Trends In Labor Force Participation

June 2013

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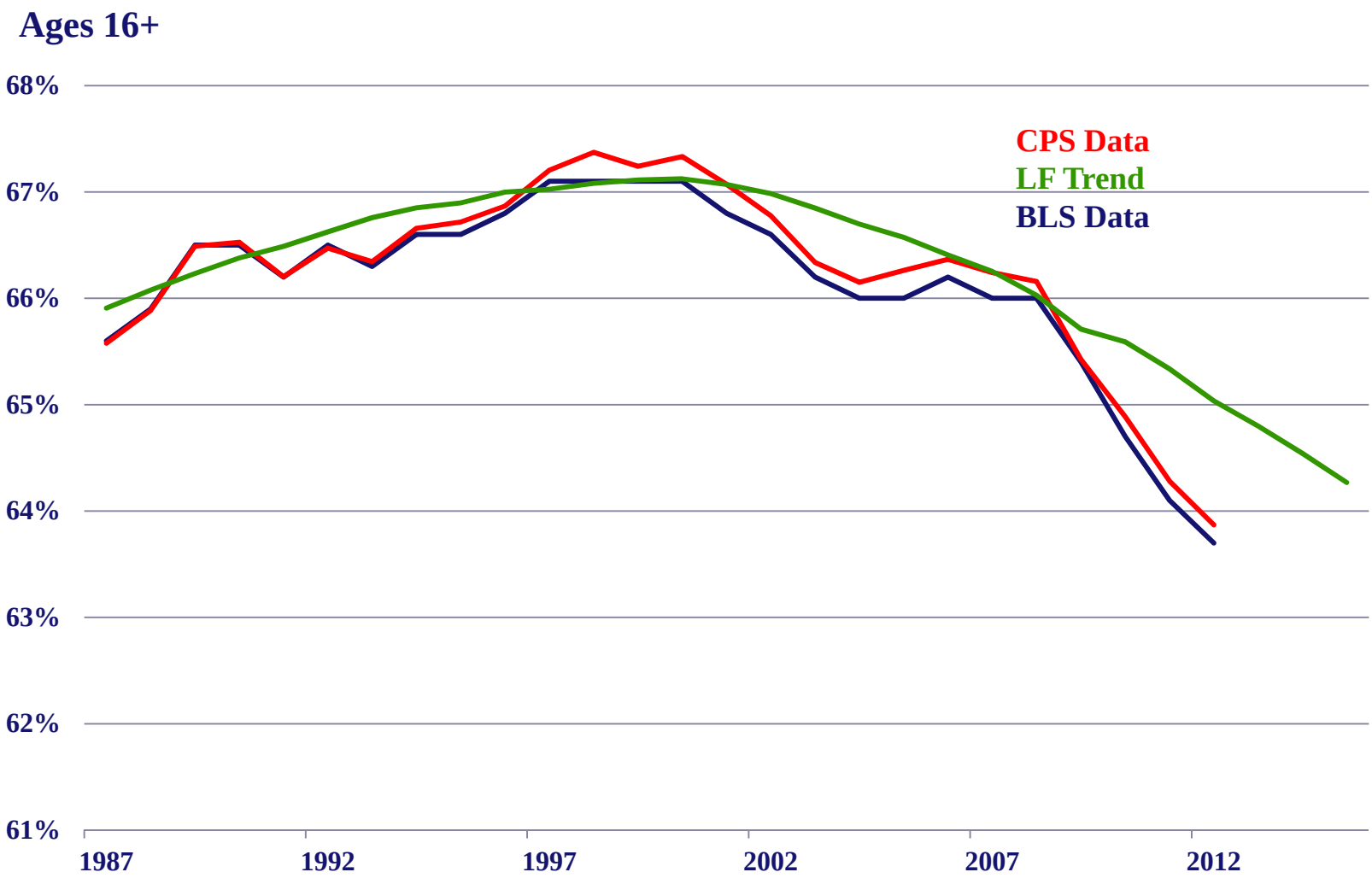
Federal Reserve Bank of Chicago

Labor Force Participation Rate, Trend vs. Actual



Main Points

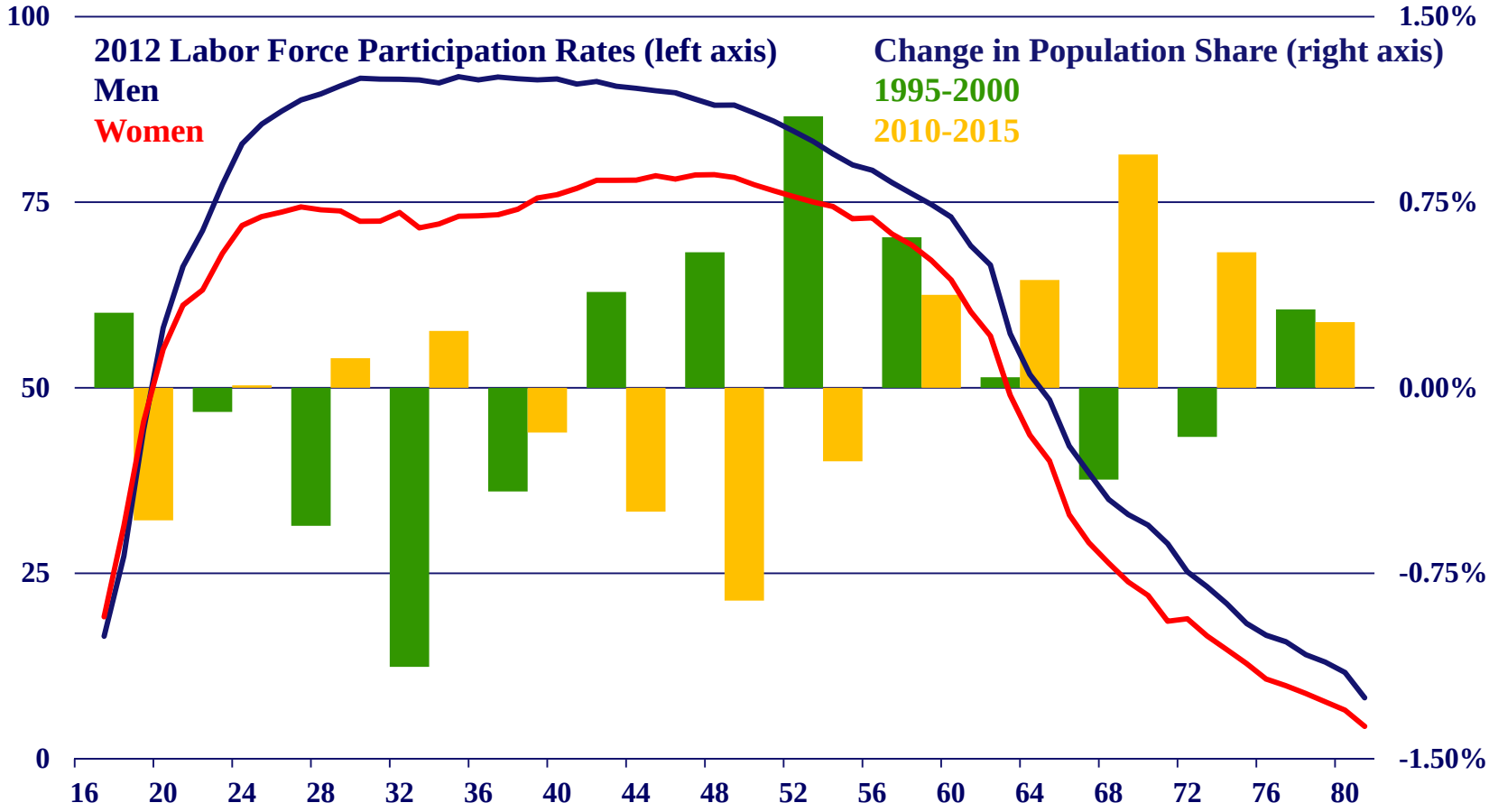
- **Participation is trending down for two reasons**
  - Demographics – we're getting older
  - Long-running behavioral trends – participation for most narrow demographic groups has been dropping steadily over time

- **Nevertheless, 2012 participation is below its long-term trend by 1.2 percentage points**
  - Even accounting for the high unemployment rate it is 0.67 percentage points below trend

- **Groups especially far below trend**
  - The young
  - Those with low education
  - Older workers are bucking the trend

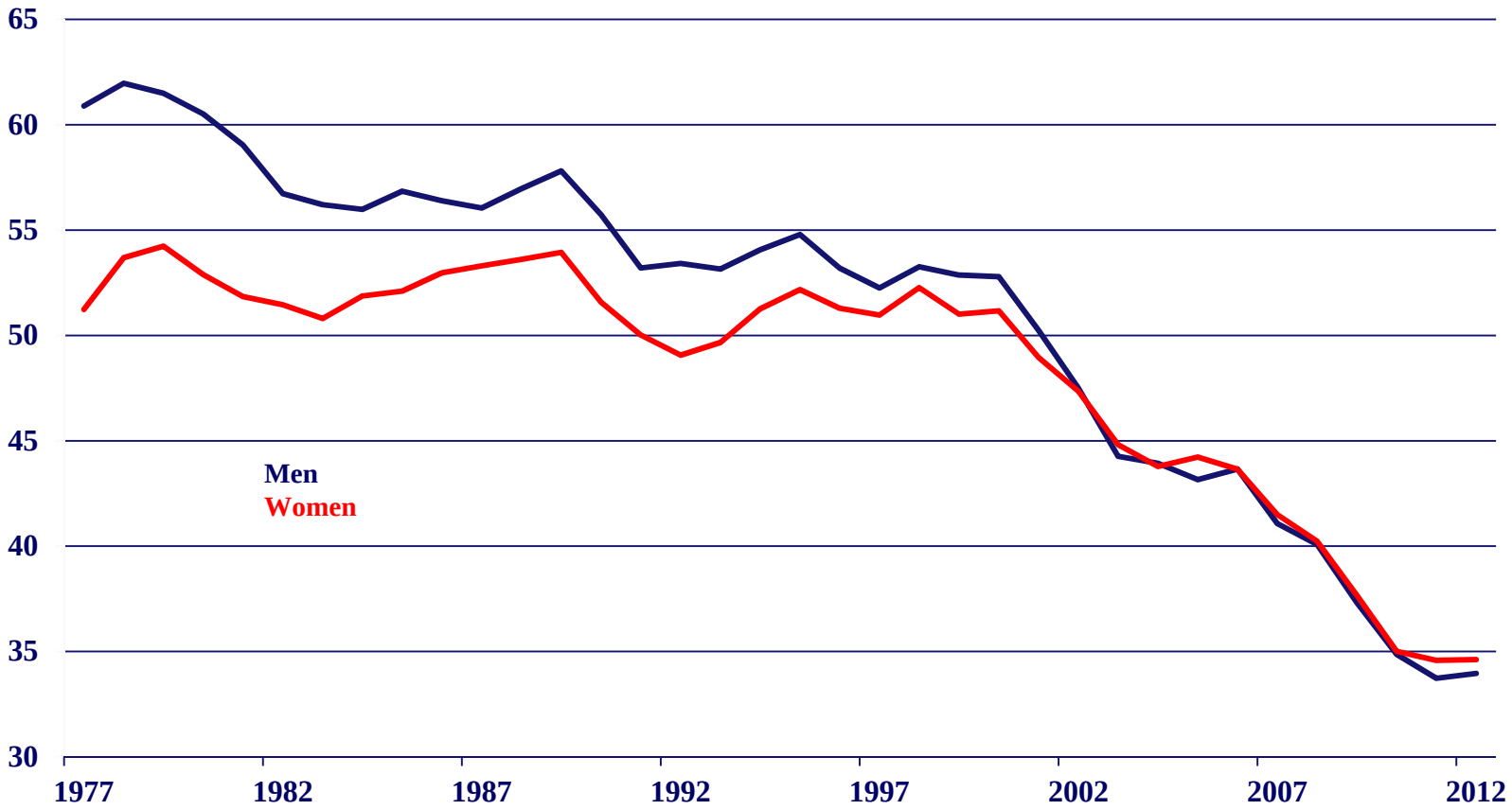
Participation By Age and Sex

2012 Labor Force Participation Rates and Change in Population Share, by Age
(percent)



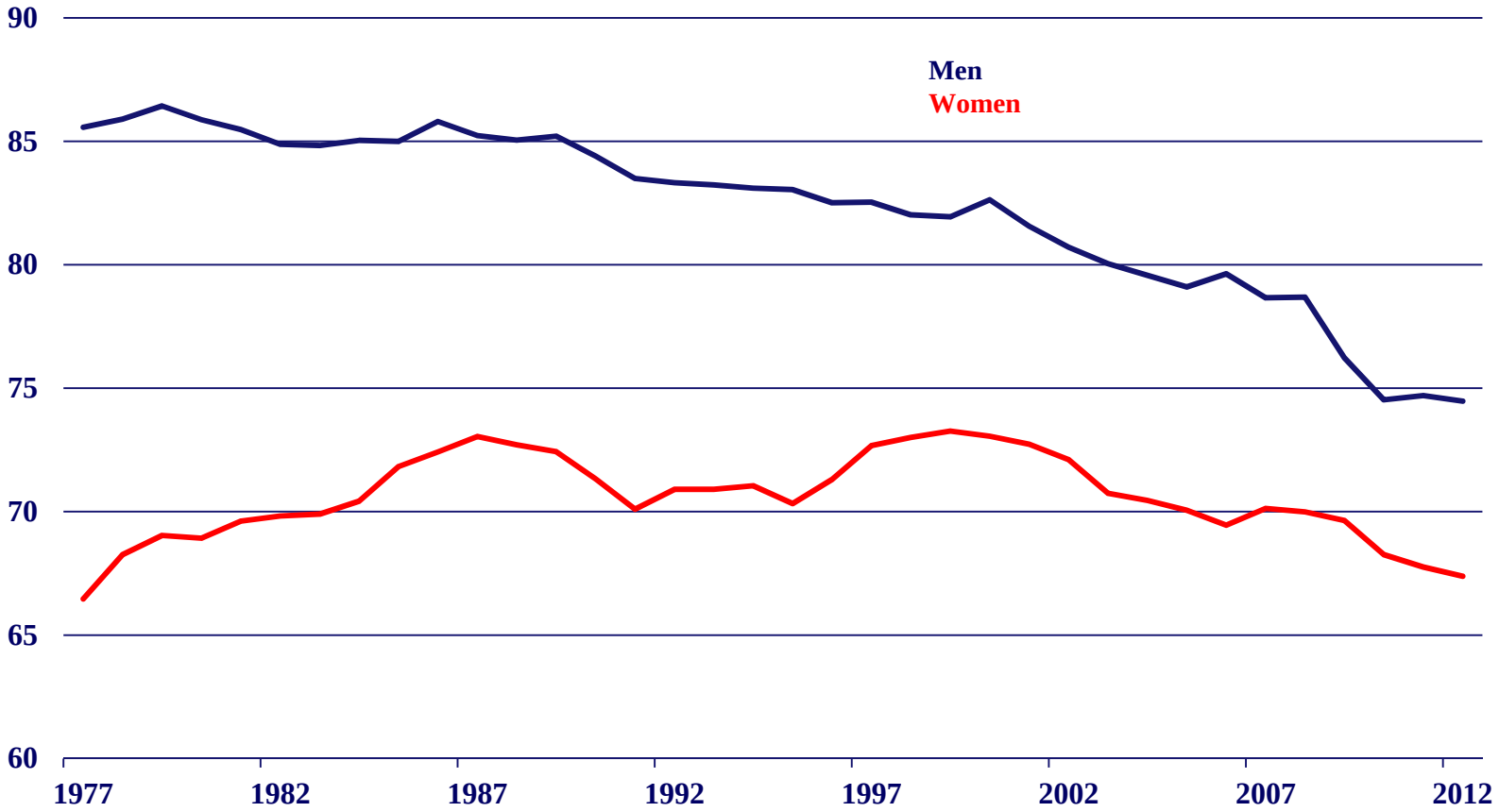
Labor Force Participation, By Age/Gender

Ages 16-19
(percent)



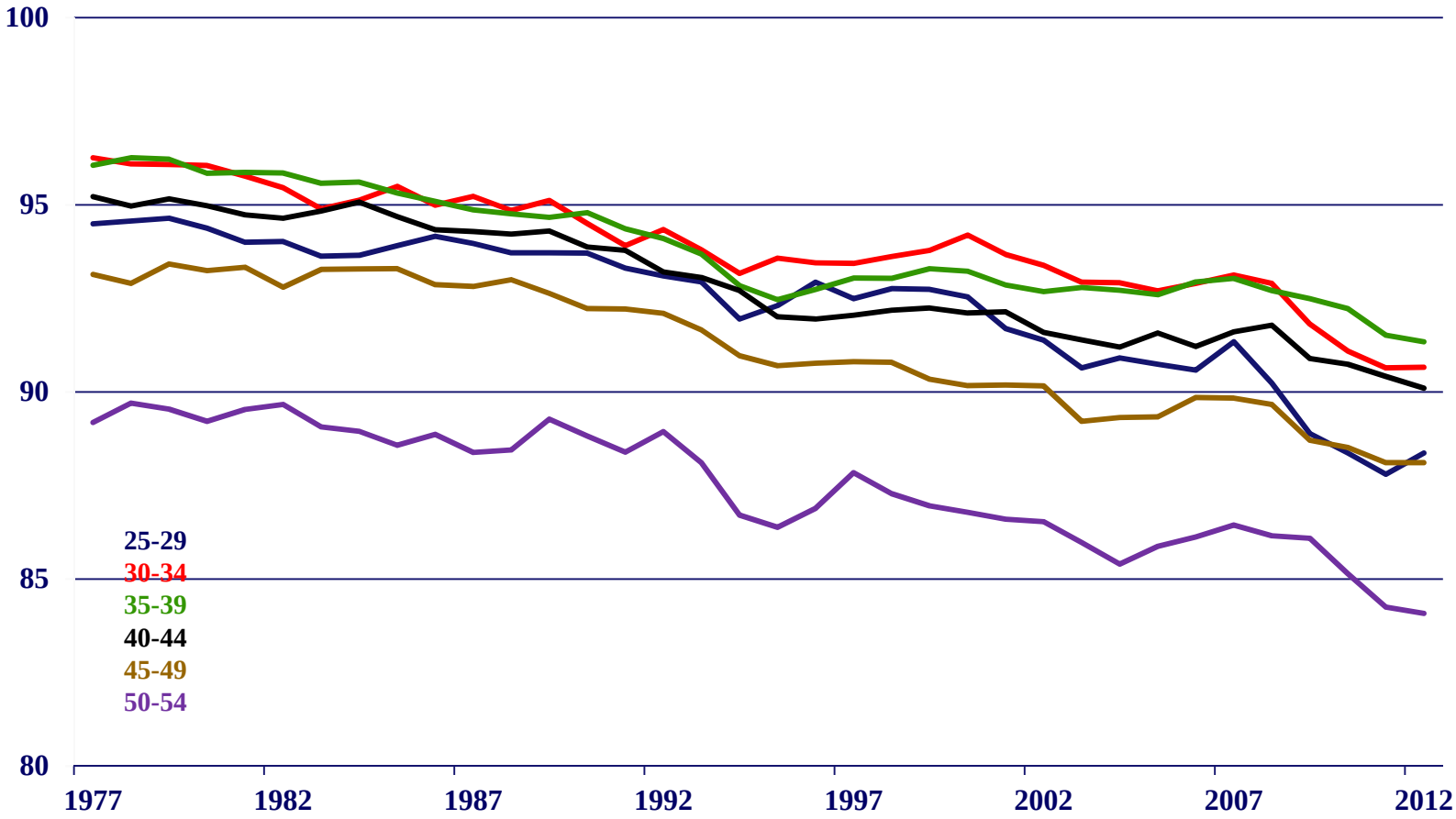
Labor Force Participation, By Age/Gender

Ages 20-24
(percent)



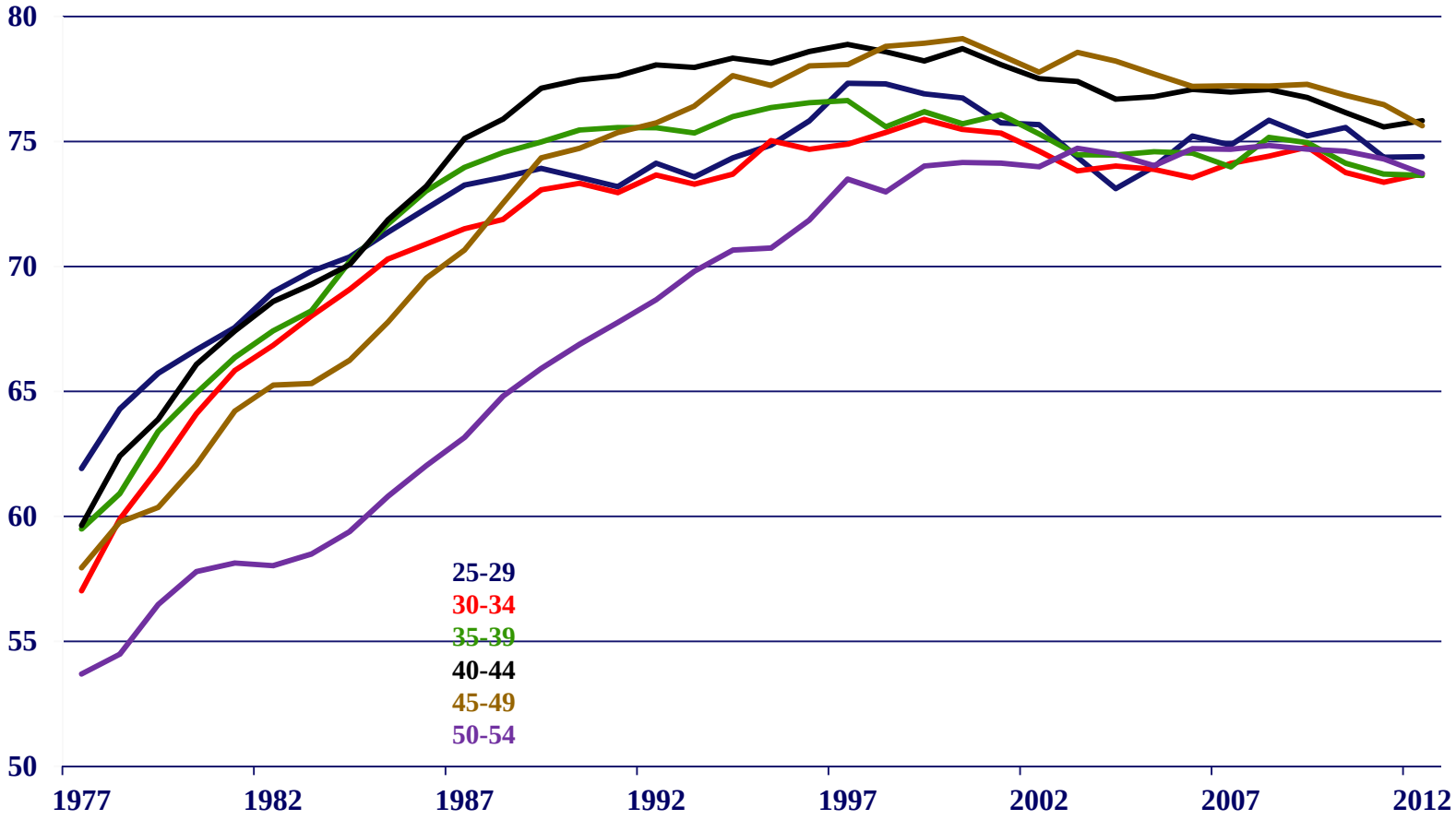
Labor Force Participation, By Age/Gender

Men, 25-54
(percent)



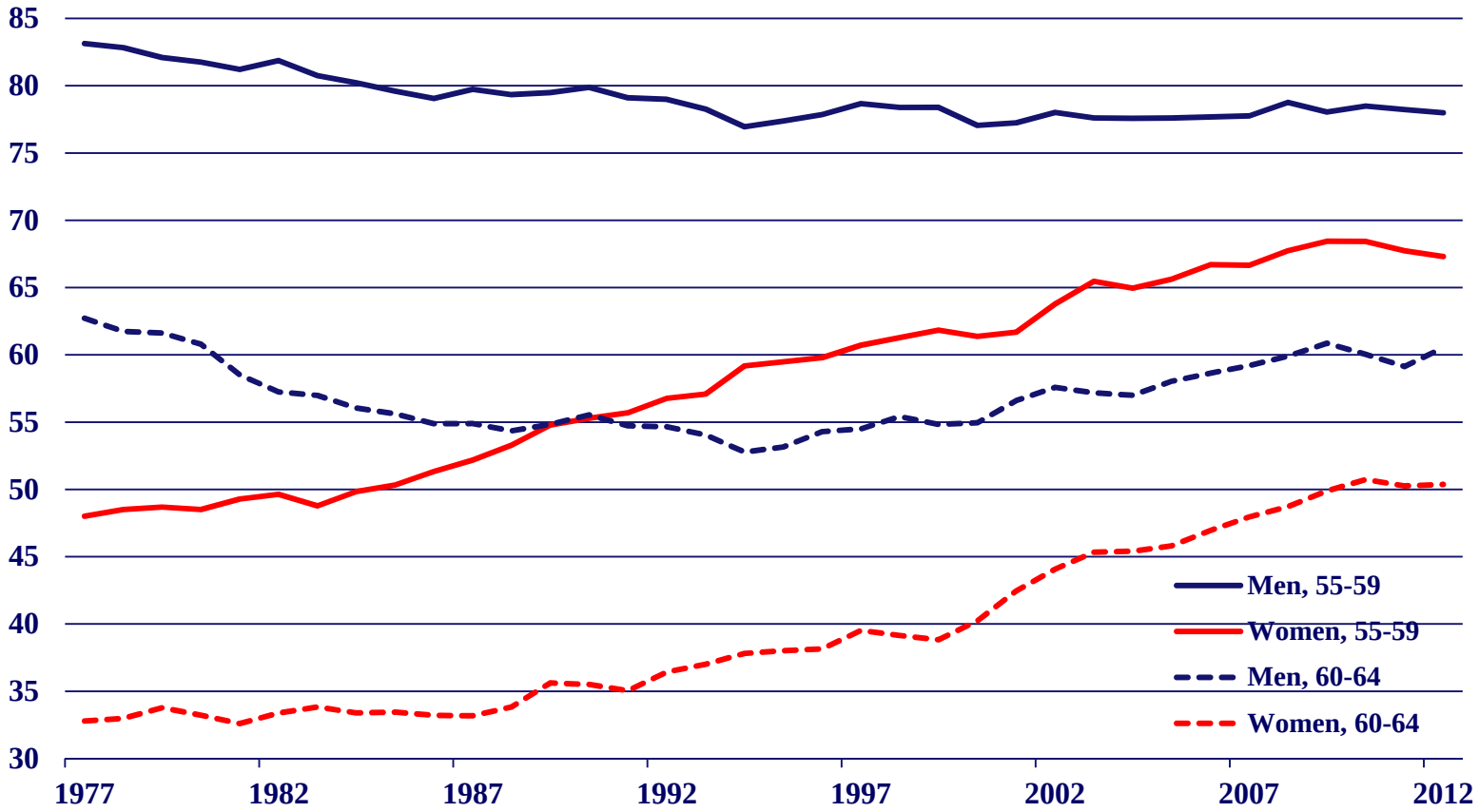
Labor Force Participation, By Age/Gender

Women, 25-54
(percent)



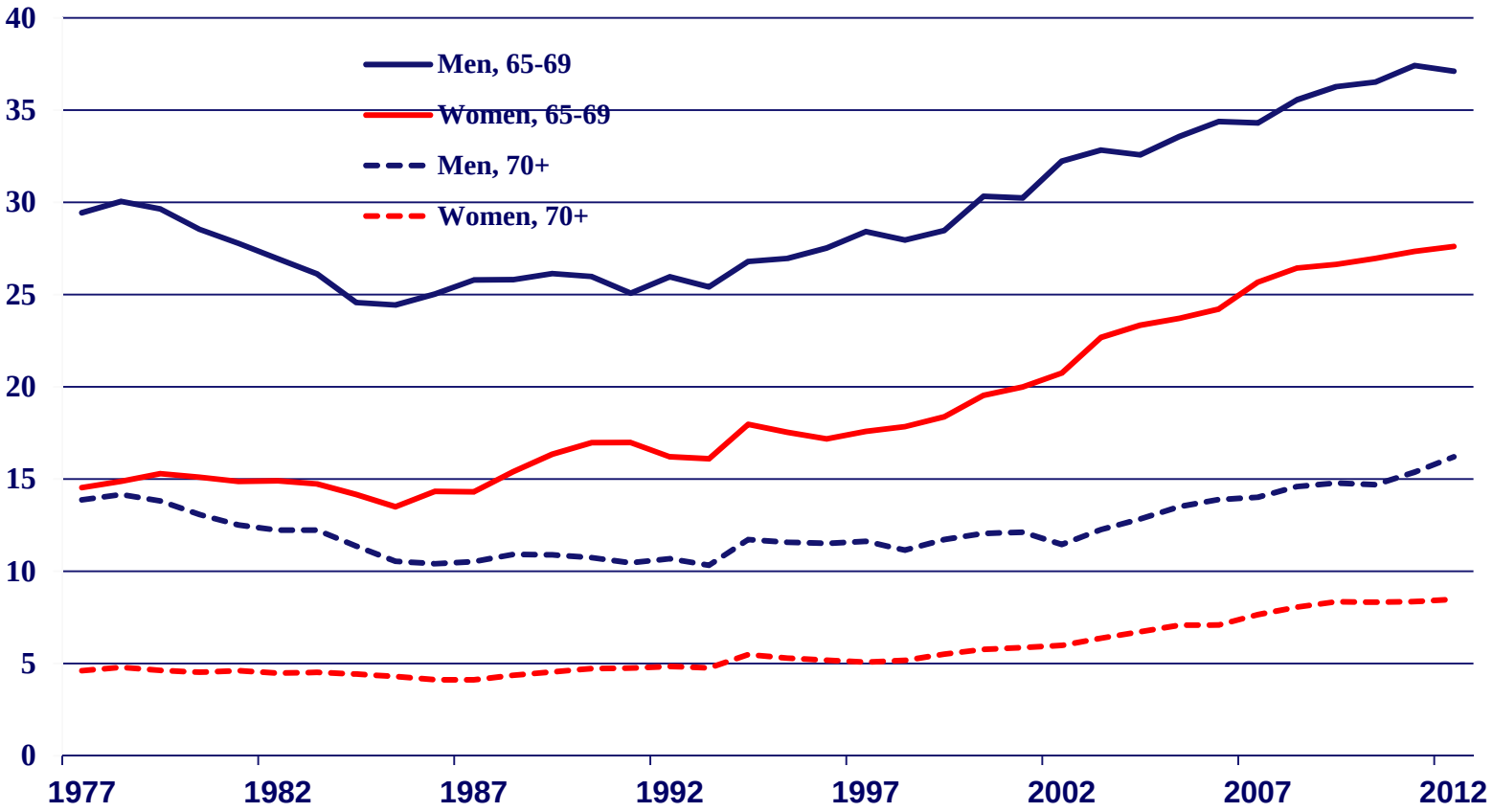
Labor Force Participation, By Age/Gender

Ages 55-64
(percent)

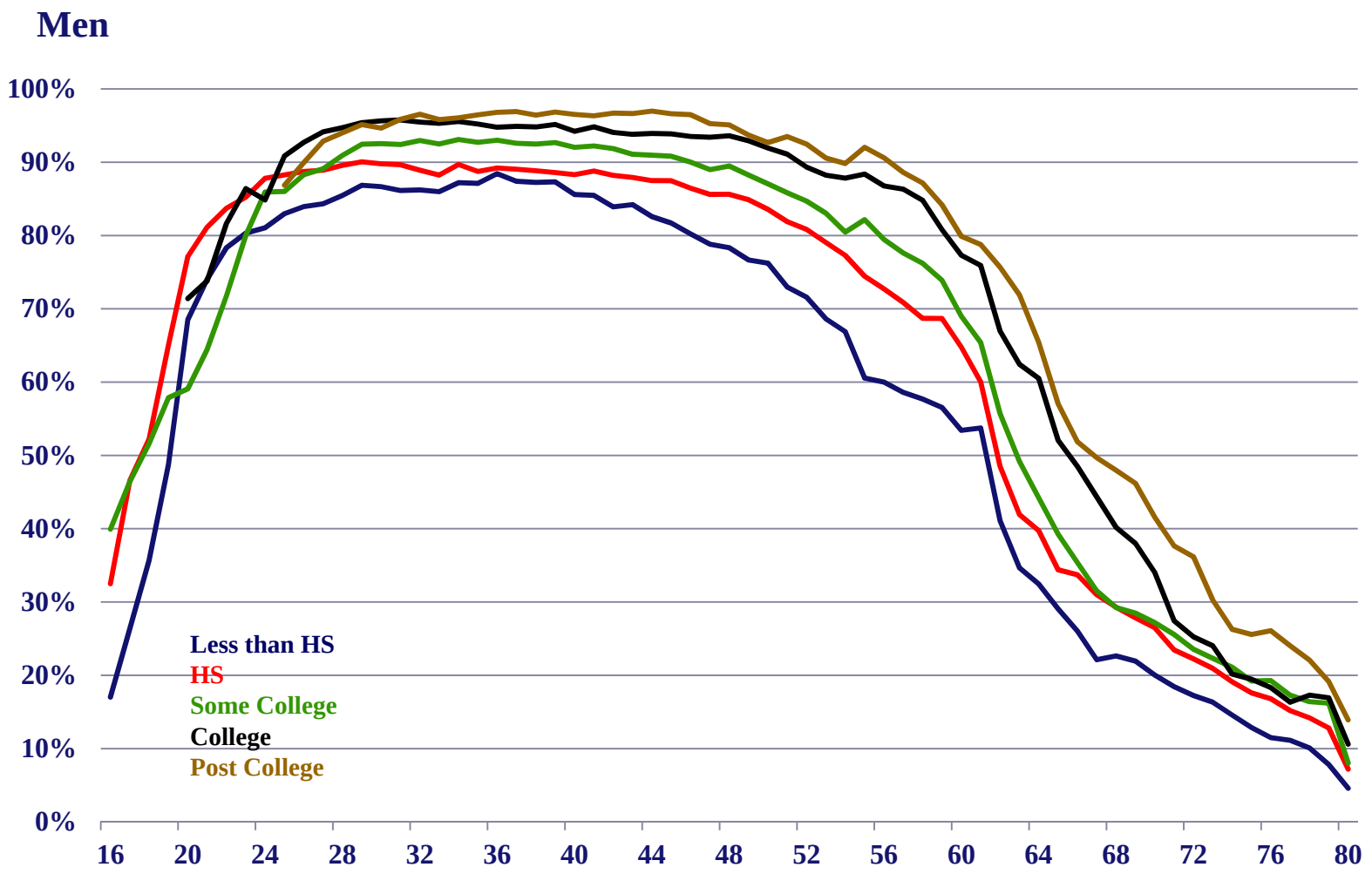


Labor Force Participation, By Age/Gender

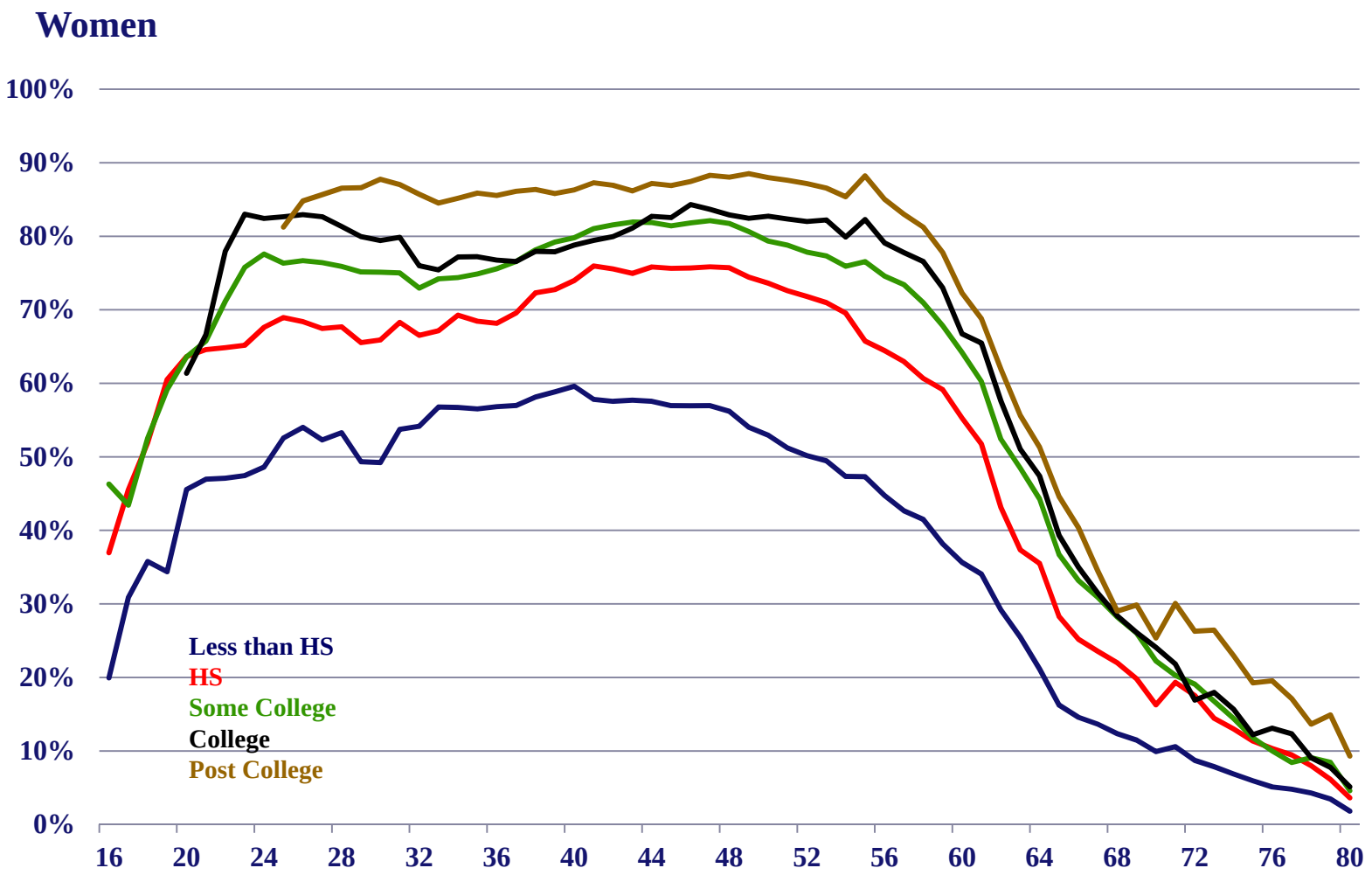
Ages 65+
(percent)



2012 Male Participation Rates By Education



2012 Female Participation Rates By Education



Forecasting Demographic Group Behavior

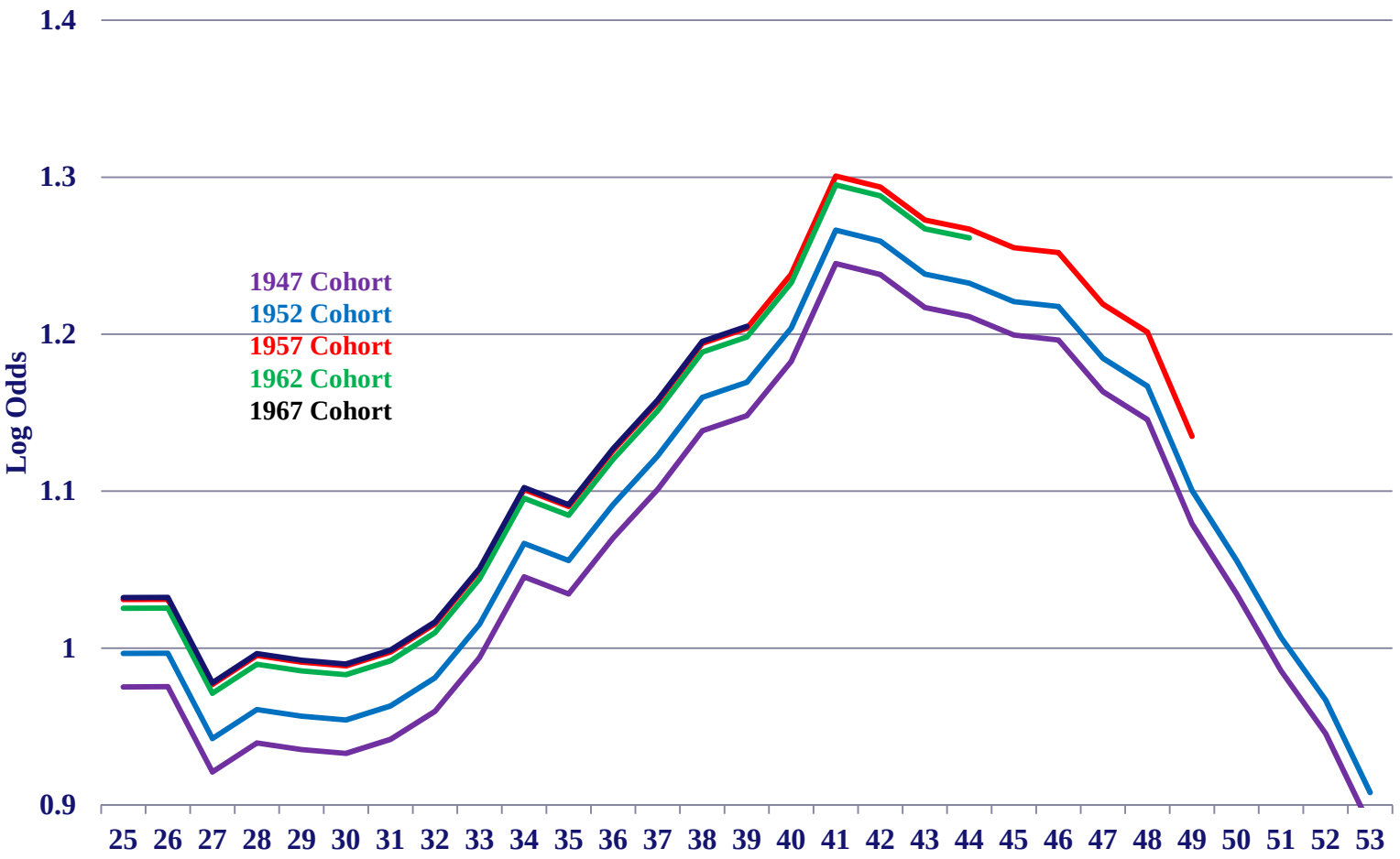
- **Question: In 2007, how to forecast participation rates of 50-54 year old women in 2015?**

- **BLS Method: Extrapolate the historical time series for participation of 50-54 year old women using last 13 years (mixing cohorts)**

- **Cohort Method:**
  - Note that women who will be 50-54 in 2015 were born 1961-65
  - Compare the LFP of the 1961-65 birth cohorts to those of earlier cohorts at the same age
  - Assume cohort differences will persist at higher ages

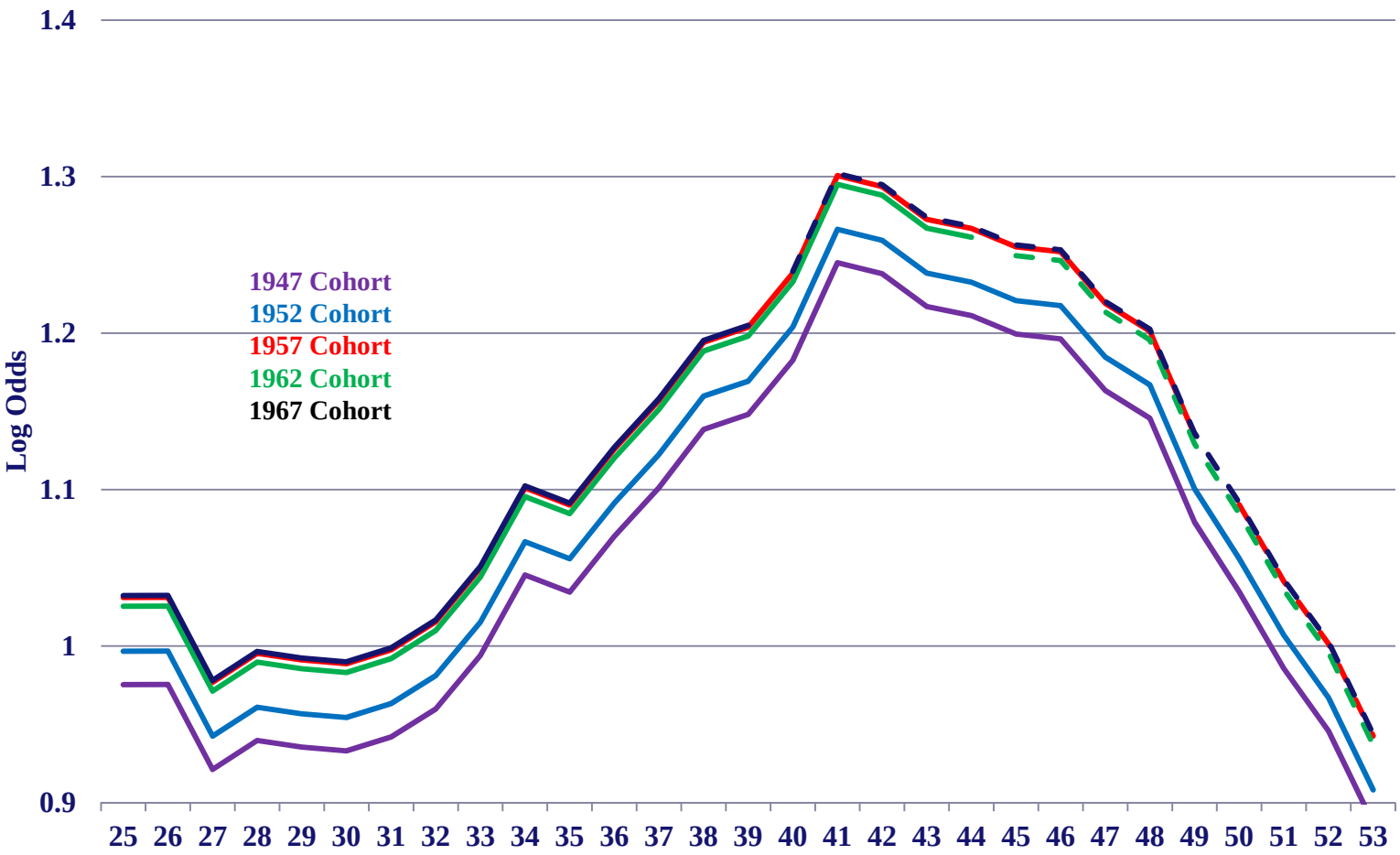
Select Model Fit LFP Profile Projections

White Female HS Graduate, 25-54



Select Model Fit LFP Profiles Through 2007

White Female HS Graduate, 25-54



Cohort-Based Projections

- **Above projections based on extensions of Aaronson and Sullivan, Chicago Fed Economic Perspectives, 2001**
- **Somewhat similar results to Aaronson, Fallick, Figura, Pingle, and Wascher, Brookings, 2006**
- **Methodological differences**
  - Estimates at individual level
    (Models estimated using CPS data 1987-2007)
  - 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**

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

β_{sb} **Birth year cohort dummies**

α_{sa} **Age dummies**

x_{sbai} **Race group dummies**

z_{sba} **Age-specific controls**

Estimated by age groups: 16-19, 20-24, 25-54, 55-70, 71-79.

Age-Specific Controls

- **Ages 16-24**
  - Real Minimum Wage
  - Hourly Wage Ratio of 16-19 year olds to 25-54 year olds
- **Ages 25-54**
  - Fraction of population married with a Child 5 Years or Younger
  - Fraction of population married with no Child 5 Years or Younger
- **Ages 55 and higher**
  - Gender specific life expectancies

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

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

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**

$$\log\left(\frac{q^e_{sbai}}{1-q^e_{sbai}}\right) = \beta^e_{sb} + \alpha^e_{sa} + x_{sbai}\gamma^e_s + z_{sba}\gamma^e_s$$

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**

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

w_{sea} **Annual unemployment gap (actual – CBO NAIRU)**

A Decomposition

Let p_t **= Overall trend LFP at time t**

p_{dt} **= Trend 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

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

Decomposition of LFP Change

(Percentage points per year)

	1987-1997	1997-2005	2005-2010	2010-2013
Total Change	**0.14**	**-0.02**	**-0.16**	**-0.19**
Demographic	**0.05**	**-0.06**	**-0.08**	**-0.10**
Behavioral	**0.09**	**0.04**	**-0.07**	**-0.09**

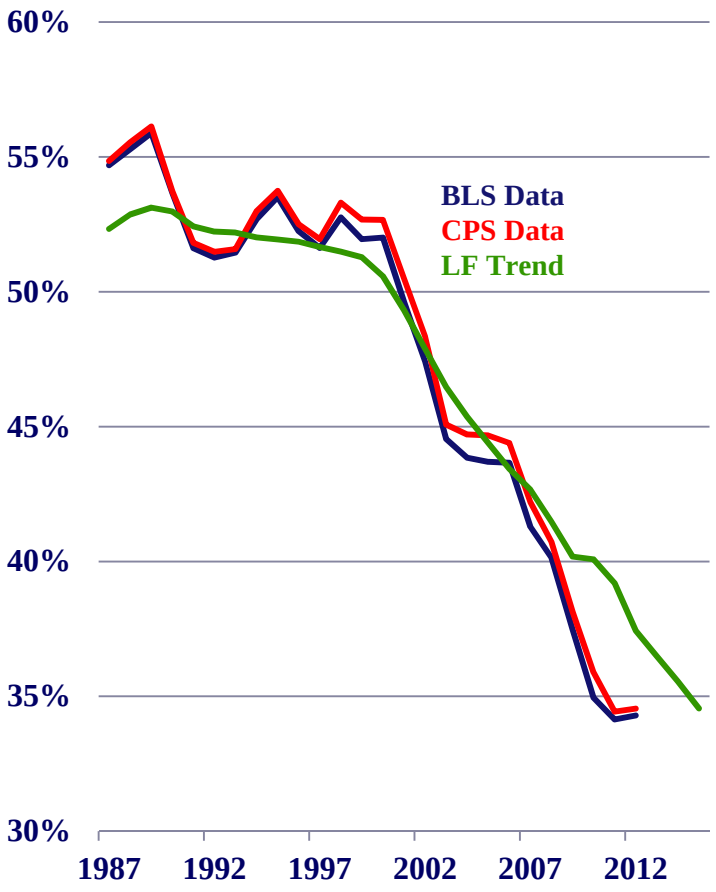
Decomposition of Demographic Contribution

(Percentage points per year)

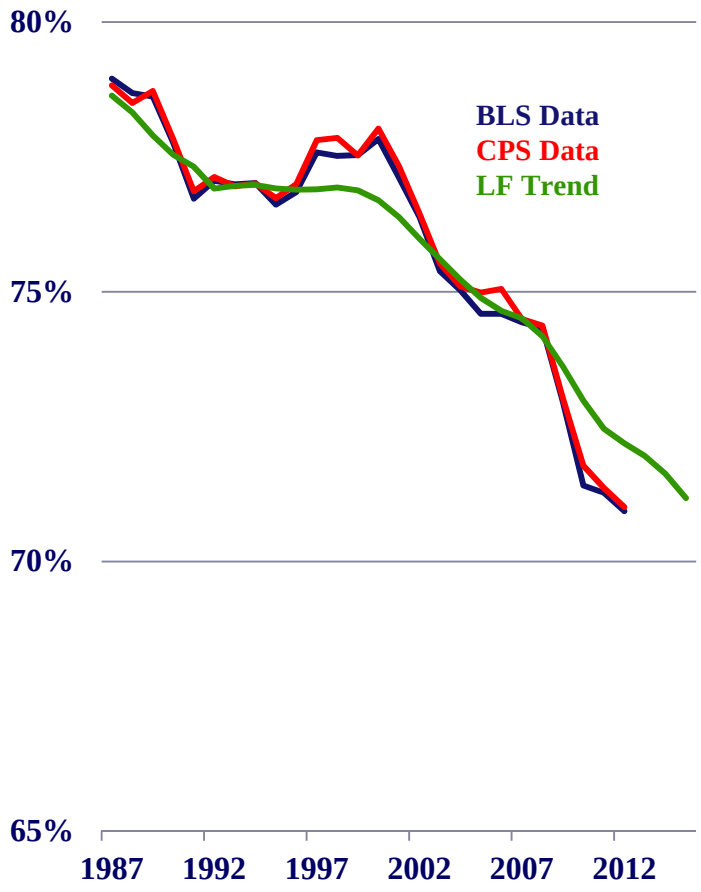
	1987-1997	1997-2005	2005-2010	2010-2013
Total	**0.05**	**-0.06**	**-0.08**	**-0.10**
Age 16-19	**0.01**	**0.00**	**0.01**	**0.03**
Age 20-24	**-0.02**	**0.01**	**0.00**	**0.00**
Age 25-54	**0.05**	**-0.04**	**-0.04**	**-0.05**
Age 55-70	**0.04**	**-0.06**	**-0.07**	**-0.05**
Age 71-79	**-0.03**	**0.03**	**0.02**	**-0.03**

Labor Force Participation Rate, Trend vs. Actual

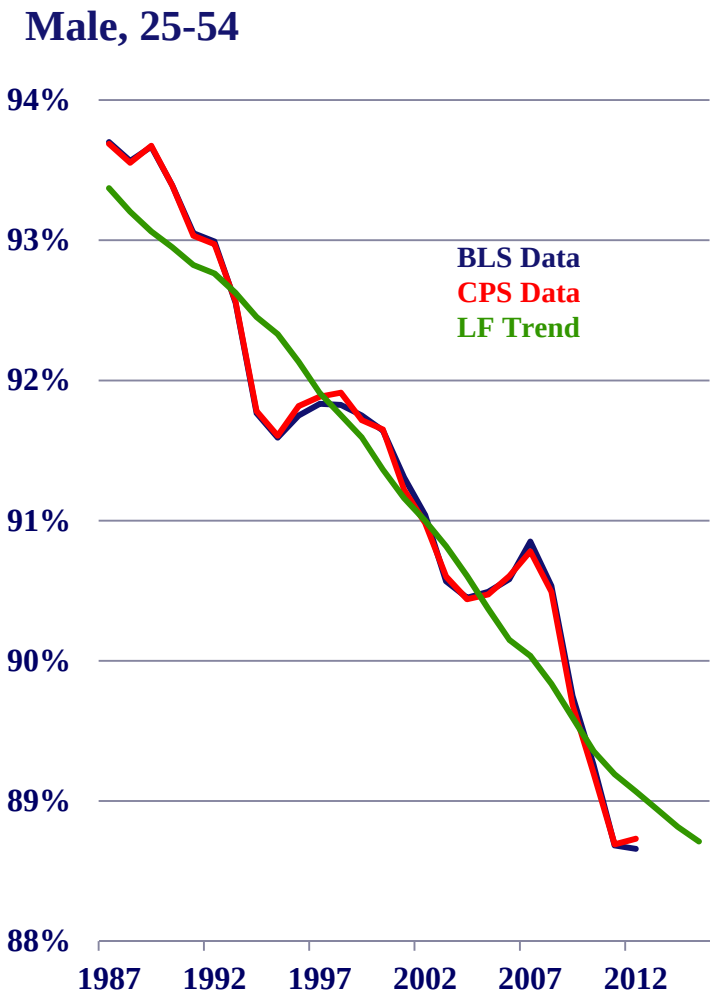
16-19 year olds

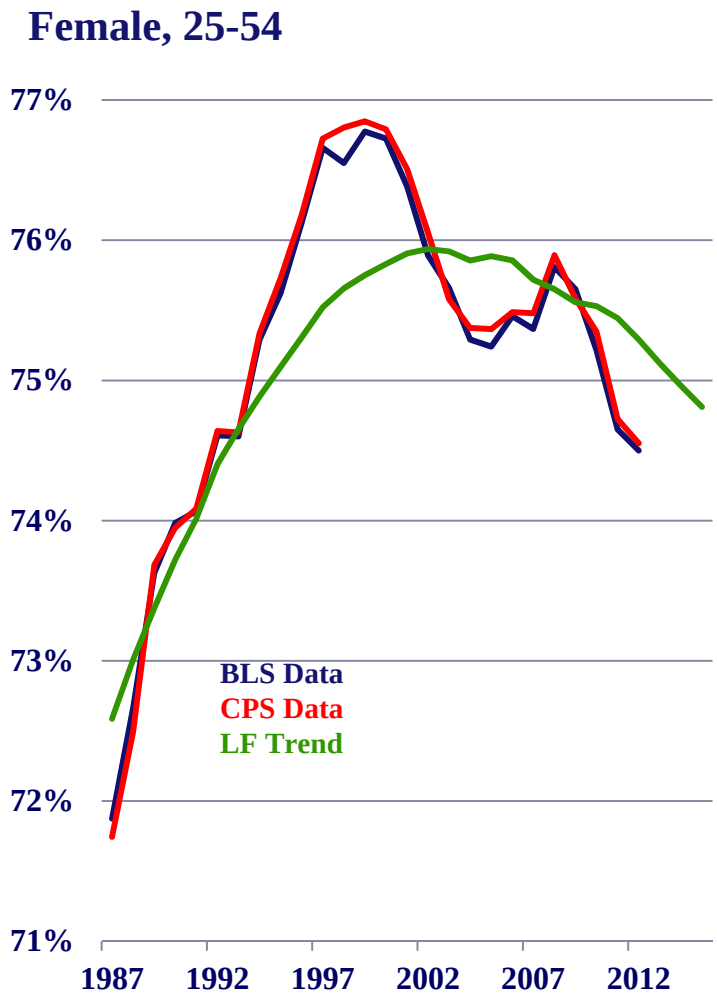


20-24 year olds



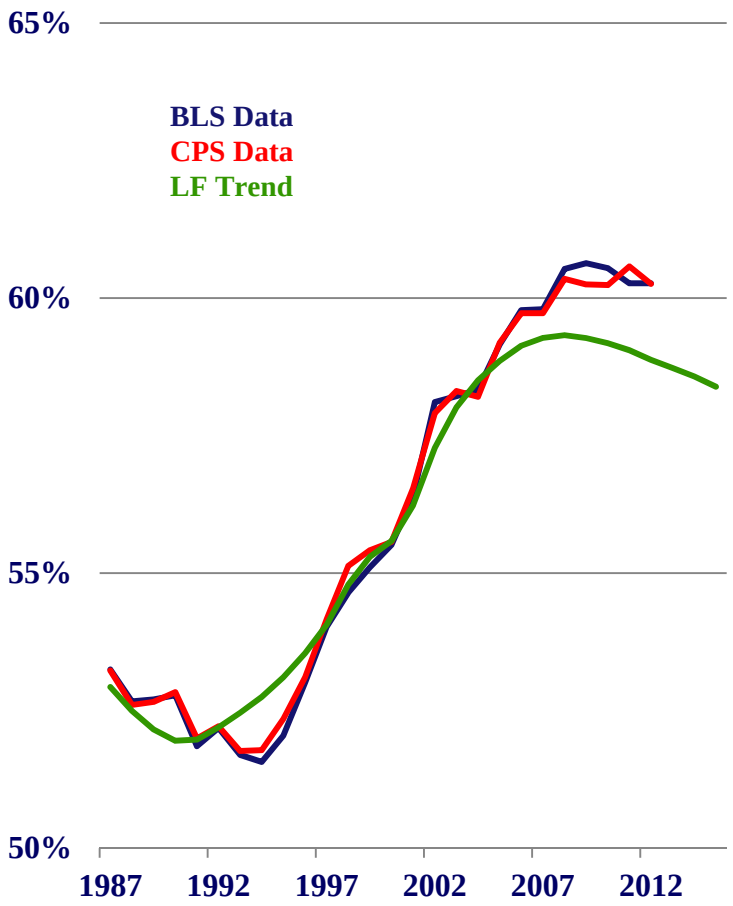
Labor Force Participation Rate, Trend vs. Actual



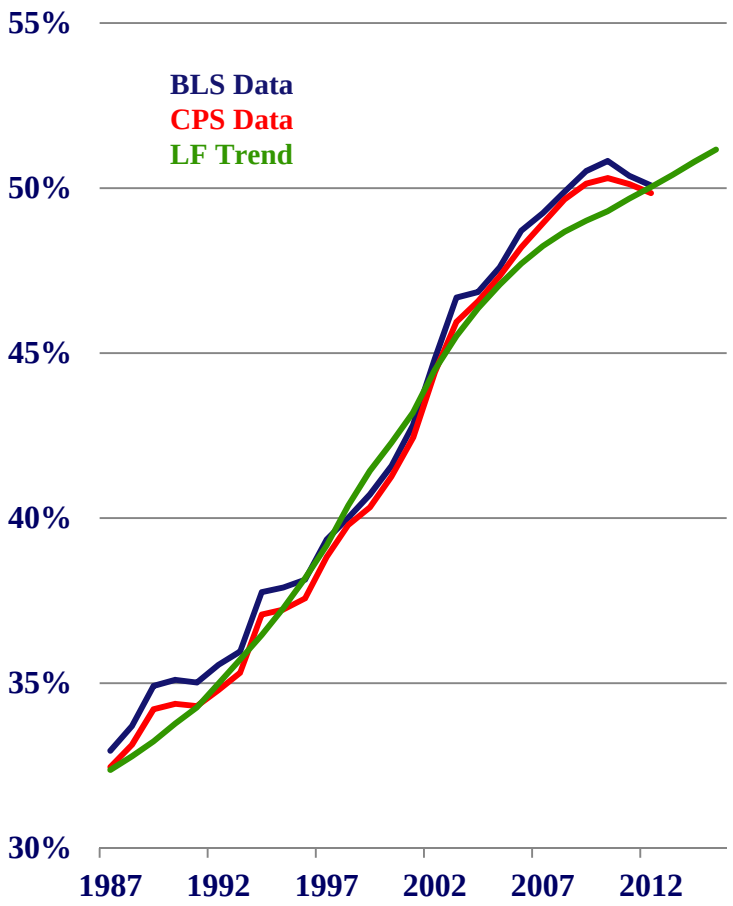


Labor Force Participation Rate, Trend vs. Actual

Male, 55-70

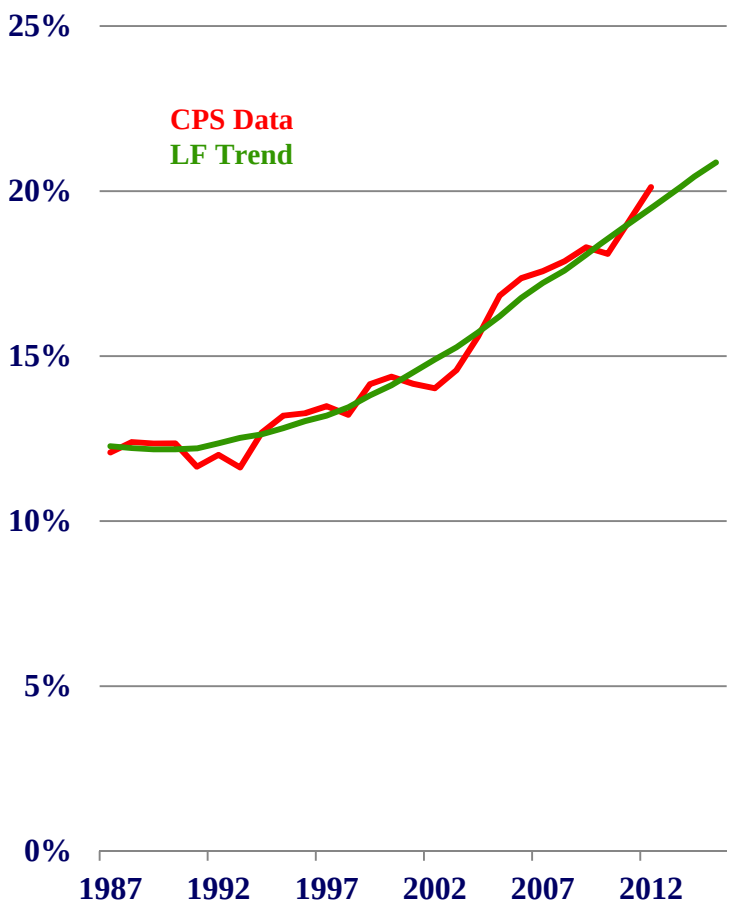


Female, 55-70

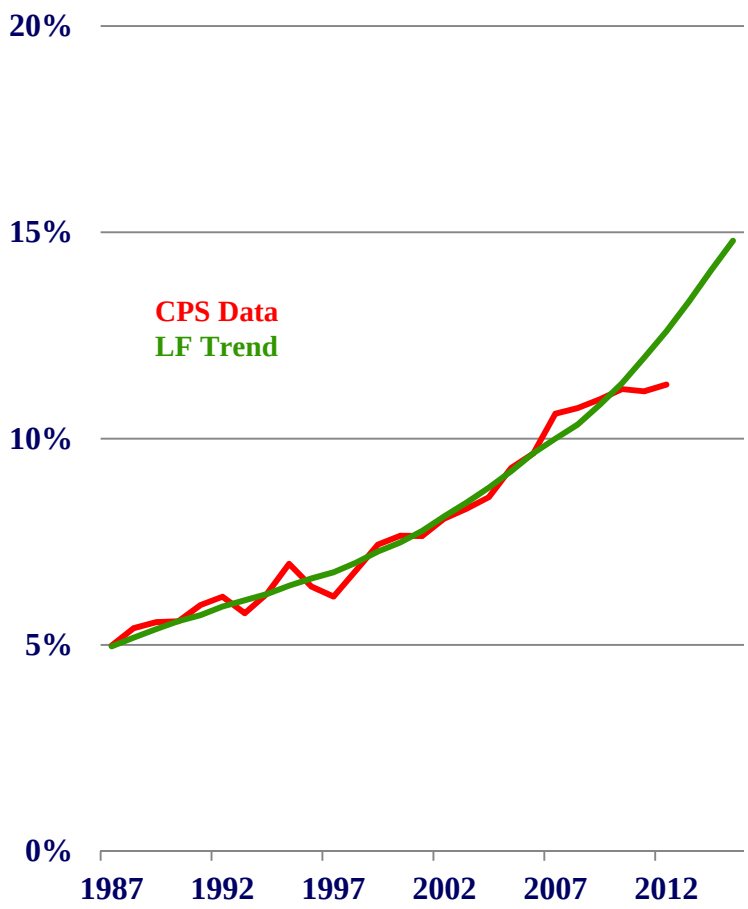


Labor Force Participation Rate, Trend vs. Actual

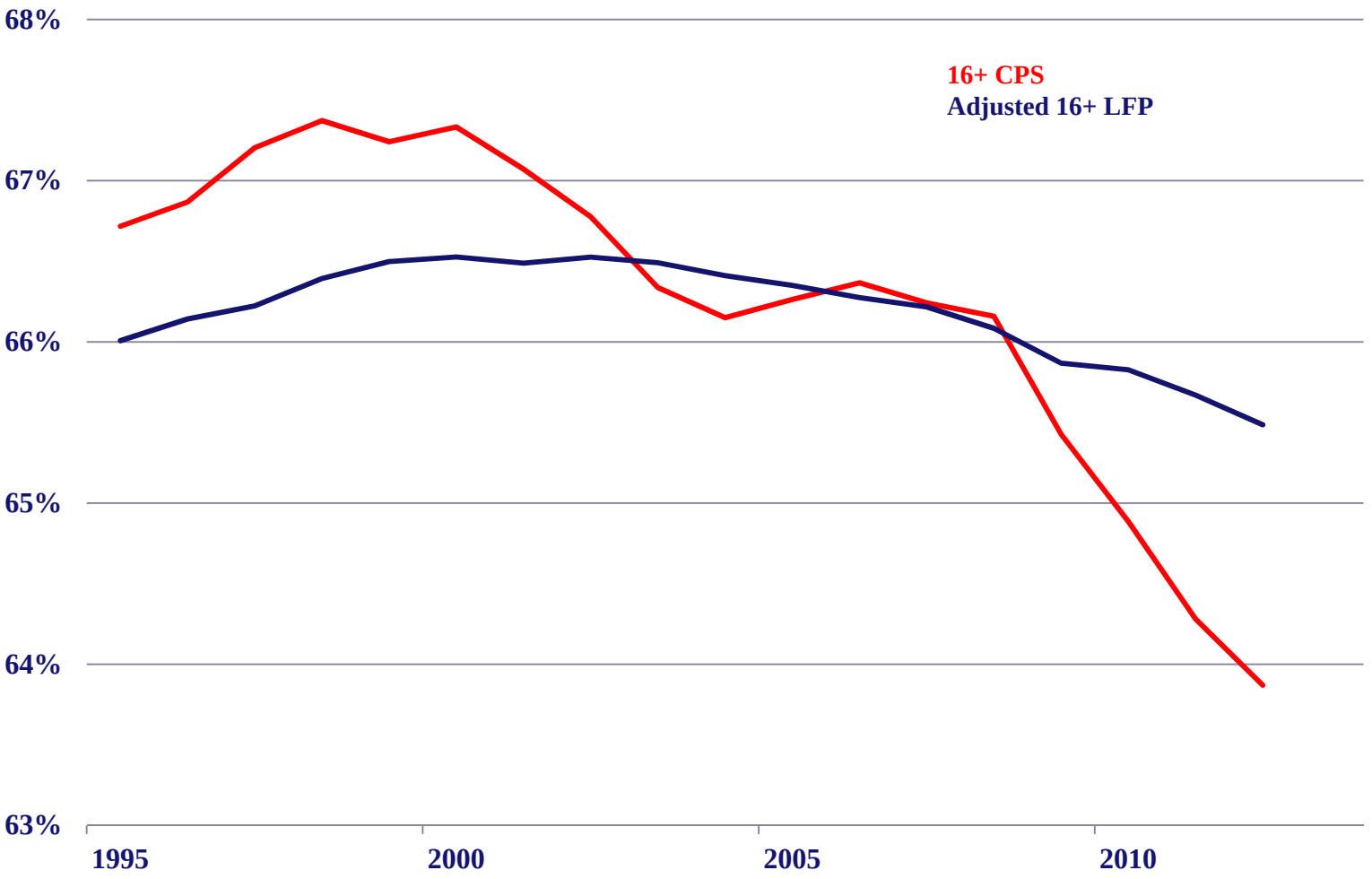
Male, >70



Female, >70



Demographically-Adjusted LFP



Decomposition of Behavioral Contribution

(Percentage points per year)

	1987-1997	1997-2005	2005-2010	2010-2013
Total	**0.09**	**0.04**	**-0.07**	**-0.09**
Men	**-0.05**	**-0.04**	**-0.08**	**-0.07**
Age 16-19	**-0.01**	**-0.03**	**-0.04**	**-0.03**
Age 20-24	**-0.01**	**-0.02**	**-0.01**	**-0.01**
Age 25-54	**-0.04**	**-0.05**	**-0.05**	**-0.03**
Age 55-70	**0.01**	**0.05**	**0.01**	**-0.01**
Age 71-79	**0.00**	**0.01**	**0.01**	**0.01**

Decomposition of Behavioral Contribution

(Percentage points per year)

	1987-1997	1997-2005	2005-2010	2010-2013
Total	**0.09**	**0.04**	**-0.07**	**-0.09**
Women	**0.14**	**0.08**	**0.01**	**-0.02**
Age 16-19	**0.00**	**-0.03**	**-0.02**	**-0.03**
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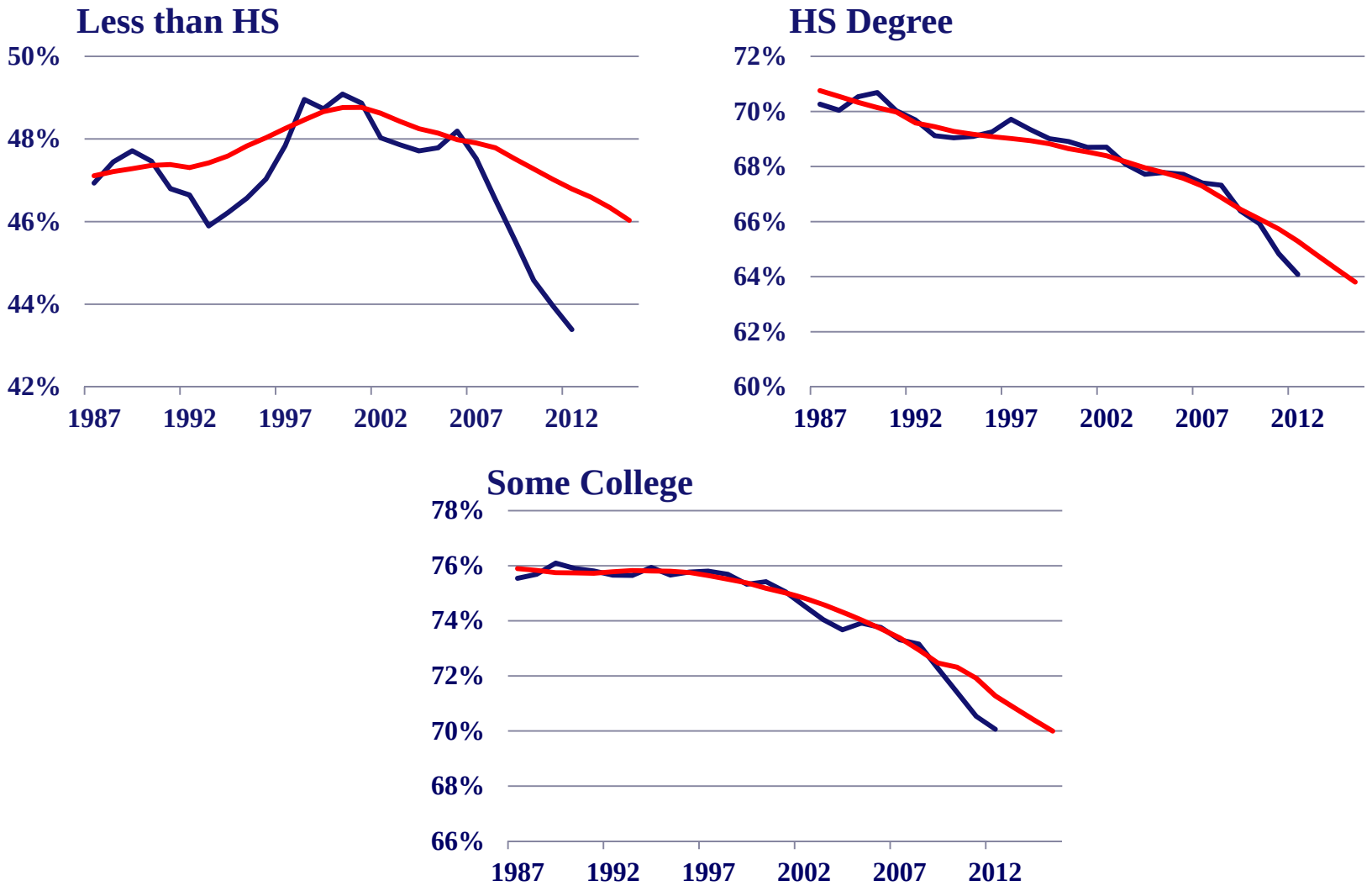
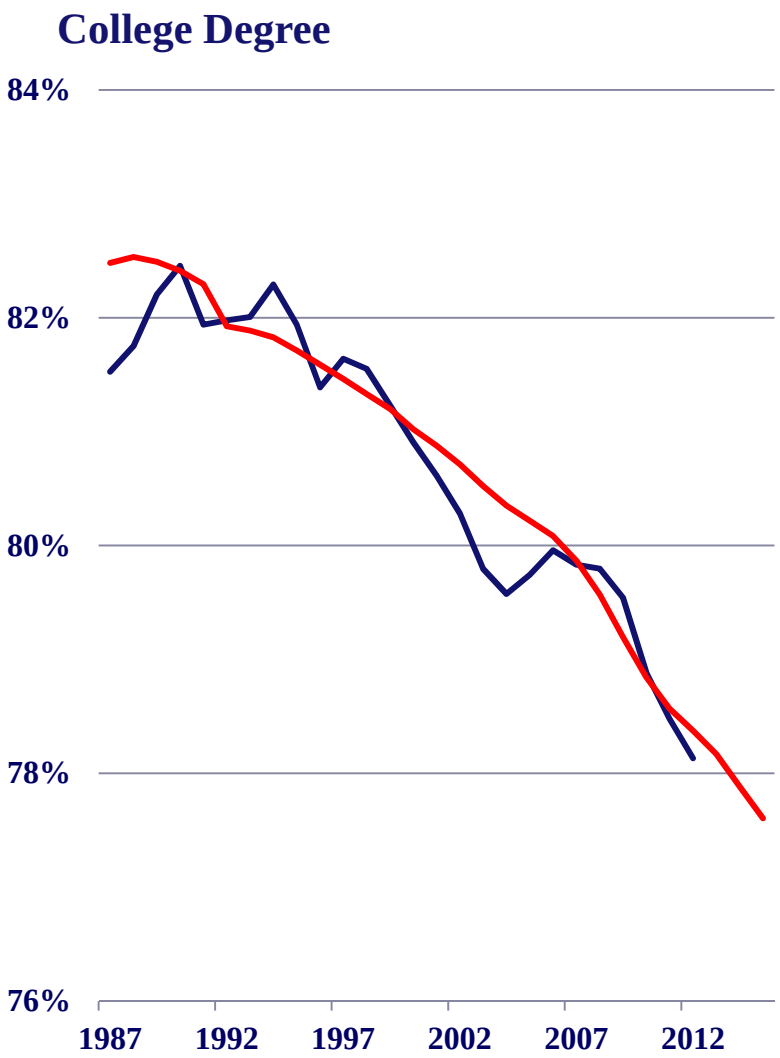
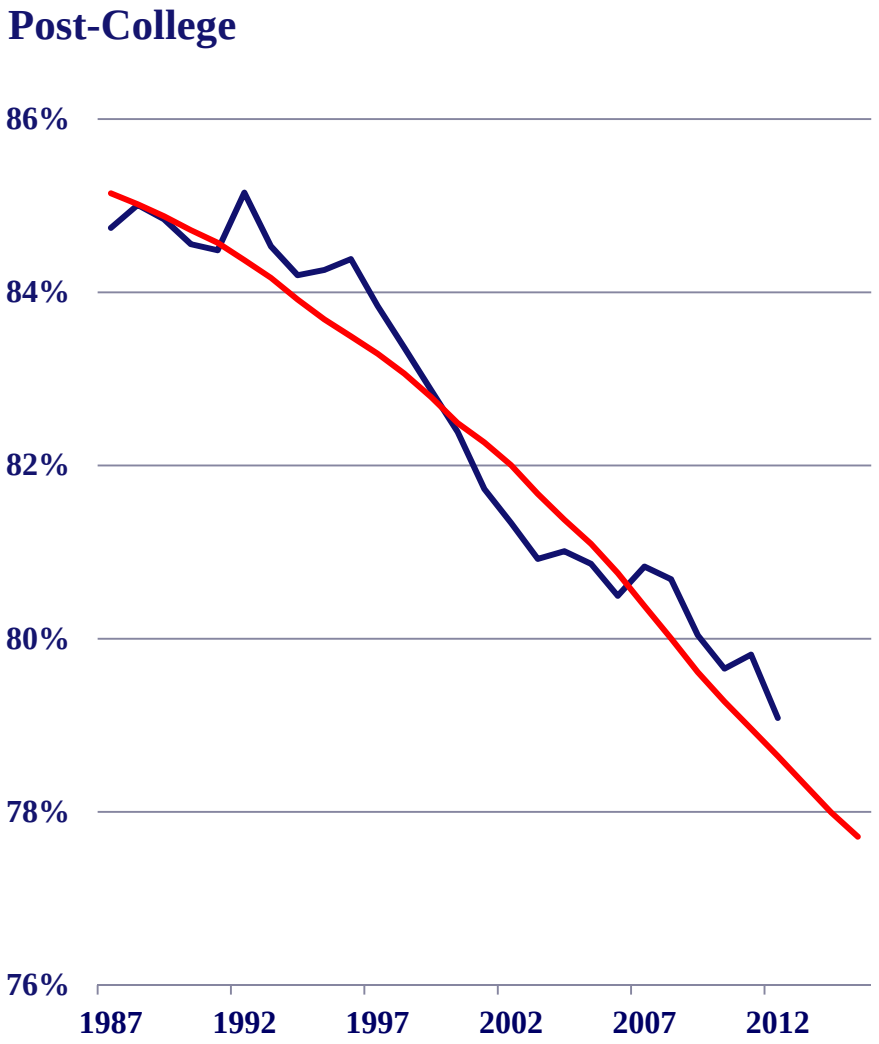
Age 25-54	**0.08**	**0.01**	**-0.02**	**-0.03**
Age 55-70	**0.05**	**0.09**	**0.04**	**0.03**
Age 71-79	**0.01**	**0.01**	**0.01**	**0.02**

LFP By Education



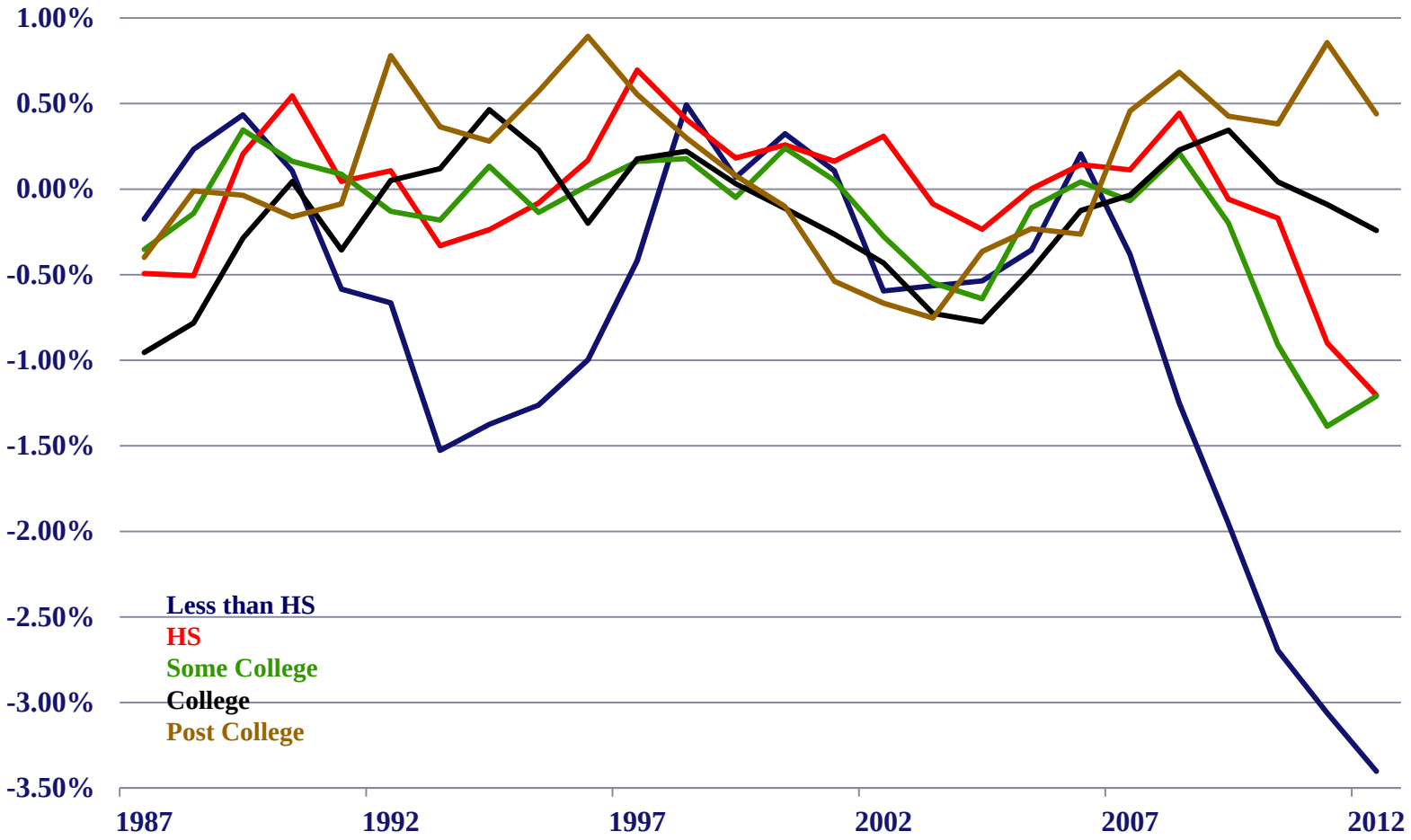
LFP By Education





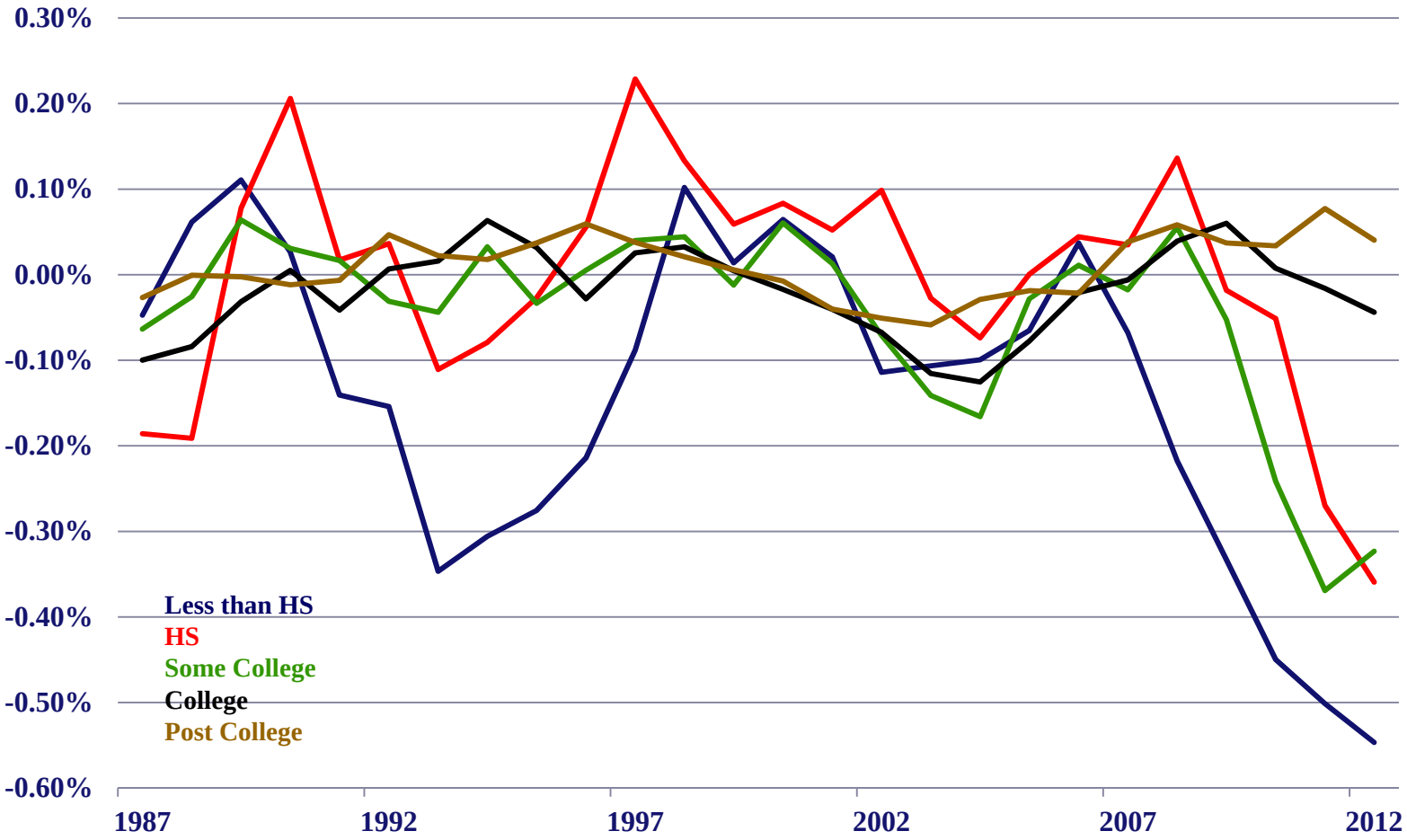
LFP Gap By Education

(Actual LF – Predicted LF)



Contribution to LFP Gap By Education

(LFP Gap * Population Share)

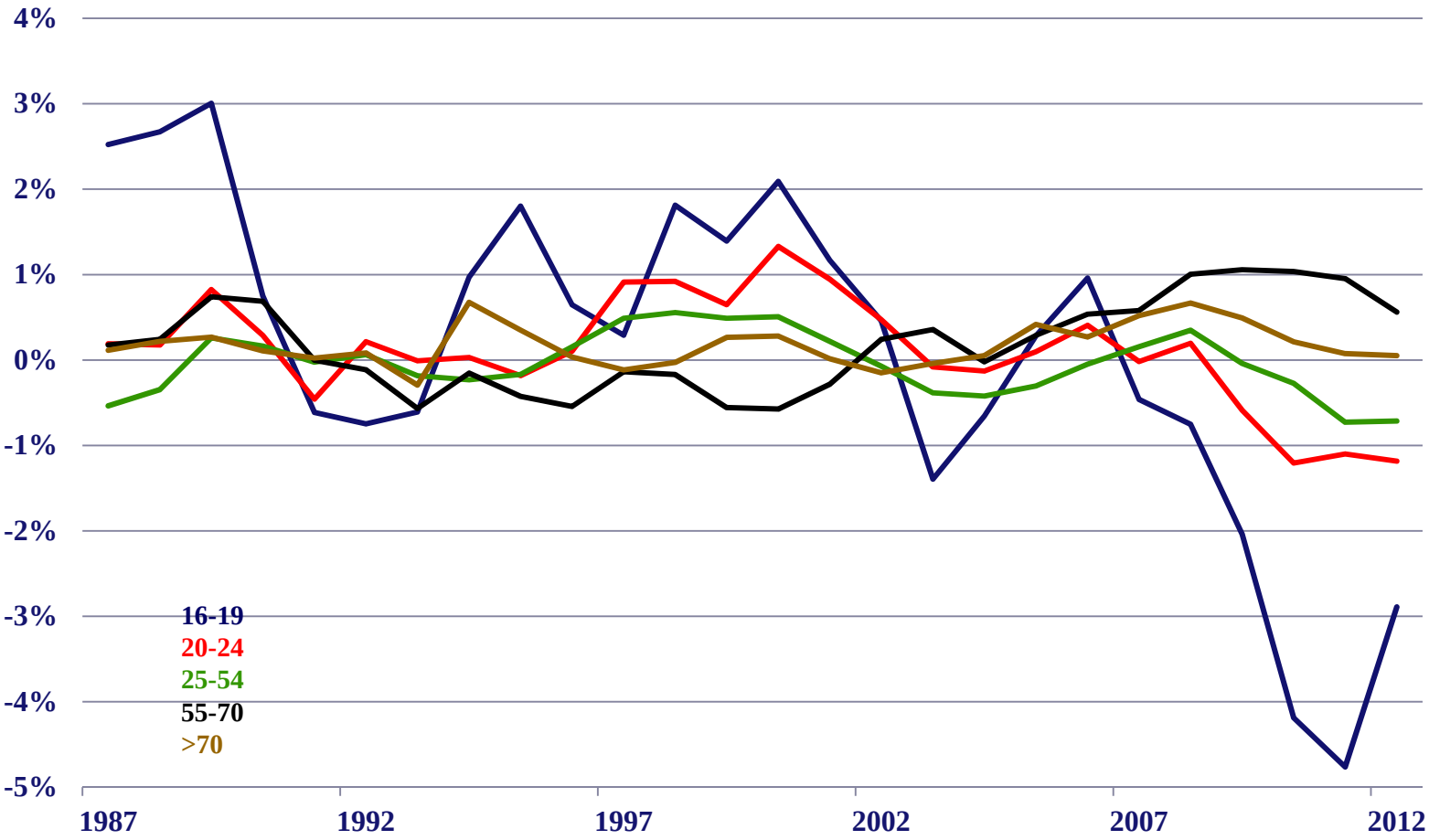


Possible Interpretation of Low Education Results

- **Housing boom may have temporarily stopped the slide of real wages for low education workers …**
  - Possible interpretation of Charles, Hurst, and Notowidigdo (2012)
- **Temporarily holding up LFP**
  - And our trend estimates
- **After housing collapse, wages and LFP declined**
- **Another story: Downward nominal wage rigidity bites harder for low education workers**
  - Productivity gains take longer to bring realignment
  - Probably more a story for unemployment

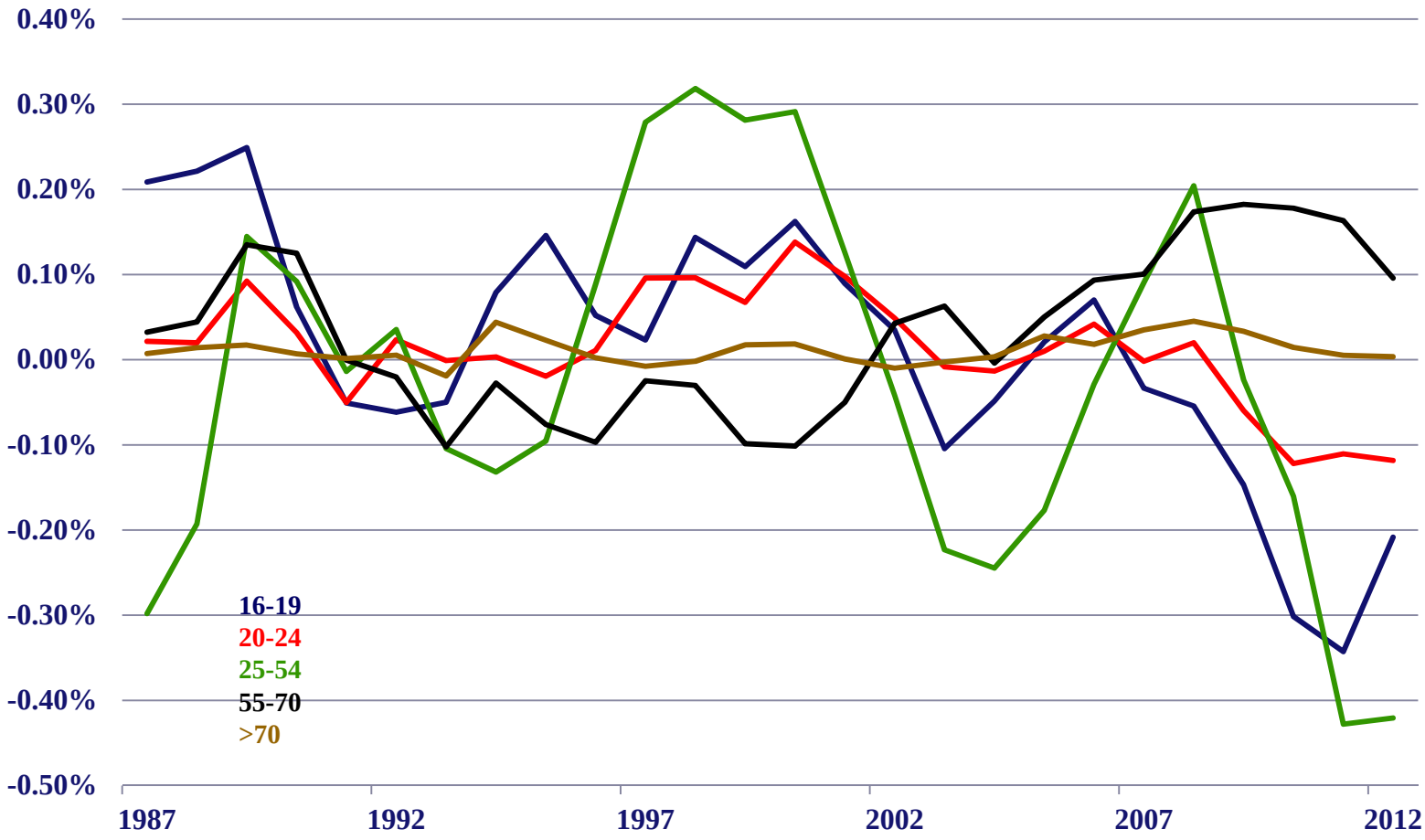
LFP Gap By Age

(Actual LF – Predicted LF)



Contribution to LFP Gap By Age

(LFP Gap * Population Share)



Possible Interpretation of Age Results

- **Young workers most affected by down turn**
  - Consistent with past research that entrants face disproportionate difficulties in poor labor markets
- **Young workers may also be returning to school**
  - Understandable given low opportunity costs
- **Older workers may be working more to compensate for negative shock to wealth**

Contribution to 2012 LFP Gap, by sex/age/education

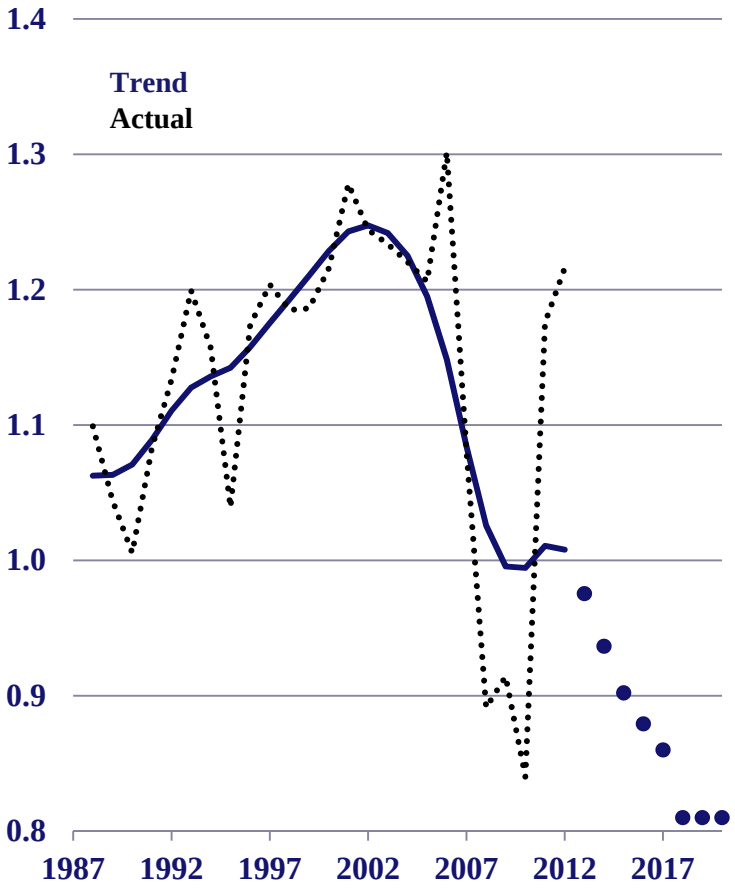
Group	2012 LFP Gap	Contribution to Total
Total Gap:	-1.14%	
Female, 25-54, HS Grads	-2.14%	-0.14%
Male, 25-54, HS dropouts	-3.03%	-0.10%
Female, 25-54, Some college	-1.03%	-0.08%
Female, 25-54, HS dropouts	-2.74%	-0.07%
Male, 20-24, HS graduates	-4.07%	-0.06%
Female, 71-79, HS Grads	-2.34%	-0.06%
Male, 25-54, HS Grads	-0.71%	-0.06%
Male, 25-54, Some College	-0.81%	-0.05%
Female, 20-24, Some College	-1.88%	-0.04%
Female, 16-19, Some college	-8.67%	-0.04%
Male, 16-19, HS dropouts	-1.59%	-0.04%
Residual: (Difference of above gaps to total)	-0.40%	

Caveats on LFP Modeling

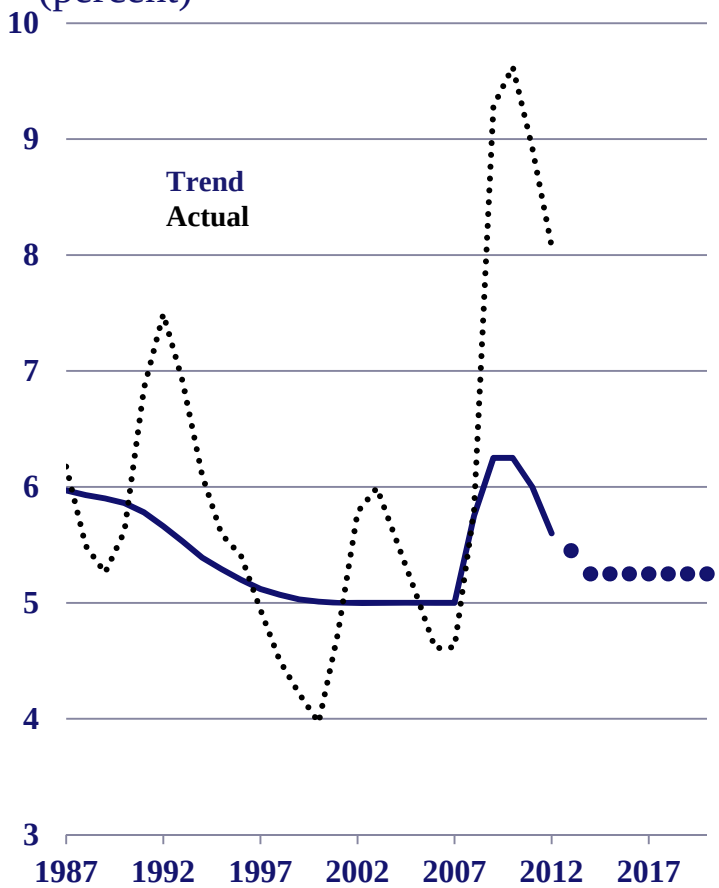
- **Modeling of business cycle could be improved**
  - E.g., some evidence that LFP responds to unemployment with very long lags
- **Could incorporate more effects of policy changes**
  - E.g., on SS, taxes, tuition, etc.
- **More generally, need better economics**
  - Labor supply responds to wages and other general equilibrium factors

Unemployment Rate

Population Growth, Trend vs. Actual
(percent)

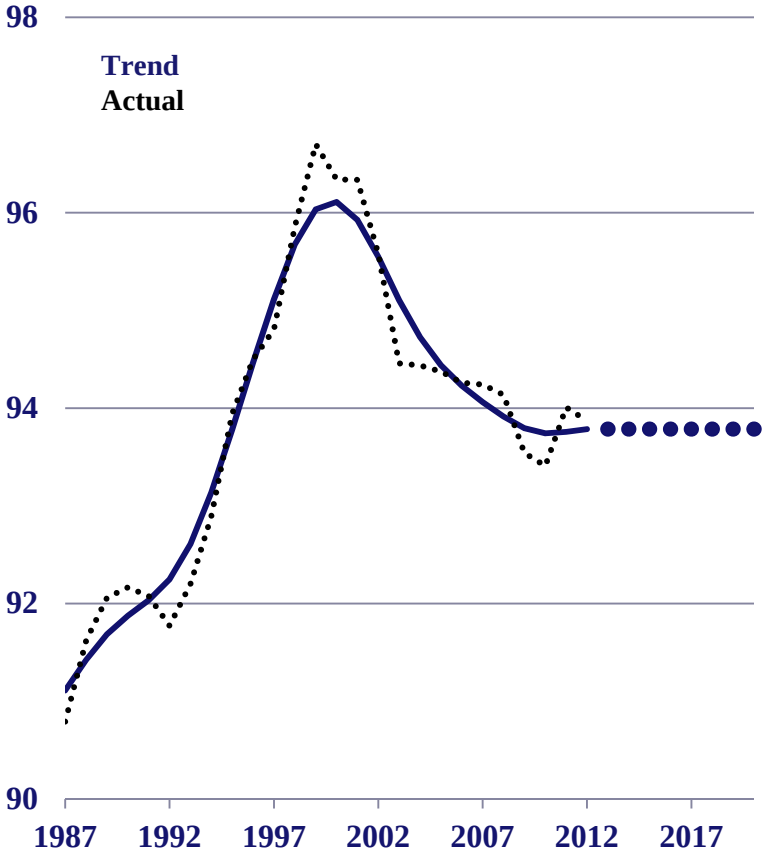


Unemployment Rate, Natural Rate vs. Actual
(percent)

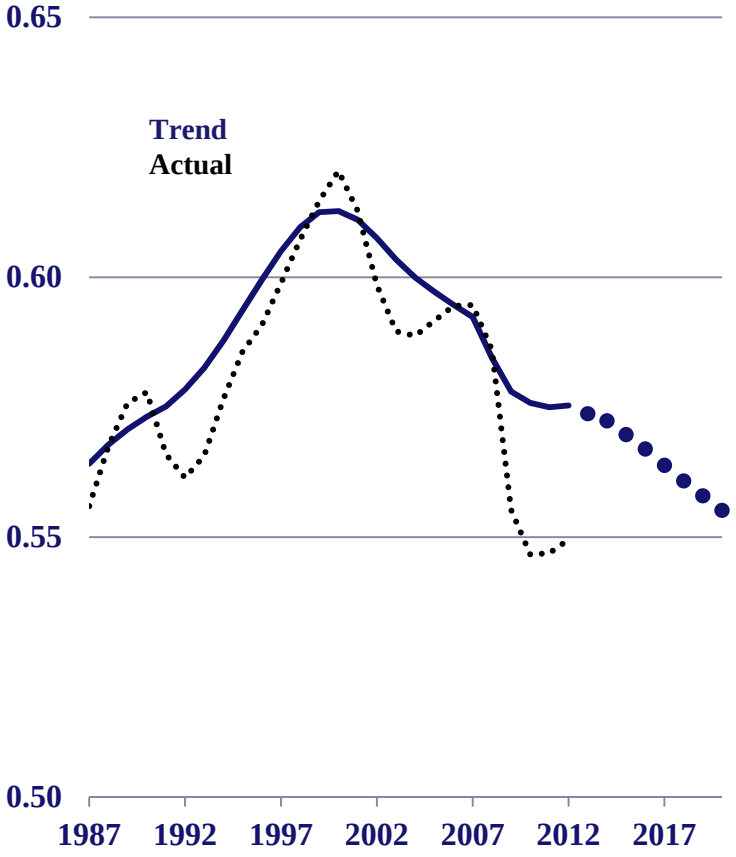


Payroll Employment

Ratio of Payroll to Household Employment
(percent)

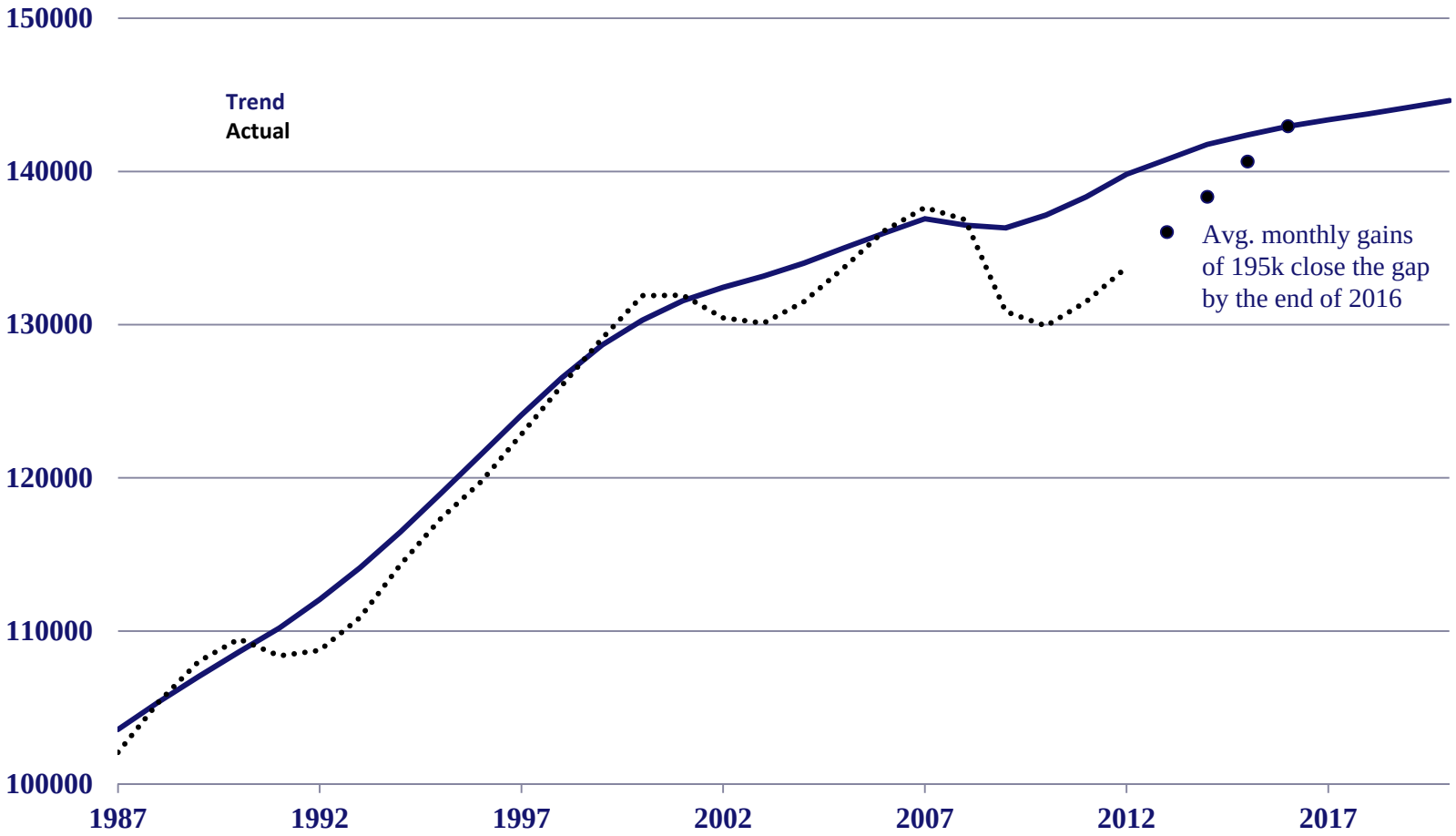


Payroll Employment-to-Population Ratio
(fraction)



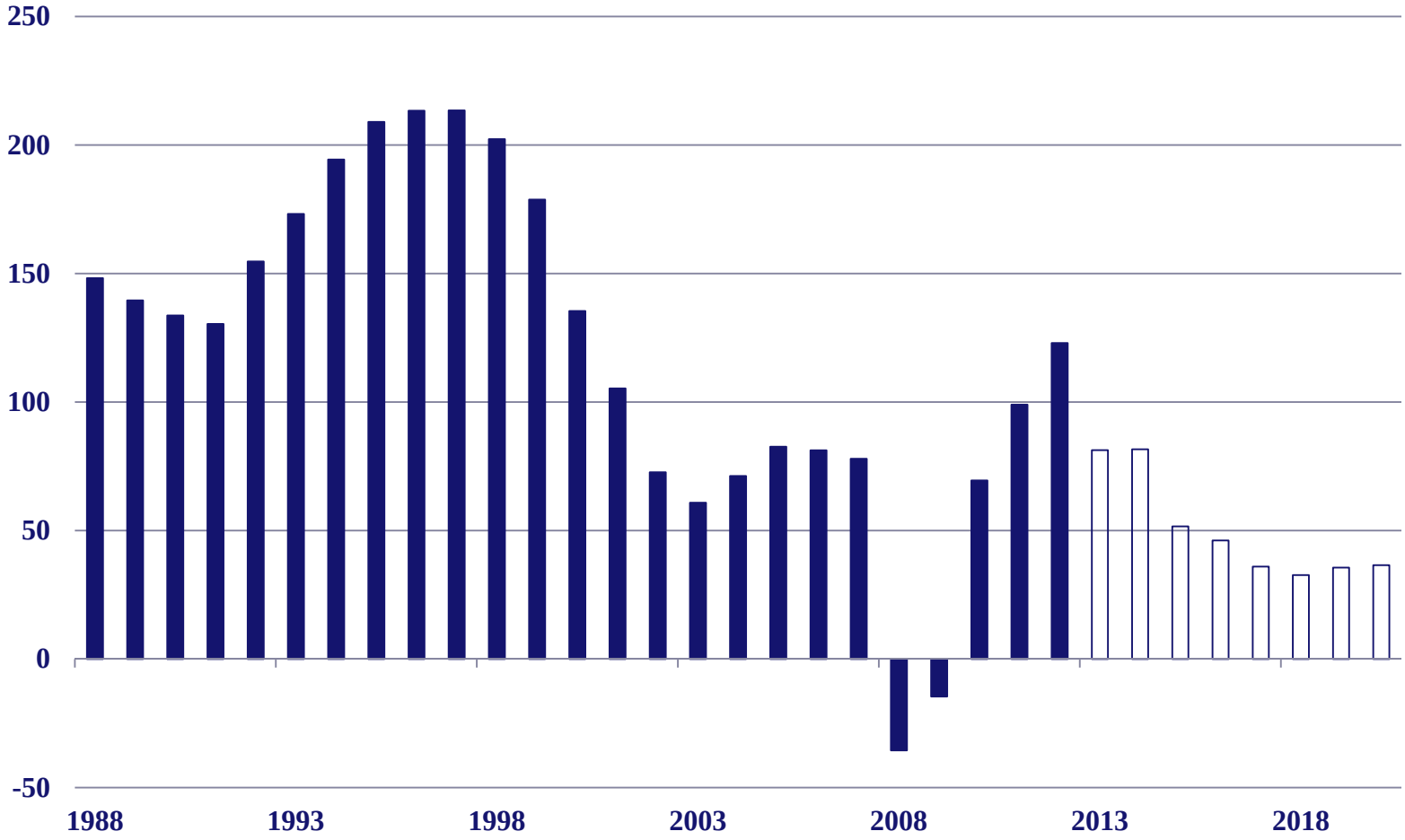
Payroll Employment

Payroll Employment Gap
(thousands of jobs)



Payroll Employment

Trend Payroll Employment Growth
(jobs/month)



Extra Slides
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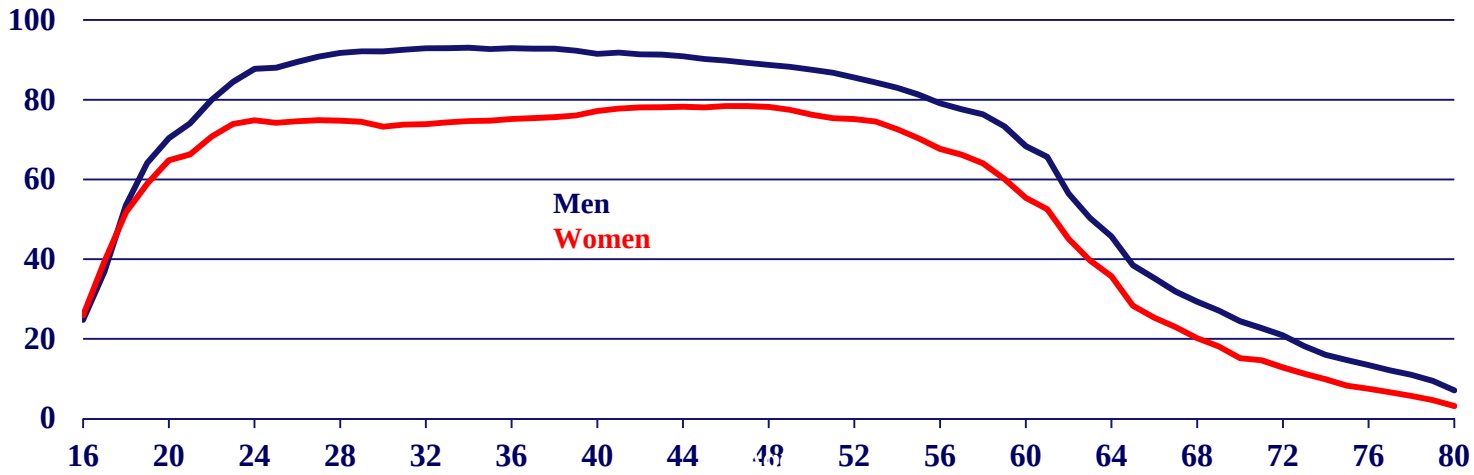
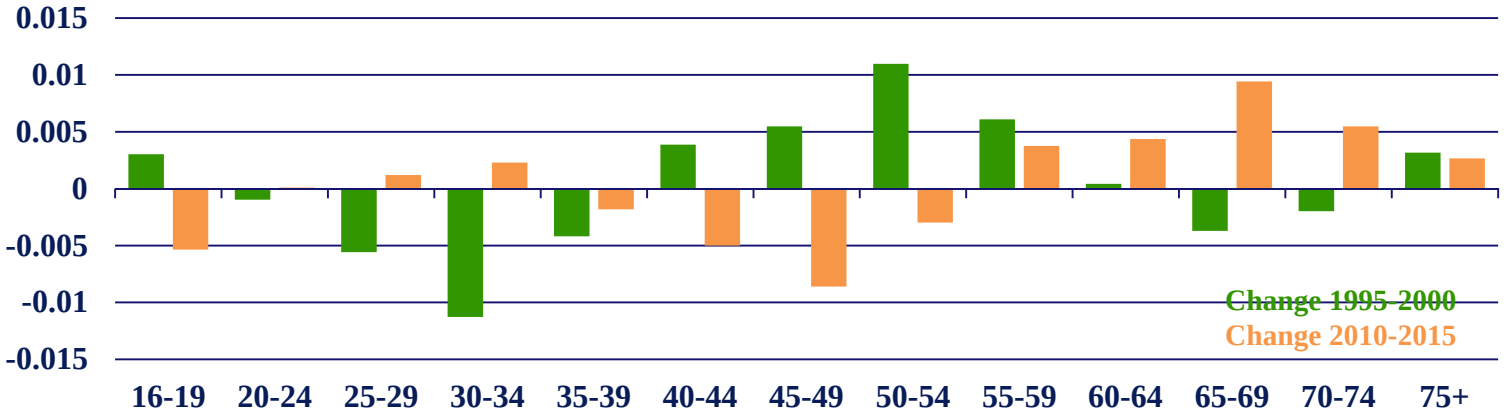
Participation By Age and Sex

2012 Labor Force Participation Rates, by Age (percent)

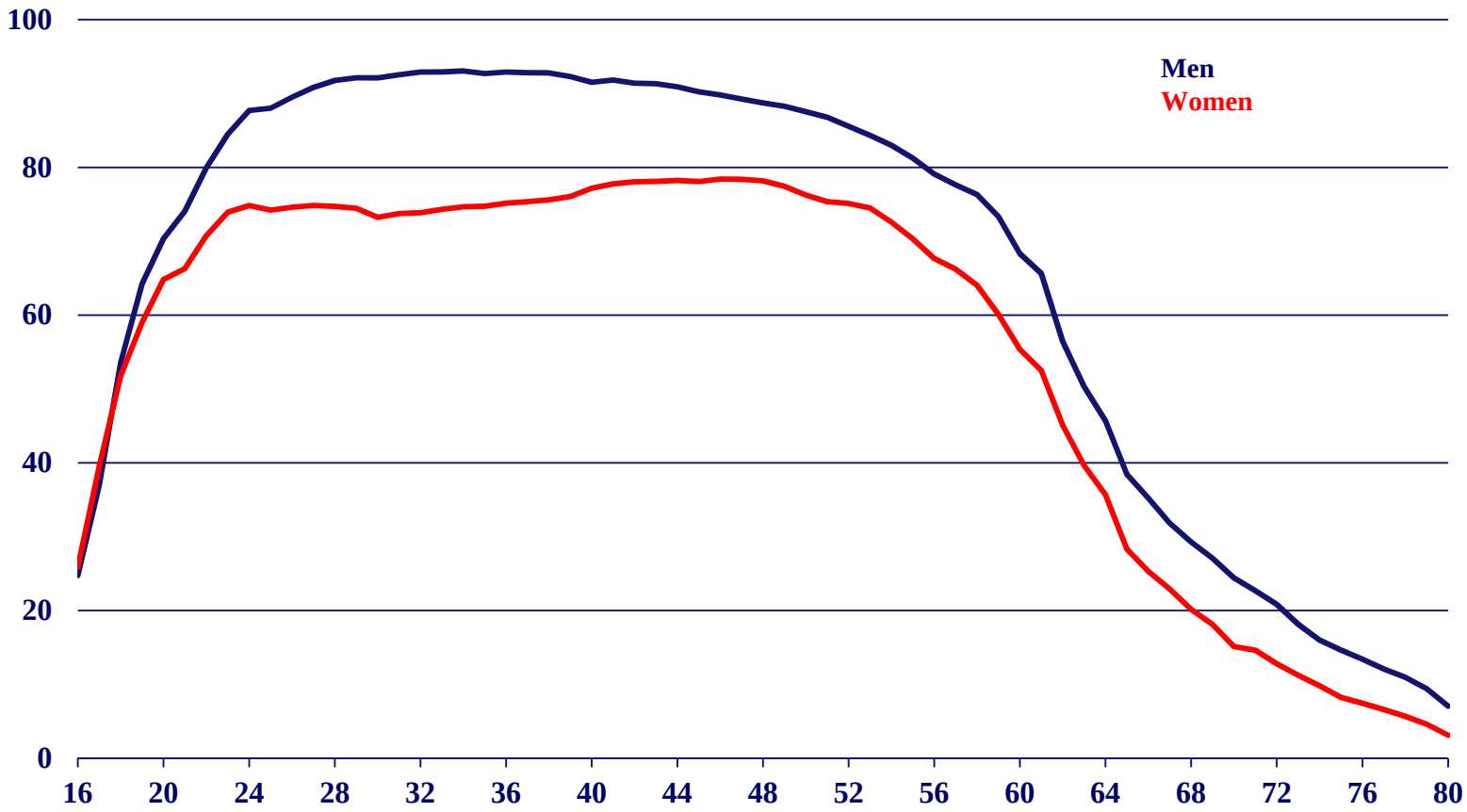


Change in Population Share, by Age (percentage points)



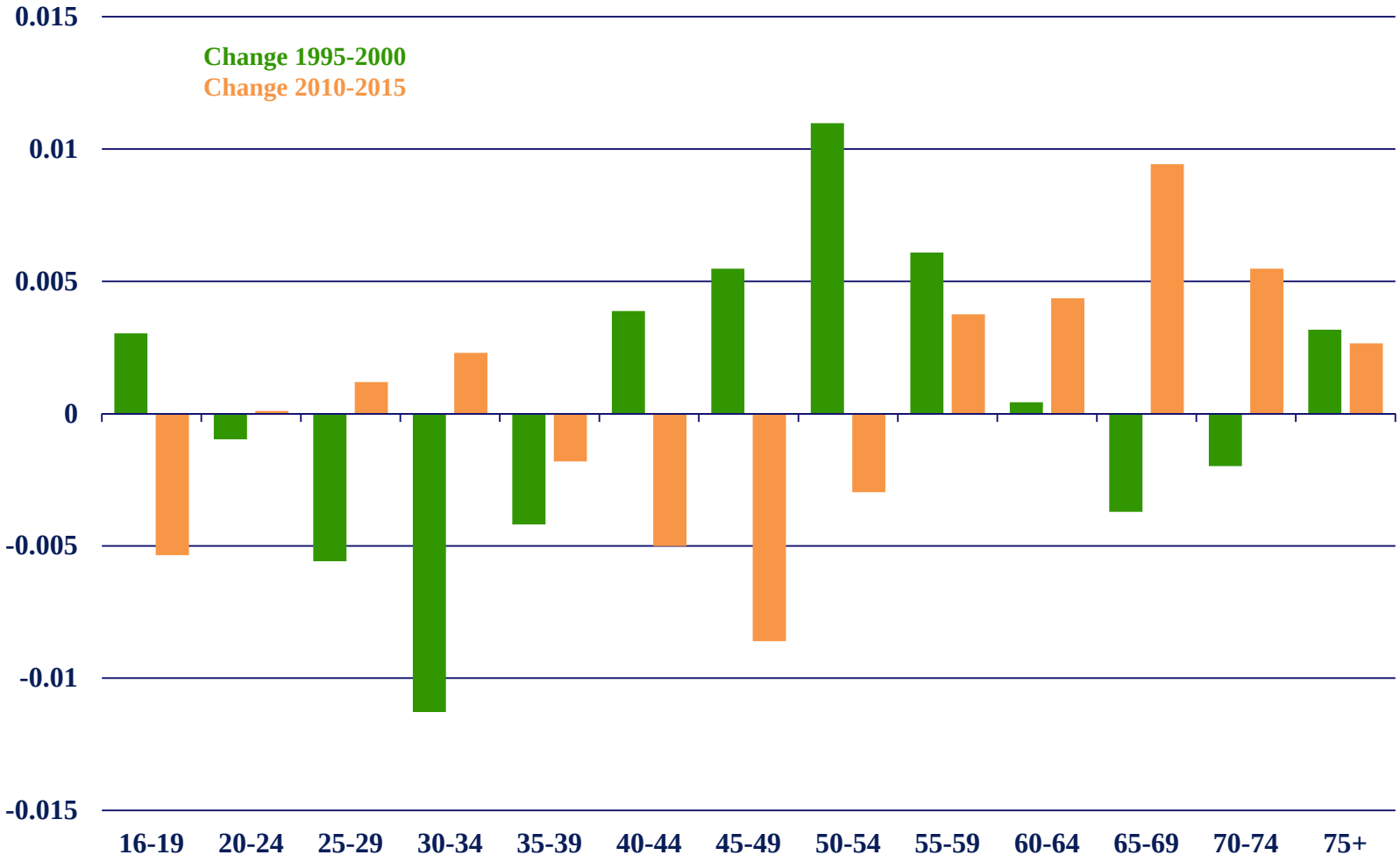
Participation By Age and Sex

2012 Labor Force Participation Rates
(percent)



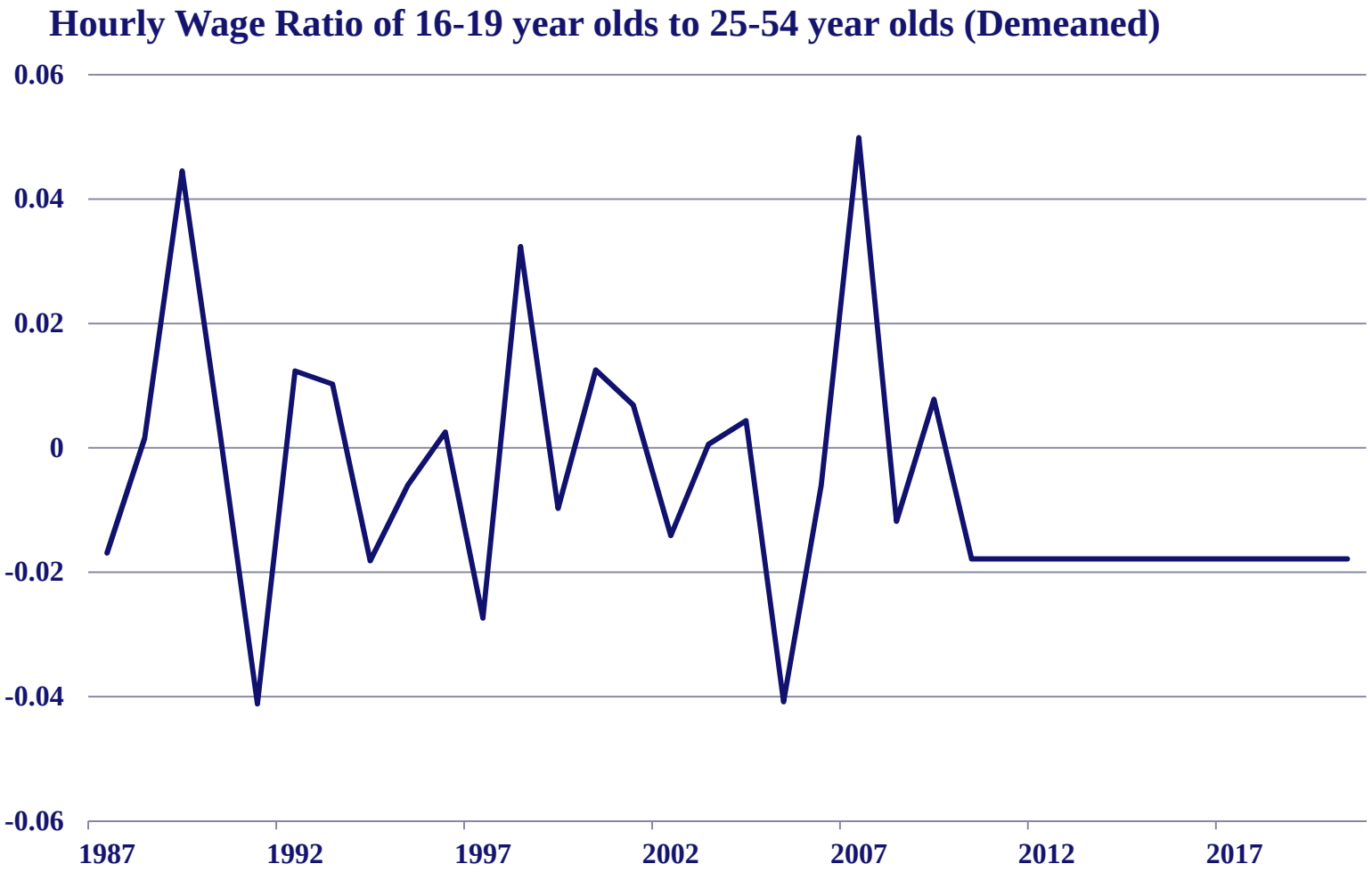
Change in Population Share, By Age

(percentage points)



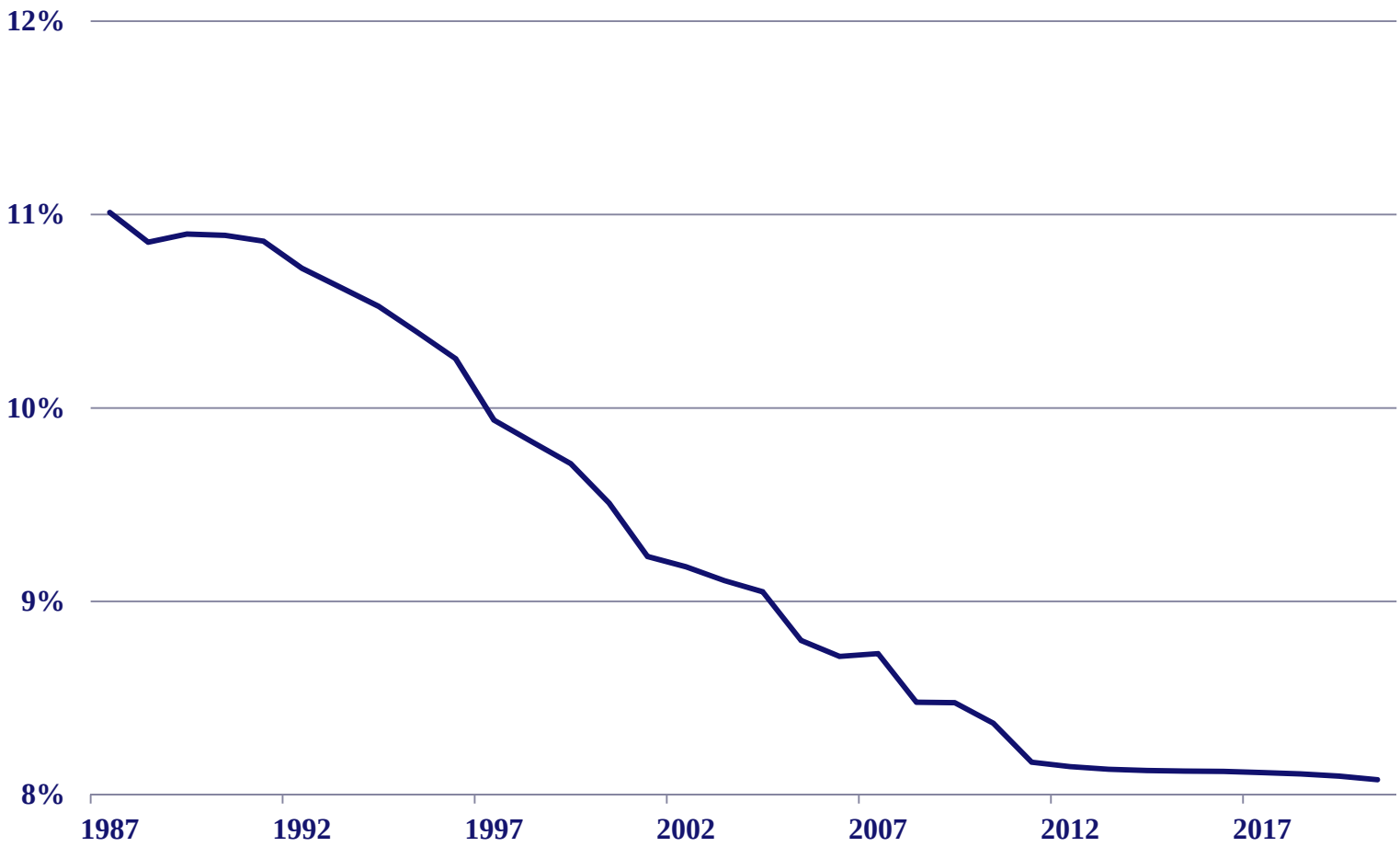
Age-Specific Control Variables
Teen and 20-24 models

Age-Specific Control Variables
Teen and 20-24 models



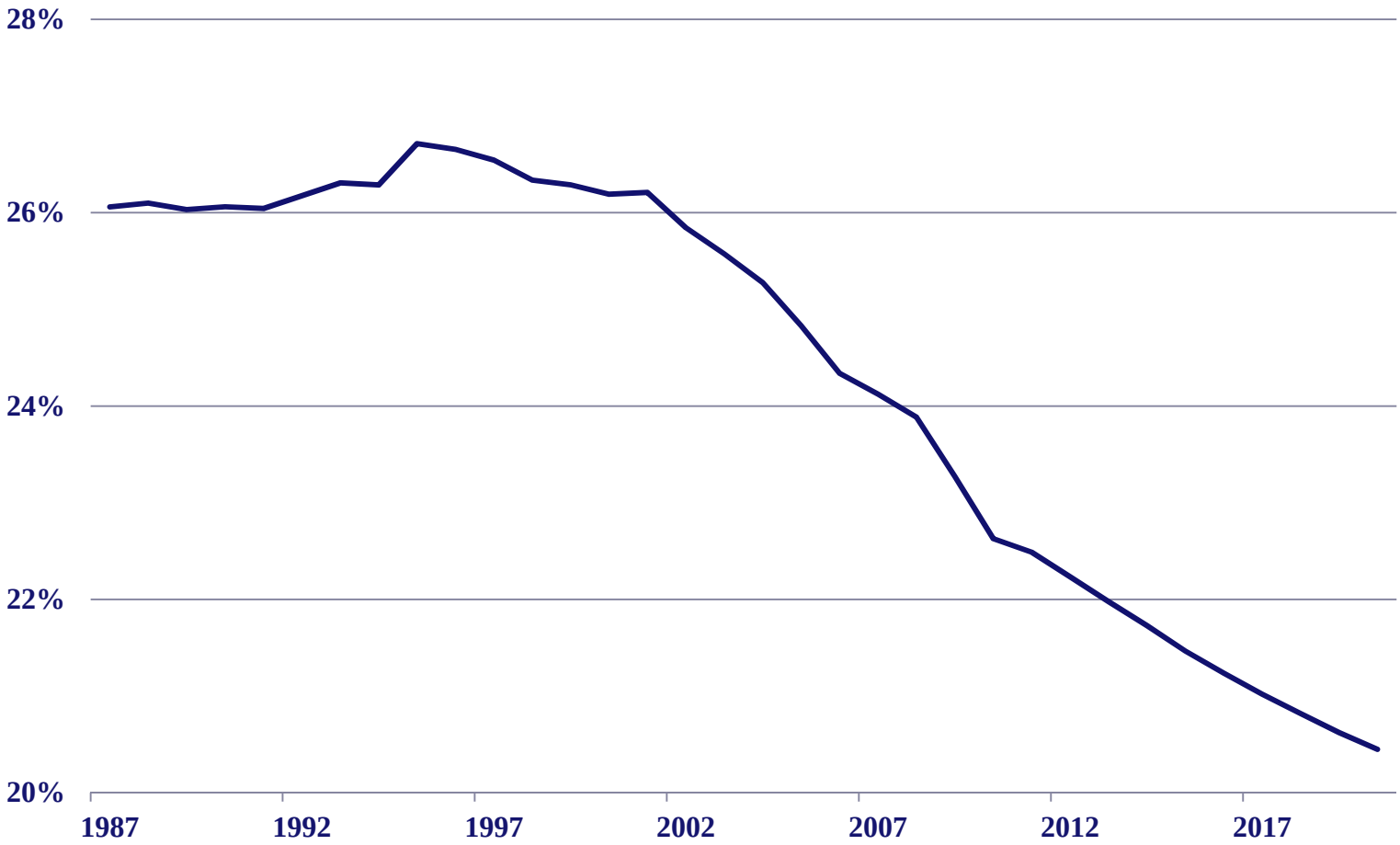
Age-Specific Control Variables
Prime age models

Married with a Child 5 Years or Younger
(percent of 25-54 year olds)



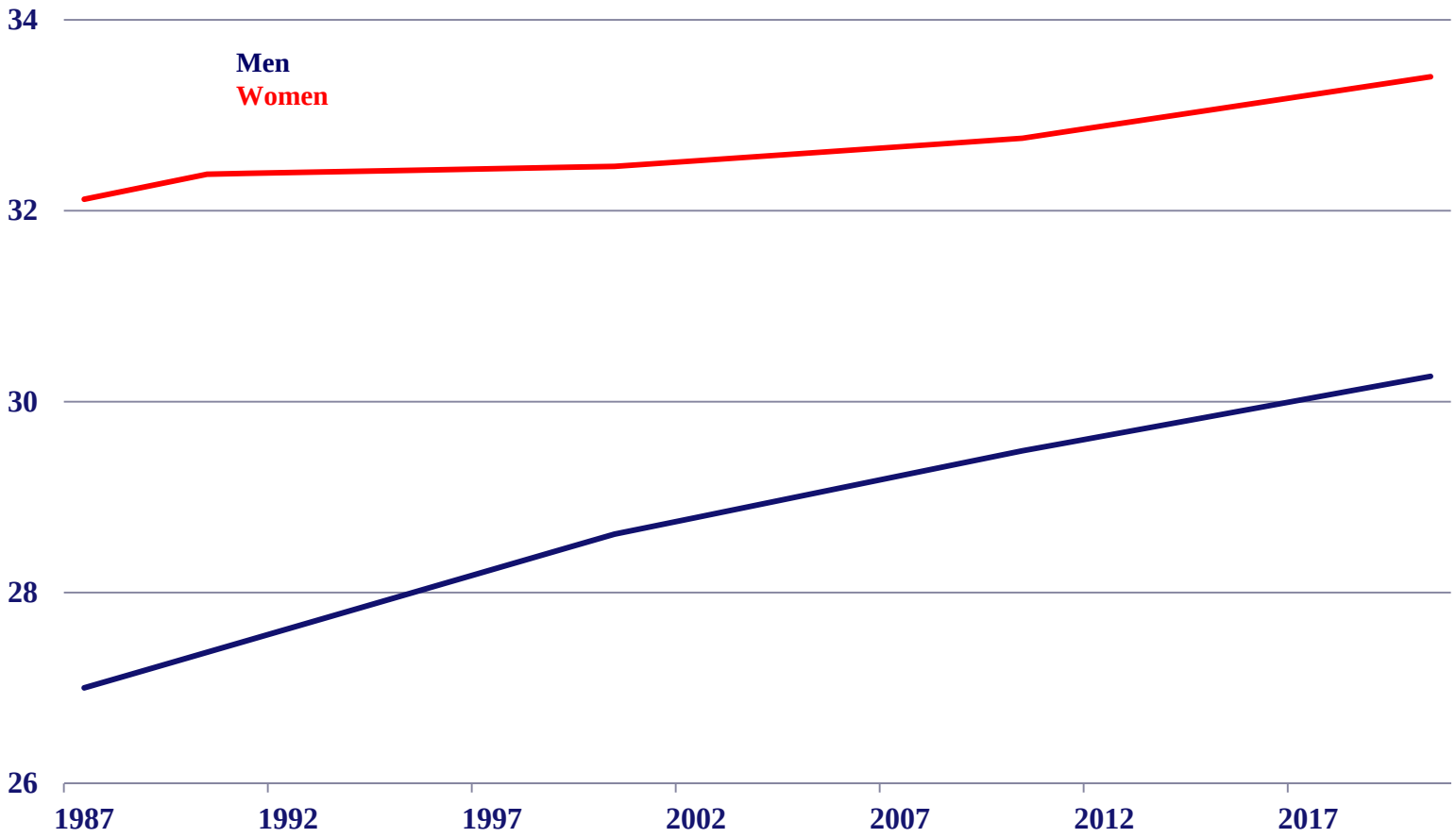
Age-Specific Control Variables
Prime age models

Married with no Child 5 Years or Younger
(percent of 25-54 year olds)

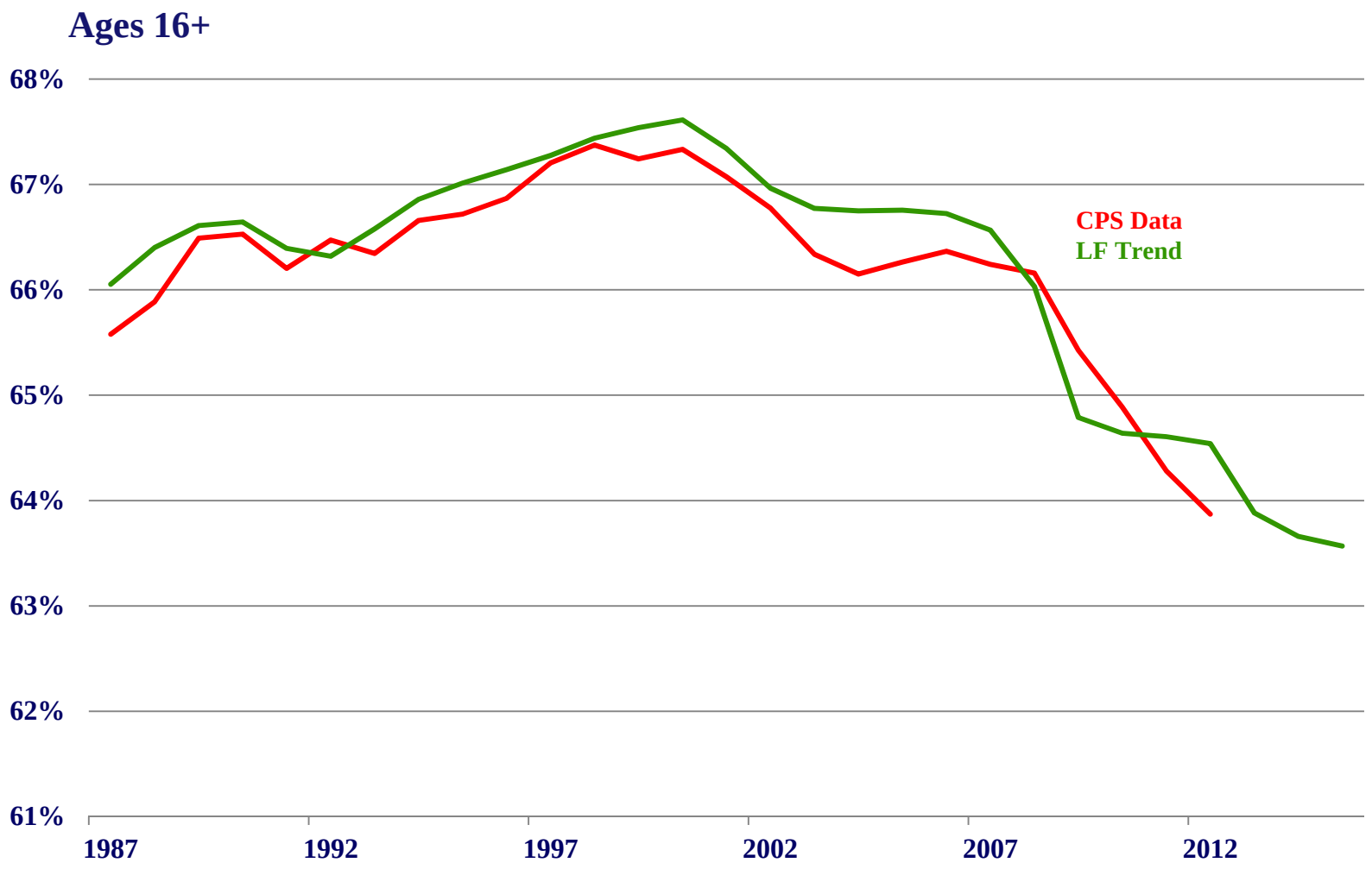


Age-Specific Control Variables
Older age models

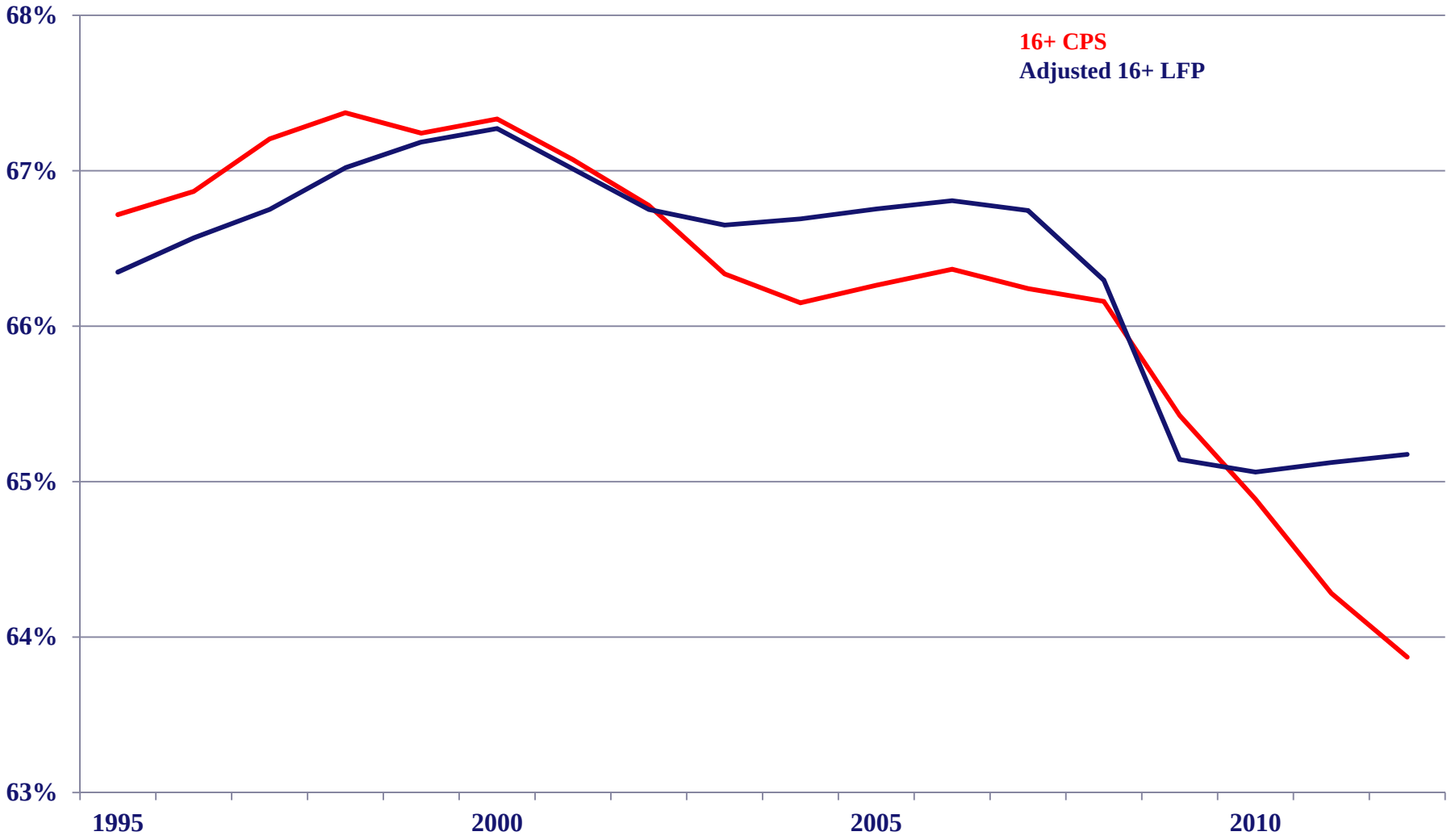
Life Expectancies by Sex
(expected years lived past 50)



LF Participation Rate, with Business Cycles

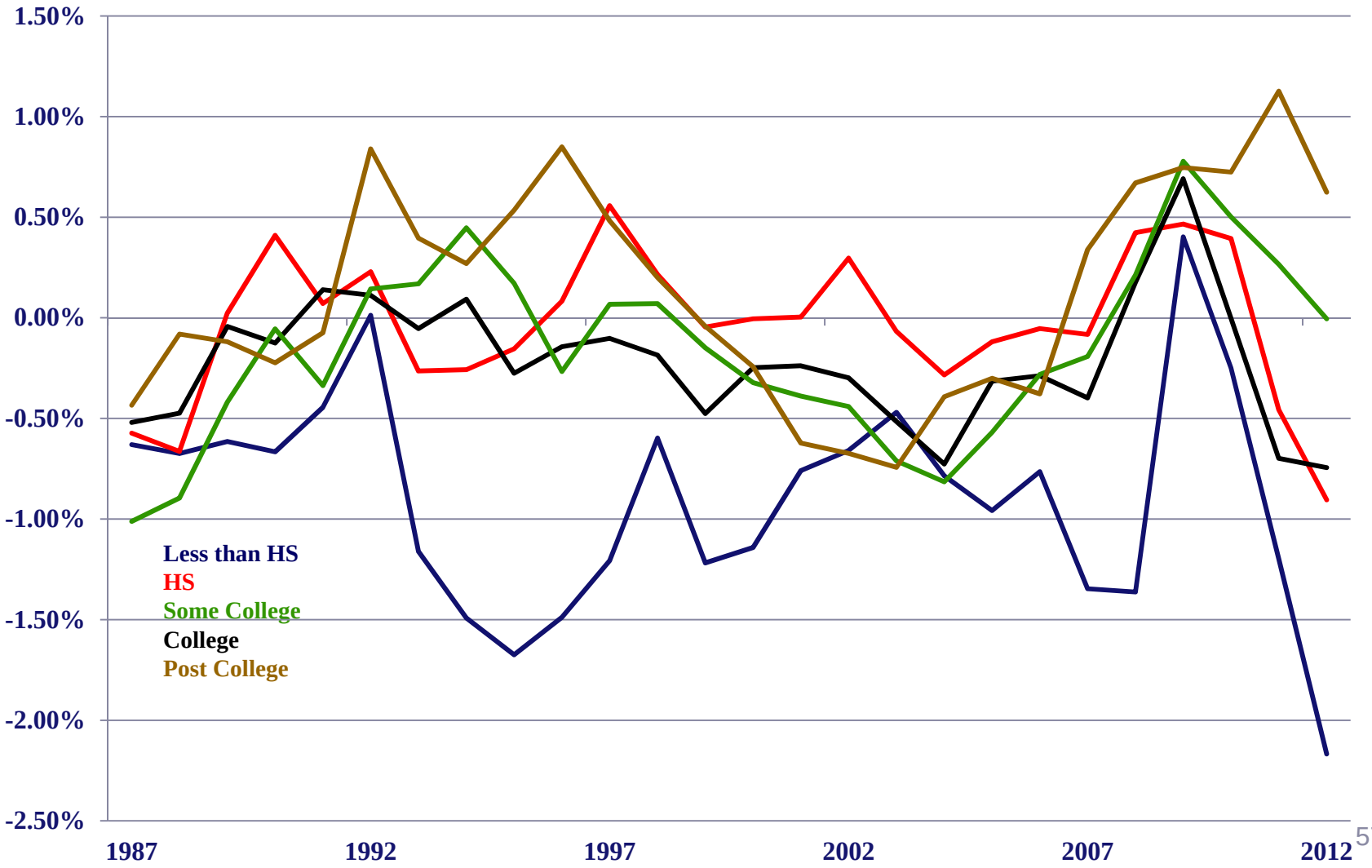


Demographically-Adj. LFP, w/Business Cycle Effect



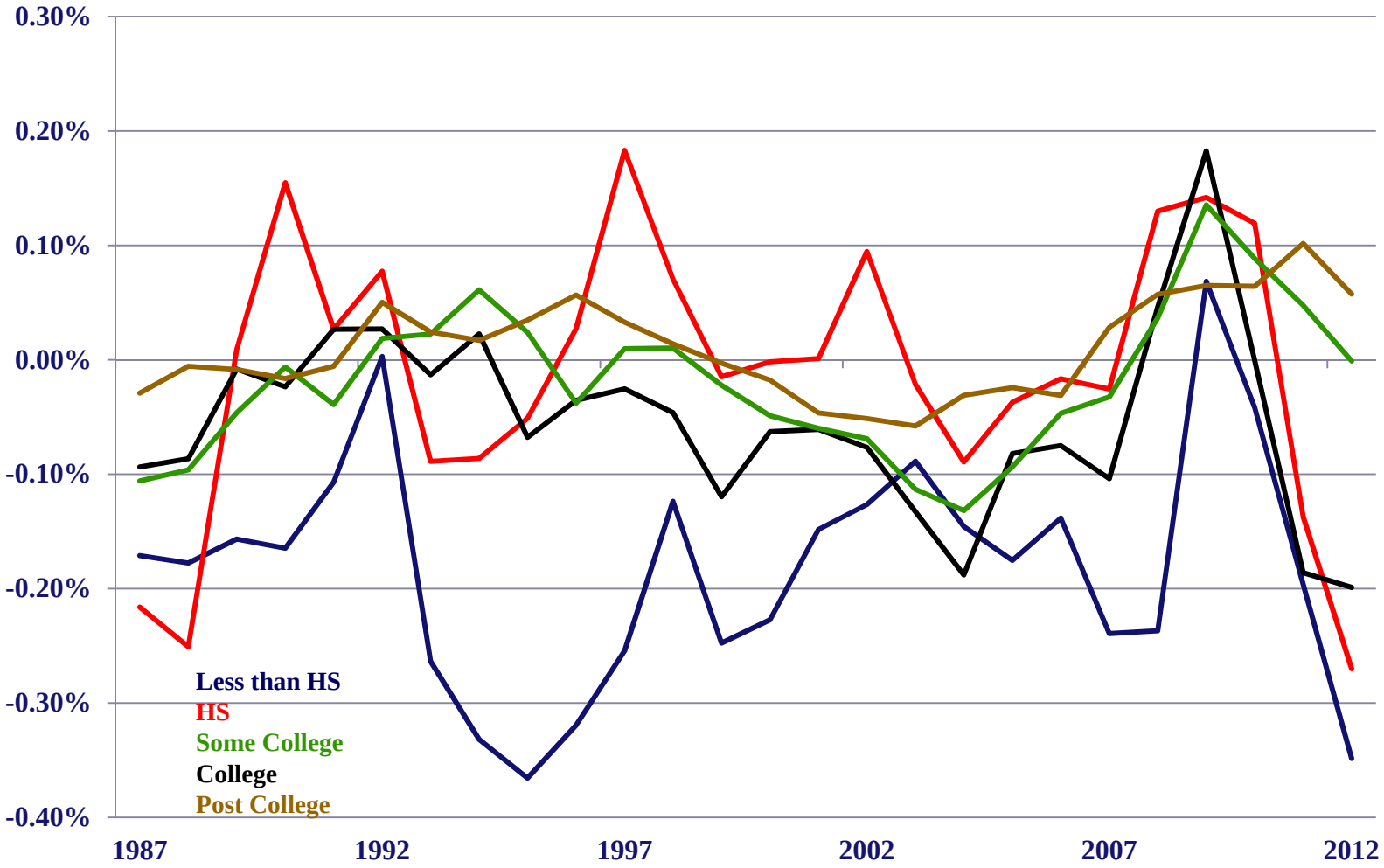
LFP Gap By Education, with Business Cycle Effect

(Actual LF – Predicted LF)

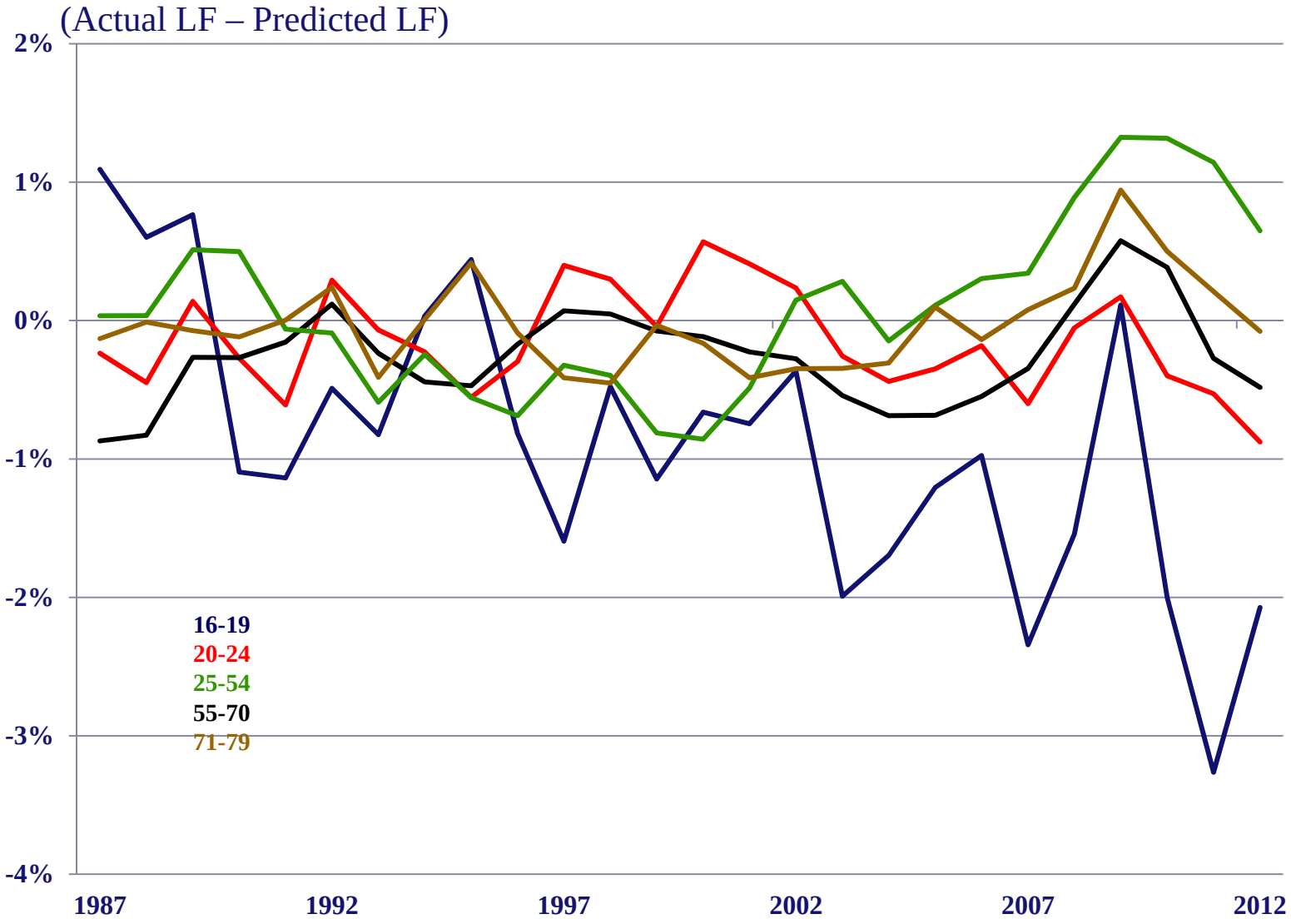


Contribution to LFP Gap By Education

(LFP Gap * Population Share)

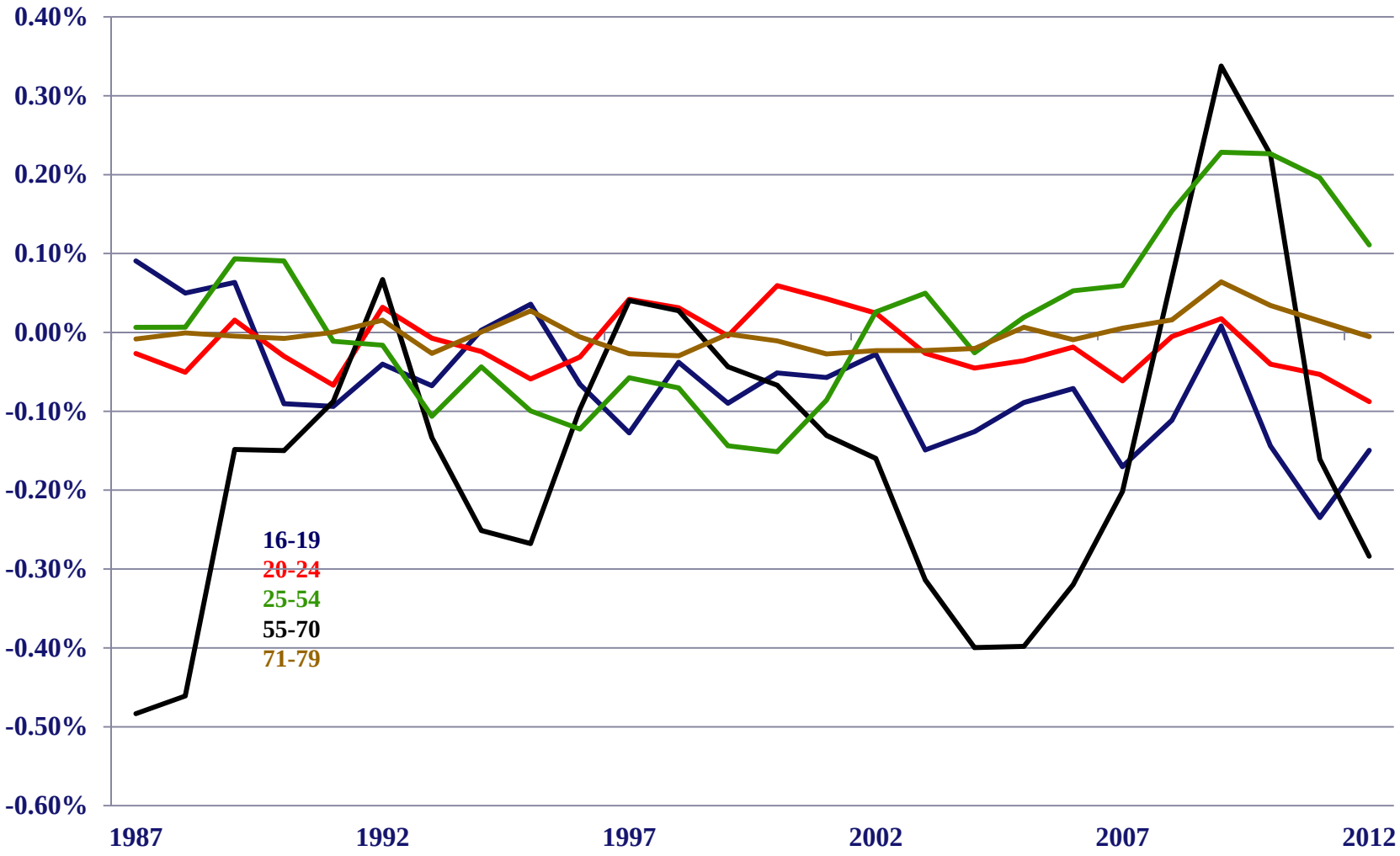


LFP Gap By Age, with Business Cycle Effect



Contribution to LFP Gap By Age

(LFP Gap * Population Share)



Labor Force Participation Rate, Trend vs. Actual

Estimated with data through 2012, Ages 16-79