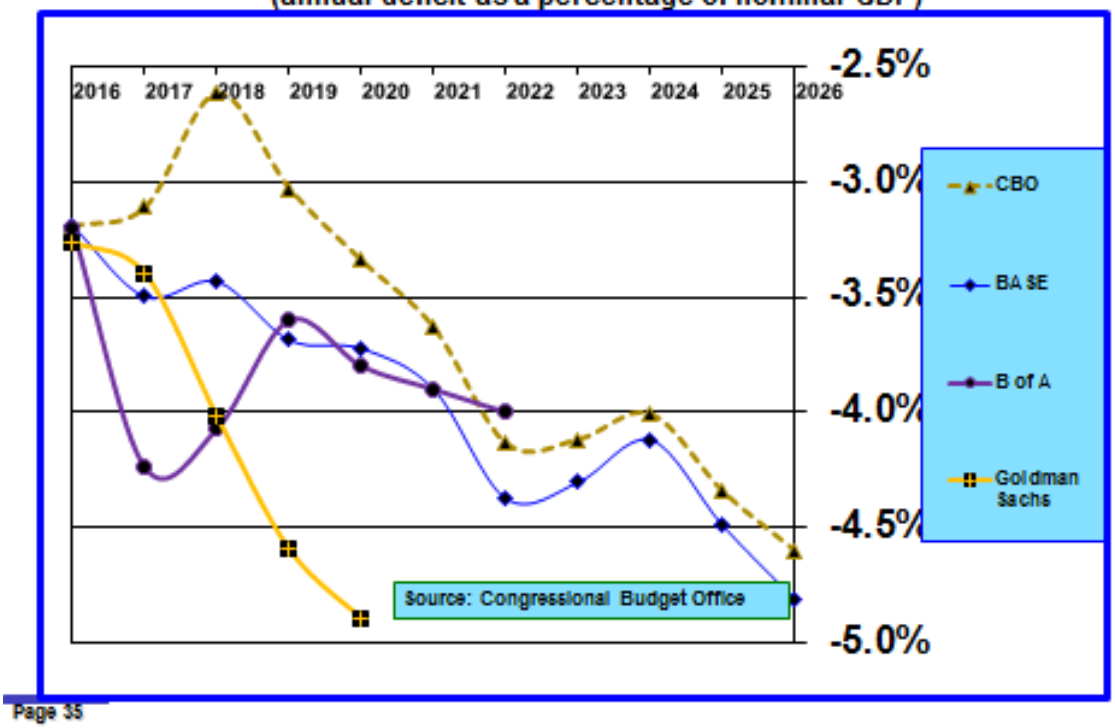


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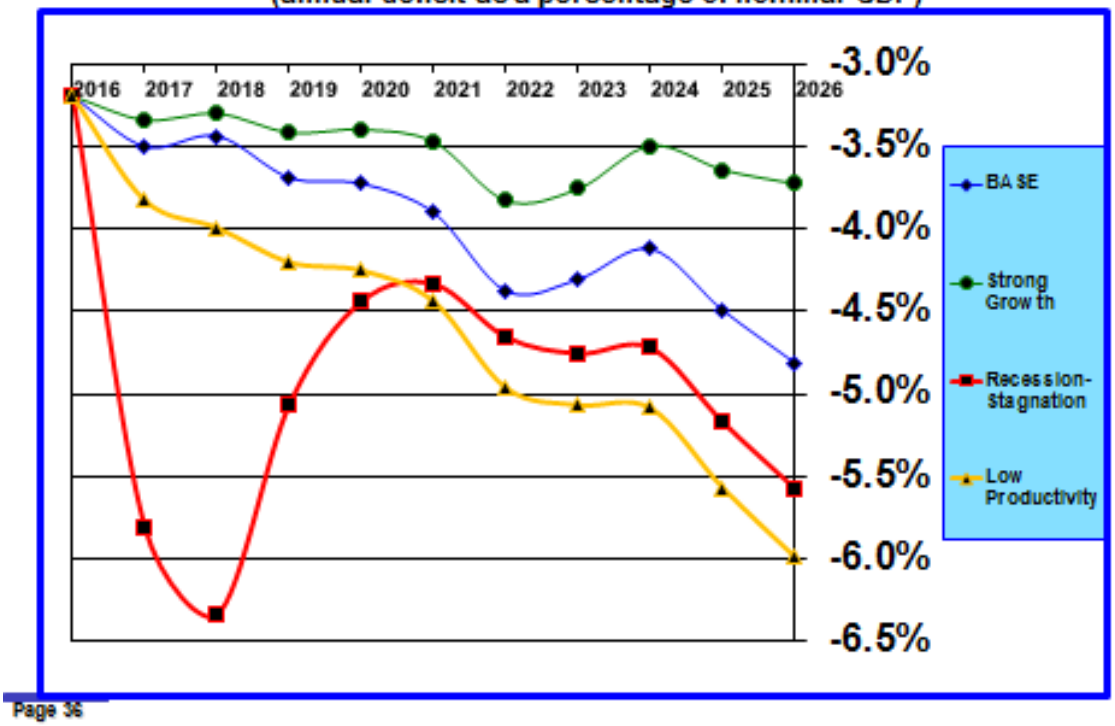
CHART 19B – Federal Budget Deficit

(annual deficit as a percentage of nominal GDP)



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an assumed $1.45 trillion fiscal stimulus program over the next 10 years, ramps up faster but is not much higher at 4.8 percent in 2026 than **CBO**'s 4.6 percent projection. Fiscal stimulus results in raising the deficit by 39 basis points in fiscal year 2017, 82 basis points in 2018 and 66 basis points in 2019. In following years, increases in the annual budget deficit are relatively modest as the lagged benefits of fiscal stimulus lead to increases in net tax revenues. Importantly, however, the assumed fiscal stimulus program does not fully pay for itself through higher net tax revenues.

However, if employment growth and productivity gains improve more, as assumed in the **Strong Growth** scenario, the annual budget deficit, after rising through 2020, stabilizes in a range of 3.5 percent to 3.7 percent and is 88 basis points lower by 2026 compared to **CBO**'s projections. While this is not exactly a wonderful outcome, it is not a particularly troublesome one.

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. If a fiscal stimulus program of the sort that is assumed in the **BASE** and **Strong Growth** scenarios were included in the **Recession-Stagnation** scenario, annual budget deficits would be higher throughout the entire 10-year period.

Finally, if productivity grows more slowly in coming years, as assumed in the **Low Productivity** scenario, annual budget deficits accelerate quickly and dangerously. This scenario also does not include a fiscal stimulus program, which would aggravate the projected annual budget deficits.

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

Table 20 shows forecast values for the ratio of federal public debt to nominal GDP. **Chart 20A** compares my **BASE** scenario ratio of federal public debt to nominal GDP projections with those of **CBO**, **B of A**, and **GS**. **Chart 20B** compares the annual ratio of federal public debt to nominal GDP projections for my four scenarios.

The fiscal year 2017 ratio of public debt to nominal GDP was 77.0 percent. This number may change a little in coming years as the Bureau of Economic Analysis revises its estimates of nominal GDP. This ratio is high relative to the pre-Great Recession ratio of 36.0 percent but not dangerous so. CBO's projections indicate that the public debt to nominal GDP ratio, under assumptions about economic activity and interest rates given current law, rise a few percentage points over the next 10 years. While this is not a good trend, it is not a particularly troublesome one.

When a $1.45 trillion fiscal stimulus program is added in the **BASE** scenario, the ratio of public debt to nominal GDP rises a little faster to 89.3 percent by 2026 compared to 84.2 percent in **CBO**'s projections. The ratio improves ever so slightly to 83.5 percent in the **Strong Growth** scenario by 2026.

Note that **GS**'s and **B of A**'s projections of the ratio of public debt to nominal GDP in **Chart 20A** track my **BASE** scenario quite closely.

However, the ratio of public debt to nominal GDP accelerates to a troublesome level near 100.0 percent by 2026 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 is already

CHART 20A – Cumulative Federal Budget Deficit

(public debt as a percentage of nominal GDP)

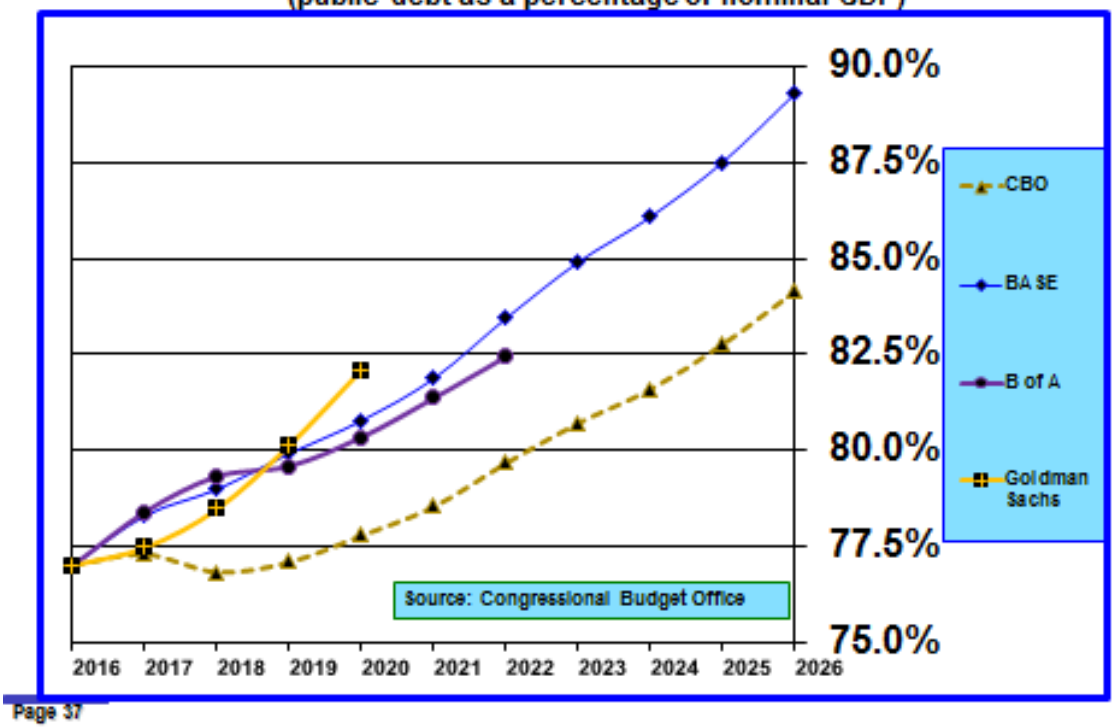

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CHART 20B – Cumulative Federal Budget Deficit

(public debt as a percentage of nominal GDP)

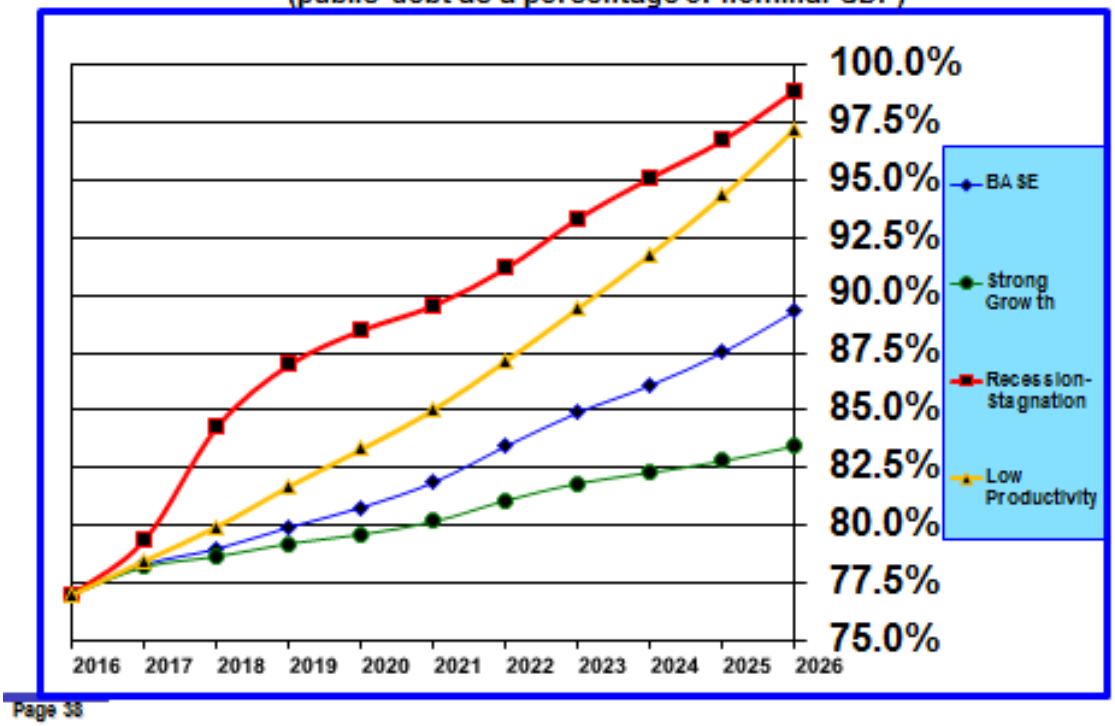

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Table 20
Total Federal Public Debt to Nominal GDP: 2016-2026
(***percentages***)

	BASE	Strong Growth	Recession-Stagnation	Low Productivity	GS	B of A	CBO
Cumulative Budget Deficit							
2016	77.0	77.0	77.0	77.0	77.0	77.0	77.0
2017	78.3	78.2	79.4	78.5	77.5	78.4	77.3
2018	79.0	78.7	84.3	80.0	78.5	79.3	76.8
2019	79.9	79.2	87.0	81.7	80.2	79.6	77.1
2020	80.8	79.6	88.5	83.3	82.1	80.4	77.8
2021	81.9	80.2	89.6	85.0		81.4	78.6
2022	83.5	81.1	91.2	87.2		82.5	79.7
2023	84.9	81.8	93.3	89.4			80.7
2024	86.1	82.3	95.1	91.8			81.6
2025	87.5	82.8	96.7	94.3			82.8
2026	89.3	83.5	98.9	97.2			84.2

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

V. Monetary Policy

After a year-long wait for the **FOMC** to raise the federal funds rate, it finally did so at its December meeting. Even though markets had long since concluded that the **FOMC** would finally act, the reaction was still modestly negative because the **FOMC** signaled through its infamous dot-plot that three rate increases are possible in 2017 compared to the two increases in 2017 that were embedded in September's dot plot.

Given that the market in the wake of Republican presidential and congressional victories has become much more optimistic about growth and correspondingly more pessimistic about higher inflation, it is hardly surprising that what amounted to tiny upward adjustments in the Summary of Economic Projections and the dot-plot was interpreted as ratifying the market's interpretation of the economic consequences of a Trump presidency. Chair Yellen emphasized in the post-**FOMC** meeting press conference that not much had really changed, but the market chose to ignore her cautions.

Markets now expected policy leadership to shift from monetary policy to fiscal policy. The role of monetary policy is expected to change from a focus on promoting economic growth to containing potential inflationary consequences of stimulative monetary policy.

Markets are supposed to anticipate the future economic consequences of policy changes and significant current events, such as a collapse in commodity prices. That is long has happened since the election. The market is now anticipating faster growth, which is why stock prices are up, and higher inflation, which is why bond prices are down and interest rates are up. But, market current assessments can overestimate or underestimate future outcomes. Also, markets in the short run are subject to "group think" which creates buying or selling momentum that often leads to over or under valuation. At times overshoots can last a very long time and reach unusual extremes as occurred with housing prices during the housing bubble prior to the Great Recession.

Seasoned market observers generally feel that the market's reaction to Trump's election is already discounting more growth and inflation than they believe is likely to occur. Many also point out that factors constraining greater economic growth, such as higher interest rates and a more expensive dollar, will set negative feedbacks into motion.

Fiscal policy changes take a long time usually to pass Congress. There are further implementation delays. And, following implementation it takes time for the fiscal policy changes to impact real economic activity. This is especially true for infrastructure spending. However, if "animal spirits" are kindled in anticipation of policy changes, business decisions can impact economic activity well before changes in fiscal policy become effective. The recent rise in both consumer and business confidence are supportive evidence that anticipatory decision making may occur. However, the case for "animal spirits" is not yet a strong one. Professional investors remain guarded in their outlook. Many business people, while more hopeful, are in a wait and see stance, as reflected by Evercore ISI's company surveys. The Federal Reserve's Beige Book, which summarizes anecdotal economic information on a regional basis, has changed little in tone and is consistent with slow, plodding growth and little upward pressure on inflation.

If you believe in the wisdom of seasonal professional investors, and if the rally in U.S. stock prices and the bear market in bonds continue, you may wish to consider moving toward a more balance equity-bond portfolio as Charles Gave of GavekalEconomics has recommended.

1. Economic Activity

In the December statement, the **FOMC** upgraded its assessment of overall economic activity by changing the adjective describing economic activity from "modest" to "moderate." This does not mean that economic activity is particularly strong, it is just a little better now than it has been. Evidence supporting material improvements in economic activity is quite hard to find. Consumer spending performed well in the third quarter but it appears to have weakened in October and November. Increasingly it looks like real GDP growth in the fourth quarter will be positive but fall short of 2.0 percent, perhaps significantly so — **B of A**'s recent projection for fourth quarter real GDP growth is 1.3 percent.

Table 21 shows the **FOMC**'s central tendency projections for real GDP growth for 2016, 2017, 2018, 2019, as well as the long-term potential real rate of GDP growth. GDP growth projections for both 2016

and 2017 were reduced and the upper bound of the range for long-term growth came down. What stands out in **Table 21** is the steady decline in projected growth over the last four years. There was a very small and inconsequential increase in the bottom end of the long run range in the December Summary of Projections.

Table 21
Economic Projections of Real GDP By Federal Reserve Board Members
(*nd Federal Reserve Bank Presidents, September 201*)

Real GDP %		Central Tendency						
		2014	2015	2016	2017	2018	2019	Long Run
	Actual	2.47	1.98					
2016	Dec			1.8 - 1.9	1.9 - 2.3	1.8 - 2.2	1.8 - 2.0	1.8 - 2.0
	Sep			1.7 - 1.9	1.9 - 2.2	1.8 - 2.1	1.7 - 2.0	1.7 - 2.0
	June			1.9 - 2.0	1.9 - 2.2	1.8 - 2.1		1.8 - 2.0
	Mar			2.1 - 2.3	2.0 - 2.3	1.8 - 2.1		1.8 - 2.1
2015	Dec		2.1	2.3 - 2.5	2.0 - 2.3	1.8 - 2.2		1.8 - 2.2
	Sep		2.0 - 2.3	2.2 - 2.6	2.0 - 2.4	1.8 - 2.2		1.8 - 2.2
	June		1.8 - 2.0	2.4 - 2.7	2.1 - 2.5			2.0 - 2.3
	Mar		2.3 - 2.7	2.3 - 2.7	2.0 - 2.4			2.0 - 2.3
2014	Dec	2.3 - 2.4	2.6 - 3.0	2.5 - 3.0	2.3 - 2.5			2.0 - 2.3
	Sep	2.0 - 2.2	2.6 - 3.0	2.6 - 2.9	2.3 - 2.5			2.0 - 2.3
	June	2.1 - 2.3	3.0 - 3.2	2.5 - 3.0				2.1 - 2.3
	Mar	2.8 - 3.0	3.0 - 3.2	2.5 - 3.0				2.2 — 2.3
2013	Dec	2.8 - 3.2	3.0 - 3.4	2.5 - 3.2				2.2 - 2.4
	Sep	2.9 - 3.1	3.0 - 3.5	2.5 - 3.3				2.2 - 2.5
	June	3.0 - 3.5	2.9 - 3.6					2.3 - 2.5
	Mar	2.9 - 3.4	2.9 - 3.7					2.3 - 2.5
2012	Dec	3.0 - 3.5	3.0 - 3.7					2.3 - 2.5

2. Employment

Little slack remains in the labor market and compensation has begun to rise, albeit slowly. The U-3 unemployment rate in November fell below CBO's of NAIRU (non-accelerating inflation rate of unemployment). However, the decline in unemployment in November was a "bad decrease" rather than a "good decrease"

because it was caused by a decline in the size of the labor force as well as by a decline in the number of unemployed workers. The parallel declines could be statistical noise stemming from the shortcomings of BLS's sampling methodology or they could simply reflect unemployed workers exiting the labor force.

Wage increases also softened in November after strong improvement in October. October's increase in wages benefited temporarily from the east coast hurricane. The October wage blip disappears in a 12-month moving average of hourly wages for all employees. The moving average indicates a slow upward trend is in place. Based upon this measure, the growth rate in hourly wages has risen 25 basis points to 2.55 percent from 2.30 percent in December 2015. This is progress but is nothing to shout about. Indeed, when one looks at the more complete measure of average weekly pay for all employees, which incorporates the length of the workweek, the story shifts from positive to negative. Growth in weekly wages, based upon a 12-month moving average, has declined from 2.42 percent in December 2015 to 2.18 percent in November. Since this data point, which is really the more relevant one, doesn't fit the narrative of an improving labor market, it is hardly ever cited. So, while payroll employment gains continue to be strong month after month, growth in the more inclusive measure of total hours worked has been slowing.

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

Critics contend that by pursuing a gradual tightening approach, the **FOMC** risks inflation overshooting the target of 2.0 percent. Of course, the target is intended to be an average over the cycle, not a ceiling. The fact is that inflation has been below the 2.0 percent target for an extended period of time. Nonetheless, some policymakers worry that if policy response is delayed too long the market consequence might be that inflation expectations become unanchored.

FOMC projections of the U-3 unemployment rate are shown in **Table 22**. While the **FOMC** has consistently overestimated expected real GDP growth, it has simultaneously underestimated the decline in the unemployment rate. While these forecasting misses would seem at first blush to be inconsistent, with the benefit of hindsight there have been two drivers. One is that productivity has not recovered to higher levels as expected which explains why real GDP growth has not measured up to expectations. The other is that labor force participation has been much weaker than expected, resulting in a faster decline in the unemployment rate. Neither of these developments was anticipated. Earlier projections of real GDP growth and the unemployment rate were based on past experience of cyclical recovery patterns which have not repeated as expected.

3. Inflation

In its December statement, the FOMC noted the "considerable" increase in inflation compensation. This is a simple statement of fact based upon the sharp increase in interest rates following Donald Trump's election. But the relevant question is whether anything has really changed that will drive inflation higher. A strong case can be made that interest rates and inflation compensation fell below reasonable levels because of aggressive global monetary policies and uncertainty tilting in the pessimistic direction about economic

Table 22
Economic Projections of Unemployment Rate by Federal Reserve Board Members And Federal Reserve Bank Presidents, March 2016

Unemp.Rate %		Central Tendency						
		2014	2015	2016	2017	2018	2019	Longer Run
Actual	5.57%	5.01%						
2016	Dec			4.7 - 4.8	4.5 - 4.6	4.3 - 4.7	4.3 - 4.8	4.7 - 5.0
	Sep			4.7 - 4.9	4.5 - 4.7	4.4 - 4.7	4.4 - 4.8	4.7 - 5.0
	June			4.6 - 4.8	4.5 - 4.7	4.4 - 4.8		4.7 - 5.0
	Mar			4.6 - 4.8	4.5 - 4.7	4.5 - 5.0		4.7 - 5.0
2015	Dec		5.0	4.6 - 4.8	4.6 - 4.8	4.6 - 5.0		4.8 - 5.0
	Sep		5.0 - 5.1	4.7 - 4.9	4.7 - 4.9	4.7 - 5.0		4.9 - 5.2
	June		5.2 - 5.3	4.9 - 5.1	4.9 - 5.1			5.0 - 5.2
	Mar		5.0 - 5.2	4.9 - 5.1	4.8 - 5.1			5.0 - 5.2
2014	Dec	5.8	5.2 - 5.3	5.0 - 5.2	4.9 - 5.3			5.2 - 5.5
	Sep	5.9 - 6.0	5.4 - 5.6	5.1 - 5.4	4.9 - 5.3			5.2 - 5.5
	June	6.0 - 6.1	5.4 - 5.7	5.1 - 5.5				5.2 - 5.5
	Mar	6.1 - 6.3	5.6 - 5.9	5.2 - 5.6				5.2 - 5.6
2013	Dec	6.3 - 6.6	5.8 - 6.1	5.3 - 5.8				5.2 - 5.8
	Sep	6.4 - 6.8	5.9 - 6.2	5.4 - 5.9				5.2 - 5.8
	June	6.5 - 6.8	5.8 - 6.2					5.2 - 6.0
	Mar	6.7 - 7.0	6.0 - 6.5					5.2 - 6.0
2012	Dec	6.8 - 7.3	6.0 - 6.6					5.2 - 6.0

growth prospects. To the extent this might have been the case, at least part of the rebound in inflation compensation reflects a return to a reasonable compensation level rather than a fundamental reassessment that inflation is headed higher. Furthermore, markets appear to be anticipating higher inflation than recent trends and the still-fragile economy suggest is likely. In other words investors may well have flipped from being too pessimistic about sustained low inflation to being too pessimistic about significant increases in inflation. So, even though the **FOMC** inflation statement is a fact reflected by recent market trading activity, it does not necessarily reflect a changed **FOMC** view. The **FOMC**'s view remains that the target 2.0 percent inflation will be reached within two years and that inflation expectations are well anchored.

As can be seen in **Table 23**, there was a slight upgrading of inflation projections in 2016, 2017, 2018 and 2019. But there was no change in the **FOMC**'s long-run 2.0 percent expectation.

Table 23
Economic Projections of Inflation By Federal Reserve Board Members And Federal Reserve Bank Presidents, September 2016

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

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