PROJECTION OF RETIRED WORKERS

April 12, 2019
Technical Panel
Washington, DC

Office of the Chief Actuary
Social Security Administration

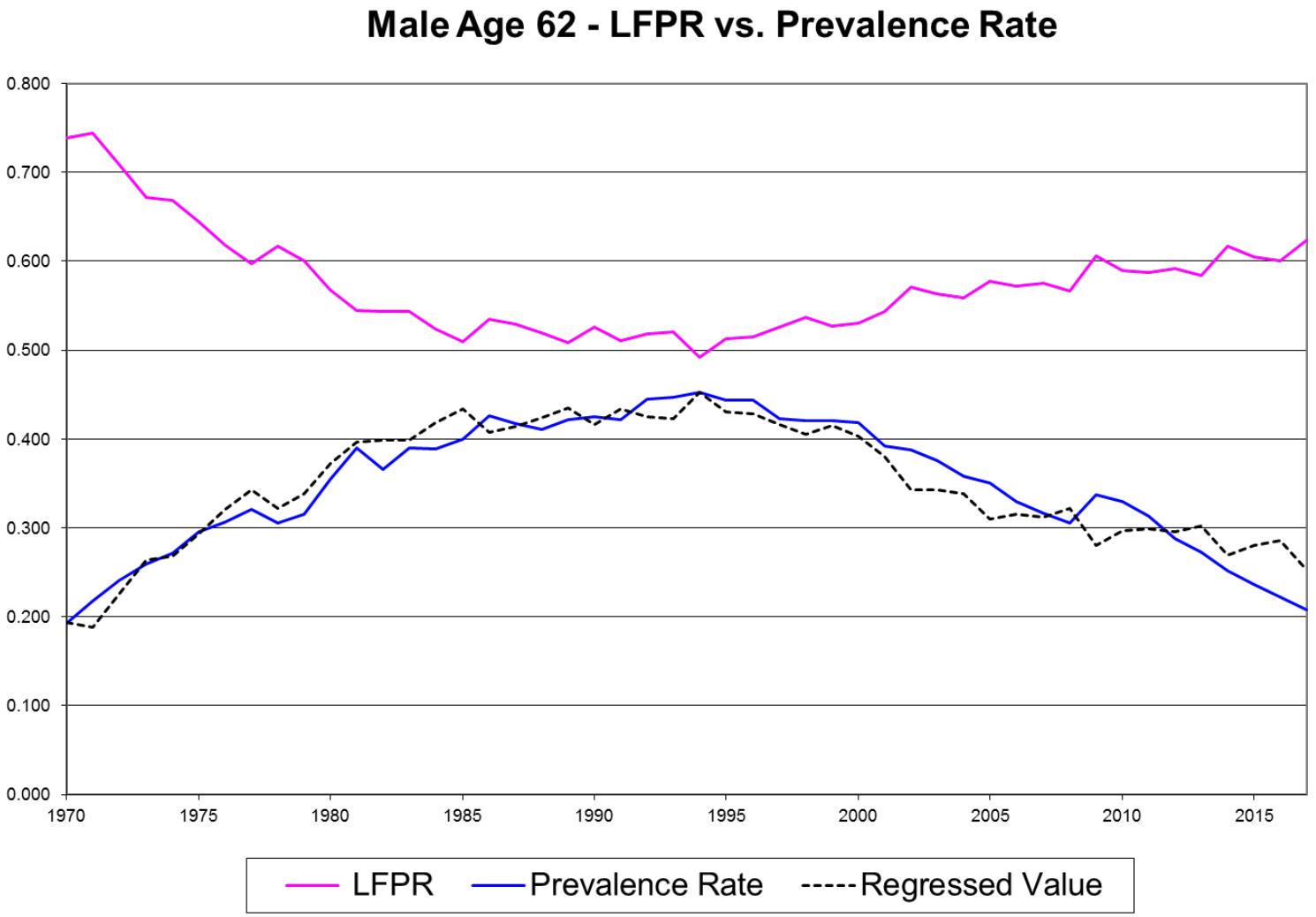
Projection of Retired Workers

- Compute by multiplying the SSA population age 62+ by a series of probabilities of the conditions a person must meet to receive retired worker benefits
  - Probability primary account holder is fully insured
  - Probability primary account holder is not receiving widow(er) or disabled-worker benefit
  - Retired Worker Prevalence rate

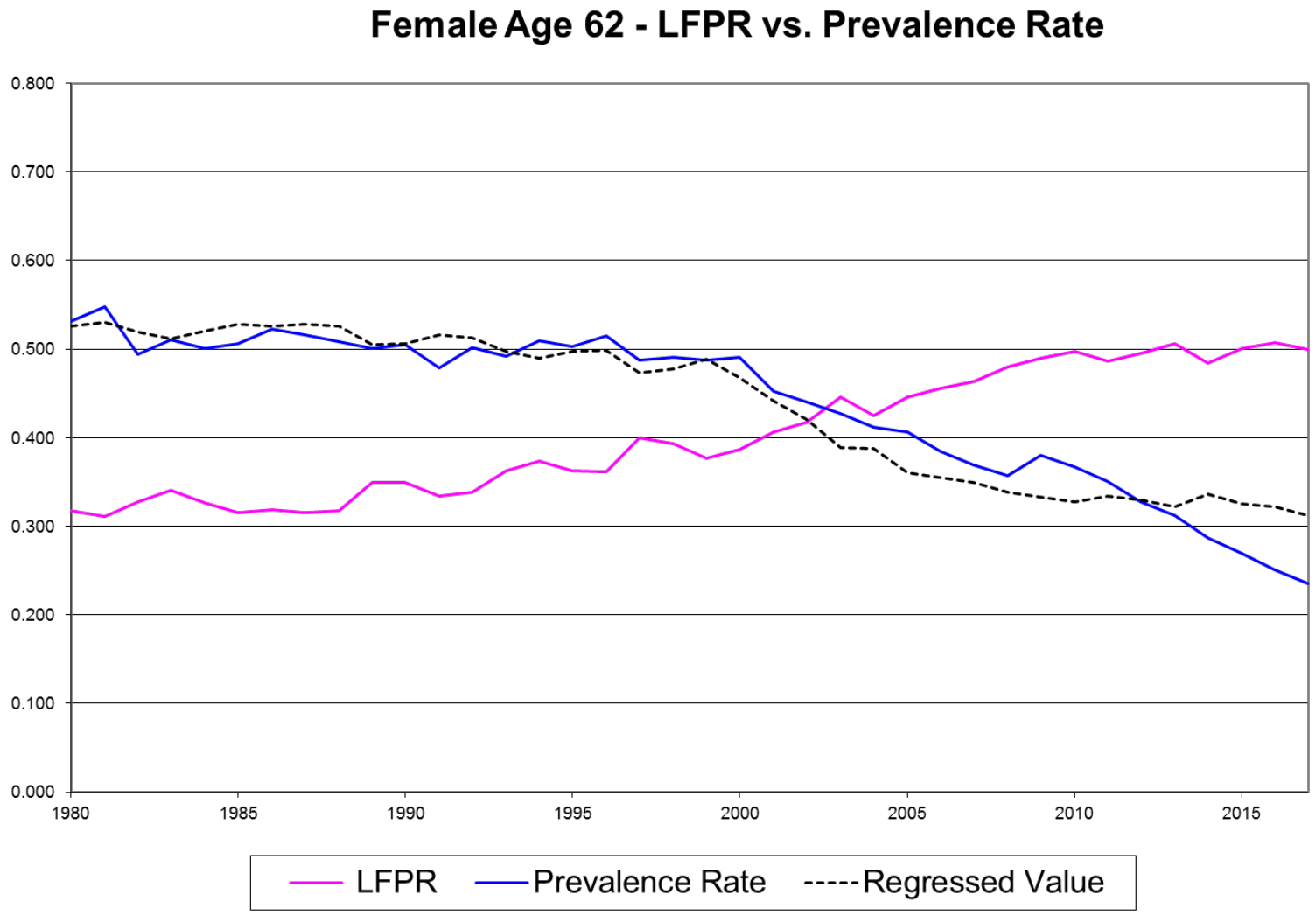
Age 62 Prevalence Rate

- Historical age 62 prevalence rates follow an inverse relationship with
  - Labor force participation rates (LFPR) at age 62 and
  - Increases in the normal retirement age (NRA).
- We assume this relationship holds for the projection period and calculate a regressed prevalence rate based on the projected LFPR and the number of months to NRA.
- Calculate prevalence rates on a cohort basis.

Male Regressed Prevalence Rates



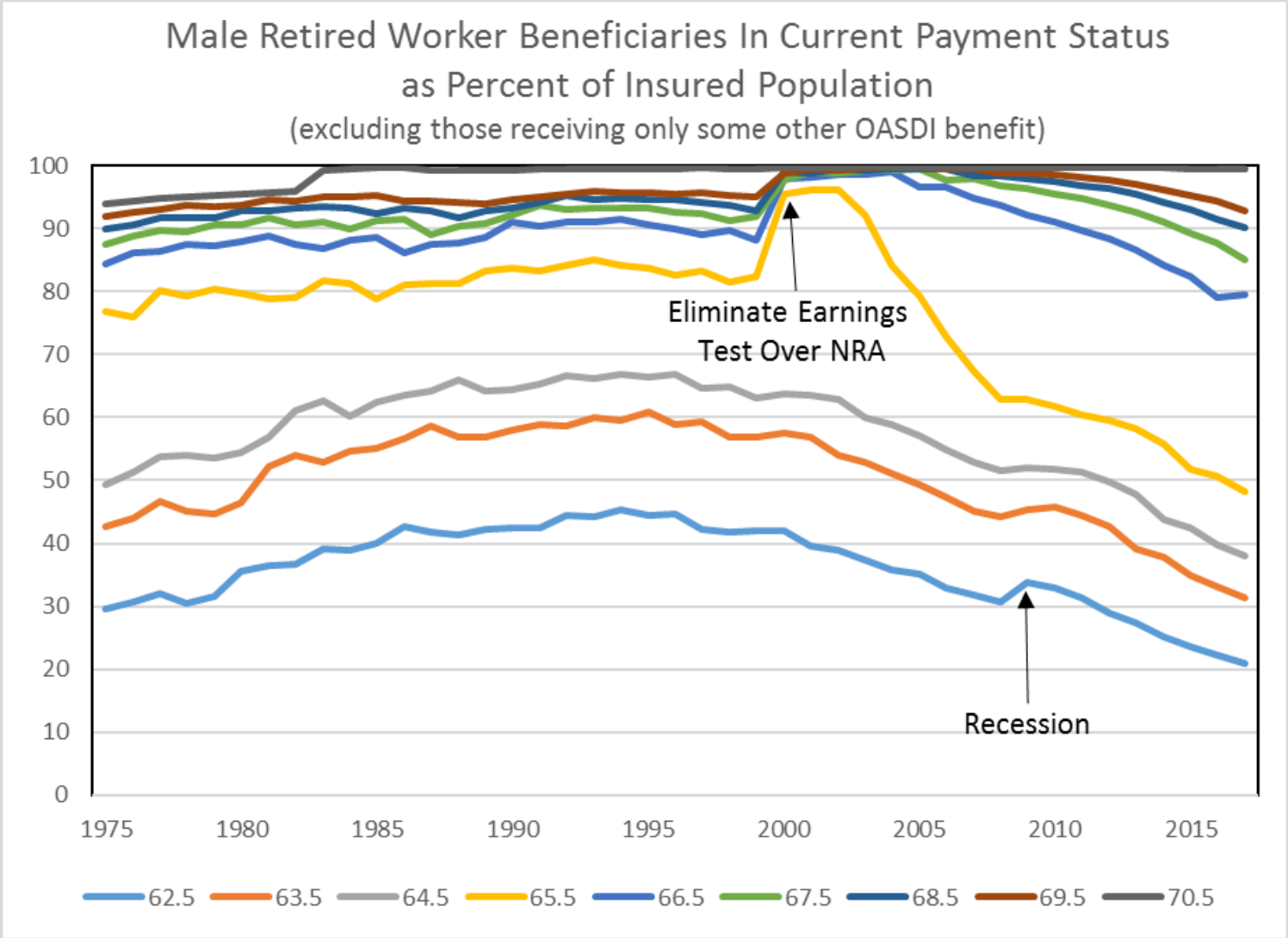
Female Regressed Prevalence Rates



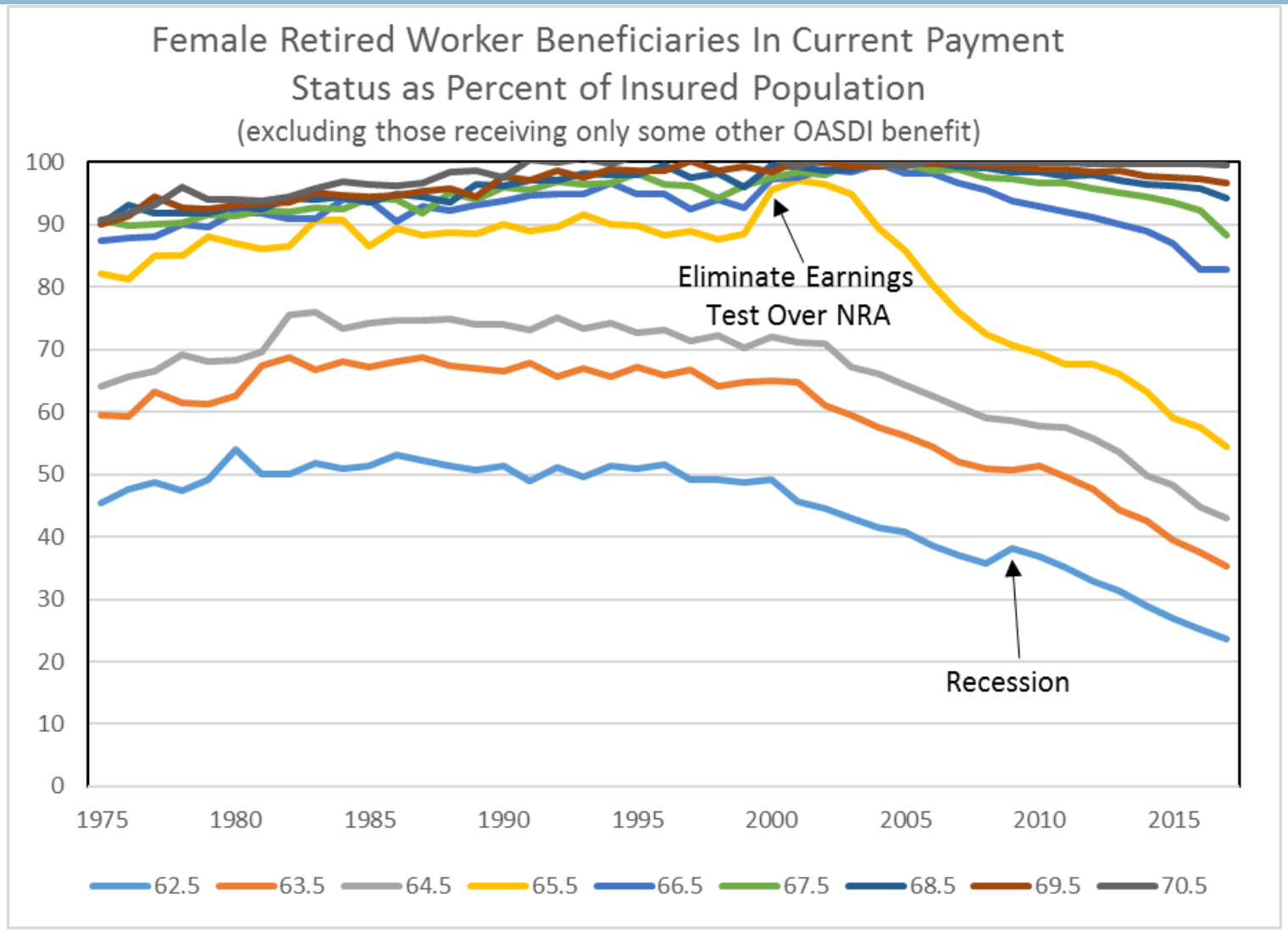
Age 63-69 Prevalence Rates

- Assume retirement decision is solely influenced by the expected change in the portion of PIA that is payable at each age relative to the potential change after initial eligibility.
  - This is based on NRA, delayed retirement credits, and actuarial reduction factors.
- Age 63-69 prevalence rate = the age 62 prevalence rate for that cohort + an estimate for those who have not retired yet, that they will retire at that age.
- To capture recent claiming trends, apply an adjustment for the difference between historical and estimated prevalence rates.

Male Retired Worker Prevalence

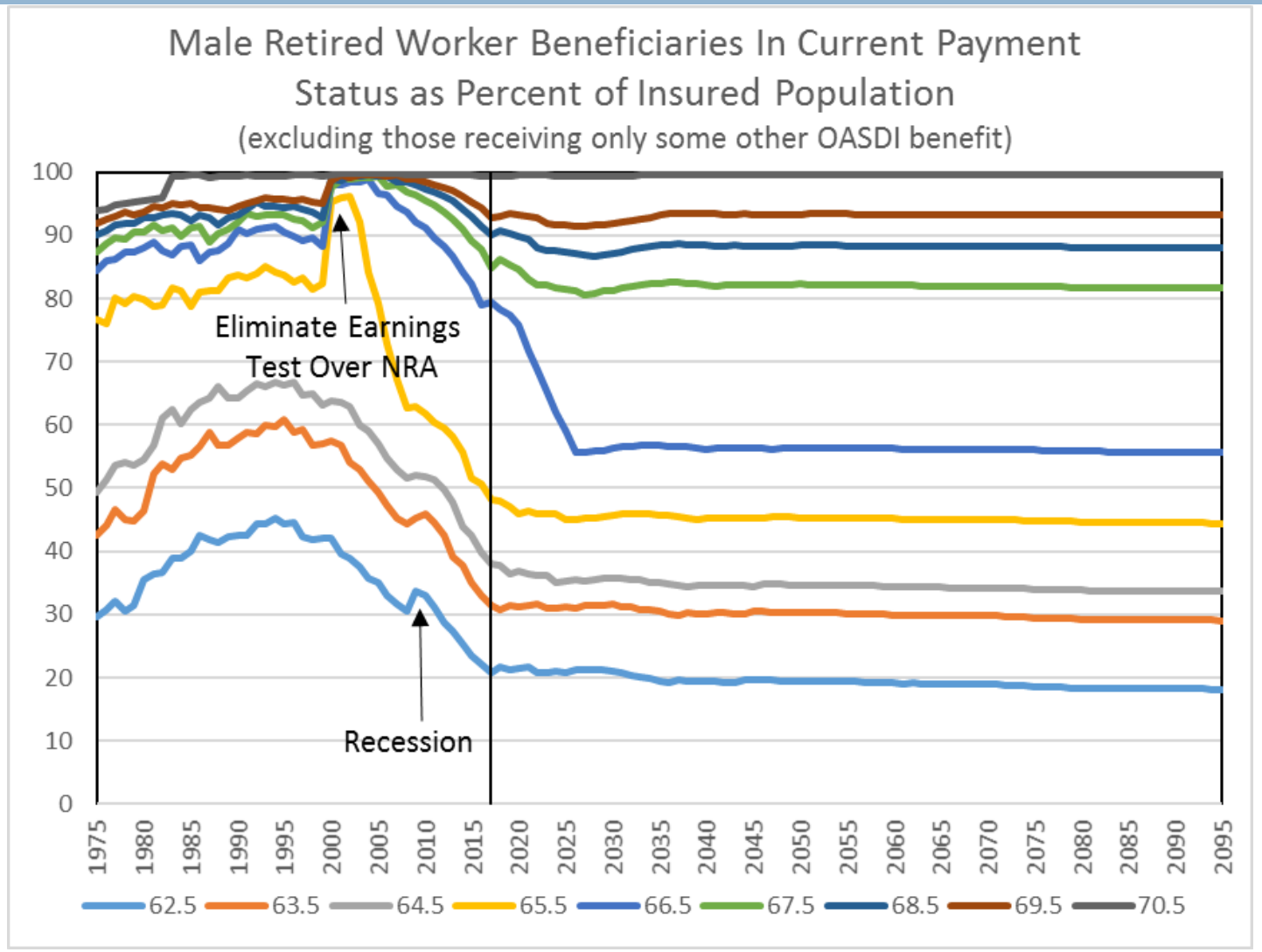


Female Retired Worker Prevalence



Projected Retired Worker Prevalence

(Long-Range Model)



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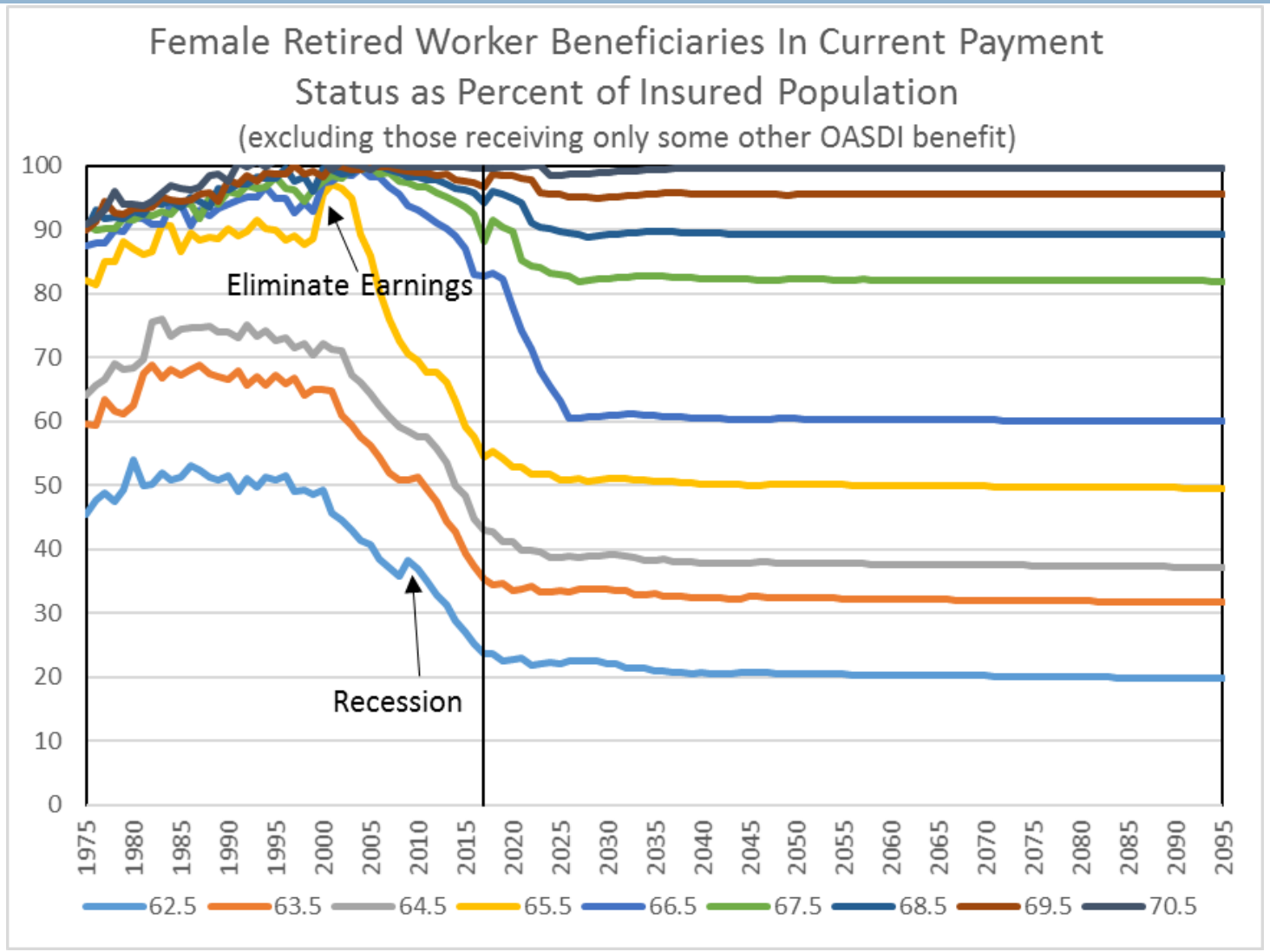

Implications of Benefit Start Ages

- The actuarial reduction factors and delayed retirement credits were set so lifetime benefits were actuarially equivalent, on average, no matter when one chooses to receive benefits.
- We review the benefit factors every year.

More Information

- 2018 OASDI Trustees Report

  http://www.ssa.gov/OACT/TR/2018/tr2018.pdf

- Model Documentation

  http://www.ssa.gov/OACT/TR/2018/2018_LR_Model_Documentation.pdf

  Pages 223-227

BENEFIT LEVEL METHODOLOGY

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Overview

- Construction of Historical Sample
- Projection Methodology
- Further Calculations of Average Benefits
- Potential Improvements
- More Information

Construction of Historical Sample

- 10 percent sample of initial entitlements in a given year (2015 for 2018TR) – about 229,000 retired worker and 59,000 disabled workers
- Ages 20 through 65 for disability
- Ages 62 through 70 for retired workers
- 2 year lookback
  - That is, for 2015 sample, as of December 2017 those with recorded initial entitlement in year 2015
  - Must not be in recorded death status as of December of the sample year (December 2015 for 2015 sample)
  - Allows for retroactive claims

Projection Methodology

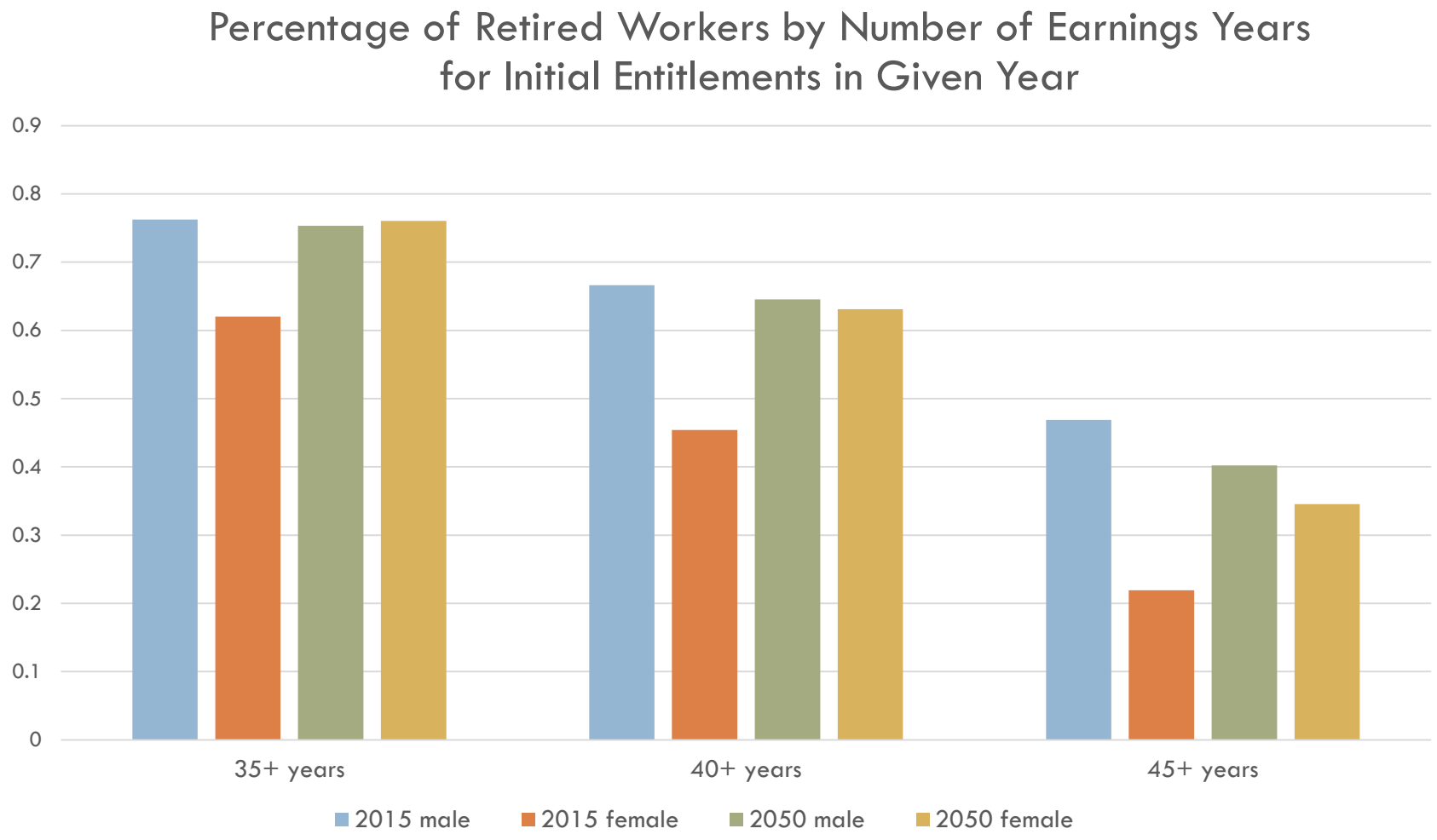
Basics using 10% Sample

- For each projection year, the historical sample stands in for those initially entitled in the given year
- Three main adjustments to historical earnings
  1) Adding or removing earnings based on changes in economy-wide covered worker rates
  2) Changes in relative taxable maximum levels over time
  3) Changes in earnings levels
- Computation of AIME and Potential AIME Percentages (PAPs)
- "Shuttling Method"

Adding or Removing Earnings

- Based on changes in economy-wide covered worker rates from historical year to projected years of earnings, methodology
  - Economy-wide covered worker rates = "legal" covered workers / "legal" population
  - For increases in economy-wide covered worker rates, adds positive earnings to replace historical zero earnings years
  - For decreases in economy-wide covered worker rates, zeroes out earnings to replace historical years with positive earnings
  - Done by 5-year age groups for disabled workers and retired workers

Adding or Removing Earnings: Results



Adding or Removing Earnings

Adjustments to basic methodology

- Fully insured rate change from historical to projected year (retired workers)
  - Conceptually reflects that increases in percentages of those qualifying for benefits would increase in proportion to sample with relatively few earnings years and therefore lower overall added earnings years

- Disabled worker differences
  - Separate adjustments in sample covered worker rates by 5-year entitlement age group

- Projected distribution by earnings years for female retired workers
  - With general increases in female sample covered worker rates, want to keep some cases at lower number of earnings years (e.g., 10 to 15 earnings years)

Changes in Relative Taxable Maximum Levels

Why Does This Change Need to Be Done?

- "Taxable maximum" = Contribution and Benefit Base ($132,900 for 2019)
- Employee/employer combined payroll tax rate of 12.4 percent applied on earnings up to taxable maximum
- Since 1981 taxable maximum values have mostly been computed with same methodology and increased by the SSA average wage index
- Before 1981 is different story
  - Ad-hoc increases through 1937-1974 and 1979-1981 (set by statute)
  - Result is that taxable maximum did not increase by average wage index for these years (typically covered a lower portion of earnings than post-1981)
  - Taxable maximum could be markedly different for later projection years

Changes in Relative Taxable Maximum Levels

How Are Earnings Adjusted?

- Set "hypothetical wage base" for each earnings year for a given projection year (what historical earnings year e.g., 1965 would look like for projection year in question e.g., 2005 for 2055 retiree)
- Generally higher than historical tax max for 1974 or earlier
- Compute earnings on a record-by-record basis as if there were no taxable maximum, if earnings at tax-max (covered earnings) based on available data
- Final result: Set earnings at lower of covered earnings or hypothetical wage base

Changes in Earnings Levels

- Last step in earnings adjustment process
- Main idea: Reflect more recent earnings distributions by age and sex in assigning targeted future earnings levels by age and sex
- First compute preliminary projected average taxable earnings (ATE) levels by age, sex, earnings year after application of the first 2 adjustments discussed (changes in covered worker rates, tax max adjustments)
- Second, compute "targeted ATE" by age, sex, earnings year
- Third, adjust preliminary ATE level up or down to match targeted ATE

Calculation of Potential AIME Percentages

- After adjusting earnings levels for covered worker rate changes, tax max changes, and earnings level changes, compute an Average Indexed Monthly Earnings" (AIME) for each record with projected year earnings
  - Segment the AIME into 30 intervals (smaller at lower AIME levels and larger for higher AIME levels)
  - Compute potential AIME percentages (PAPs) by percent of AIME for a given record that falls into each subinterval
  - Average the PAPs by age/sex/Trust Fund as input file to compute initial entitlement PIAs

"Shuttling Method"

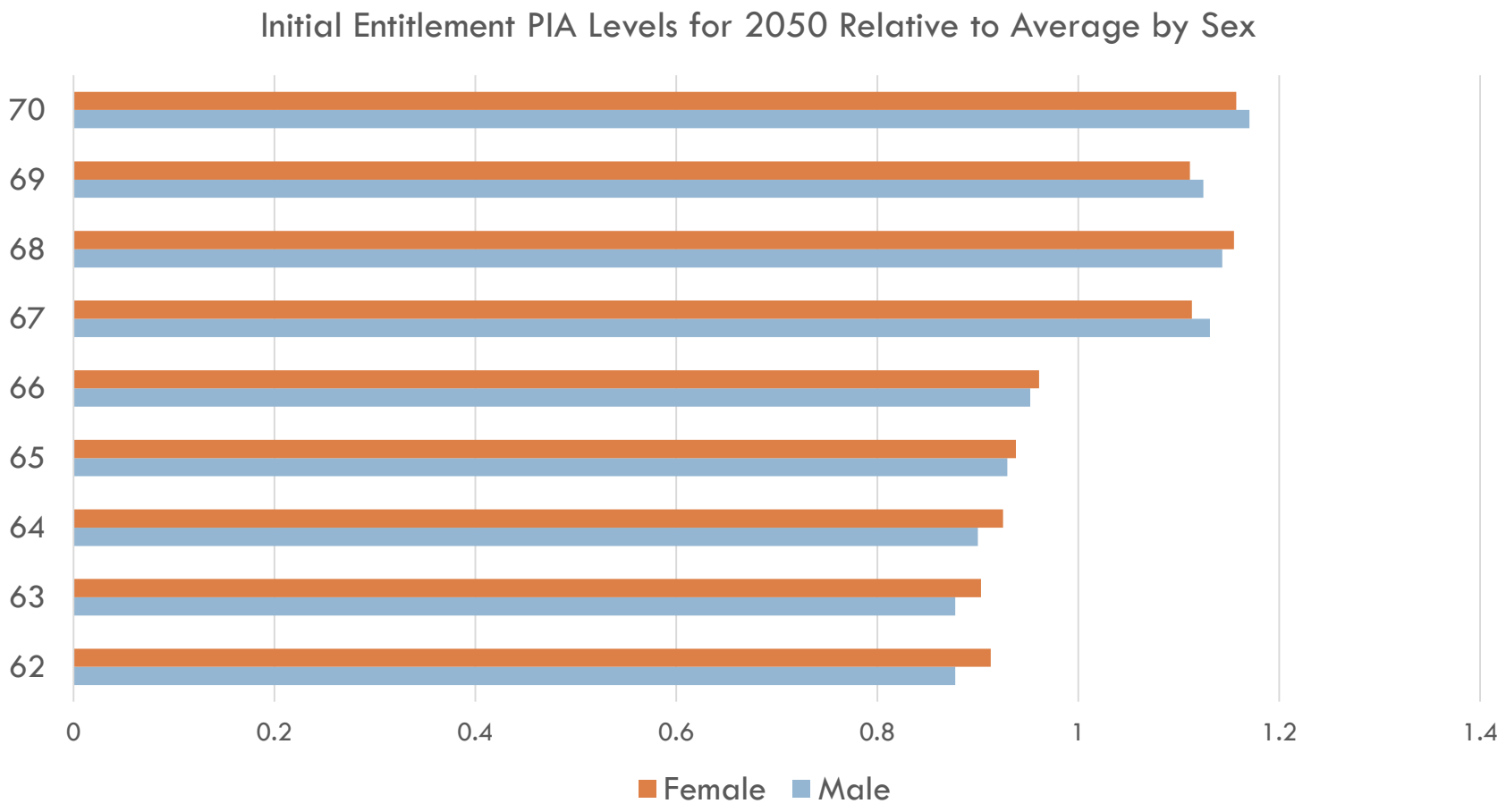
- Distribution of retired workers by age of retirement can vary widely between historical pattern from initial entitlement sample year and pattern for projected years
- The "shuttling method" is an algorithm to have AIMEs (PAPs) from one age in the historical sample represent a different age for a given projected year
- Generally shuttling is from an earlier retirement age to a later retirement age but "backward shuttling" in projections does rarely occur
- When shuttling to a later retirement age, earnings are potentially added based on projected sample covered worker rate at that age with a resulting recomputed AIME
- Any earnings are taken away for backward shuttling

Average Benefit Calculations

- Using Potential AIME Percentages, we compute PIAs by age/sex/Trust Fund with appropriate bend points, indexing years, and COLAs for the projection year

- Convert from PIAs to benefit amounts – major items considered
  - Actuarial reduction factors / delayed retirement credits for age at entitlement for retired workers
  - Windfall Elimination Provision (WEP) for retired workers
  - Workers' compensation offset (WC) for disabled workers

Average Benefit Calculations

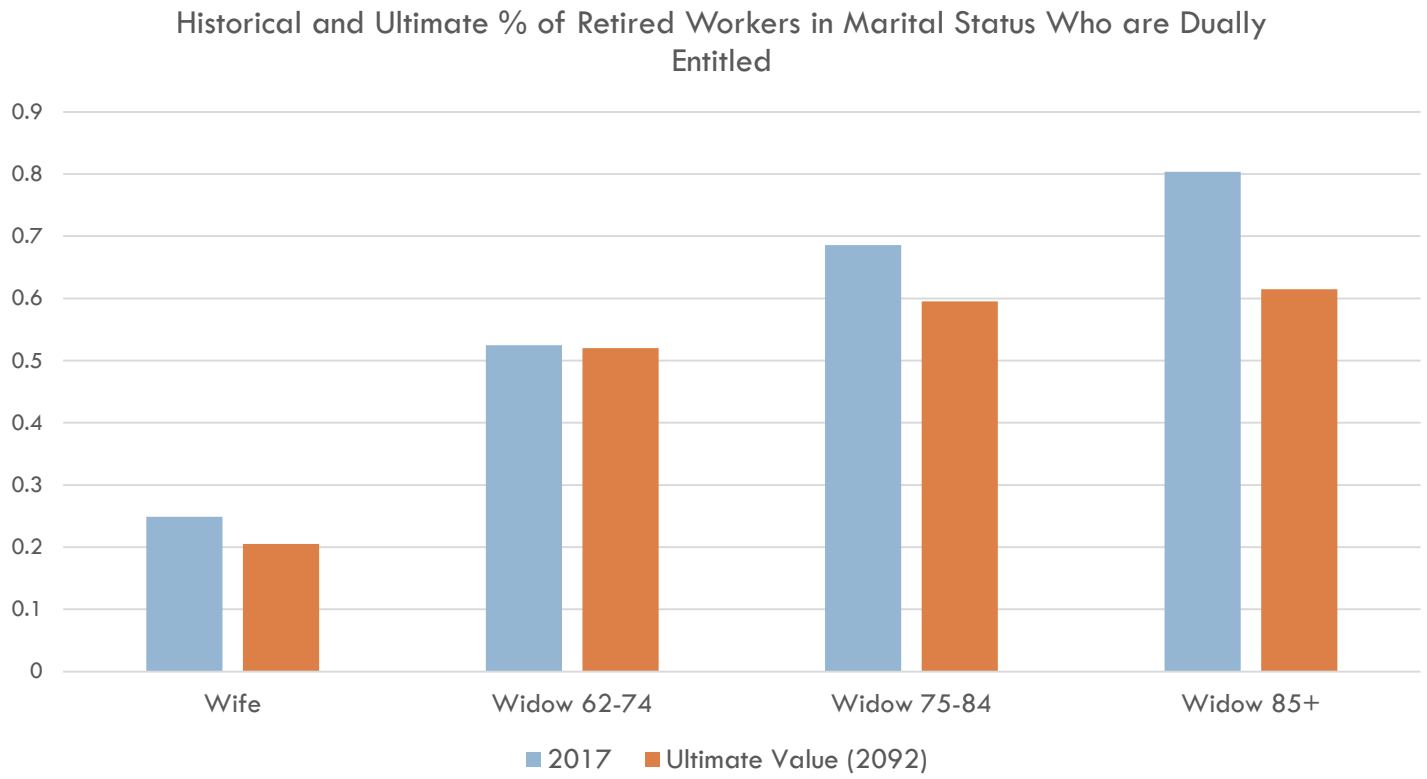


Dual Entitlement

- Workers with excess auxiliary benefit (most typically, retired workers with a higher widow(er) or aged spouse benefit)
  - About 7.2 million dually entitled retired workers as of December 2017
- 10% sample just projects worker benefit
- Separate methodology in place to project number of dually entitled beneficiaries and average excess benefit amount
  - Estimate an "ultimate" value for each beneficiary type (used for 75th projection year)
  - Grade in to "ultimate" value using regression with reasonable adjustments

Dual Entitlement

- Historical vs Ultimate Comparison of Major D/E Categories



Post Entitlement

- After initial entitlement, aggregate average benefits change due to 2 main factors beyond the COLA:
  - Mortality differentials by benefit level
  - Earnings after entitlement causing a benefit recomputation and possibly a higher PIA

- We compute "post-entitlement" factors to account for benefit differentials after initial entitlement
  - 10 sets of consecutive year comparisons of historical data of those in-current-pay in the later year, and also in-current-pay in the previous year
  - Initial post-entitlement factors with most recent 3-year historical average
  - Ultimate post-entitlement factors using most recent 10-year historical average
  - Retired workers done by sex and duration from entitlement 1 years, 2 years,…, to 12+ years
  - Disabled workers done by sex and duration 1, 2,…, 9+ years and separately for under 50 and 50+

Post Entitlement

Results

- For almost all durations for retired workers, higher benefits after entitlement beyond COLA
- For disabled workers, generally higher benefits after entitlement but can be lower than COLA at earlier durations
- "Ultimate" effects at 12+ duration for retired workers and 9+ for disabled workers
  - About 0.3% per year for retired workers not previously disabled
  - About 0.2% per year for retired workers previously disabled and disabled workers
- For retired workers, roughly half the post-entitlement increase is due to mortality differentials by benefit level

Potential Improvements

- Dispersion in earnings levels for 10% sample
  - If more earnings inequality, then relatively more AIME would be in the 15% benefit factor and relatively less in the 90/32% factors for lower earners
  - Leads to lower average benefits

- Increase in sample size (more than a 10% sample) – earlier work shows variation within separate 1% samples

- Multiple initial entitlement samples from different years to minimize variation when updating for new data

More Information

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- Model Documentation

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  Pages 256 on.

Appendix

Adding or Removing Earnings: Example

Project sample covered worker rates for 40-44 age group for retired workers in 2035 for increase in economy-wide rates

- Individuals in 2015 sample year are aged 40-44 in 1985-1997 historically (retirees born 1945-1953)
- Individuals in 2035 projection year are aged 40-44 in 2005-2017
- Calculation: if increase in economy-wide rates over time, projected sample covered worker rate =
  - Sample covered worker rate + (1 – sample CWR) * (projected economy-wide rate - historical economy-wide rate)/(1– historical economy-wide rate)
- Given:
  - Sample covered worker rate aged 40-44 = .8
  - Economy-wide covered worker rate aged 40-44 in 1985-1997 = .75
  - Economy-wide covered worker rate aged 40-44 in 2005-2017 = .85
- Projected sample-covered worker rate = .8 + .2 * (.85-.75)/(1-.75) = .88
- Therefore would add earnings for zero earnings cases every 2 out of 5 cases (.88-.80)/(1-.8)

Appendix

Adjusting Earnings Levels—More Information

- Targeted ATE = Sample ATE by sex, age, historical earnings year * adjustment ratio

- Example for earnings for female at age 40 for worker retiring at age 65 in 2030
  - Given: sample ATE = $17,441 for age 40 in 1990 (retire 2015)
  - Given: projected "economy-wide" ATE for female age 40 in 2005 (retire 2030) = $29,831
  - Given: historical "economy-wide" ATE at age 40 in 1990 (retire 2015) = $17,326
  - The ratio of wage-indexed back to 1990 for year 2005 = .5691 ($21,028/$36,953)
  - Projected ATE in historical dollar 1990 = $16,976 ($29,831 * .5691)
  - Therefore, adjustment ratio = $16,976 projected economy-wide ATE (40 in 2005) in 1990 dollars / $17,326 historical economy-wide ATE at age 40 = 0.9798
  - Targeted ATE = Sample ATE * adjustment ratio = $17,089 ($17,441 * .9798)