

Projecting Labor Supply in the Annual *Trustees Report*

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Technical Panel on Assumptions and Methods

Motivation

- OACT total labor supply projection is the result of a labor force participation model plus average hours assumption
 - LFPR model does not include many key drivers
 - Crucial “trend versus transition” question buried
 - No real sense of uncertainty about labor supply
- Trends in labor supply have a potentially significant impact on Social Security finances
 - Especially for older workers
 - Especially in the short/medium term

From Trustees Report, Chapter V

“The projected labor force participation rates are not basic assumptions. They are derived from a historically-based structural relationship using demographic and economic assumptions specific to each alternative. However, the participation rates are not highly sensitive to most of the demographic and economic assumptions. Accordingly, the projected labor force participation rates do not vary substantially into the future and across alternatives.”

Labor Supply Matters

- Senate Finance Hearing July '10
- OACT testimony
 - 10 percent increase in LFP for 62 and older could eliminate .09 on summary AB; 5% of shortfall
 - Returning to 1950 LFP by age (adjusted for DI) could eliminate .79 on AB; 35% of shortfall
- Nicole Maestas testimony/follow-up
 - Have seen significant upward trend in LFP since mid 1990s, more than 10 percent increase likely

Why Labor Supply 62+ Matters

- Older workers often face very high effective tax rates on additional years of work
 - Deferring benefit negated by actuarial adjustment
 - Key is that PIA largely unaffected unless replacing a low-earning year with a high-earning year; by age 62, many have 35+ good years of earnings
 - For women, sometimes just replacing spousal or survivor with earnings on their own record
- Shows why more than LFPR per se, intensity of increased labor supply (total earnings) matters

Relationship to Uncertainty Presentation

- In November, I used labor force participation as an example of what should be an explicit input and discussed in Summary section
 - Trustees should see the effect of varying labor supply, and they should weigh in on values
 - Readers should see uncertainty b/c of labor supply
- Start today with question of *whether* labor supply should be a basic assumption, finish with *how* to specify the basic assumption(s)

Outline for Today's Talk

- I. Review of 2007 Technical Panel labor force participation recommendations
- II. Description of OACT labor supply model(s)
 - Connection b/t models and basic assumptions
- III. Making labor supply a basic assumption
 - How to map labor force participation by age and sex into a few basic assumptions?
 - Should assumptions be about labor force participation, or hours-weighted participation?

2007 Technical Panel Recommendations

- **A-7:** No change in intermediate/high, but large potential upside risk, so increase low-cost
- **M-17:** Review and potentially restructure; simpler, more transparent, more rigorous
- **M-18:** Focus on specific subgroups, especially non-natives and older workers
- **M-19:** integration of LFP with other assumptions; hours, productivity, earnings

Presenting Projections for LFPR

- LFPR is not a basic assumption, but varies b/t high- and low-cost because of movements in underlying determinants (e.g, life expectancy)
- Straight LFPRs for all men and all women 16+ biased when population ages, so convention is to use base population weights (age-adjusted)
 - Important to keep this measure in mind later, when discussing difference between using group-specific “models” versus “basic assumptions”

75th Year Age-Adjusted LFP Rates

	Low-Cost		Intermediate		High-Cost	
	Men	Women	Men	Women	Men	Women
2007 Trustees Report	72.8%	60.6%	73.3%	60.8%	73.9%	60.9%
2007 Technical Panel	77.0%	65.0%	73.3%	60.8%	73.9%	60.9%
2010 Trustees Report	73.0%	61.0%	72.1%	60.4%	71.2%	59.6%

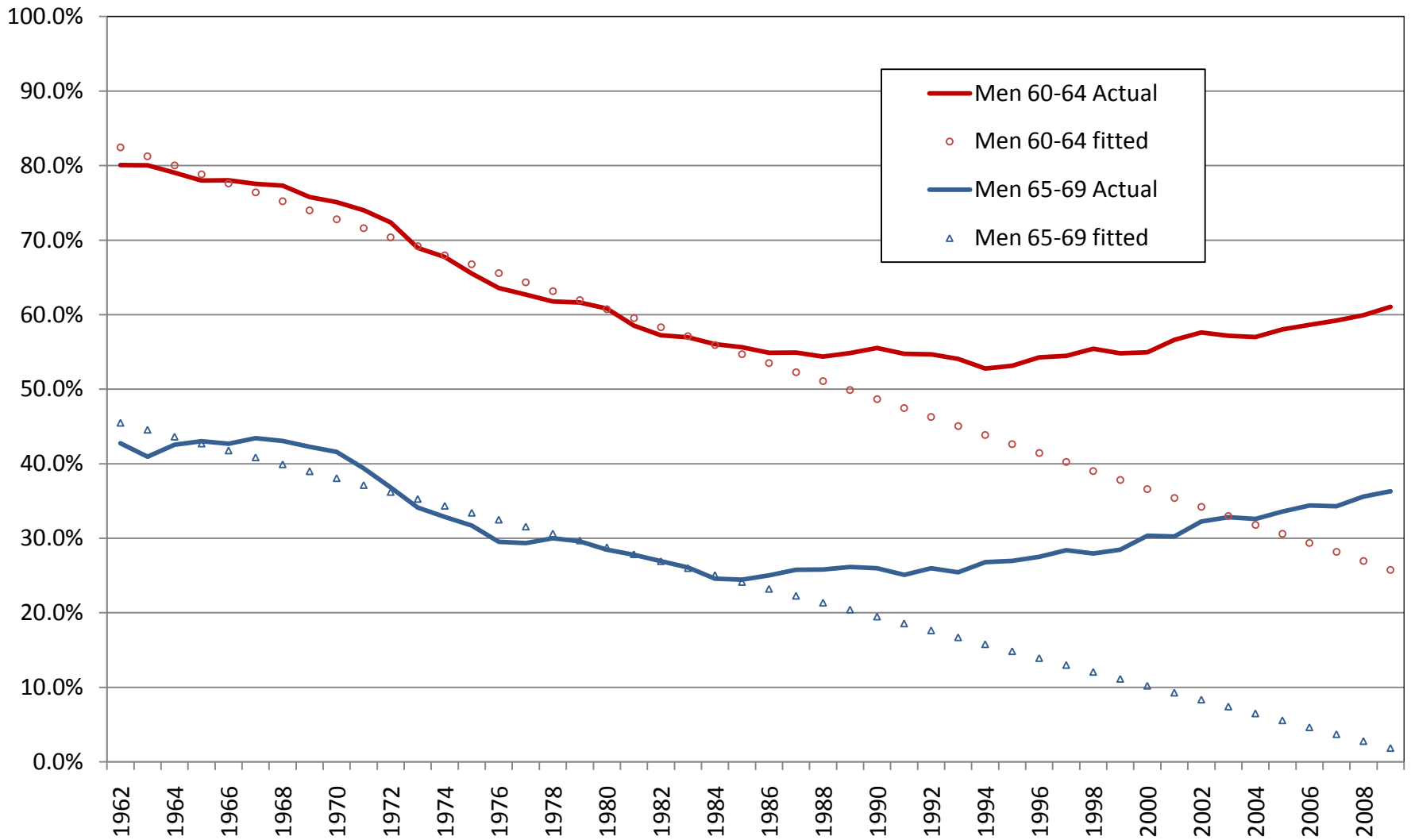
Evaluating Projections for LFPR

- Overall LFPRs for ages 16+ in 2008 base year
 - Men = 73.0% (vs 72.1% in 75th year 2010 *TR*)
 - Women = 59.5% (vs 60.4% in 75th year 2010 *TR*)
- Roughly constant over next 75 years, but are differential trends across age groups
- Shows danger of summarizing all LFPR with one number, and raises question for later, how many numbers do Trustees need to see?

OACT Changes in LFPR Since 2007

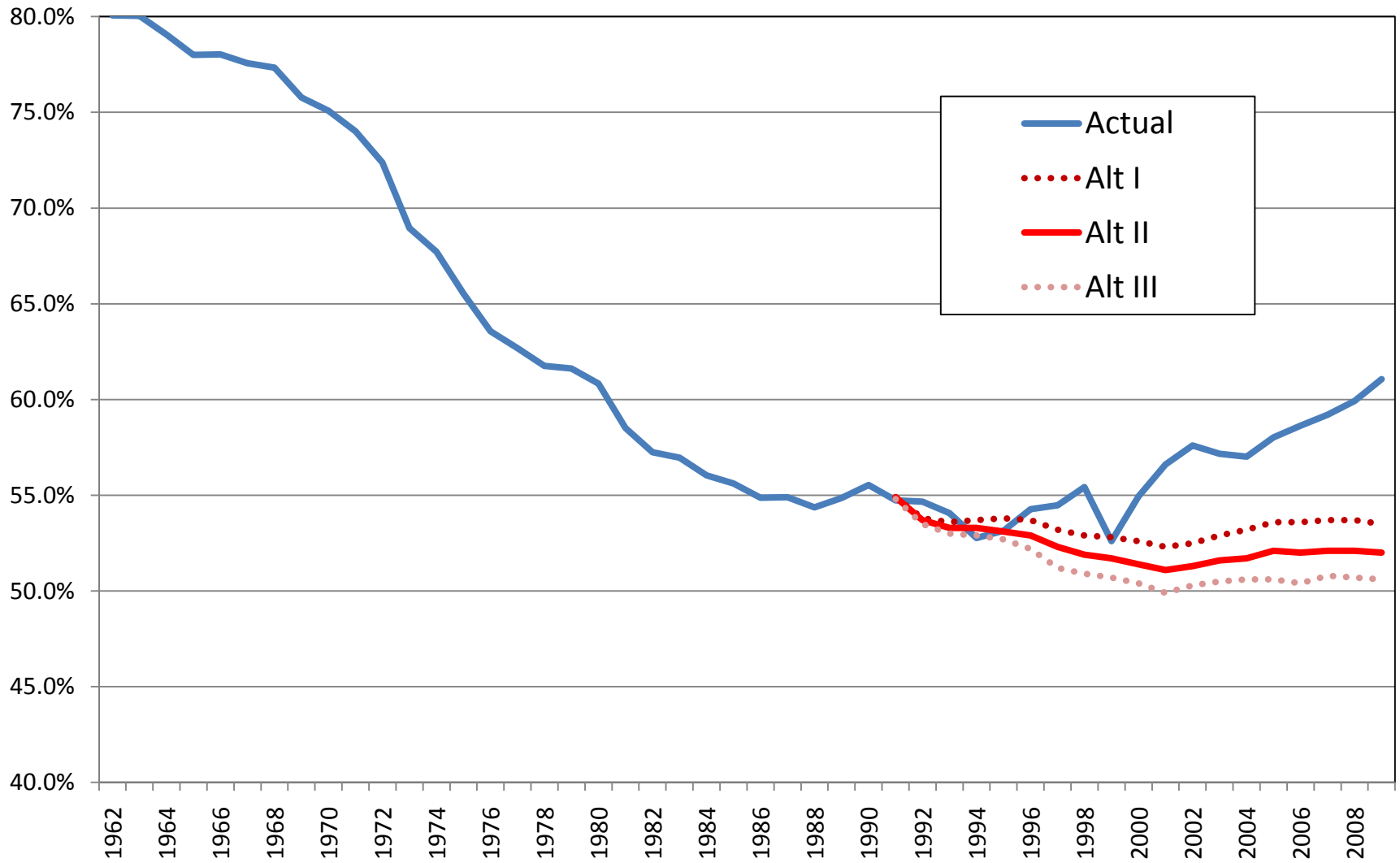
- Intermediate and high-cost values for 75th year are slightly lower in 2010 than in 2007
- Still no meaningful ranges; changes in model structure last couple years flipped direction
 - Low cost used to be associated with lower LFPRs, and now they are (appropriately) higher LFPRs
- Low-cost up slightly, but not nearly as much as 2007 Panel suggested (they were focused on increasing LFPRs for older workers)

Labor Force Participation Rates of Men Ages 60-64 and 65-69 (Actual vs. linear forecast fitted to 1962-1986 data)



1990 Trustees Report Projections for 1991-2010

Labor Force Participation Rate of Men Ages 60-64



Ranges for LFPR Values

- Next session on labor supply assumption will involve many more graphs like these
 - Which groups? What measures?
 - Trend versus transition, implied uncertainty
- Rest of today's presentation setting that up
 - OACT labor force participation model
 - Relationship between model/basic assumptions
 - Preliminary thoughts on groups/measures

OACT Labor Force Model(s)

- Underlying philosophy straight-forward
 - Split population into groups (age, sex, marital, children) to control for major determinants of LFP
 - Add within-group controls for demographic, economic, programmatic, and cohort variables
 - Adjust for any “out of model” effects like increasing life expectancy
- If there are no forces pushing LFPR up or down within a given *group*, LFPR is effectively a constant, which is ideal for projecting

OACT LFPR Model Details

- Total of 153 groups, 69 male, 84 female
- Independent variables (not relevant to all)
 - Disability prevalence
 - Unemployment rate
 - Benefit replacement rate (62 to 70 year olds)
 - Earnings test (62 to 69 year olds)
 - Number children <6 (females 20 to 44)
 - Cohort effects (females 55+, males 75+)
 - Spousal LFPR (males 62 to 70)
 - Life expectancy (40 year olds and older)
 - Some trends (younger ages)

Example Equation (Males Age 61)

$$\begin{aligned} \text{PM61} = & - 0.55646 - \text{B2_2064DI} * \text{B1_M6064D} * \text{RM61DI} + \text{PM61E_DE} + \text{PM61_DM} + 0.00203 * \\ & \text{RM6064} + 0.00160 * \text{RM6064.1} - 0.00021 * \text{RM6064.2} - 0.00235 * \text{RM6064.3} - 0.00374 * \\ & \text{RM6064.4} - 0.00331 * \text{RM6064.5} + 0.08544 * \text{PF59} \end{aligned}$$

Ordinary Least Squares

ANNUAL data for 15 periods from 1994 to 2008

Date: 18 NOV 2009

$$\begin{aligned} & \text{pm61_adj} - (-\text{b1_m6064d} * \text{b2_2064di} * \text{rm61di} + \text{pm61e_de} + \text{d09a:pm61_dm} - 0.00598 * \\ & (\text{rm6064} + \text{rm6064.1}) / 2) \\ & = 0.08544 * \text{pf59_adj} - 0.55646 \\ & (0.91866) \qquad \qquad (10.4384) \end{aligned}$$

Sum Sq 0.0017 Std Err 0.0116 LHS Mean -0.5076

R Sq 0.0610 R Bar Sq -0.0113 F 1, 13 0.8439

D.W.(1) 1.5689 D.W.(2) 1.9879

Example Equation (Males Age 62)

$$\begin{aligned} \text{PM62} = & 0.26329 * \text{PF60} - 0.29161 - \text{B2_2064DI} * \text{B1_M6064D} * \text{RM62DI} + \text{PM62E_DE} + \\ & \text{PM62_DM} + 0.00203 * \text{RM6064} + 0.00160 * \text{RM6064.1} - 0.00021 * \text{RM6064.2} - 0.00235 * \\ & \text{RM6064.3} - 0.00374 * \text{RM6064.4} - 0.00331 * \text{RM6064.5} - 0.60 * \text{RRADJ_M62} - 0.02 * \\ & \text{POT_ET_TXRT_62} \end{aligned}$$

Ordinary Least Squares

ANNUAL data for 15 periods from 1994 to 2008

Date: 18 NOV 2009

$$\begin{aligned} & \text{pm62_adj} - (-\text{b1_m6064d} * \text{b2_2064di} * \text{rm62di} + \text{pm62e_de} + \text{d09a:pm62_dm} - 0.00598 * \\ & (\text{rm6064} + \text{rm6064.1}) / 2 - 0.60 * \text{rradj_m62} - 0.02 * \text{pot_et_txrt_62}) \\ & = 0.26329 * \text{pf60_adj} - 0.29161 \\ & (3.03035) \qquad \qquad (6.36388) \end{aligned}$$

Sum Sq 0.0021 Std Err 0.0127 LHS Mean -0.1531

R Sq 0.4140 R Bar Sq 0.3689 F 1, 13 9.1830

D.W.(1) 1.6709 D.W.(2) 2.6665

Sympathy for 2007 TPAM...

- OACT description very dense: above eqns + intro paragraphs are extent of documentation
 - Have to guess at syntax, variable names, actual transformation of variables prior to estimation
 - No real sense of explanatory power; looking at coefficients/r-squared on transformed/adjusted versions of the independent variables
- Helps explain why 2007 TPAM called for more “rigor” at the same time they wanted more “transparency” and “simplicity”

...but Sympathy for OACT Also

- 1st 2007 Panel method recommendation probably not practical given fundamentals
 - Not clear (to me) how to specify more rigorous model that would not exacerbate basic problems
- CBO's microsimulation for labor force participation more similar than different
 - Same demographic, economic, policy variables
 - Also allows coefficients to vary across groups
 - Also does not capture many key trends; missing same sorts of key determinants for (esp.) 62+

Missing Drivers of LFPR for 62+

- OACT, BLS, CBO, past Technical Panels, all list missing LFP determinants for older workers:
 - Shift from DB to DC pensions
 - Employer sponsored health insurance
 - Rising educational attainment
 - Improving age/health gradient, ability to work
 - Increased demand for older workers
 - Current financial crisis; housing and DC assets
 - Current financial crisis; unemployment

Implications for LFPR Model

- Given that list of missing key drivers, what modeling approach is suggested?
- In theory, a microsimulation with those determinants assigned to every observation
 - That model does not exist, not foreseeable
- Even if it did exist, still likely to be residual unexplained trends that will involve judgment
- **Bottom line:** There is no practical modeling solution, so LFP should be a basic assumption

Models Versus Basic Assumptions

- Choice between model and basic assumption actually not as stark/contentious as it seems
 - Right now, OACT uses a model, summarizes implications by reporting age-adjusted LFPRs
 - Could specify age-adjusted LFPRs, and use a model to allocate those values across groups
- Ties back to the issue of how many numbers are needed to characterize trends; for example split men vs women, <62 versus 62+ or some other age split, native vs immigrant

Significant Departure?

- This “top-down” versus “bottom-up” modeling distinction arises frequently
- CBOLT uses “allocation” in several modules
 - Often aligning micro equations to macro targets
 - Labor supply calibrated to CBO 10 year projection
 - Also, assigning outcomes like differential mortality
- OACT “add factors” also blur distinction between models and assumptions

Labor Supply as a Basic Assumption

- Moving past whether, preliminary thoughts on how to switch to basic assumption approach
- First Dimension: Level of Aggregation
 - How many basic assumptions are needed?
 - By sex, age, native vs immigrant?
- Second dimension: Measure of Labor Supply
 - Focus on LFPR in isolation, or simultaneously with total labor hours/labor earnings?

What Level of Aggregation?

- Tradeoff is between tractability and separating out important trends for subpopulations
 - 2007 Technical Panel emphasized latter (M-18)
- Two numbers for all men and all women (as currently reported in TR) certainly too few; values for every age/sex/nativity too many
- Ultimately answer should be empirical and sufficient to preserve correspondence between model(s) and basic assumption(s)

What Measure of Labor Supply?

- LFPR is only part of the story about trends
 - Are older workers leaving career jobs later?
 - Are they more likely to work part-time?
- OACT estimates at beginning required extra assumption about hours and/or weeks worked
 - 2007 Technical Panel also recognized this (M-19)
- Again, question is empirical, need to look at trends in both LFPR and total labor supply (hours, weeks) and possibly earnings itself