Overview of the Ultimate Economic Assumptions for the Trustees Report

Presentation for the SSAB Technical Panel

OCACT

January 25, 2019

Outline

1. Overview of the Economic Assumptions & Model
2. Labor Productivity
3. Labor Share of Output
4. Earnings as a Percentage of Compensation
5. Average Hours Worked
6. Inflation (CPI and the GDP Deflator)
7. Real Earnings Growth
8. Taxable Ratio
9. Labor Force, Unemployment, and Employment
10. Real GDP
11. Real Interest Rate

Table V.B1.—Principal Economic Assumptions

Calendar year	Annual percentage change[a] in— Productivity (Total U.S. economy)	Earnings as a percent of compensation	Average hours worked	GDP price index	Average annual wage in covered employment	Consumer Price Index	Real-wage differential[b]
Historical data:							
5-year periods:							
1960 to 1965 . . .	3.28	-0.18	0.15	1.36	3.22	1.24	1.98
1965 to 1970 . . .	2.07	-.31	-.68	4.03	5.84	4.23	1.61
1970 to 1975 . . .	2.08	-.50	-.88	6.60	6.58	6.76	-.22
1975 to 1980 . . .	.95	-.32	-.17	7.19	8.89	8.91	-.04
1980 to 1985 . . .	1.75	-.33	.01	5.21	6.52	5.22	1.29
1985 to 1990 . . .	1.36	-.19	-.06	3.11	4.79	3.83	.96
1990 to 1995 . . .	1.33	-.11	.33	2.44	3.54	3.03	.51
1995 to 2000 . . .	2.31	.28	.14	1.67	5.30	2.43	2.88
2000 to 2005 . . .	2.62	-.41	-.79	2.35	2.68	2.49	.19
2005 to 2010 . . .	1.61	-.08	-.47	1.93	2.50	2.30	.22
2010 to 2015 . . .	.48	.20	.37	1.68	2.96	1.61	1.34
Economic cycles:[c]							
1966 to 1973 . . .	2.28	-.29	-.72	4.60	6.05	4.61	1.43
1973 to 1979 . . .	1.08	-.43	-.54	7.52	8.58	8.54	.04
1979 to 1989 . . .	1.41	-.28	-.03	4.68	5.83	5.31	.48
1989 to 2000 . . .	1.79	.05	.14	2.20	4.50	2.96	1.55
2000 to 2007 . . .	2.12	-.23	-.60	2.50	3.22	2.65	.58
2007 to 2017 . . .	1.00	.03	-.07	1.54	2.20	1.66	.54
Single years:							
2007	.96	-.05	-.29	2.67	4.50	2.88	1.62
2008	.91	-.06	-.75	1.93	2.42	4.09	-1.67
2009	2.88	-.66	-1.86	.79	-1.56	-.67	-.89
2010	2.55	-.10	.56	1.23	2.59	2.07	.53
2011	.10	.28	.93	2.06	3.14	3.56	-.42
2012	.46	.40	-.04	1.84	3.32	2.10	1.22
2013	.43	.01	.25	1.61	1.20	1.37	-.17
2014	.68	.25	.26	1.80	3.70	1.50	2.20
2015	.74	.07	.43	1.08	3.46	-.41	3.88
2016	.18	.06	-.40	1.28	.97	.98	[d]
2017[e]	1.10	.02	-.07	1.81	2.88	2.13	.75
Intermediate:							
2018	1.72	.03	-.06	1.97	3.82	2.23	1.59
2019	1.71	-.03	.01	2.06	4.23	2.50	1.73
2020	1.72	.04	.01	2.20	4.55	2.60	1.95
2021	1.73	.03	[d]	2.20	4.52	2.60	1.92
2022	1.72	-.06	[d]	2.20	4.43	2.60	1.83
2023	1.72	-.07	[d]	2.20	4.38	2.60	1.78
2024	1.71	-.11	-.01	2.20	4.33	2.60	1.73
2025	1.68	-.09	-.03	2.20	4.26	2.60	1.66
2026	1.68	-.08	-.05	2.20	4.20	2.60	1.60
2027	1.68	-.06	-.05	2.20	3.97	2.60	1.37
2027 to 2092 . . .	1.68	-.06	-.05	2.20	3.80	2.60	1.20

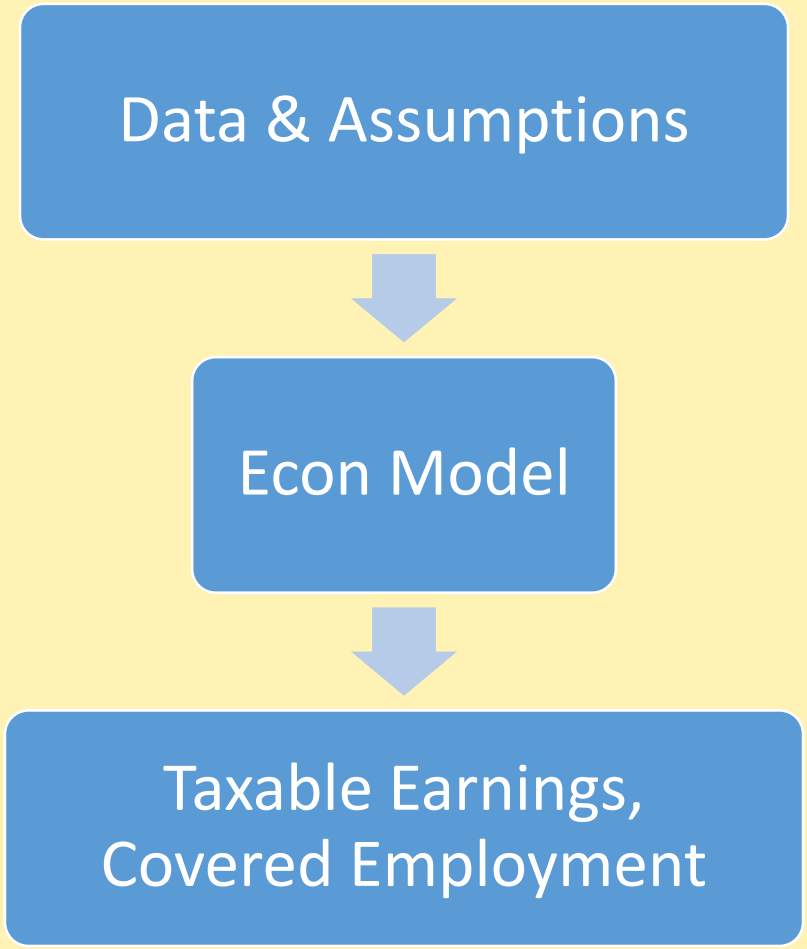
Table V.B2.—Additional Economic Factors

Calendar year	Average annual unemployment rate[a]	Annual percentage change[b] in—			Average annual interest rate	
		Labor force[c]	Total employment[d]	Real GDP[e]	Nominal[f]	Real[g]
Historical data:						
5-year periods:						
1960 to 1965	5.5	1.3	1.6	5.0	4.0	2.5
1965 to 1970	3.9	2.2	2.1	3.5	5.9	1.0
1970 to 1975	6.1	2.5	1.5	2.7	6.7	[h]
1975 to 1980	6.8	2.7	2.9	3.7	8.5	-.9
1980 to 1985	8.3	1.5	1.5	3.3	12.1	6.9
1985 to 1990	5.9	1.7	2.0	3.4	8.5	5.1
1990 to 1995	6.6	1.0	.9	2.6	7.0	4.3
1995 to 2000	4.6	1.5	1.8	4.3	6.2	3.9
2000 to 2005	5.4	.9	.7	2.5	4.6	2.4
2005 to 2010	6.8	.6	-.4	.8	3.8	1.8
2010 to 2015	7.2	.4	1.3	2.2	2.0	.5
Economic cycles:[i]						
1966 to 1973	4.6	2.4	2.0	3.6	6.1	1.3
1973 to 1979	6.8	2.7	2.4	3.0	7.7	-1.0
1979 to 1989	7.3	1.7	1.7	3.1	10.5	5.2
1989 to 2000	5.6	1.3	1.3	3.3	6.8	4.0
2000 to 2007	5.2	1.0	.9	2.4	4.6	2.2
2007 to 2017	7.0	.5	.5	1.4	2.3	.9
Single years:						
2007	4.6	1.1	1.1	1.8	4.7	1.9
2008	5.8	.8	-.4	-.3	3.6	.6
2009	9.3	-.1	-3.7	-2.8	2.9	4.4
2010	9.6	-.2	-.6	2.5	2.8	.9
2011	8.9	-.2	.6	1.6	2.4	-.7
2012	8.1	.9	1.8	2.2	1.5	.3
2013	7.4	.3	1.0	1.7	1.9	.1
2014	6.2	.3	1.6	2.6	2.3	.4
2015	5.3	.8	1.7	2.9	2.0	2.7
2016	4.9	1.3	1.7	1.5	1.8	1.0
2017[j]	4.4	.7	1.2	2.2	2.3	-.3

Table V.B2.—Additional Economic Factors (Cont.)

Calendar year	Average annual unemployment rate[a]	Annual percentage change[b] in—			Average annual interest rate	
		Labor force[c]	Total employment[d]	Real GDP[e]	Nominal[f]	Real[g]
Intermediate:						
2018	4.4	1.1	1.1	2.7	2.7	0.1
2019	4.9	1.3	.9	2.6	3.4	.2
2020	5.3	1.3	.8	2.6	3.9	.8
2021	5.5	1.0	.7	2.5	4.3	1.3
2022	5.5	.7	.7	2.4	4.6	1.7
2023	5.5	.7	.7	2.4	4.9	2.0
2024	5.5	.7	.7	2.4	5.1	2.3
2025	5.5	.6	.6	2.3	5.2	2.5
2026	5.5	.6	.6	2.2	5.3	2.6
2027	5.5	.6	.6	2.2	5.3	2.7
2030	5.5	.5	.5	2.1	5.3	2.7
2035	5.5	.4	.4	2.1	5.3	2.7
2040	5.5	.5	.5	2.1	5.3	2.7
2045	5.5	.5	.5	2.2	5.3	2.7
2050	5.5	.5	.5	2.1	5.3	2.7
2055	5.5	.5	.5	2.1	5.3	2.7
2060	5.5	.4	.4	2.1	5.3	2.7
2065	5.5	.4	.4	2.0	5.3	2.7
2070	5.5	.4	.4	2.1	5.3	2.7
2075	5.5	.5	.5	2.1	5.3	2.7
2080	5.5	.5	.5	2.1	5.3	2.7
2085	5.5	.5	.5	2.1	5.3	2.7
2090	5.5	.4	.4	2.1	5.3	2.7
2095	5.5	.4	.4	2.0	5.3	2.7

The Big Picture: OCACT Economic Model



The Big Picture: OCACT Economic Model and Beyond

- Inputs to the Econ model:
  - Economic and demographic data
  - OCACT demographic projections
  - Economic assumptions
- Output of the Econ model:
  - Taxable earnings → payroll tax revenues
  - Covered employment
  - Used by other OCACT & OACT models to project benefit cost and reserves

Two Key Parts of the OCACT Economic Model

- Employment
  - Population, LFPR, unemployment rate
  - Average (CPS-style) US employment (quarterly, annual)
  - Covered employment at any time during a year
- Earnings
  - Employment * avg. hours * productivity = GDP
  - GDP * labor share = US compensation
  - US compensation – benefits – ECSI = US earnings
  - US earnings – non-covered earnings = covered earnings
  - Covered earnings * taxable ratio = taxable earnings

Principal Economic Assumptions

- Total Economy Labor Productivity (real GDP per hour worked) growth rate
  - A key driver of the average real **earnings growth** rate
  - 2018 Trustees Report assumption is a 1.68 percent annual growth rate
- Labor share of output
  - The ultimate ratio of compensation to GDP, and thus a key determinant of the ratio of earnings to GDP
  - The difference between the current and ultimate labor share drives the **earnings growth** over the short range
  - 2018 Trustees Report assumption: 63.1 percent ultimate ratio (0.0 percent ultimate growth rate)
- Earnings as a share of compensation growth rate
  - Difference includes employer contributions to pensions, health insurance, social insurance contributions
  - 2018 Trustees Report assumption: -0.06 percent
- Average Hours Worked Per Week
  - Contributes to the GDP growth rate
  - A driver of the average earnings growth rate
  - 2018 Trustees Report assumption: -0.05 percent

Principal Economic Assumptions

- Consumer Price Index for Urban Wage Earners (CPIW)
  - A key driver of COLA and real earnings growth rate
  - 2018 Trustees Report assumption: 2.6 percent growth rate
- Price Differential (GDP Deflator growth-CPIW growth)
  - Differential is due to computational differences and coverage differences, each component is assumed to form differential
  - Differential and CPIW form GDP Deflator assumption
  - GDP deflator links productivity to nominal earnings growth
  - 2018 Trustees Report assumption: -0.4 percent growth rate
- Growth in average U.S. earnings
  - Determined from above assumptions, but labor productivity growth rate is the foundation
  - 2018 Trustees Report assumption: 3.8 percent growth rate

Additional Economic Assumptions

- Share of OASDI covered earnings subject to OASDI taxes (Taxable Ratio)
  - 2018 Trustees Report assumption: 82.5 percent
- Labor force participation rate (LFPR) and the unemployment rate (RU)
  - Components of the average US employment
  - Key factors in both covered employment and earnings
  - **Employment** is the quantity of interest, so LFPR and RU should be considered together
  - Determined from OCACT Model
- Real Interest Rate on Trust Fund New Issues
  - 2018 Trustees Report assumption: 2.7 percent

Key Considerations

- We have seen recovery in employment since the Great Recession, but labor productivity, labor share, average earnings, and interest rates have lagged.

- How to incorporate recent experience into the ultimate assumptions
  - Was the Great Recession and its aftermath an aberration or evidence of new trends?
  - Should we wait for complete business cycle to re-evaluate assumptions?

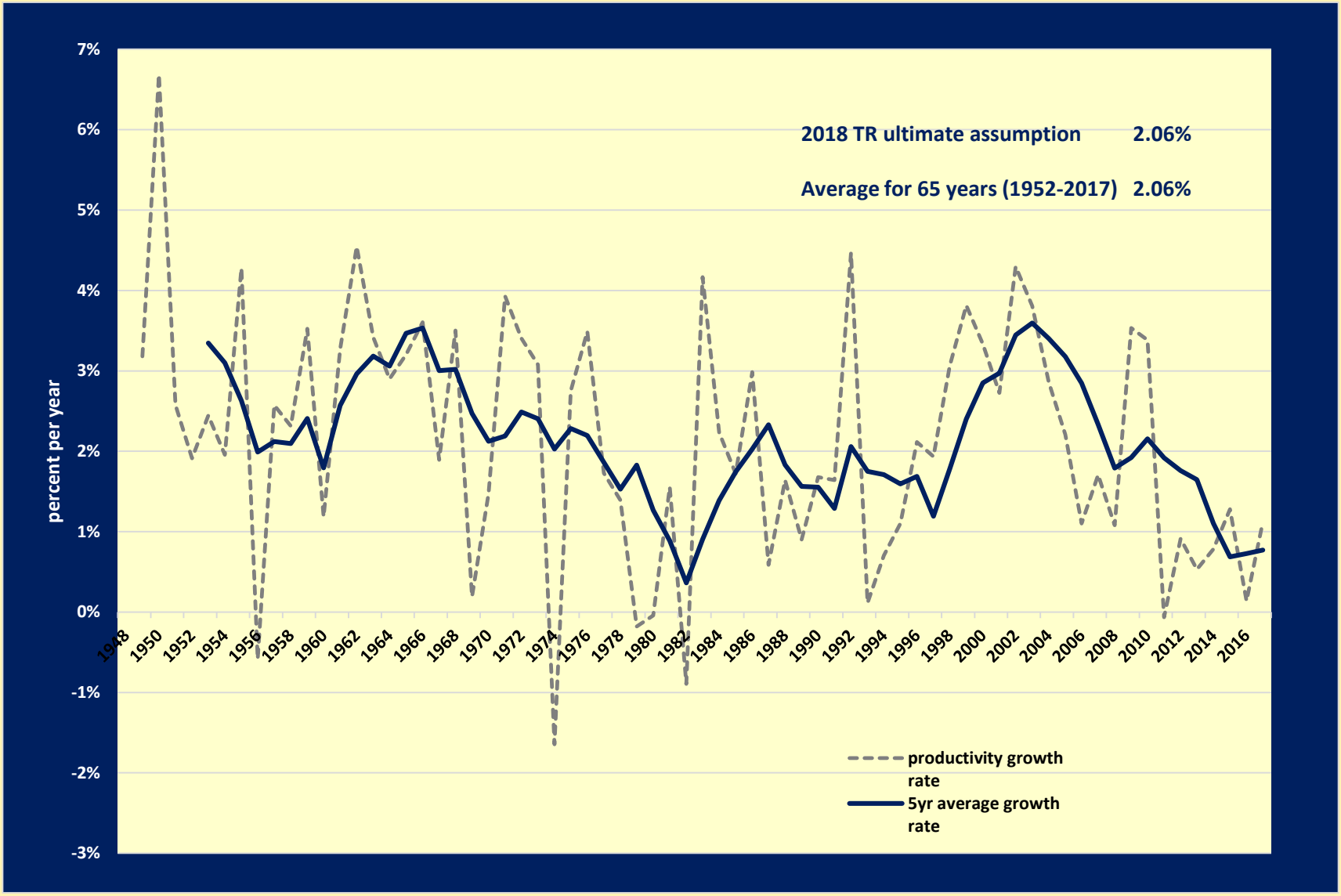
- Important to have a holistic approach to setting ultimate assumptions

Additional Slides

Productivity Growth Rate

- No accepted theoretical model on which to base projections
- Long-run historical average is useful
- Past sector shifts (Farm→Non-Farm) won't repeat
- Thus we use historical growth rate in Nonfarm Business sector productivity as the basis for projections
- Assume constant sector weights, zero productivity growth for government and non-profit sectors

Historical NFB Productivity Growth Rate



Future Labor Productivity

Optimistic View

- Past productivity slowdowns have been reversed; the current slowdown is not permanent
- Future technological advances can result in higher productivity growth after a (long) period of adoption and diffusion (Brynjolfsson)
- New technologies not properly accounted for in GDP hide the existing productivity growth (Brynjolfsson, Varian, Sichel)
- Estimate of future productivity growth (Branstetter and Sichel, 2017)

Table 1 Conservative and optimistic projections of productivity growth

Item	Conservative scenario	Optimistic scenario
Annual percentage growth in labor productivity (baseline from Byrne, Oliner, and Sichel 2017)	1.50	1.50
Source of additional productivity growth (percentage points)		
Big data in healthcare	0.07	0.14
Robotics	0.07	0.25
E-learning	0.15	0.30
Higher research intensity in non-Western economies	0.10	0.25
Total augmented labor productivity growth (percent)	1.89	2.44
Memorandum:		
Second wave scenario from Byrne, Oliner, and Sichel (2017) (percent)	2.20	2.20

Source: Authors' calculations.

- 1.89 to 2.44 percent per year

Future Labor Productivity

Pessimistic view

- Productivity growth will stay permanently lower, close to the recent experience
- Fewer productivity-boosting inventions (Gordon)
- Slower improvement in labor force quality (Jorgenson)
- Estimate of future productivity growth

TABLE 1—PAST AND FUTURE GROWTH RATES

	1920–2014	2015–2040
Output per hour	2.26	1.20
Average output per person	2.11	0.80
Median income per person	1.82	0.40
Disposable median income per person	1.69	0.30

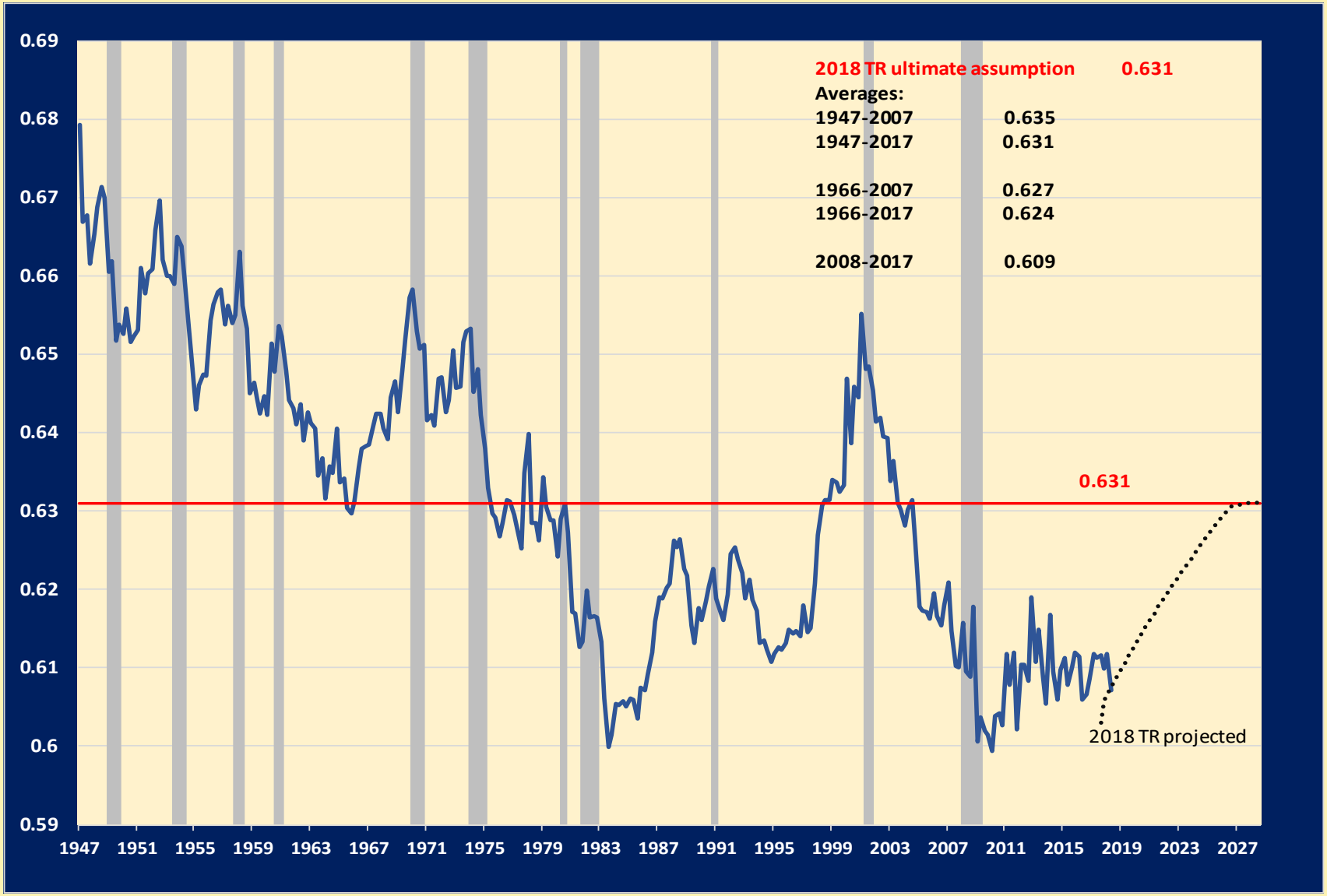
Source: Gordon (2016, Figure 18-5).

- 1.20 percent =
  avg growth of output per hour for 1970-1994 and 2004-2015 (1.38 p.p. per year)
  less
  estimated effect of the slowing advance of educational attainment (-0.18 p.p.)

Productivity Growth – Other Considerations

- Theoretical link between productivity growth and interest rate
- Equilibrium interest rate (return to capital) depends on the time discount parameter and the growth rate of productivity
- Changes to the ultimate assumptions for productivity growth and interest rate should be considered together

Labor Share of GDP



Wage-to-Compensation Ratio

- Compensation of employees comprises taxable wages (and salaries and incentives) plus
  - Employer-sponsored health insurance (ESHI) premiums
  - Employer contributions to retirement funds
  - Employer contributions to social insurance programs
  - Other non-taxable benefits (small – about 1% of comp.)
- Projections of future changes in wage-to-comp. ratio are mostly driven by projections of ESHI costs
- Retirement savings *should* increase with longevity, but decline of DB plans has been the main factor

Covered Wages vs. NIPA Wages

- Wage earners not covered by OASDI:
  - Some state & local government employees
  - Federal employees hired before 1983 (closed group)
  - Workers in the underground economy
  - Certain classes of authorized foreigners
  - Certain exempt classes (students working at schools, religious exemptions…)
- All self-employment net income is covered… but how much of it is reported?
  - BEA estimates only ~31% of SE income is reported

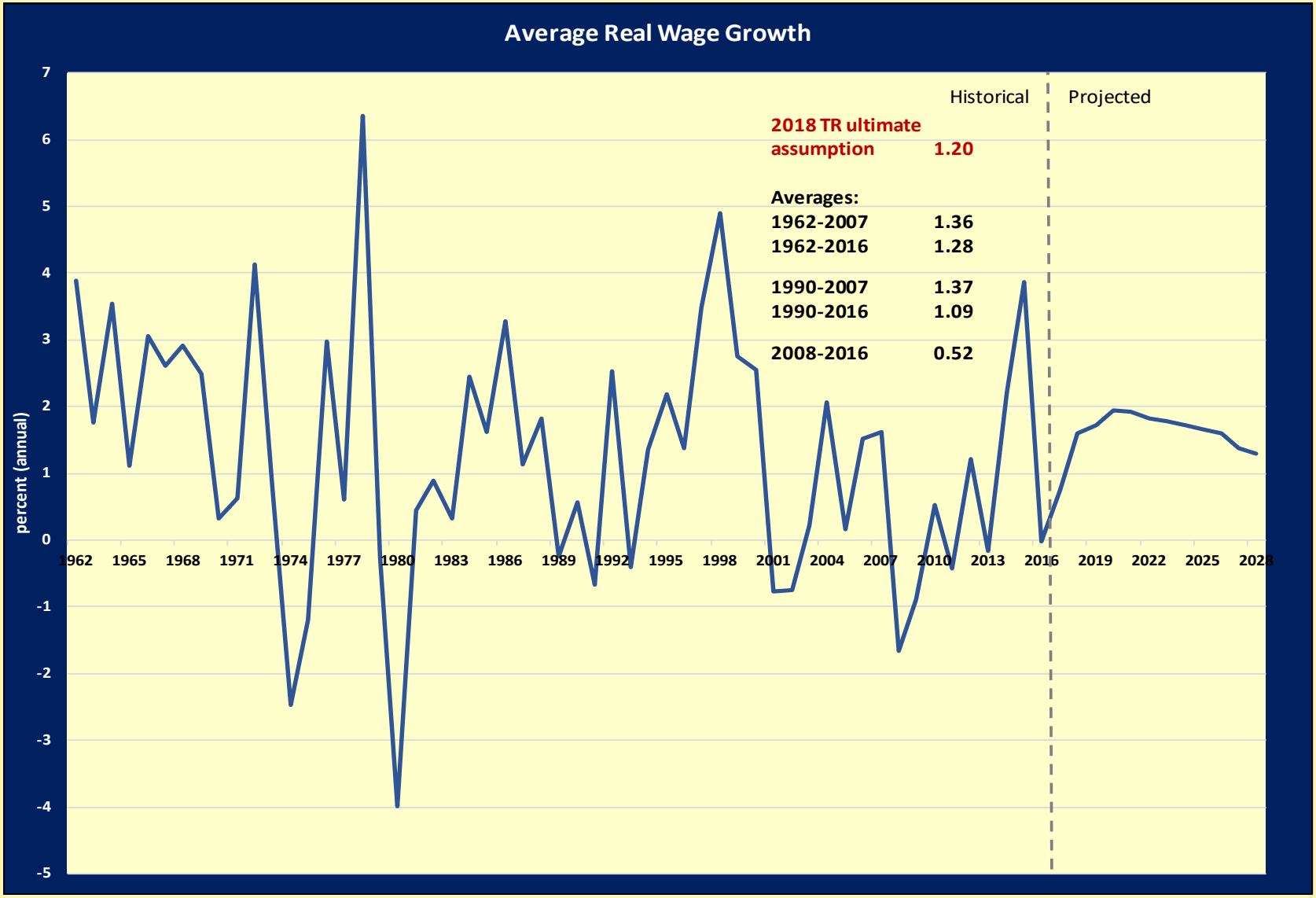
CPI-W Inflation

- Inflation as measured by the CPI-W determines the COLA for beneficiaries
- Ultimate assumption for CPI-W inflation in the 2018TR alt 2 is 2.6 percent
- Historical Average Annual Percentage Change (adjusted):
  - 1979-1990: 5.00%
  - 1990-2001: 2.45%
  - 2001-2007: 2.63%
  - 2007-2018: 1.74%
- Average since 2007 low due to severity (and slow recovery from "Great Recession"), 2018 back to about 2.6 percent.
- Federal Reserve inflation target of 2.0 percent is based on a different measure, Personal Consumption Expenditures (PCE), and is lower than CPI-W by about 0.3ppt due to difference in computational methods.

Price Differential

- The price differential is the annual growth rate in the GDP deflator minus the annual growth rate in the CPI-W
- The GDP deflator is used to determine productivity which affects wage growth and hence OASDI taxes, whereas the CPI-W determines benefits
- Assumed ultimate price differential in 2018TR alt 2 was -0.4 percentage point, of which
  - -0.3 percentage point due to difference in computational methods, and
  - -0.1 percentage point due to coverage differences

Real Average Covered Wage Growth



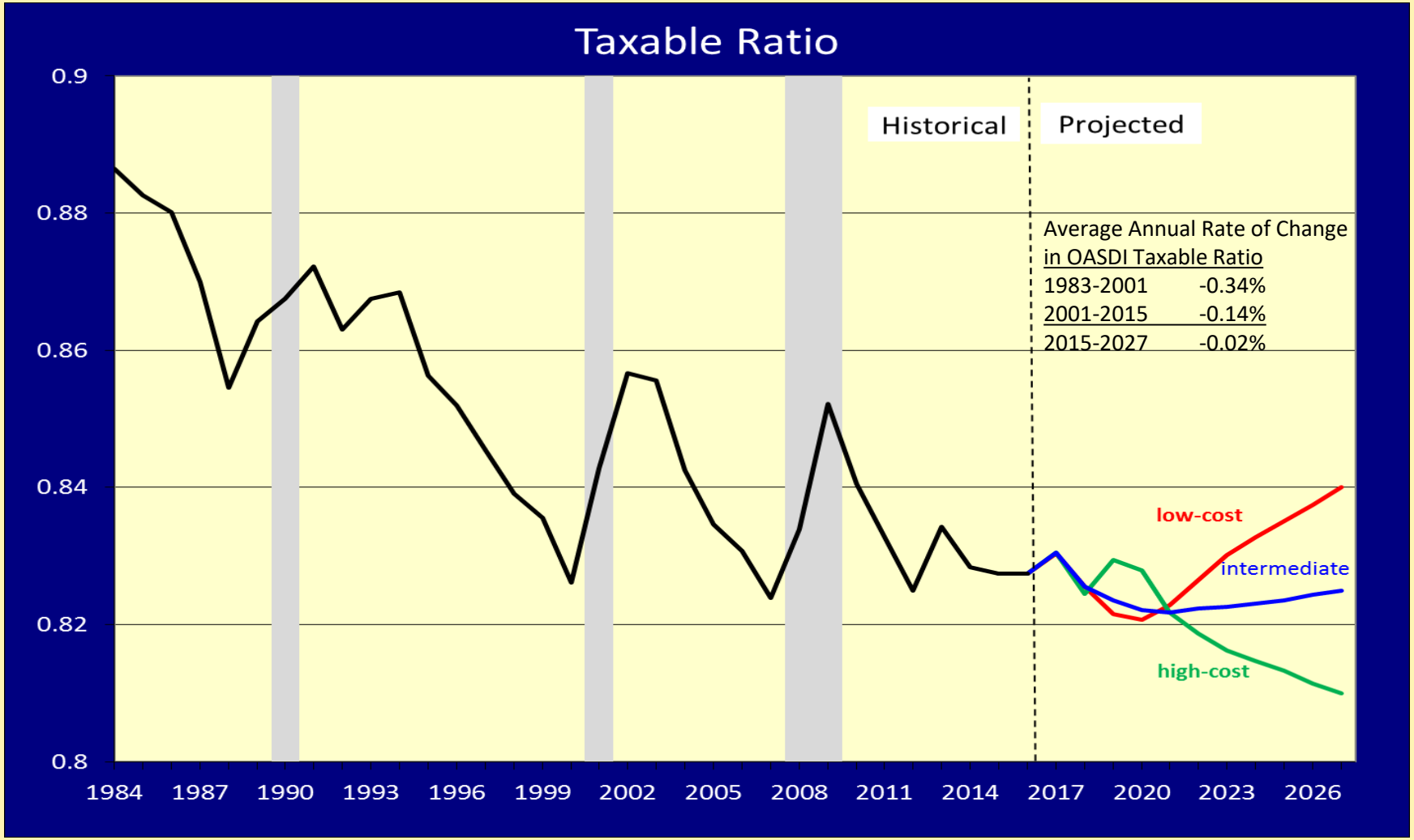
The Taxable Ratio

- The taxable earnings ratio is the ratio of taxable earnings (from wages and self-employment) to covered earnings subject to the OASDI payroll tax.
  - Covered earnings are taxed up to the taxable maximum (also known as the contribution and benefit base). For 2019, the taxable maximum is $132,900.
  - The taxable maximum rises with the national wage index.
    - The average wage index (AWI) is the average compensation subject to Federal income taxes as reported on Form W-2 and includes compensation and employees from non-covered employment.
    - For more information on the AWI and the taxable maximum, https://www.ssa.gov/oact/COLA/index.html

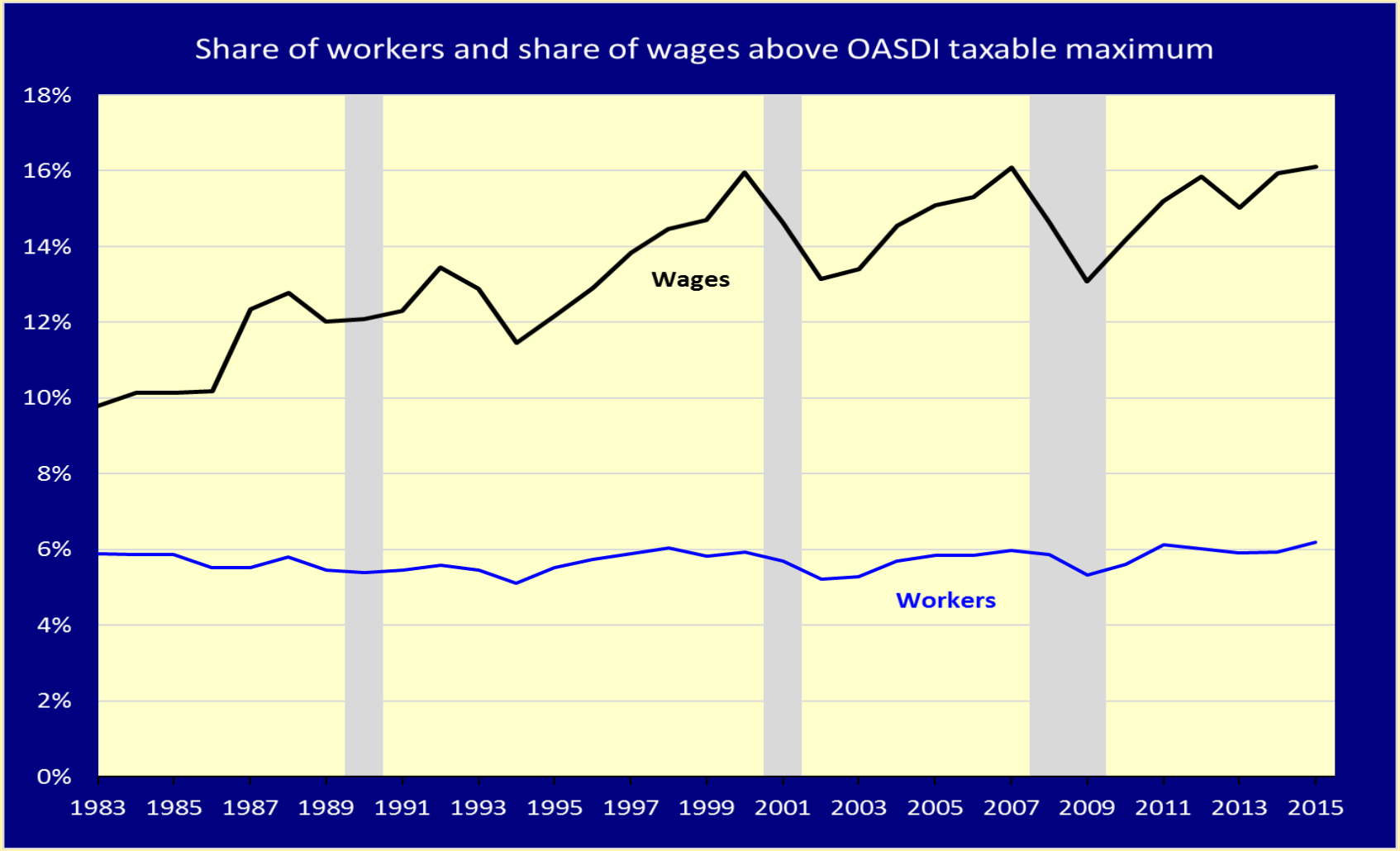
The Taxable Ratio

- Stock Options
  - Incentive Stock Options (ISO) vs. Nonqualified Stock Options (NSO)
  - Income from ISOs is not subject to OASDI tax
  - Income from the exercise of NSOs is subject to OASDI tax and can amplify swings in the taxable ratio due to the business cycle
    - For example, the steep drop in the taxable ratio in the late 1990s

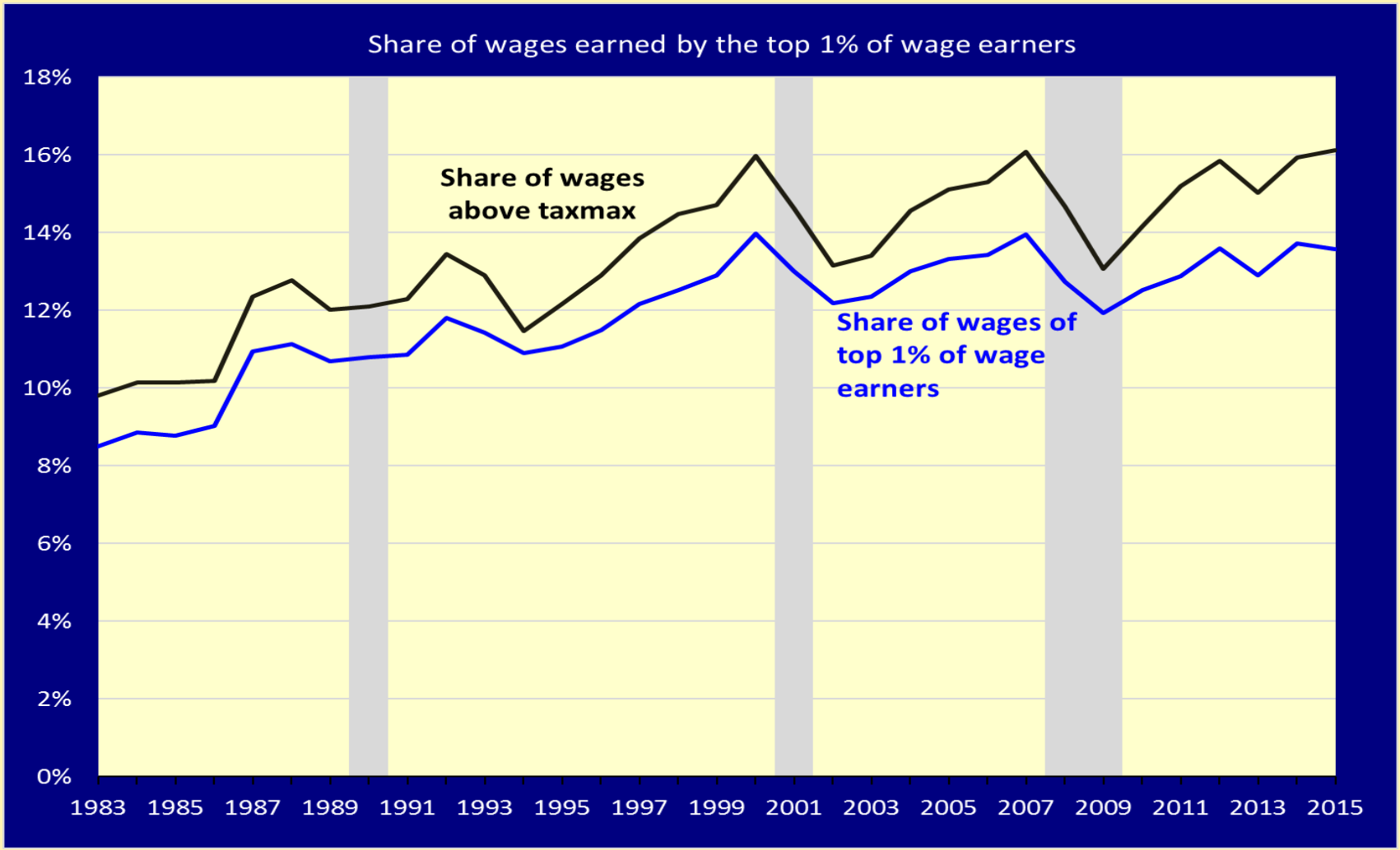
Taxable Ratio: Historical (through 2016) and TR2018 projections



OASDI-covered Wages in Excess of Taxable Maximum



Share of Wages Earned by the Top 1% of Wage Earners



Labor Force, Unemployment, and Employment

- Projections of *covered employment* (by age and sex) are important for the trust fund actuarial status
- Covered employment determines level of payroll, insured population, total level of benefits
- Employment projections are created from the projections of the LFPRs and the unemployment rates (by age and sex).
  - Has the relationship changed?
- The ultimate age-sex-adjusted unemployment rate is set by assumption;
  LFPRs are projected by OCACT's model.

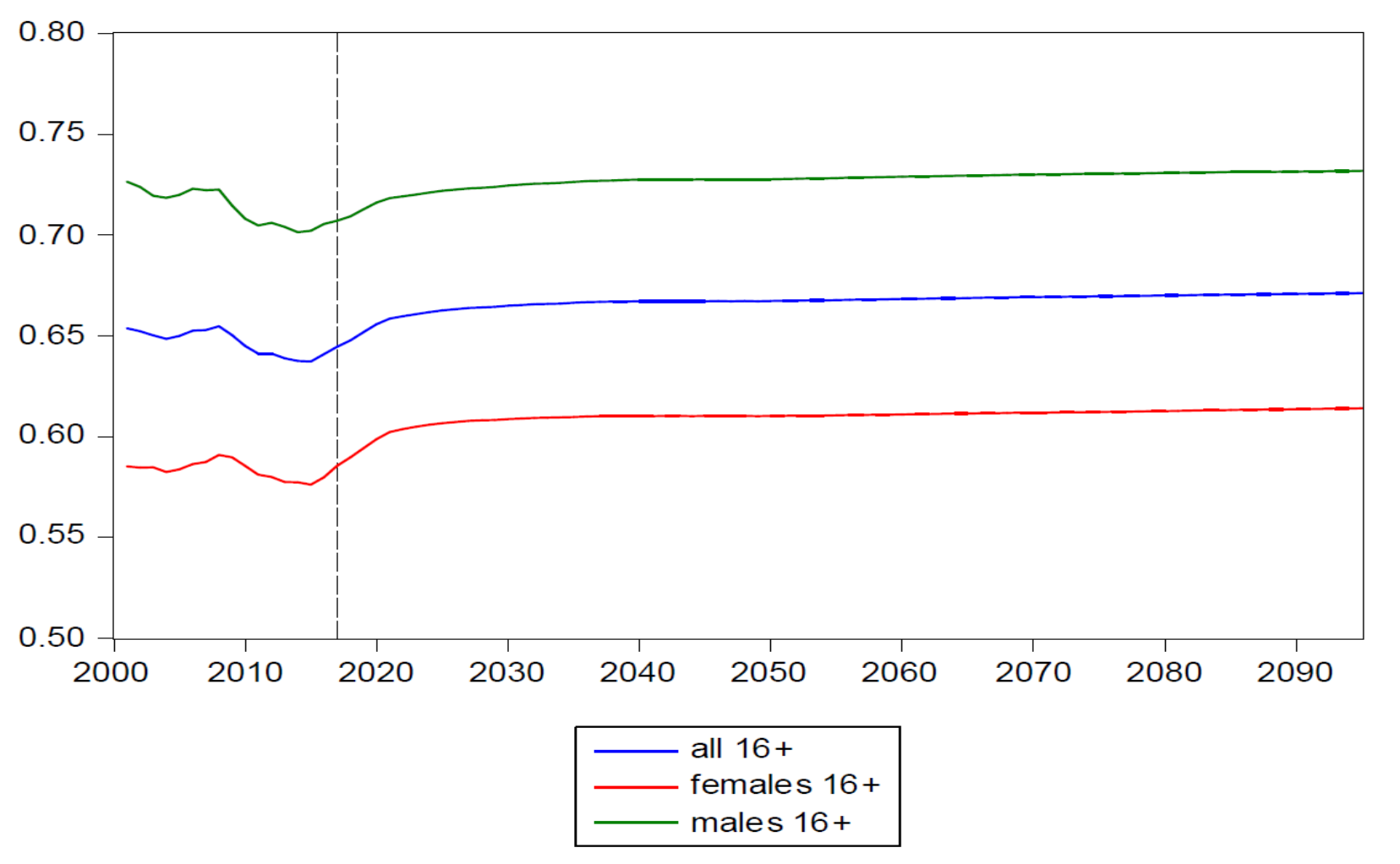
Labor Force Participation and Employment Rate Projections

Projected LFPRs ultimately depend on:

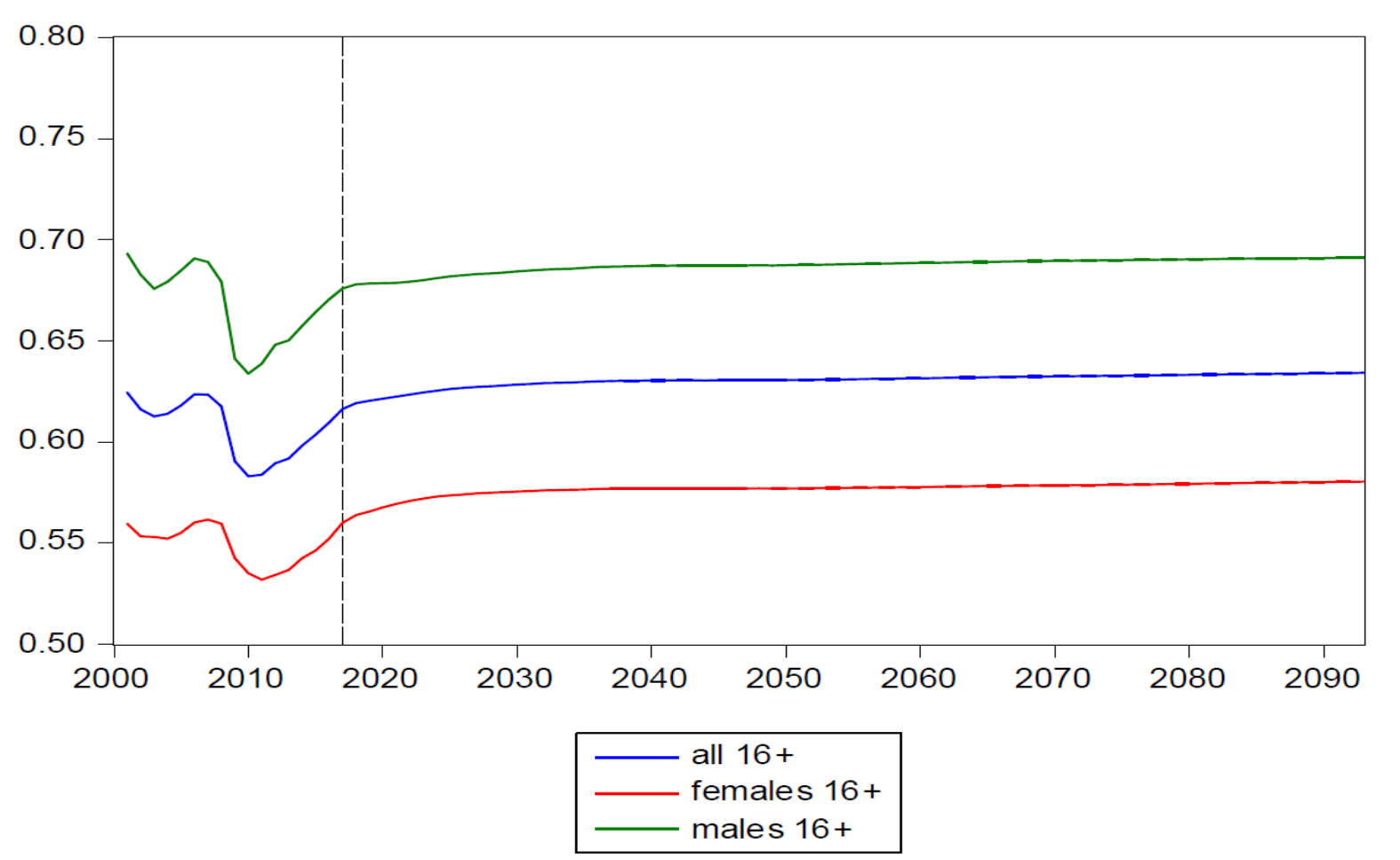
- The ultimate assumption for the (age-sex specific) unemployment rates
- LFPR model equations, which project LFPRs using the unemployment rates and other factors
- Demographic projections

Ratio of employment to population is obtained from the projected LFPRs and the projected/assumed unemployment rates.

Projected LFPRs (age-sex adjusted) 2018 TR (intermediate assumptions)

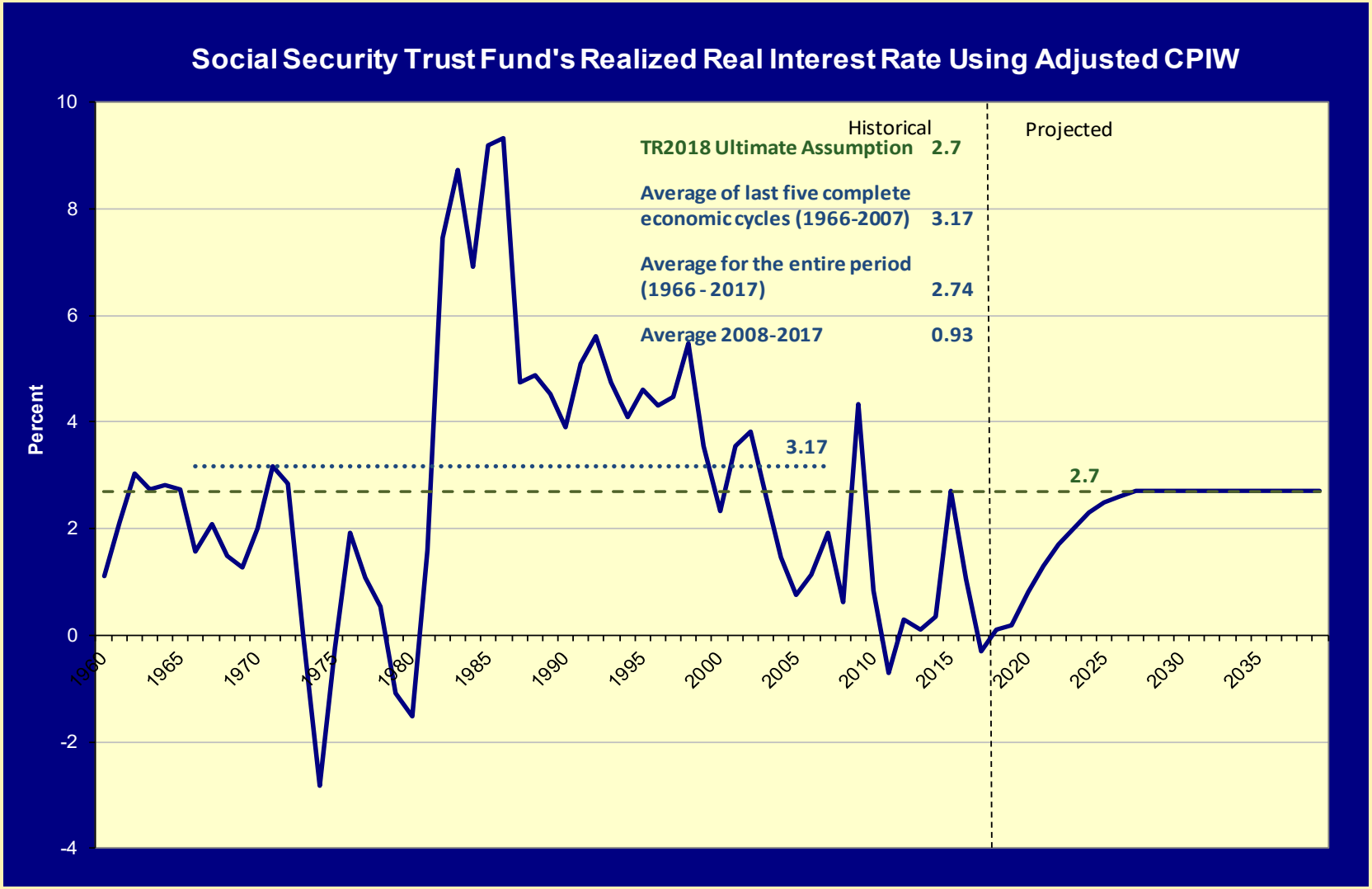


Projected Ratio of Employment to Population (age-sex-adjusted)
2018 TR (intermediate assumptions)



History and Projections of Real Interest Rates

Realized Real Interest Rate on Trust Fund New Issues (in first year)



Real Interest Rate Projection Comparisons

Year Published	CBO Long-Term Budget Outlook [a]		OMB Budget [b]	Trustees Report (alt 2)
	10th year	long-term		
2010	3.7	3.0	3.2	2.9
2011	3.1	3.0	3.2	2.9
2012	2.7	3.0	3.2	2.9
2013	2.9	3.0	2.8	2.9
2014	2.6	2.5	2.7	2.9
2015	2.2	2.3	2.2	2.9
2016	1.7	2.3	2.0	2.7
2017	1.2	2.3	1.7	2.7
2018	1.4	2.4	1.5	2.7

(a) CBO's projections for the first 10 years are constrained by the requirement to assume continuation of current law.
(b)The OMB Budget's projected ultimate values published in 2010 - 2018 are from the FY2011 - FY2019 budgets.

Private Forecasters Real Interest Rate and NFB Productivity

- 2018 TR: Real Interest rate 2.7%, NFB productivity growth: 2.1%
- Moody's Analytics
  - 2011 Forecast (2032-2040)
    Real interest rate: 2.8% NFB productivity growth: 1.6%
  - 2017 Forecast (2038-2047)
    Real interest rate: 1.9% NFB productivity growth: 1.6%
  - 2018 Forecast (2039-2048)
    Real interest rate: 2.2% NFB productivity growth: 1.6%
- IHS Global Insight
  - 2011 Forecast (ultimate by 2035)
    Real interest rate: 2.8% NFB Productivity growth: 2.1%
  - 2017 Forecast (2038-2047)
    Real interest rate: 1.7% NFB Productivity growth: 1.6%
  - 2018 Forecast (2039-2048)
    Real interest rate: 1.6% NFB Productivity growth: 1.5%