

# A Macroeconomic Primer for Forensic Economists

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**David G. Tucek**  
**Value Economics, LLC**  
<http://www.valueeconomics.com/>  
**314 434 8633**  
**david.tucek@valueeconomics.com**

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## Why This Topic?

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- **It is E, and Ultimately, FE**
  - **Almost all cases involve projecting future losses and discounting them to the present.**
  - **Interest rates and expectations for inflation and real growth are linked.**
  - **The expectations and the ultimate values are driven, to a large extent, by the macro economy.**

## Why This Topic?

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- **It is E, and Ultimately, FE**
- **“Those Who Only Remember the Past May Be Doomed to Repeat Its Mistakes” (Havrilesky, *JFE*, 3(1), 1990, pp. 23-28)**

## Is Dave Crossing the Aisle to Current Interest Rates?

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## Why This Topic?

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- **It is E, and Ultimately, FE**
- **Havrilesky**
  - **Well-trained forensic economist should be cognizant of**
    - **Productivity growth**
    - **Budget deficits**
    - **Debt burden**
    - **Deregulation**
    - **Monetary Policy**

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- I would add **DEMOGRAPHICS** and highlight **PRODUCTIVITY GROWTH**.

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  - Havrilesky
    - Well-trained forensic economist should be cognizant of
      - **Productivity growth**
      - Budget deficits
      - Debt burden
      - Deregulation
      - Monetary Policy
    - Havrilesky → Keep the E in FE.
    - True whether you rely on current or historical discount rates.
- I would add **DEMOGRAPHICS** and highlight **PRODUCTIVITY GROWTH**.

## Why This Topic?

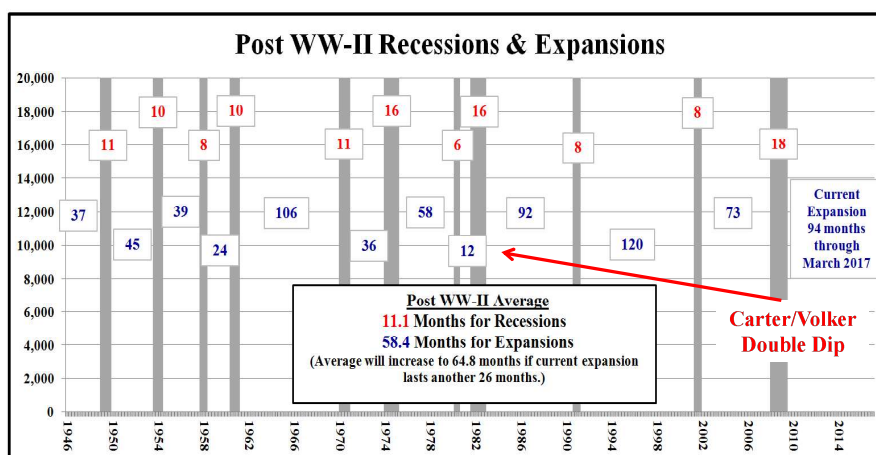
- It is E, and Ultimately, FE
- Havrilesky
- Dave can benefit
  - Presenting is thinking (to paraphrase Ireland).
  - Have I misstated or overlooked something?

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## An Initial Look at History

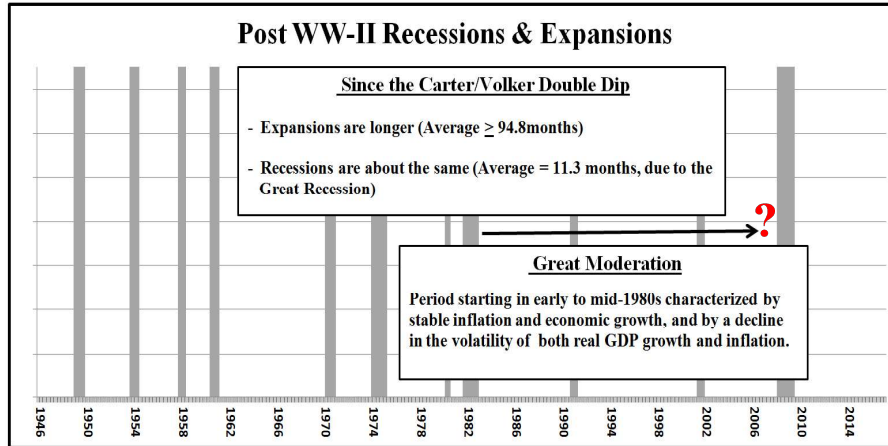


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# An Initial Look at History

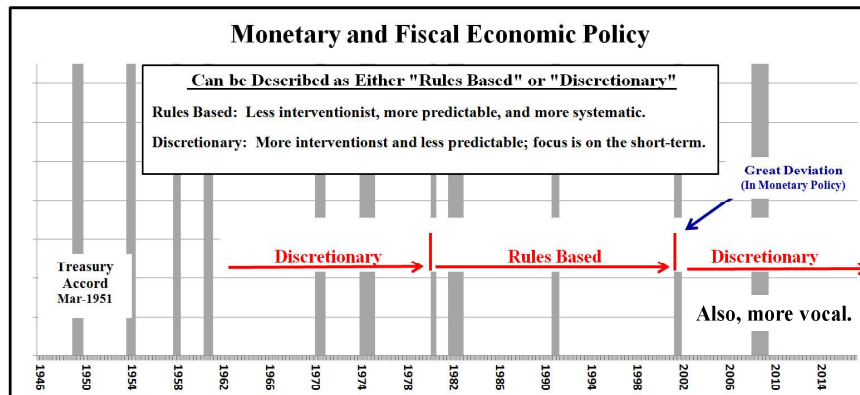


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# Another Look at History



"The Cycle of Rules and Discretion in Economic Policy", John B. Taylor, 2011, *National Affairs* (7), pp. 55-65.

"Macroeconomic Lessons from the Great Deviation", John B. Taylor, Remarks at the 25<sup>th</sup> NBER Macro Annual Meeting, May-2010.

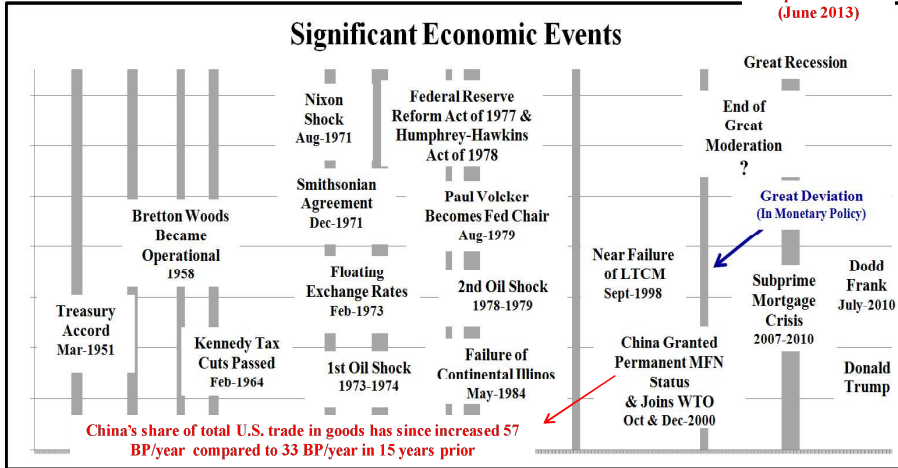
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# Still Another Look at History

Bond Market  
Taper Tantrum  
(June 2013)

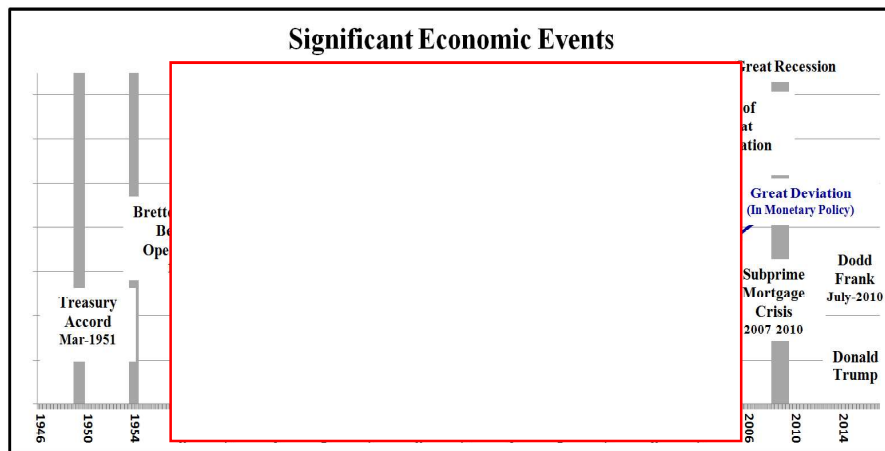


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# What's an FE to Do?

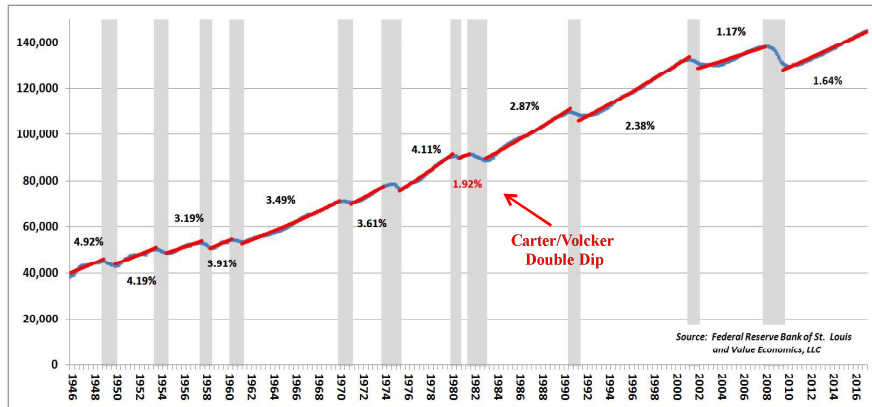


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## Trendline Employment Growth During Expansions

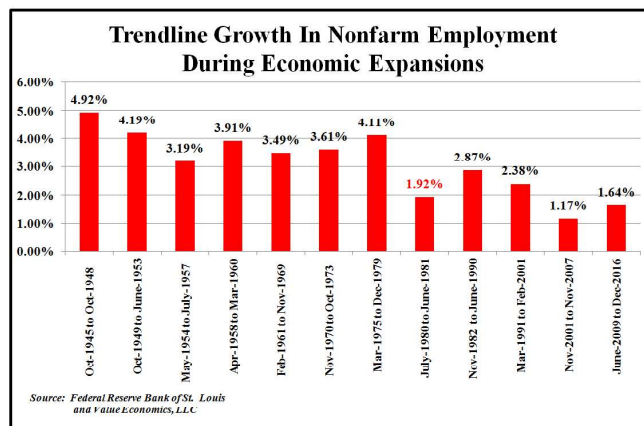


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## A More Useful Presentation



Last two are below the rest.

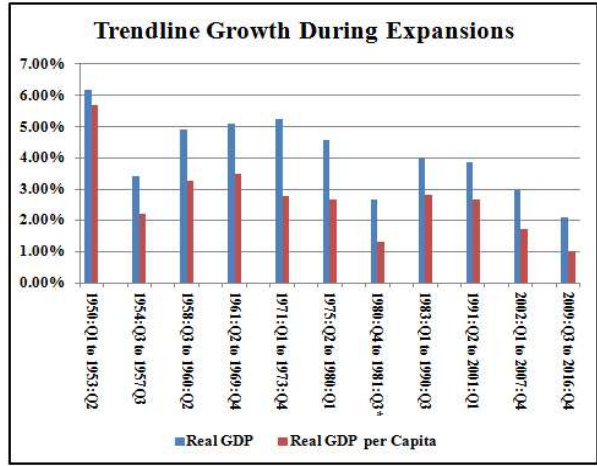
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## Similar Pattern Seen in More Broad-Based Measures



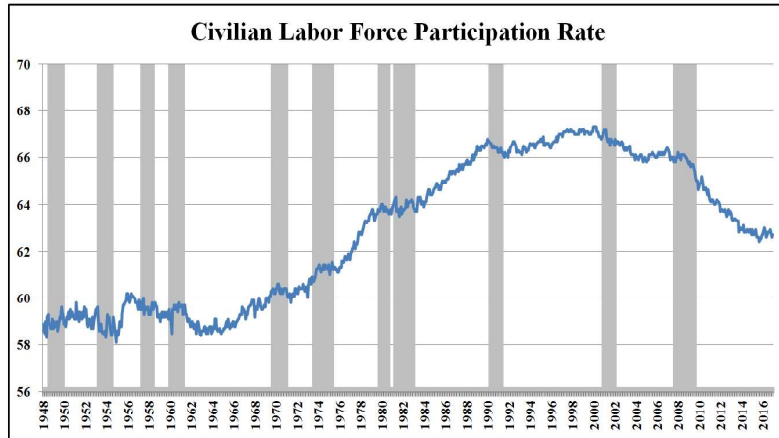
Last two are below the rest. (Excluding Carter/Volcker Double Dip)

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## One Reason for the Decline in Growth

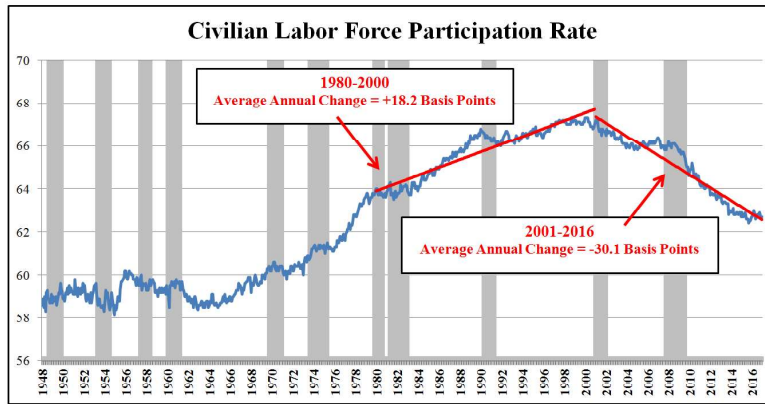


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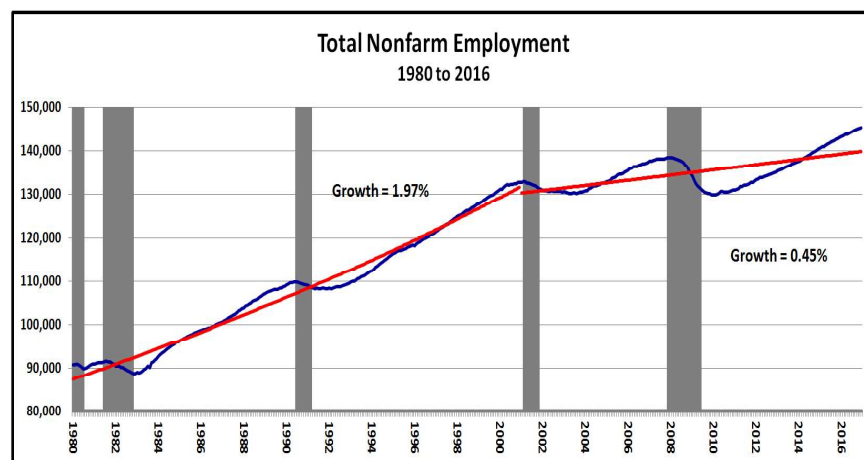


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## Similar Pattern Seen in Employment



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## And in Other Measures

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	1980Q1 to 2000Q4	2001Q1 to 2016Q4
<b>Total Nonfarm Employment</b>	1.97%	0.45%
<b>Real W&amp;S ECI</b>	0.20%	0.13%
<b>Real Total Comp ECI</b>	0.51%	0.31%
<b>Real GDP</b>	3.37%	1.63%
<b>Real GDP per Capita</b>	2.20%	0.55%
<b>CPI-U Inflation</b>	3.56%	2.18%
<b>Population <math>\geq</math> Age 16</b>	1.12%	1.07%
<b>Total Factor Productivity</b> (Utilization Adjusted)	1.77%	0.72%
<b>Business Labor Productivity</b>	1.91%	1.65%
<b>Labor Force Participation</b> (Annual Change in Basis Points)	18.2	-30.1

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## Reasons for the Decline in Growth

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- **Robert Gordon's Major Headwinds:**
  - Demography: end of “demographic dividend” and retirement of baby boomers.
  - A plateau in educational attainment in the U.S.
  - Rising income inequality.
  - The increasing burden of federal, state and local government debt.
  - Impact of globalization on both employment levels and earnings.
  - Cost of environmental policy.
  - High cost of medical care in the U.S.
  - Slower technological growth.

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## Reasons for the Decline in Growth

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- **Robert Gordon's Major Headwinds**
- **Larry Summers' Secular Stagnation Argument**
  - The supply of savings has increased while at the same time the investment schedule (i.e., the demand for savings) has decreased.
  - Full-employment required interest rate (FERIR) is negative.
  - Due to zero lower bound on nominal interest rates and a low-inflation environment, the negative FERIR and full employment cannot be attained. (Except that with 4.7% unemployment we are there, due to increased inflation.)

## Reasons for the Decline in Growth

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- **Robert Gordon's Major Headwinds**
- **Larry Summers' Secular Stagnation Argument**
  - Slower population growth.\* **\*Overlap with Gordon**
  - (Possibly) slower technological growth.\*
  - Rising income inequality.\*
  - Regulatory burdens raise the wedge between safe rates and rates charged to borrowers.
  - Central bank policies that increases the demand for safe assets, which drives down safe (nominal) interest rates.
  - Hysteresis in the capital and labor markets contributes to a sustained downward shift in potential output.

## Reasons for the Decline in Growth

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- Robert Gordon's Major Headwinds
- Larry Summers' Secular Stagnation Argument

Arguments for each position are not mutually exclusive.

Many of the factors cited are persistent (demographics in particular).

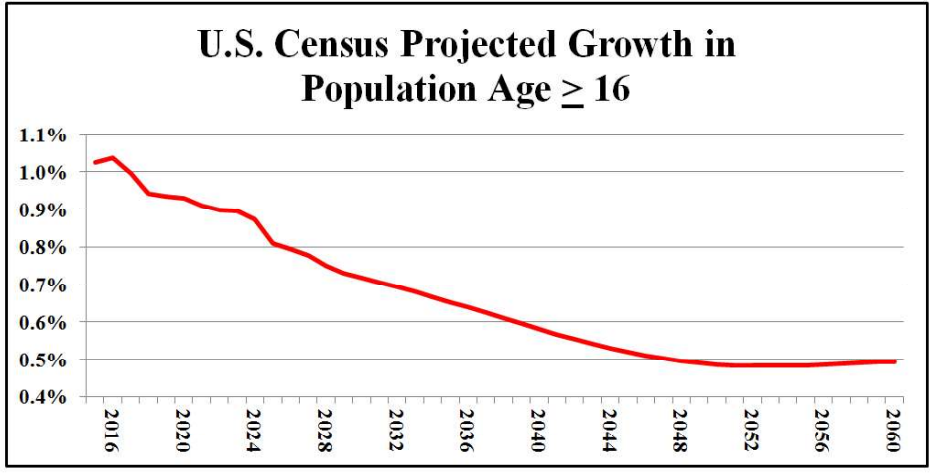
Future long-term growth will be determined by increases in the labor force and in productivity.

## Future LT Growth Depends on **Increases in the Labor Force** and in Productivity

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- Labor force growth depends on
  - Population Growth
    - Natural Increase
    - Net Immigration
  - Labor force participation rate

**Population growth is expected to decline.**

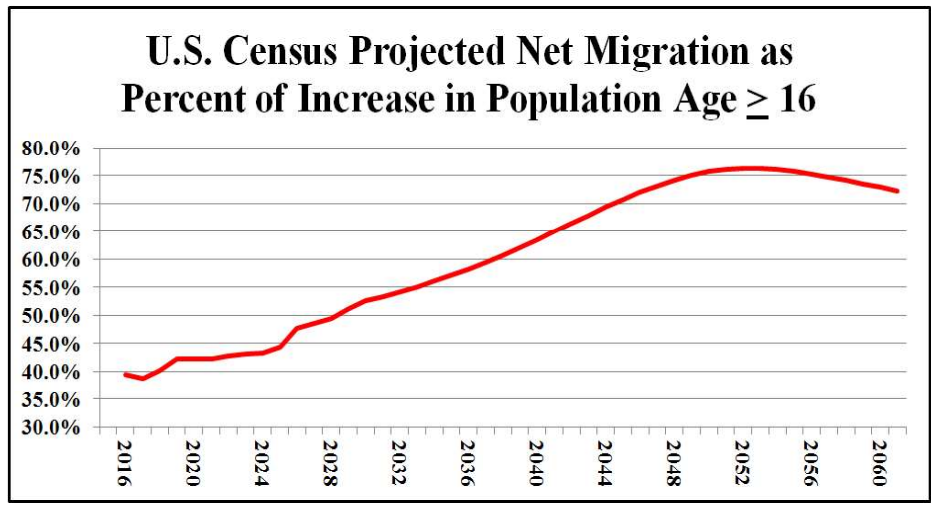


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**Net migration's share of increase is expected to increase.**

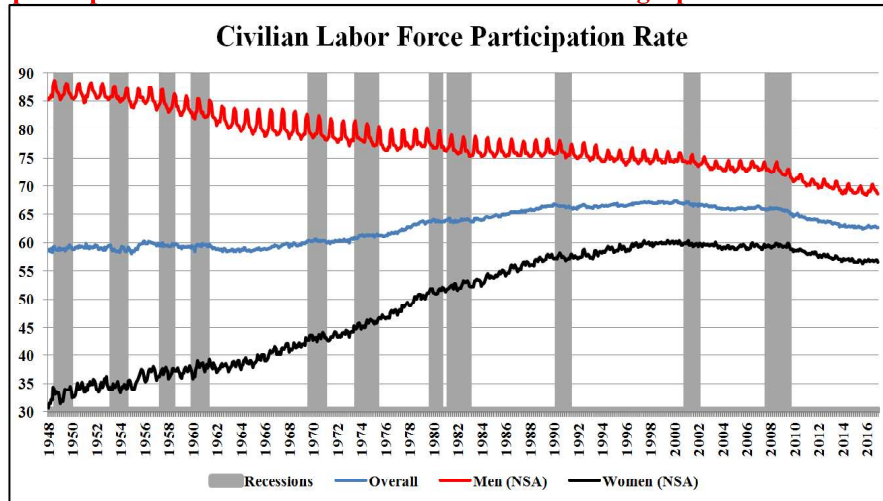


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**The increase in female participation more than offset decline in male participation until the late 1990's – the end of the demographic dividend.**

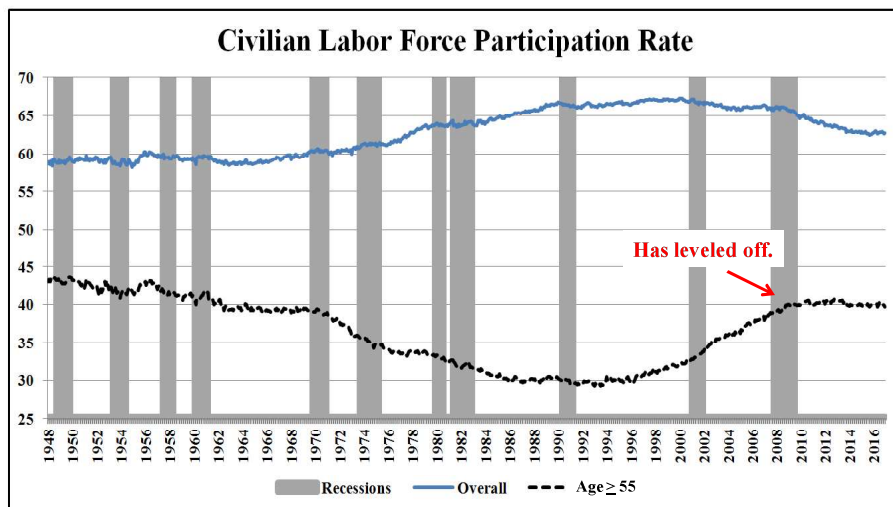


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**But for the increase in Age  $\geq$  55 participation, the decline in the overall rate would have occurred earlier and been steeper.**

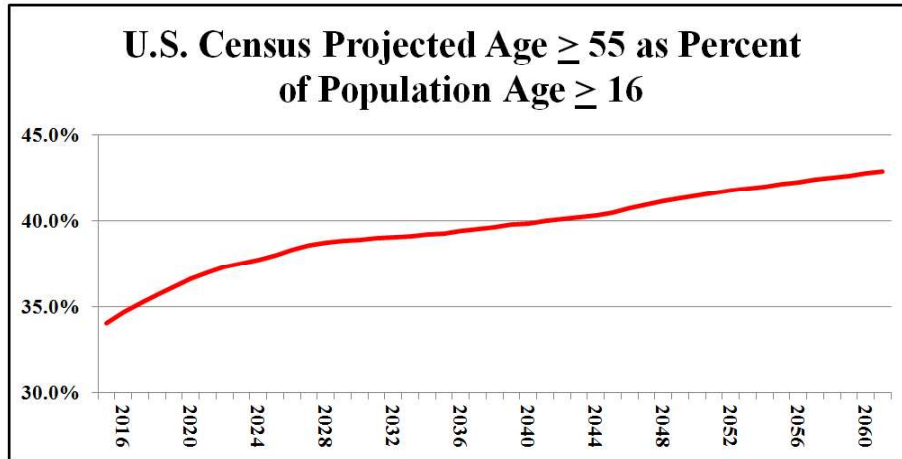


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**Share of Age  $\geq 55$  is expected to increase.  
Will be a drag on overall LF participation rate.**



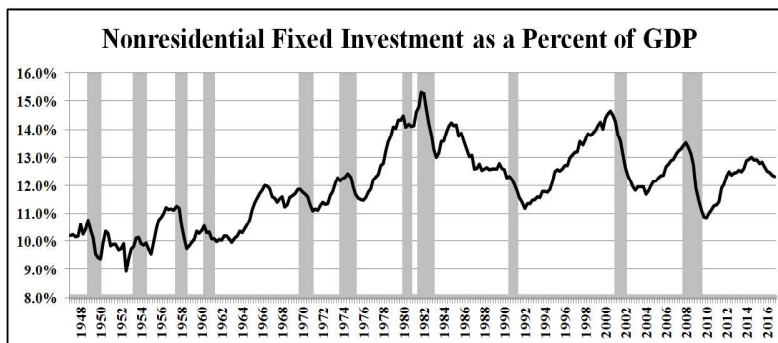
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## **Future LT Growth Depends on Increases in the Labor Force and in **Productivity****

- Productivity growth depends on investment in new technology.



**Drifted downward since 1980 with slightly more pronounced decline since 2000.**

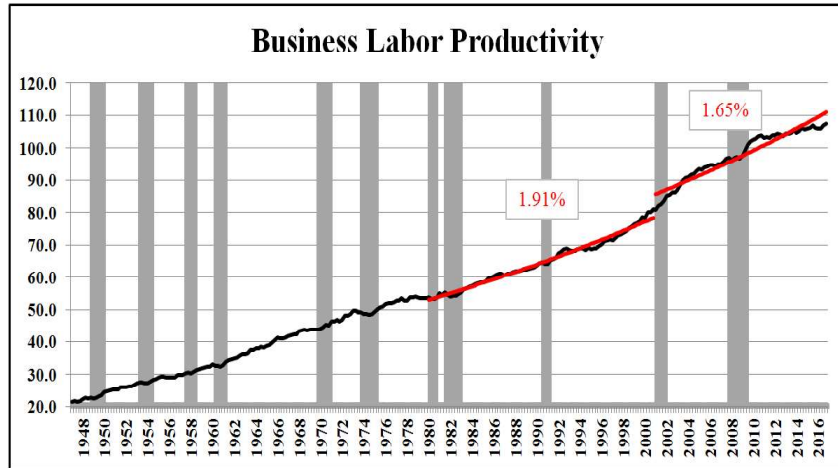
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**1.65% versus 1.91%  $\leq$  20% less growth over 20 to 30 years**

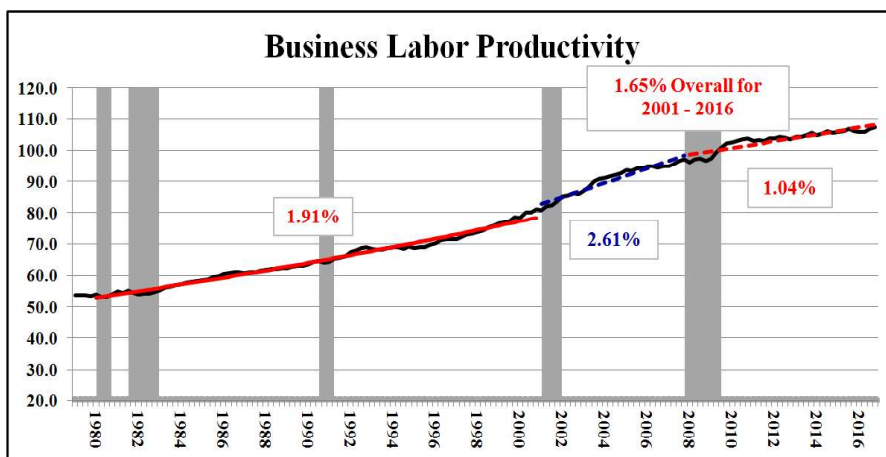


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**1.04% versus 1.91%  $>$  50% less growth over 20 to 30 years**



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**Even if growth and inflation have slowed since 2001, and even if the slowdown is expected to persist, why is this ultimately FE?**

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**If you rely on historical growth rates, you will be hard-pressed to justify use of data prior to 2001.**

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**Even if growth and inflation have slowed since 2001, and even if the slowdown is expected to persist, why is this ultimately FE?**

**If you rely on forecasted growth rates, you need to reach a judgment on the validity of the forecast that takes the post-2001 decline in growth into account.**

**BTW, the fact that current interest rates reflect expectations about future inflation and growth is also an issue.**

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**Is the forecast consistent with the expectations?**

**BTW, the fact that current interest rates reflect expectations about future inflation and growth is also an issue.**

---

**Is the forecast consistent with the expectations?**



**We are not going to beat that horse today.**

**How to reach a judgment on the legitimacy of the forecast?**

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**Step 1: Broad-brush look at type of growth we can expect.**

## What Growth Can We Reasonably Expect?

- **Relied on U.S. Census Population Projection**
- **Three growth rates for productivity:**
  - 1.00% (continuation of decline from 2008 on)
  - 1.60% (trendline growth since 2001)
  - 1.30% (middle ground between these two)
- **Three assumptions concerning LF participation**
  - Continue to decline by 30 basis points per year (59.4% in 2027Q4)
  - Decline at half this rate (61.0% in 2027Q4)
  - No further decline (62.7% in 2027Q4)

**2027Q4 is the end of CBO's forecast horizon**

## What Growth Can We Reasonably Expect?

- **Based CPI-U forecast on the following equation**

$$\ln(\text{CPI-U}) = \alpha + B_1 \ln(\text{Productivity}) + B_2 \ln(\text{RGDP/Potential RGDP}) + B_3 \ln(\text{CPI-U}(-1))$$

**Why is the sign positive?**

	$\alpha$	$B_1$	$B_2$	$B_3$
<b>Coefficient</b>	-0.002460	0.116147	0.092783	0.902252
<b>t-Statistic</b>	-0.04	2.43	1.74	24.62
<b>P-value</b>	0.964953	0.018157	0.086774	0.000000
<b>R-Squared =</b>	0.995308	<b>Adjusted R-Squared =</b>		0.995073
<b>Sample Period =</b>	2001Q1 to 2016Q4		NOB = 64	
<b>MAPE =</b>	0.5241%	1980Q1 to 2016Q4		0.5226%

## What Growth Can We Reasonably Expect?

- Also relied on this equation

$$\ln(\text{CPI-U}) = \alpha + B_1 \ln(\text{Productivity}) + B_2 \ln(\text{RGDP/Potential RGDP}) + B_3 \ln(\text{CPI-U}(-1))$$

(Equation 2)

	$\alpha$	$B_1$	$B_2$	$B_3$
Coefficient	0.033295	0.057315	0.085524	0.945973
t-Statistic	3.04	5.19	3.17	115.95
P-value	0.002825	0.000001	0.001870	0.000000
R-Squared =	0.999630	Adjusted R-Squared =		0.999622

Sample Period = 1980Q1 to 2016Q4

NOB = 148

2001Q1 to 2016Q4

1980Q1 to 2016Q4

MAPE = 0.5194%

0.4304%

**Same as Equation 1, with sample period starting in 1980**

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## What Growth Can We Reasonably Expect?

- And on this equation

$$\ln(\text{CPI-U}) = \alpha + B_1 \ln(\text{Productivity}) + B_2 \ln(\text{RGDP/Potential RGDP})$$

(Equation 3)

	$\alpha$	$B_1$	$B_2$
Coefficient	-0.644151	1.313235	0.824349
t-Statistic	-6.96	63.20	3.25
P-value	0.000000	0.000000	0.001450
R-Squared =	0.965046	Adjusted R-Squared = 0.964564	

Sample Period = 1980Q1 to 2016Q4

NOB = 148

2001Q1 to 2016Q4

1980Q1 to 2016Q4

MAPE = 2.4469%

4.3335%

**Same as Equation 2, without lagged CPI-U term.**

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## What Growth Can We Reasonably Expect? (Annual Growth through 2027Q4 – Same Horizon as CBO)

	Real GDP				
	-30.0	-15.0	0.0	0.0	
1.00%	1.40%	1.65%	1.90%	1.90%	<div style="border: 1px solid black; padding: 2px; display: inline-block;">CBO 1.83%</div>
1.30%	1.70%	1.95%	2.20%	Within Range	
1.60%	2.00%	2.25%	2.50%		
	Real GDP per Capita				
	-30.0	-15.0	0.0	0.0	
1.00%	0.50%	0.76%	1.00%	1.00%	<div style="border: 1px solid black; padding: 2px; display: inline-block;">CBO 1.00%</div>
1.30%	0.80%	1.05%	1.30%	Within Range	
1.60%	1.10%	1.35%	1.60%		
	CPI-U Inflation				
	-30.0	-15.0	0.0	0.0	
1.00%	0.93%	1.14%	1.33%	1.33%	<div style="border: 1px solid black; padding: 2px; display: inline-block;">CBO 2.36%</div>
1.30%	1.48%	1.68%	1.88%	Probably Out of Range	
1.60%	2.03%	2.23%	2.43%		

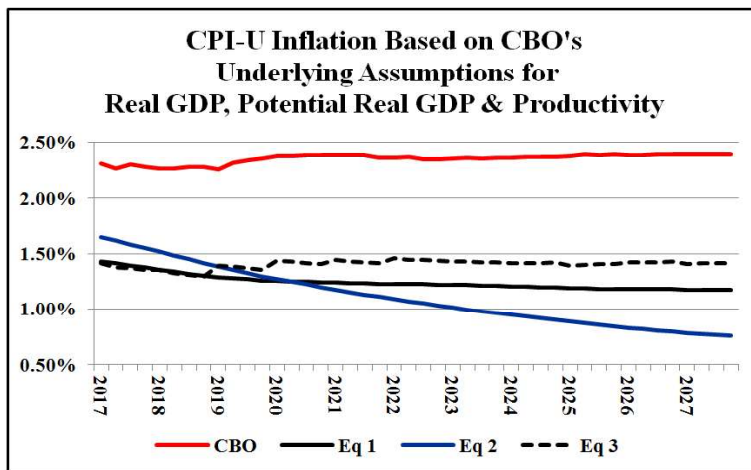
Overstated because 1.60% > productivity growth underlying potential RGDP

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## Closer Look at CPI-U Inflation

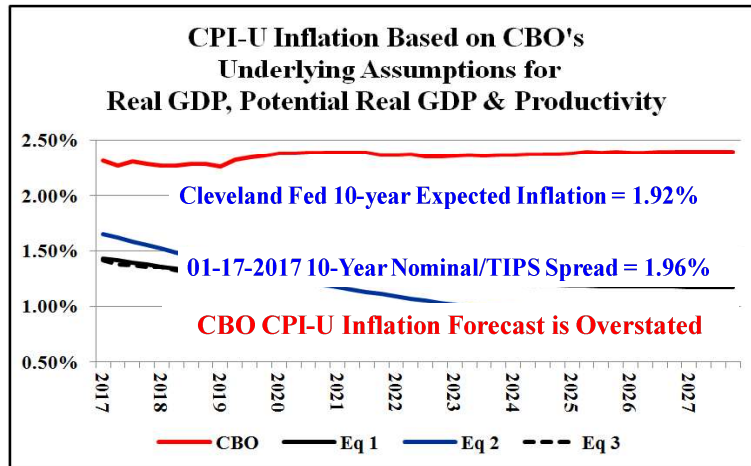


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## Closer Look at CPI-U Inflation



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## How to reach a judgment on the legitimacy of the forecast?

### Step 2: Examine assumptions underlying

- Population Growth
- LF Participation
- Productivity Growth

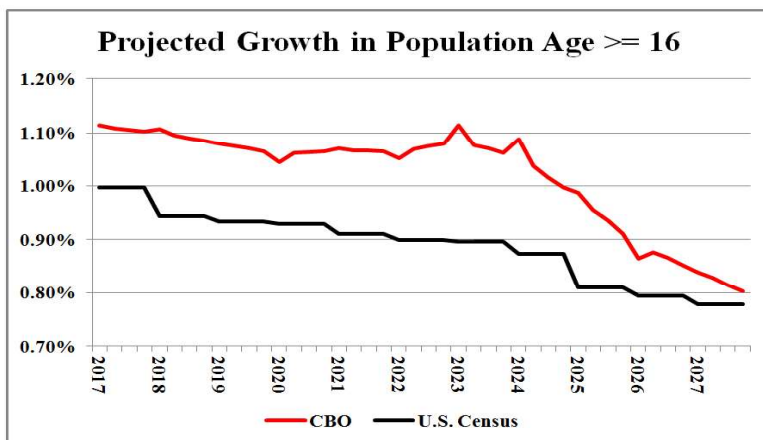
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# Population Growth

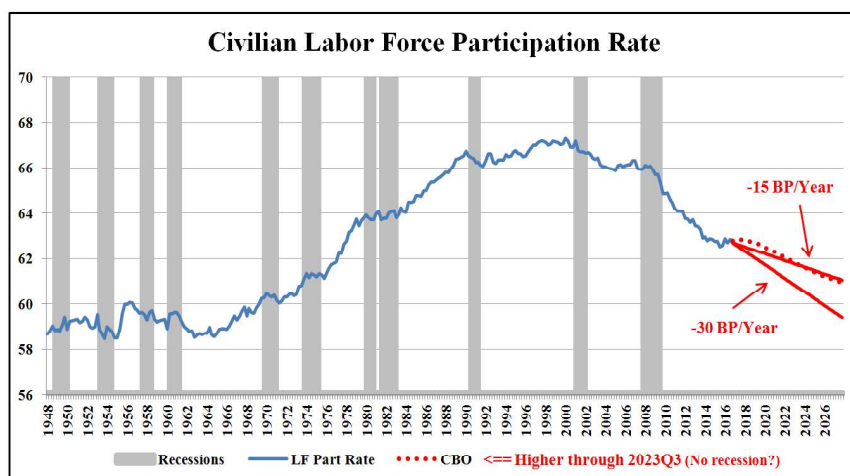


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# Labor Force Participation

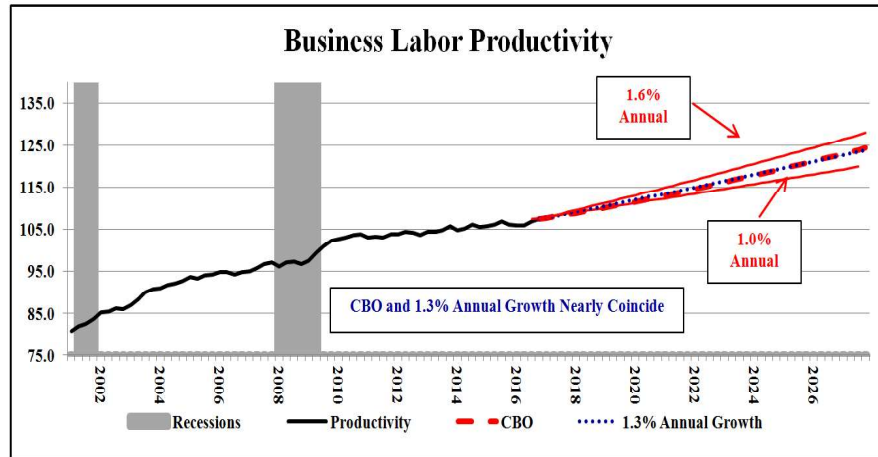


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# Productivity



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## How to reach a judgment on the legitimacy of the forecast?

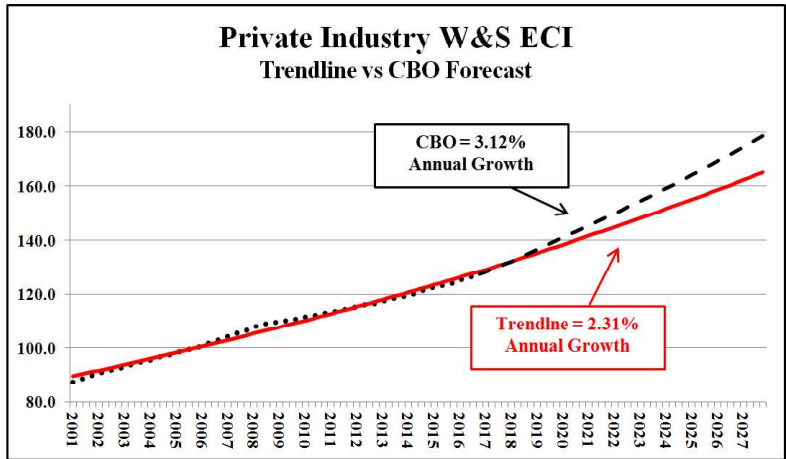
**Step 3: Examine forecast for variables of particular interest to an FE.**

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# Nominal W&S Growth

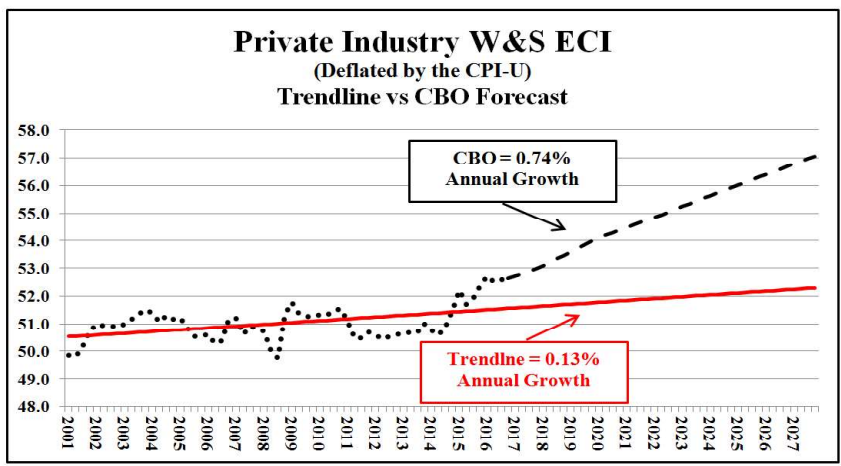


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# Real W&S Growth

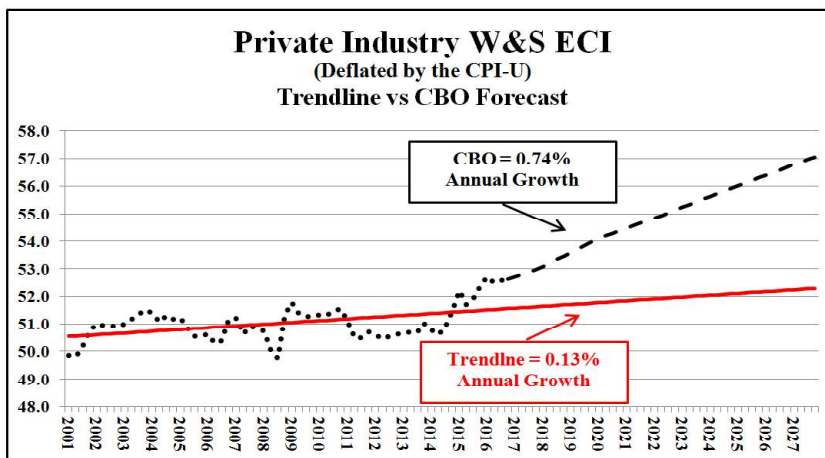


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1980-2016 trendline growth = 0.35% → CBO is 2 times greater



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## Conclusions About CBO Forecast

- Population growth is >> than that forecast by U.S. Census, who are presumably more knowledgeable.
- Projected population likely does not reflect effect of increased enforcement of immigration laws.
- Pattern of LF Participation doesn't reflect the likelihood of a recession between now and 2023Q3.
- Productivity is a tough nut to crack – IF growth rate since 2008 is assumed to increase, then a 1.3% middle ground appears reasonable.
- CPI-U inflation is excessive.
- Projected real growth in W&S ECI is inexplicable.

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## Conclusions About Relying on a Forecast

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- **It takes work to reach and maintain an informed opinion on any forecast.**
  - **There are a lot of moving parts: Monetary and fiscal policy; developments in the global economy; changes in regulation; uncertainty; unknown shocks.**
  - **Time passes and events occur that are not reflected in the forecast.**

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- **Hard to defend the use of a specific forecast even if you do the work – there are too many possible scenarios.**

## Conclusions About Relying on a Forecast

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- **It takes work to reach and maintain an informed opinion on any forecast.**
- **May not work with a production shop business model.**
- **Hard to defend the use of a specific forecast even if you do the work – there are too many possible scenarios.**
- **Dead horse in the room:** Is the forecast consistent with the expectations for inflation and economic growth underlying current interest rates?

## What's an FE to Do?

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- It takes an opinion
- May be a model.
- Hard to do the if you ios.
- **Dead** at with the ex th under

## This is What I've Seen

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- **No analysis of the forecast – just take it, plug into a spreadsheet and go.**

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- **Proffer the thinnest of reasons for using the forecast.**
- **Run the risk of being accused of speculation (takes both a persistent FE and a willing attorney on the other side).**



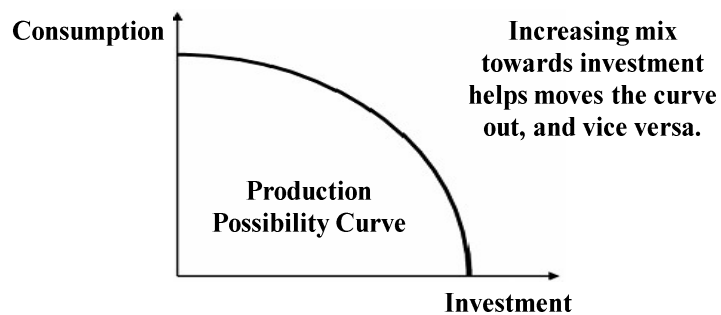
## This is What I've Seen

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- No analysis of the forecast – just take it, plug into a spreadsheet and go.
- Proffer the thinnest of reasons for using the forecast.
- Run the risk of being accused of speculation (takes both a persistent FE and a willing attorney on the other side).
- Ignore not only the dead horse in the room, but also the E in FE.

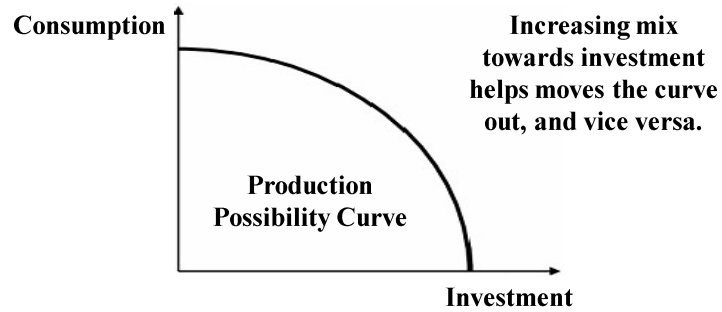
## Bonus Topic (Something to think about)

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- Oldest boomer will be 80 in 2027; median age will be 70.
- Their health will be failing.
- Their demand for medical & ADL care will be increasing.

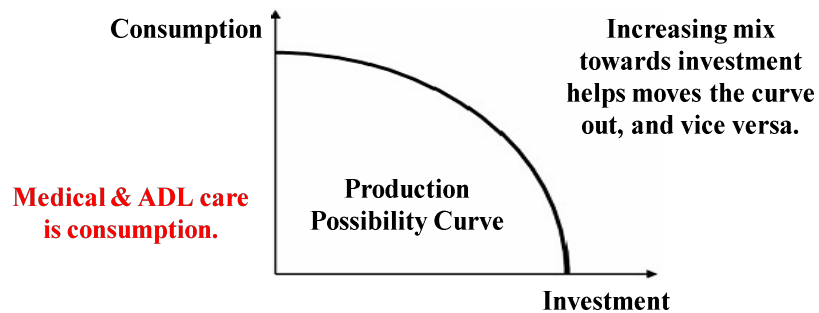
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