The Outlook For Labor Force Growth

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Pop Quiz!

- **Payroll employment increases have averaged 150,000 per month over the last six months. Is that**
- **A: Good**
- **B: Bad**
- **C: Mediocre**
- **D: Not enough information to say**

1995 Answer

- Payroll employment increases have averaged 150,000 per month over the last six months. Is that
- A: Good
- B: Bad
- **C: Mediocre – 150,000 per month was about the trend**
- D: Not enough information to say

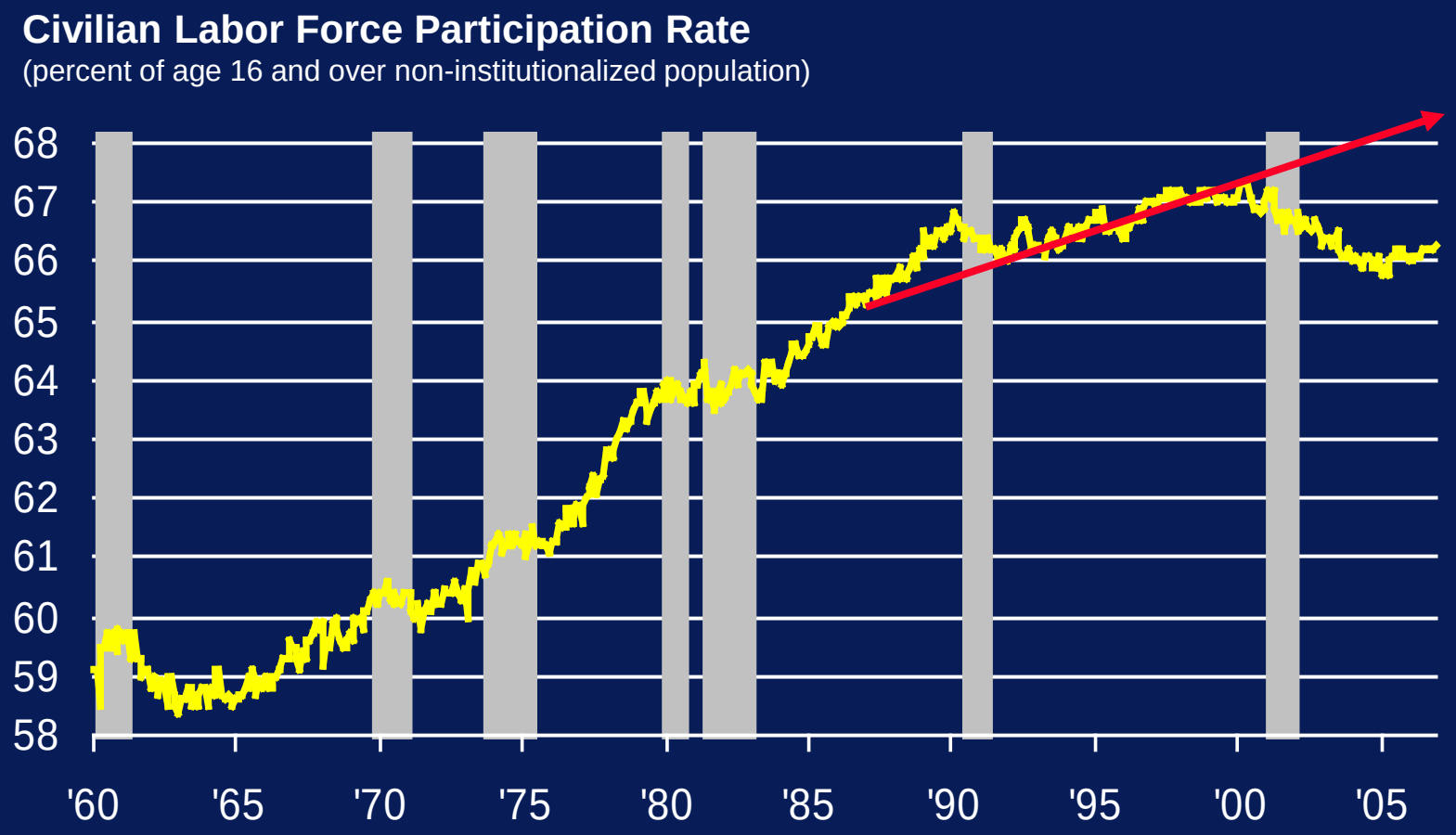
2007 Answer

- Payroll employment increases have averaged 150,000 per month over the last six months. Is that
- **A: Good –Trend is now more like 100,000**
- B: Bad
- C: Mediocre
- D: Not enough information to say

Factors Affecting Growth in Available Workers

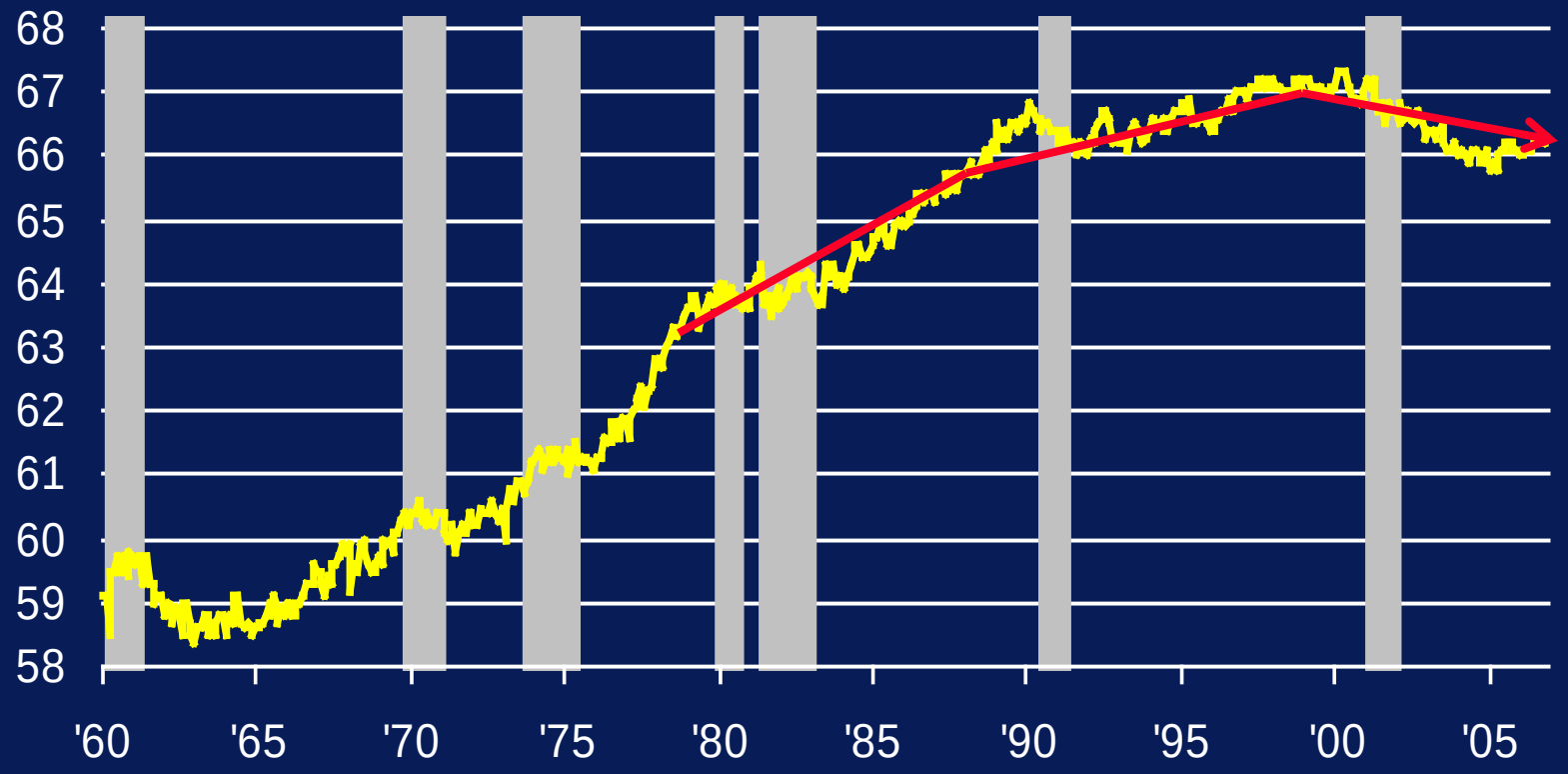
- **Population Growth**
  - **Recently about 1.2% per year**
  - **Projected to slow slightly**
- **Labor Force Participation**
  - **Well off its peak**
  - **Argue here that it is likely to go lower**

Labor Force Participation Is Below Old Trend



But the Trend Has Likely Changed

Civilian Labor Force Participation Rate
(percent of age 16 and over non-institutionalized population)



A Decomposition

Let p_t = *LFP at time t*

p_{dt} = *LFP for demographic group d at time t*

f_{dt} = *Share of population in group d at time t*

Then

$$p_t = \sum_d f_{dt} p_{dt}$$

And

$$\Delta p_t = \underbrace{\sum_d f_{dt} \Delta p_{dt}}_{\text{Behavior}} + \underbrace{\sum_d (p_{dt-1} - p_{t-1}) \Delta f_{dt}}_{\text{Demographics}}$$

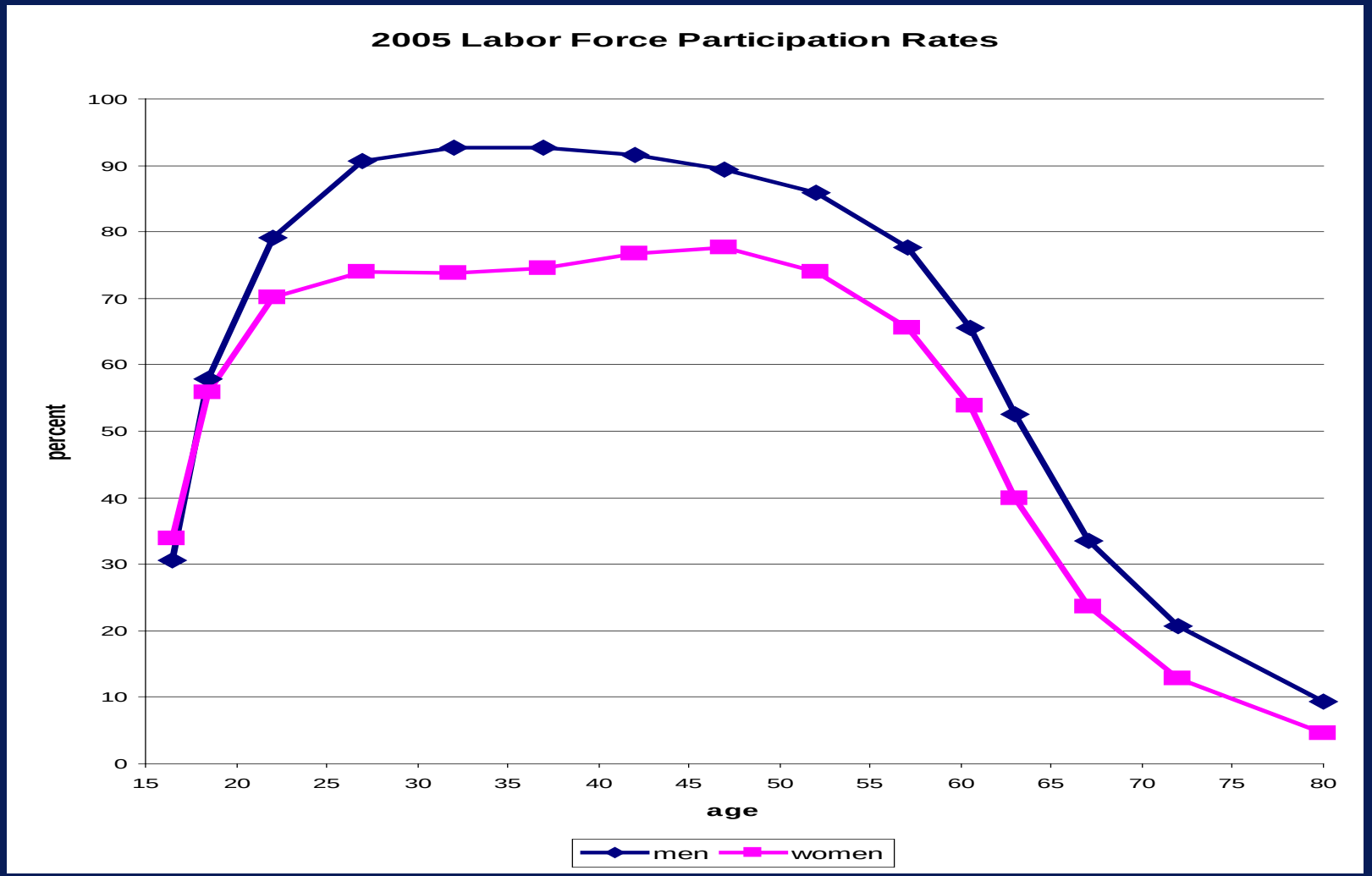
Decomposition of LFP Change

(Percentage points per year)

	1979-1987	1987-1997	1997-2005	2005-2010
Total Change	**0.24**	**0.12**	**-0.10**	**-0.26***
Behavioral	**0.20**	**0.08**	**-0.04**	**-0.17***
Demographic	**0.04**	**0.04**	**-0.06**	**-0.10***

*= Projection

Participation by Age and Sex

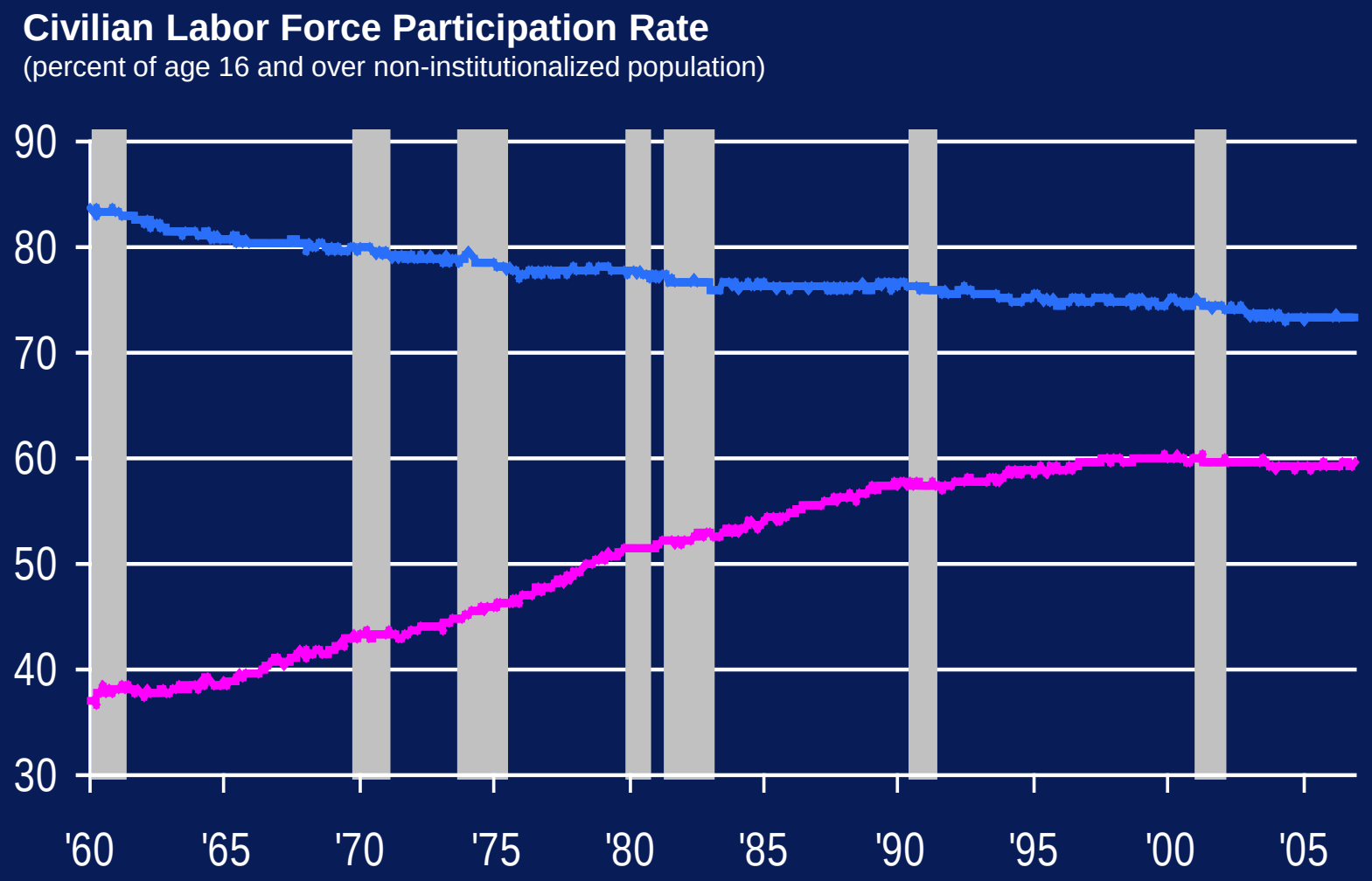


Decomposition of Demographic Contribution

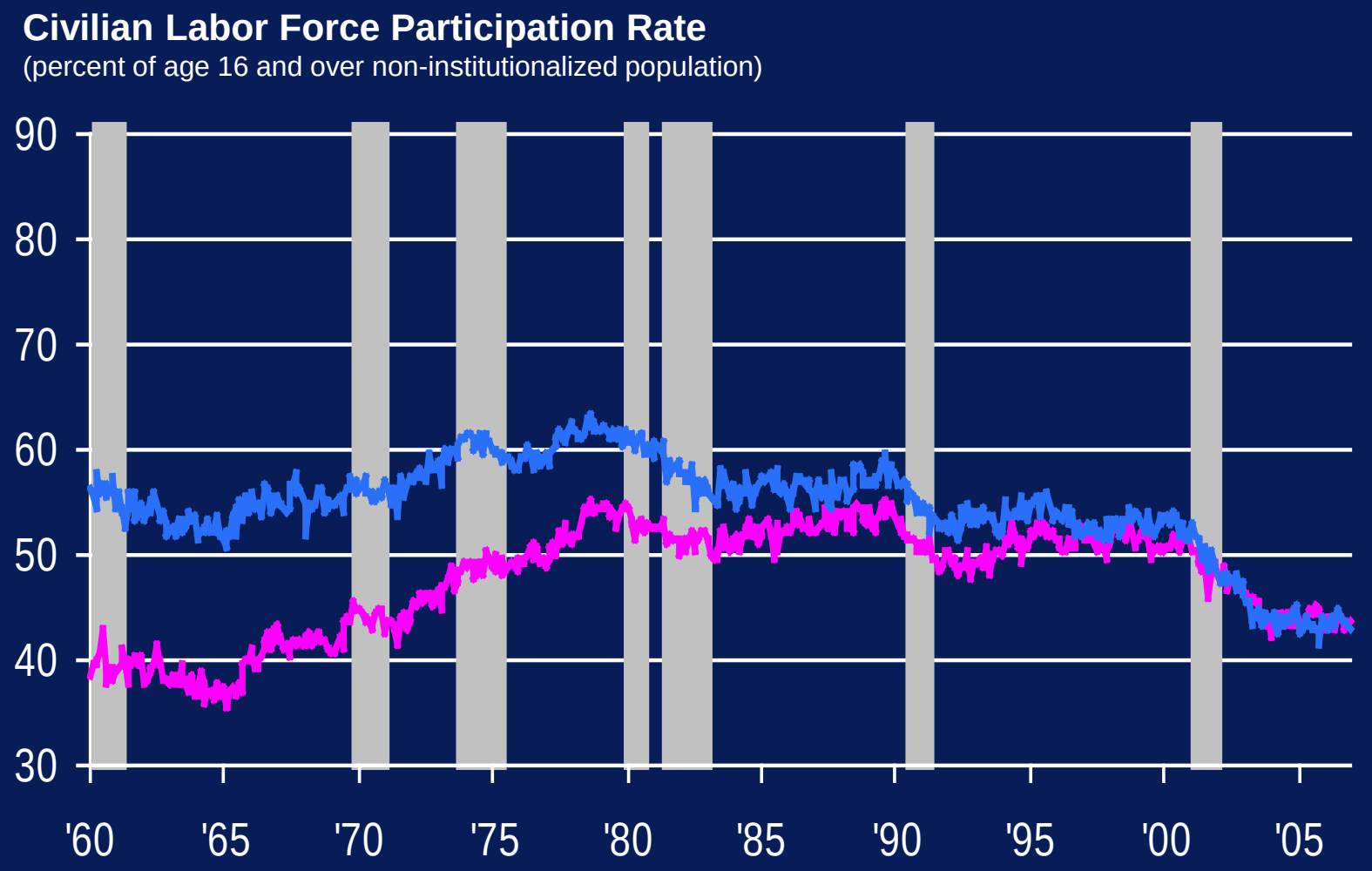
(Percentage points per year)

	1979-1987	1987-1997	1997-2005	2005-2010
Total	**0.04**	**0.04**	**-0.06**	**-0.10**
Age 16-25	**-0.00**	**-0.02**	**0.01**	**-0.00**
Age 26-55	**0.11**	**0.07**	**-0.06**	**-0.05**
Age 56-65	**0.00**	**0.03**	**-0.01**	**-0.04**
Over age 65	**-0.07**	**-0.04**	**0.01**	**-0.00**

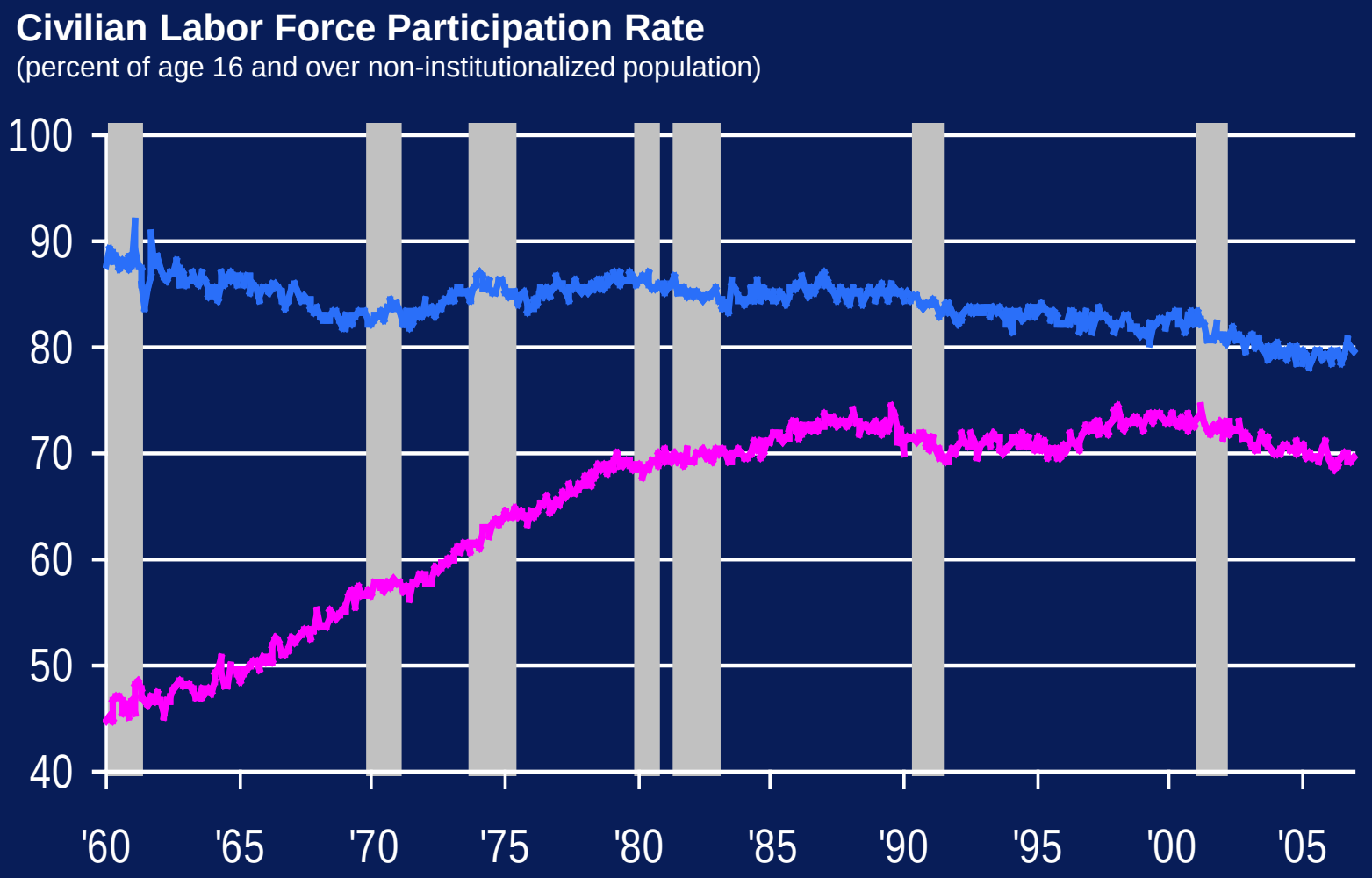
Labor Force Participation: Men and Women



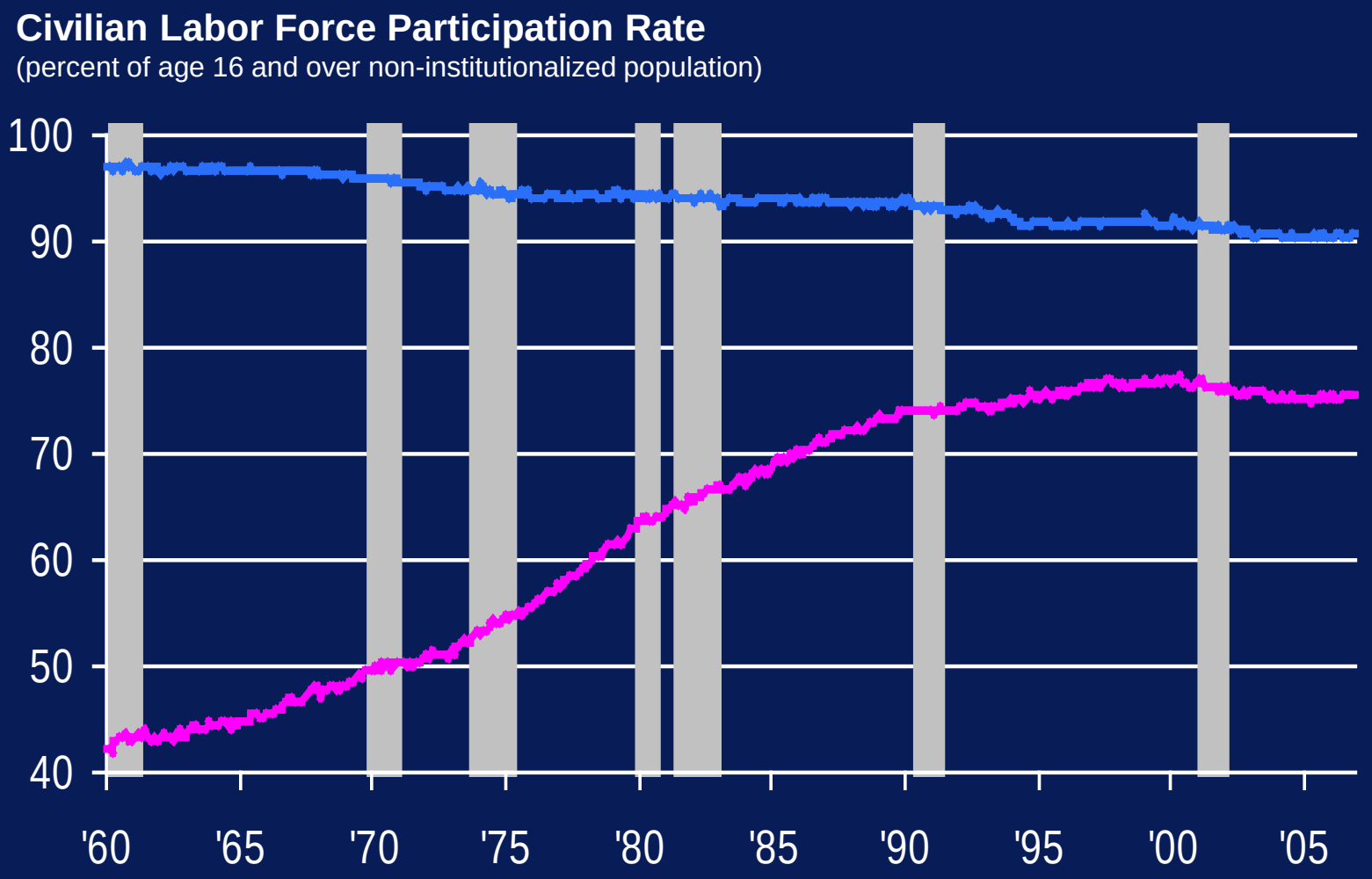
Labor Force Participation: Age 16-19



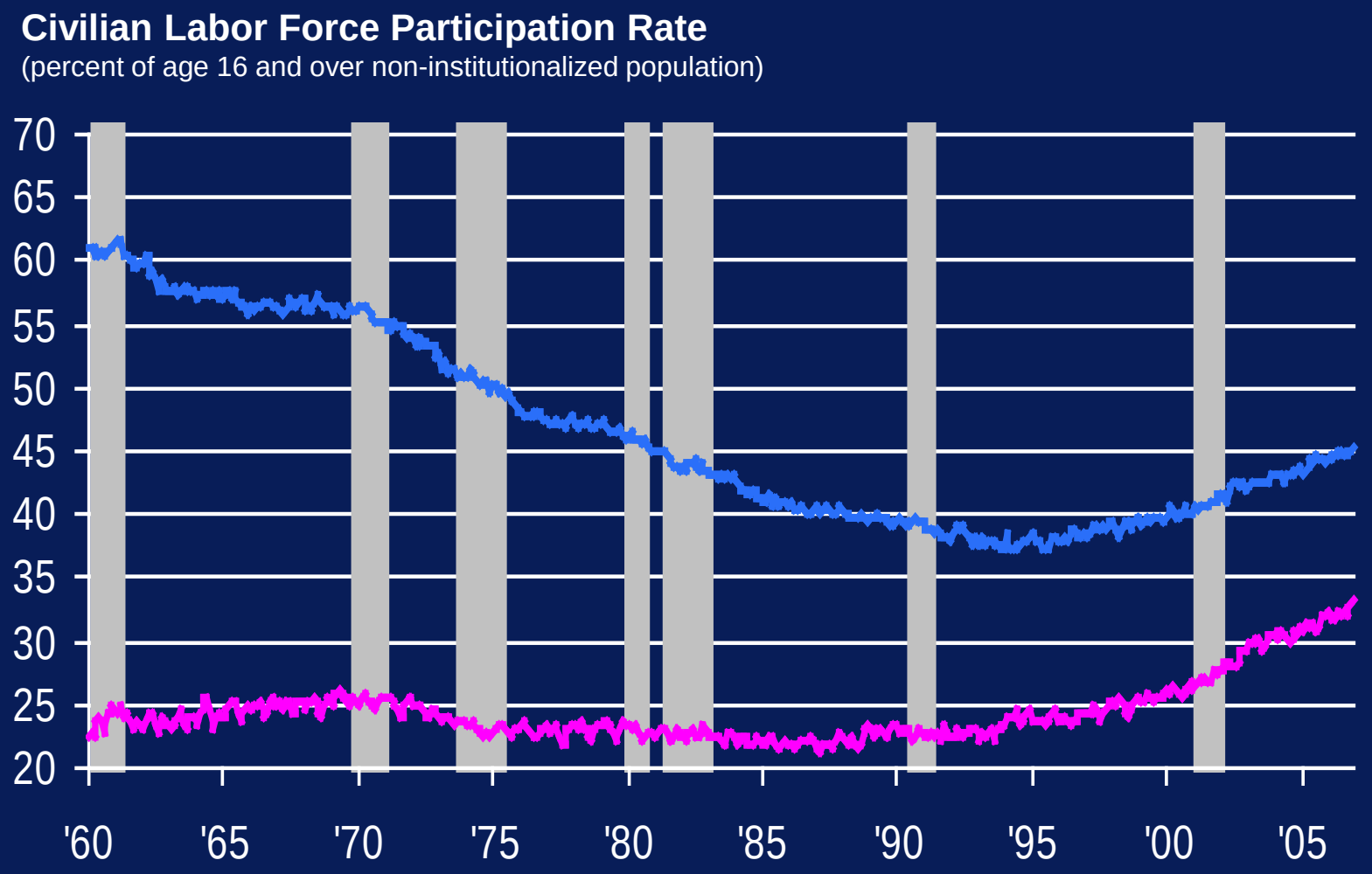
Labor Force Participation 20-24



Labor Force Participation 25-54



Labor Force Participation 55 and Over



Decomposition of Behavioral Contribution

(Percentage points per year)

	1979-1987	1987-1997	1997-2005	2005-2010
Total	**0.20**	**0.08**	**-0.04**	**-0.17***
Men	**-0.13**	**-0.10**	**-0.03**	**-0.05***
Age 16-25	**-0.04**	**-0.04**	**-0.06**	**-0.05***
Age 26-55	**-0.03**	**-0.07**	**-0.01**	**-0.05***
Age 56-65	**-0.04**	**-0.00**	**0.01**	**0.00***
Over age 65	**-0.02**	**0.01**	**0.02**	**0.04***

*= Projection

Decomposition of Behavioral Contribution

(Percentage points per year)

	1979-1987	1987-1997	1997-2005	2005-2010
Total	**0.20**	**0.08**	**-0.04**	**-0.17***
Women	**0.33**	**0.18**	**-0.02**	**-0.12***
Age 16-25	**0.03**	**-0.01**	**-0.06**	**-0.03***
Age 26-55	**0.30**	**0.13**	**-0.05**	**-0.13***
Age 56-65	**0.00**	**0.05**	**0.04**	**0.01***
Over age 65	**-0.00**	**0.01**	**0.04**	**0.04***

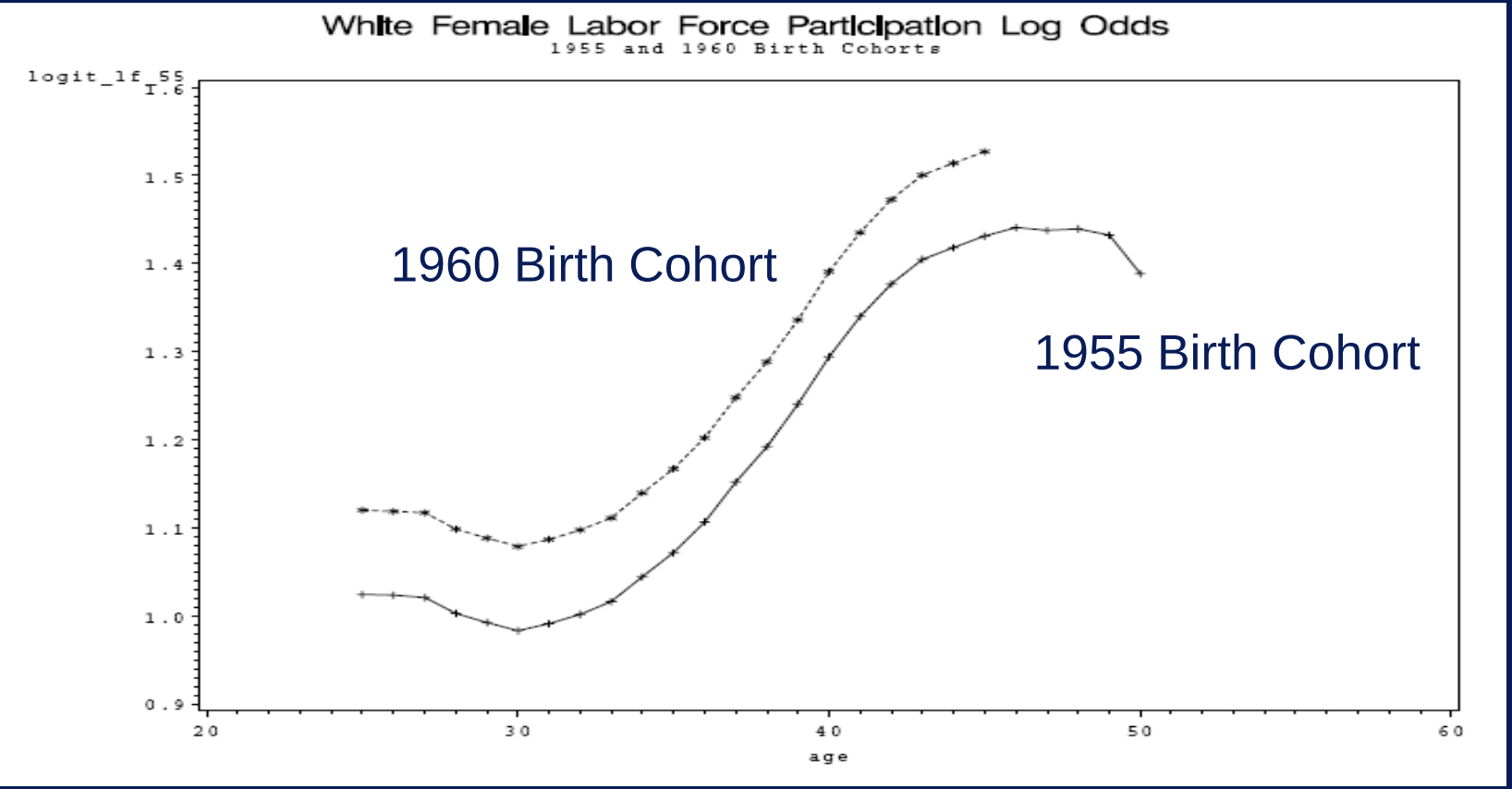
*= Projection

Forecasting Demographic Group Behavior

- **Question: What will happen to participation rates for 50-54 year old women between now and 2010?**
- **BLS Method: Extrapolate the time series for 50-54 year old women**
- **Cohort Method:**
  - **Note that women who will be 50-54 in 2010 were born 1955-60**
  - **Compare the LFP of the 1955-60 birth cohorts to those of the 1950-54 birth cohorts cohorts at ages up to 45-49**
  - **Assume cohort differences will persist at higher ages**

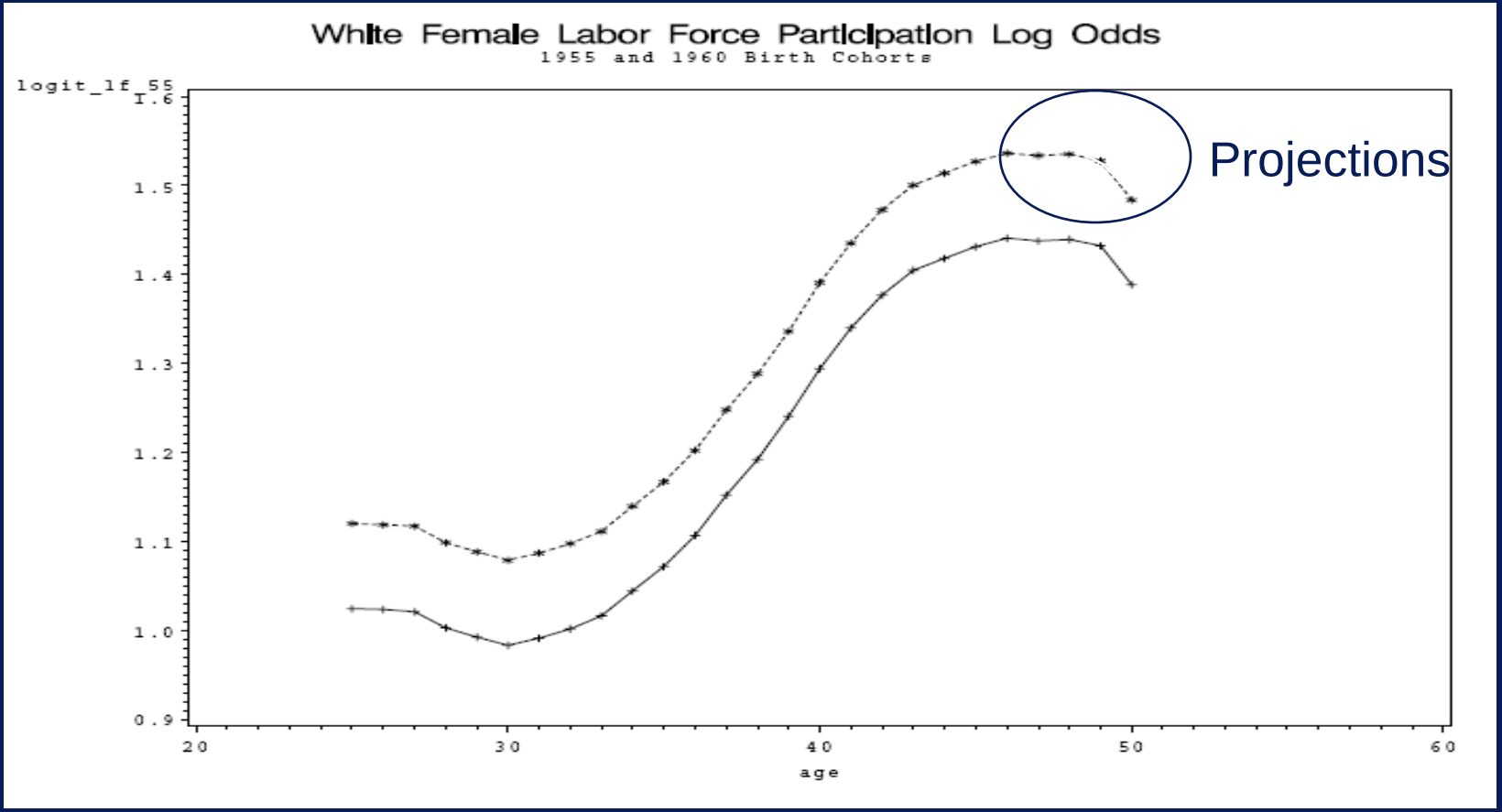
Example (Based on Model Fit)

If 1960 Cohort follows 1955 Pattern at Higher Level …



Example (Based on Model Fit)

… Then can predict 1960 cohort LFP five years from now:



Cohort-Based Projections

- **Above projections based on extensions of Aaronson and Sullivan, Chicago Fed Economic Perspectives, 2001**
  - **Work in progress**
- **Somewhat similar to Aaronson, Fallick, Figura, Pingle, and Washer, Brookings, 2006**
- **Differences**
  - **Estimates at individual level (CPS Outgoing Rotation Groups 1979-2005)**
  - **Everything conditional on educational levels**
  - **Many details**

A Basic Logistic Cohort Model

p_{sbai} = *Prob individual i of sex s born in year b is in LF at age a*

$$\log\left(\frac{p_{sbai}}{1-p_{sbai}}\right) = \beta_{sb} + \alpha_{sa} + x_{sbai}\gamma_s$$

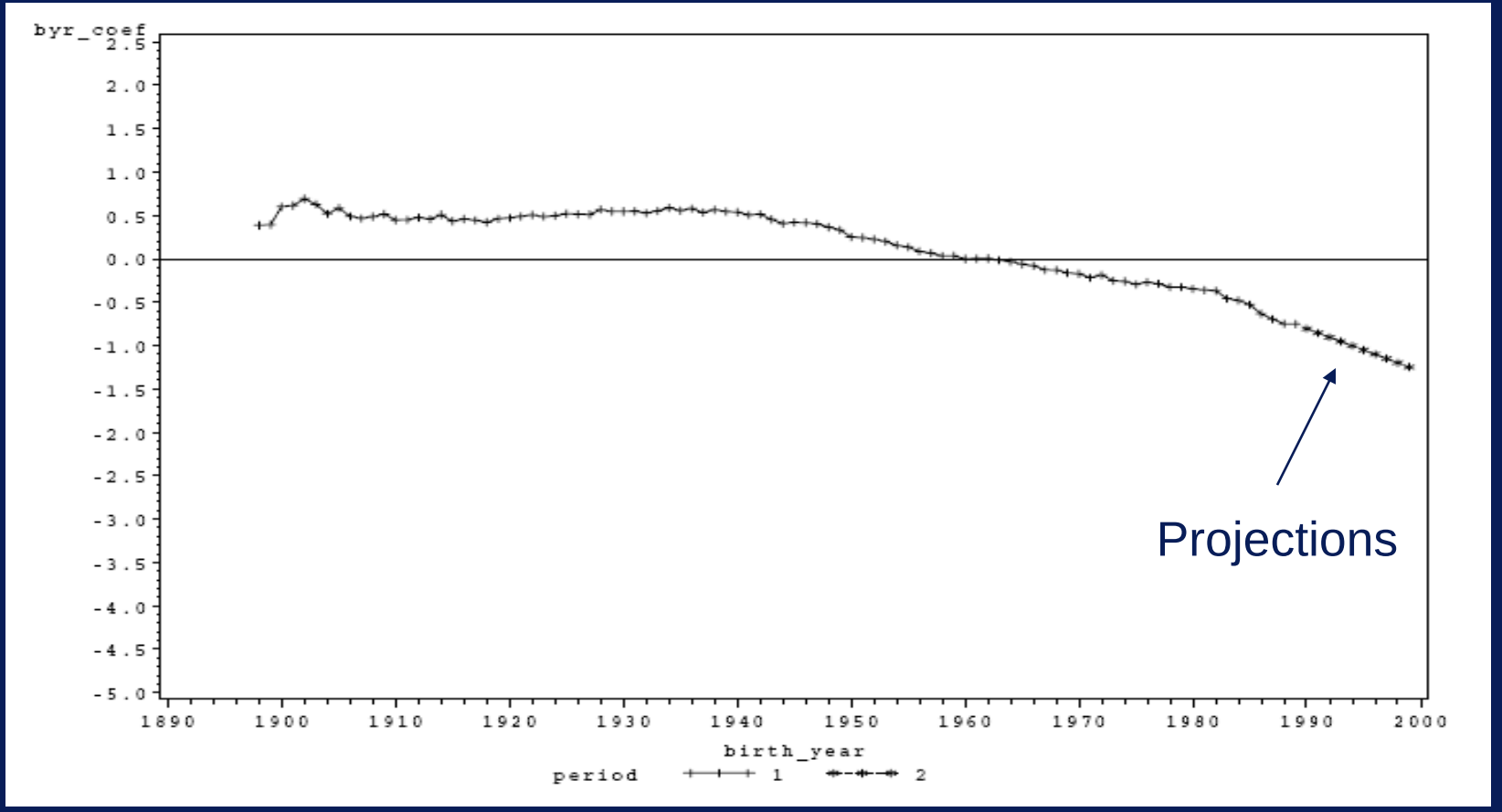
β_{sb} *Birth year cohort dummies*

α_{sa} *Age dummies*

x_{sbai} *Race group dummies*

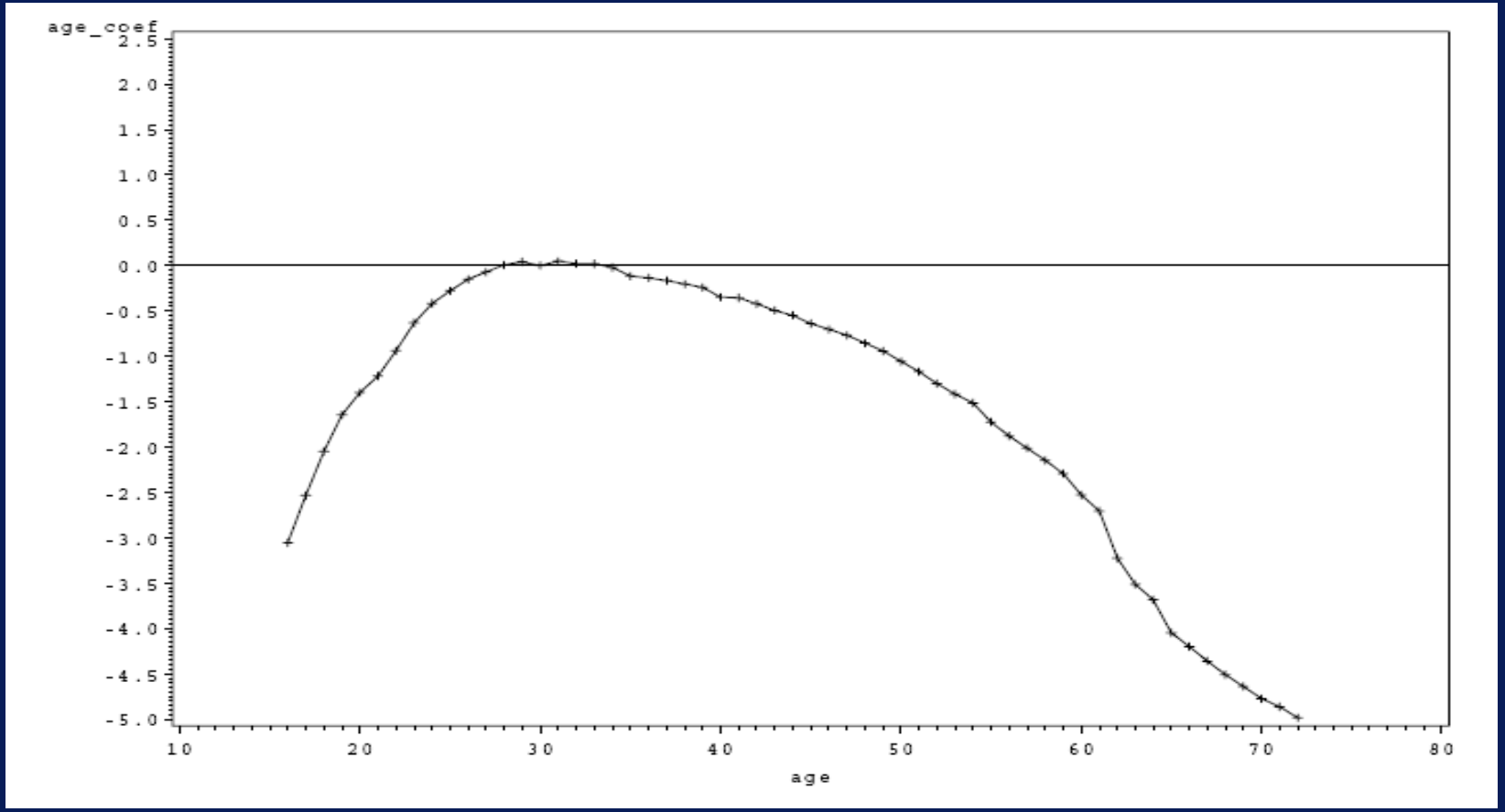
Cohort Effects

Coefficients on Birth Years: Males
(1960 normalized to 0)



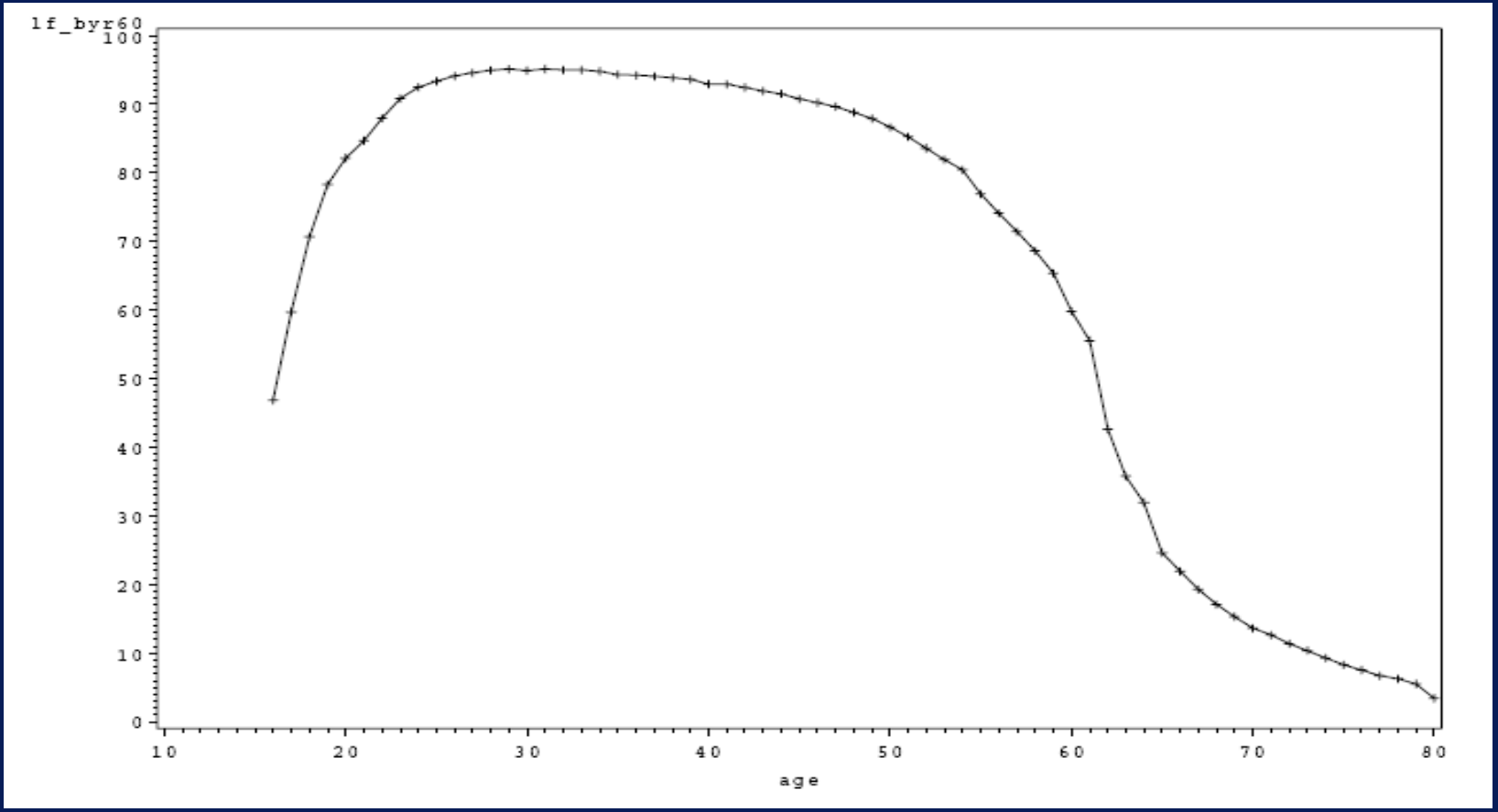
Age Effects

Coefficients on Age Dummies: Males
(30 normalized to 0)



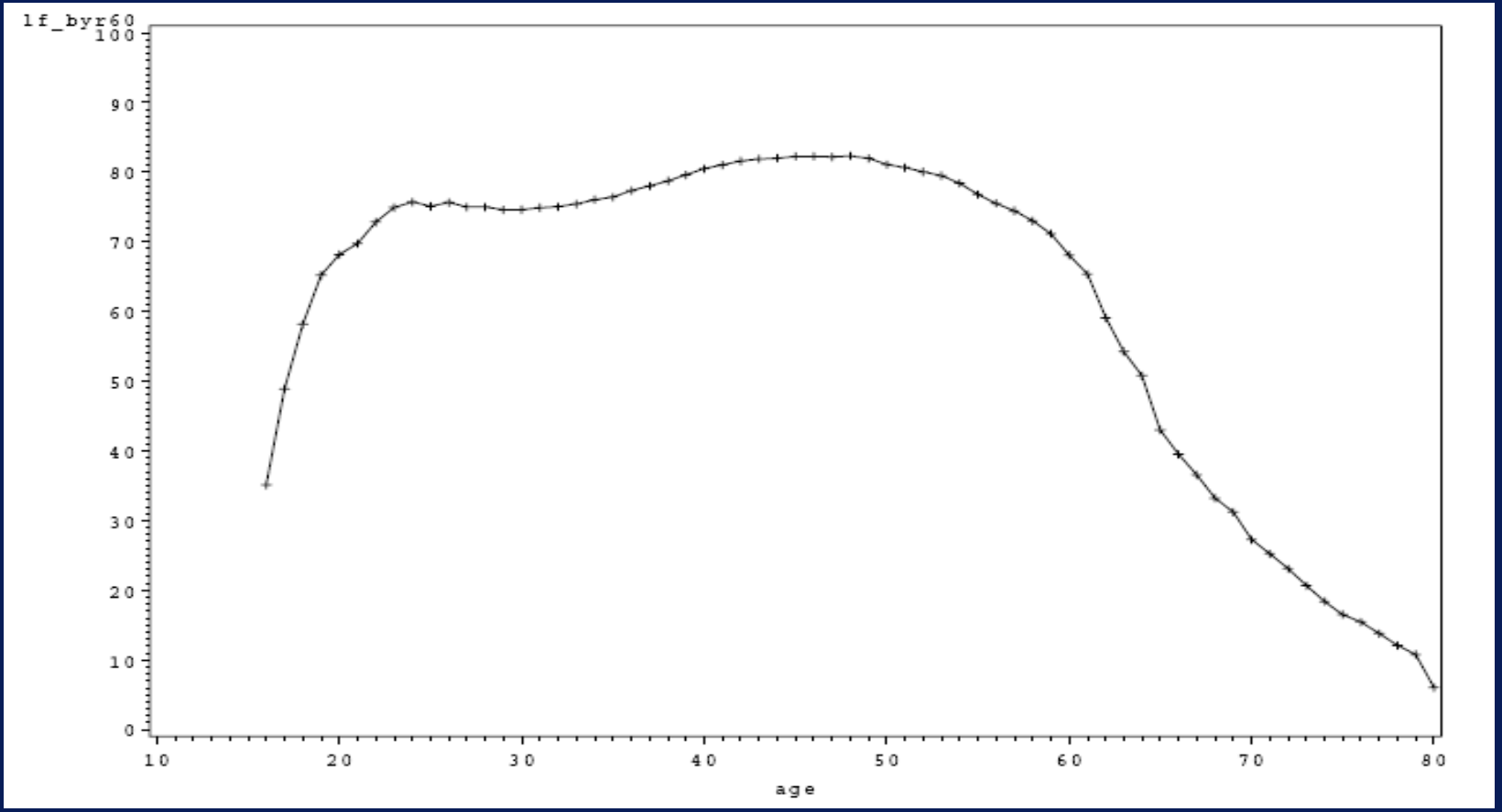
Age Profile

Predicted LFP: Males
(1960 Birth Cohort)



Age Profile

Predicted LFP: Females
(1960 Birth Cohort)



Extension: Condition on Education

p_{sebai} = *Prob individual i of sex s and education e born in year b is in LF at age a*

5 education categories: <HS, =HS, Some College, College, > College

$$\log\left(\frac{p_{sebai}}{1-p_{sebai}}\right) = \beta_{seb} + \alpha_{sea} + x_{sebai}\gamma_{se}$$

Extension: Condition on Education

To forecast LFP, need educational attainment forecasts

q^{e}_{sbai} = *Prob individual i of sex s born in year b has attainment of at least e at age a given attainment of at least e - 1*

$$\log\left(\frac{q^{e}_{sbai}}{1-q^{e}_{sbai}}\right) = \beta^{e}_{sb} + \alpha^{e}_{sa} + x_{sbai}\gamma^{e}_{s}$$

Extension: Allow for Business Cycle Effects

p_{sebai} = *Prob individual i of sex s and education e born in year b is in LF at age a*

$$\log\left(\frac{p_{sebai}}{1-p_{sebai}}\right) =$$

$$\beta_{seb} + \alpha_{sea} + w_{sea,b+a}\lambda_{se} + x_{sebai}\gamma_{se}$$

$w_{sea,b+a}$ = *Current and two quarterly lags of CBO unemployment gap (actual – NAIRU) interacted with 4th order polynomial in age*

Extension: Allow for Shifts in Age Profiles

p_{sebai} = *Prob individual i of sex s and education e born in year b is in LF at age a*

$$\log\left(\frac{p_{sebai}}{1-p_{sebai}}\right) =$$

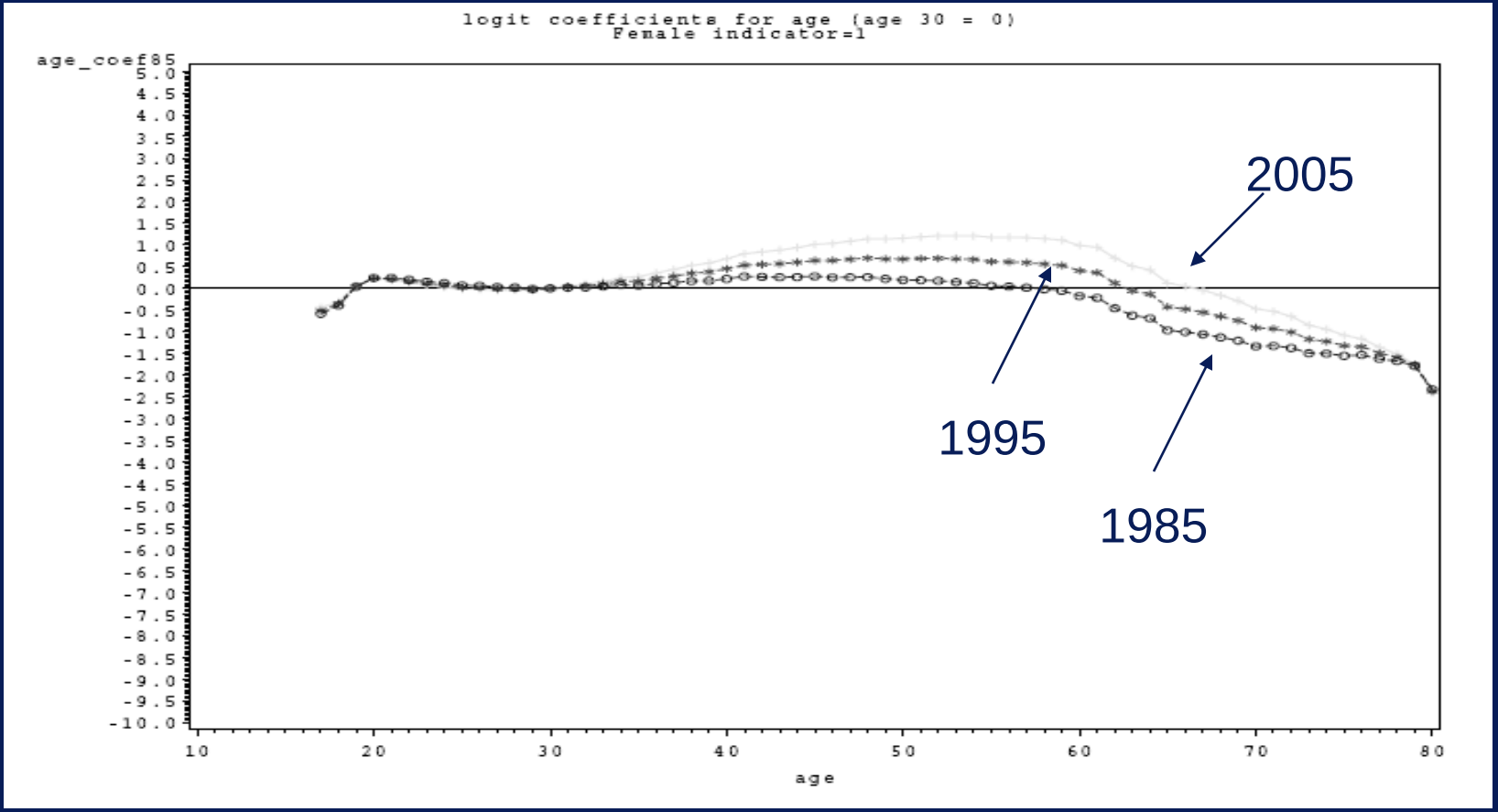
$$\beta_{seb} + \alpha_{sea} + \nu_{sea,b+a}\phi_{se} + w_{sea,b+a}\lambda_{se} + x_{sebai}\gamma_{se}$$

$\nu_{sea,b+a}$ = *Linear year (b+a) interacted with 4th order polynomial in age*

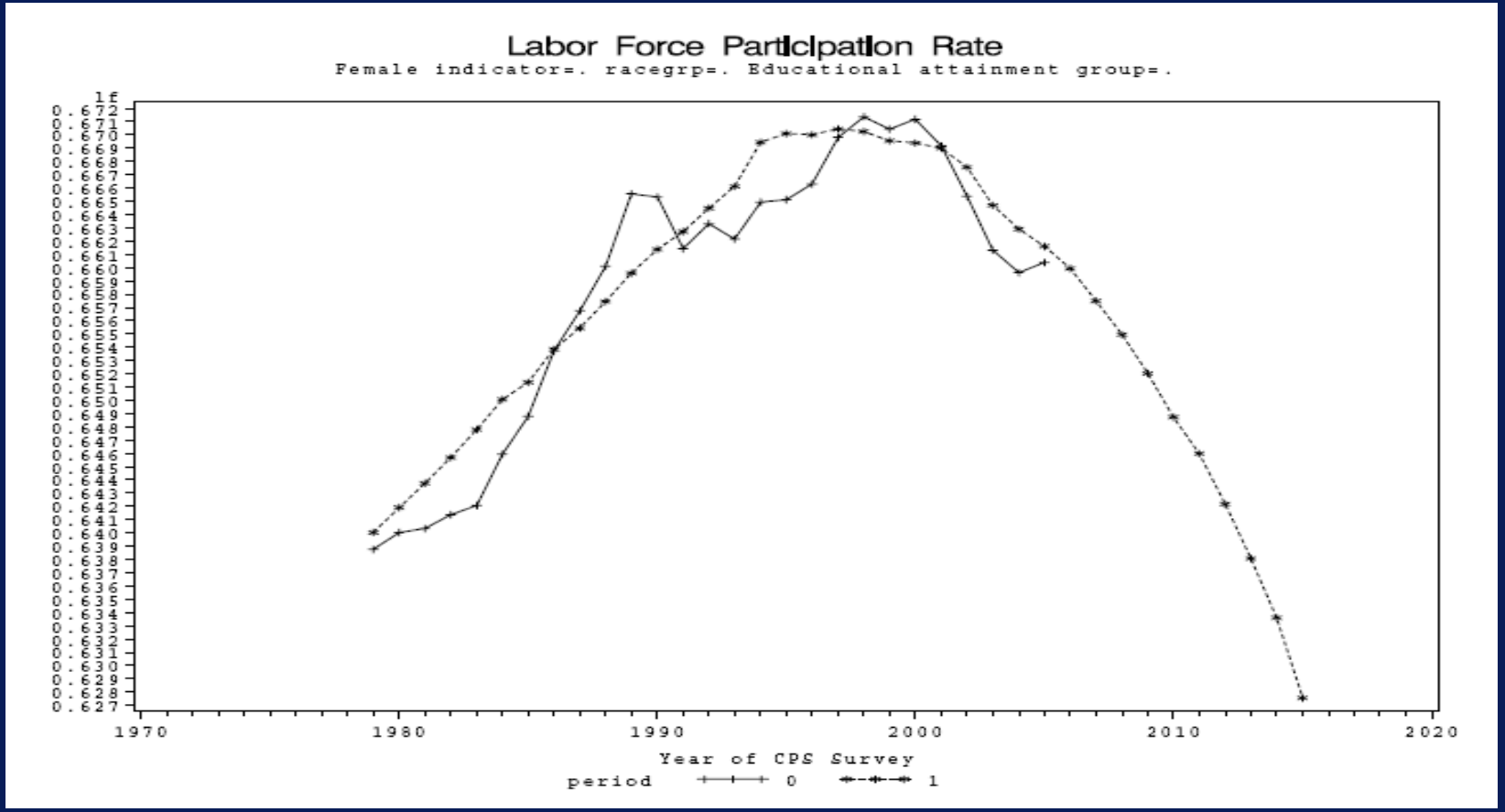
Change in age profile happens linearly over time, but the changes happen at different rates for different ages

Example of Shifting Age Profile

Females with HS education



Results: Model Based Trend Falling



+ = data * = model trend

Caveats

- **Modest statistical parameter uncertainty**
- **Substantial model uncertainty**
- **Models have no economics: Trends can change**
- **E.g., persistent labor market tightness could push up wages, which could increase labor supply (or decrease labor supply)**
- **E.g., policy changes on SS, taxes, tuition, etc could affect labor force participation**

Implication for Employment Growth

- **1.20% per year population growth *plus***
- **0.20 percentage point per year drop in LFP *implies***
- **0.90% per year labor force growth rate (LF roughly 2/3 of Pop)**
- **If nonfarm employment is a constant share of LF, this implies about 100,000 employment increase per month (135 million * 0.009 / 12)**
- **(Non farm employment / Civilian employment trending up over last several decades, trending down over last several years -- could imply an adjustment of 10,000 either way)**

Labor Composition (AKA Labor Quality)

- **Not all workers are equally productive**
- **Observable characteristics like education and (potential) experience predict wage rates**
- **If wages are proportional to productivity, changes in the distribution of education and experience predict effects on productivity**
- **Aaronson and Sullivan predict contributions to productivity growth from labor composition falling from 0.3 to 0.1 percentage points**

Potential Output Growth

- **Swing from 0.1% increases (mid 1990s) in LFP to 0.2% decreases in LFP (mid 2000s) implies 0.45 percentage points slower growth of available workers**
- **Slowing in labor composition improvements implies roughly 0.15 percentage points slower growth of labor productivity**
- **Combined slowing of labor input growth implies 0.6 percentage points less growth in potential output**
- **Of course, other factors (TFP, capital deepening) matter as well**