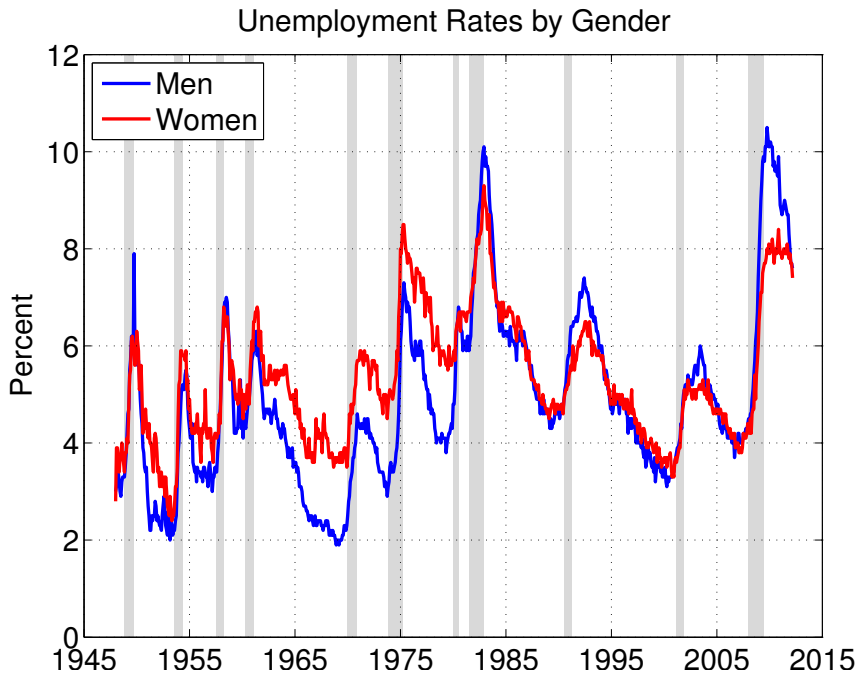
The Gender Unemployment Gap

Stefania Albanesi, FRBNY and CEPR
Ayşegül Şahin, FRBNY

ESSIM Tarragona: May 30, 2014

The Gender Unemployment Gap



- The gender unemployment gap was positive until 1980.
- After 1980, the gender unemployment gap virtually disappeared, except for recessions, when men's unemployment rate exceeds women's.

Questions

The Gender Unemployment Gap

- What are the determinants on gender differences in unemployment?
- Are there any common international patterns? What can we learn for other countries from the US experience?
- How has changing women's labor supply affected aggregate labor market conditions?

Findings: Trends

- Convergence in labor force attachment by gender, and in particular the rise in female labor force participation, played an important role in the trend decline of the gender unemployment gap in the US.
  - Most advanced OECD economies display similar patterns to the US.

Findings: Business Cycles

- Gender differences in employment behavior over the business cycle in the US have evolved over time:
  - Gender differences in the growth of participation play an important role in early cycles.
  - Gender differences in industry composition can explain most gender differences in employment for recent recessions.
- Rising female labor force participation reduced the depth of recessions, and generated strong recoveries in early US cycles.
  - Flat women's participation since the early 1990s contributed to the recent jobless recoveries.

Outline

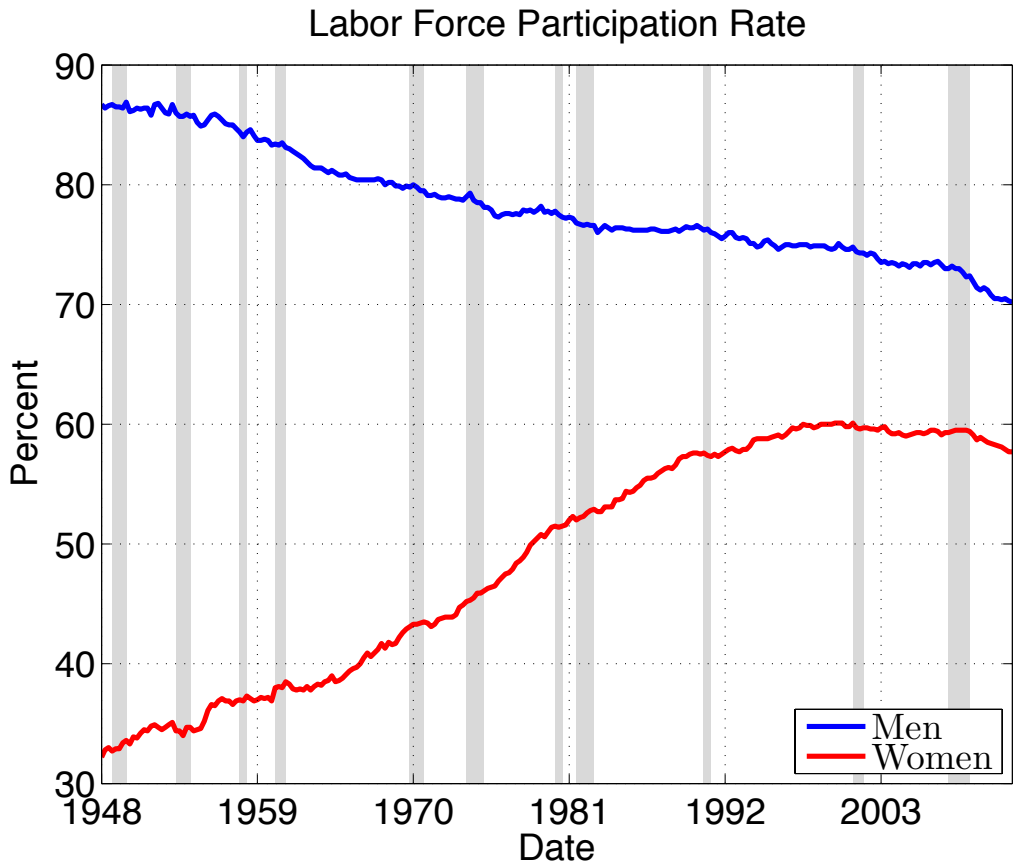
- Trends
  - The US experience
    - Composition explanations
    - Quantitative analysis
  - International evidence
- Business cycles in the US

Trends:
The US Experience

Convergence in Labor Force Attachment

Labor Force Participation by Gender

- Female LFP rose in the post-war period to a peak of 60% in 1995, and *stabilized thereafter*. Male LFP slowly declined throughout.



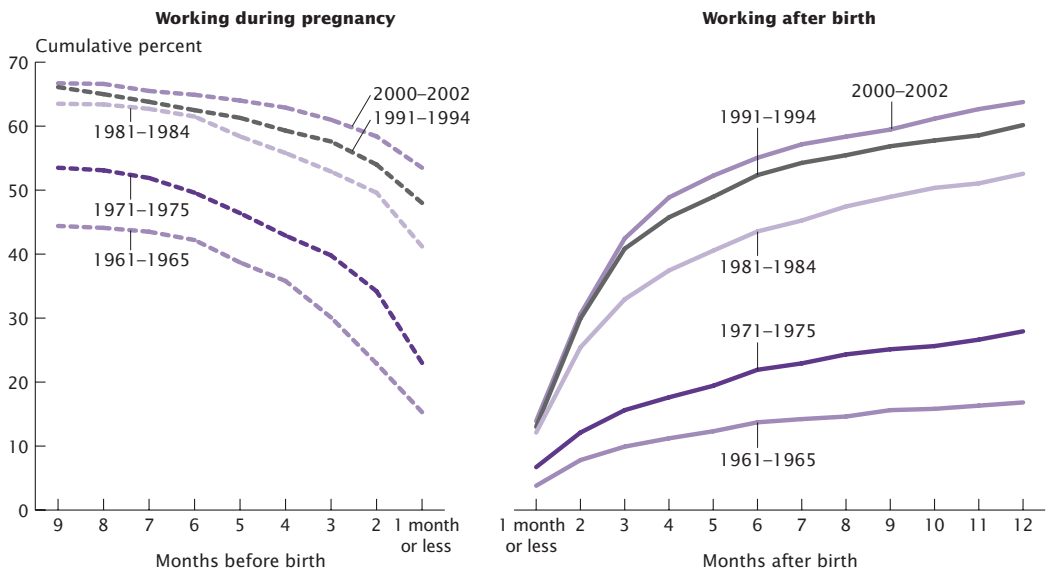
All individuals age 16+. Source: Current Population Survey.

Convergence in Labor Force Attachment

Women's Non-Participation Spells

- Women's historically high incidence of non-participation spells in relation to childbirth (Goldin 1990, Royalty 1998) has substantially declined.

Figure 4.
Percent of Women Working During Pregnancy and Percent Working After Their First Birth by Month Before or After Birth: Selected Years, 1961–1965 to 2000–2002



Source: 1961–1965 to 1981–1984: Bureau of the Census, Current Population Reports, Series P-23, No. 165 (*Work and Family Patterns of American Women*), Table B-5; 1991–1994: P70-79 (*Maternity Leave and Employment Patterns: 1961–1995*), Figure 7; and 2000–2002: Survey of Income and Program Participation, 2004 Panel, Wave 2.

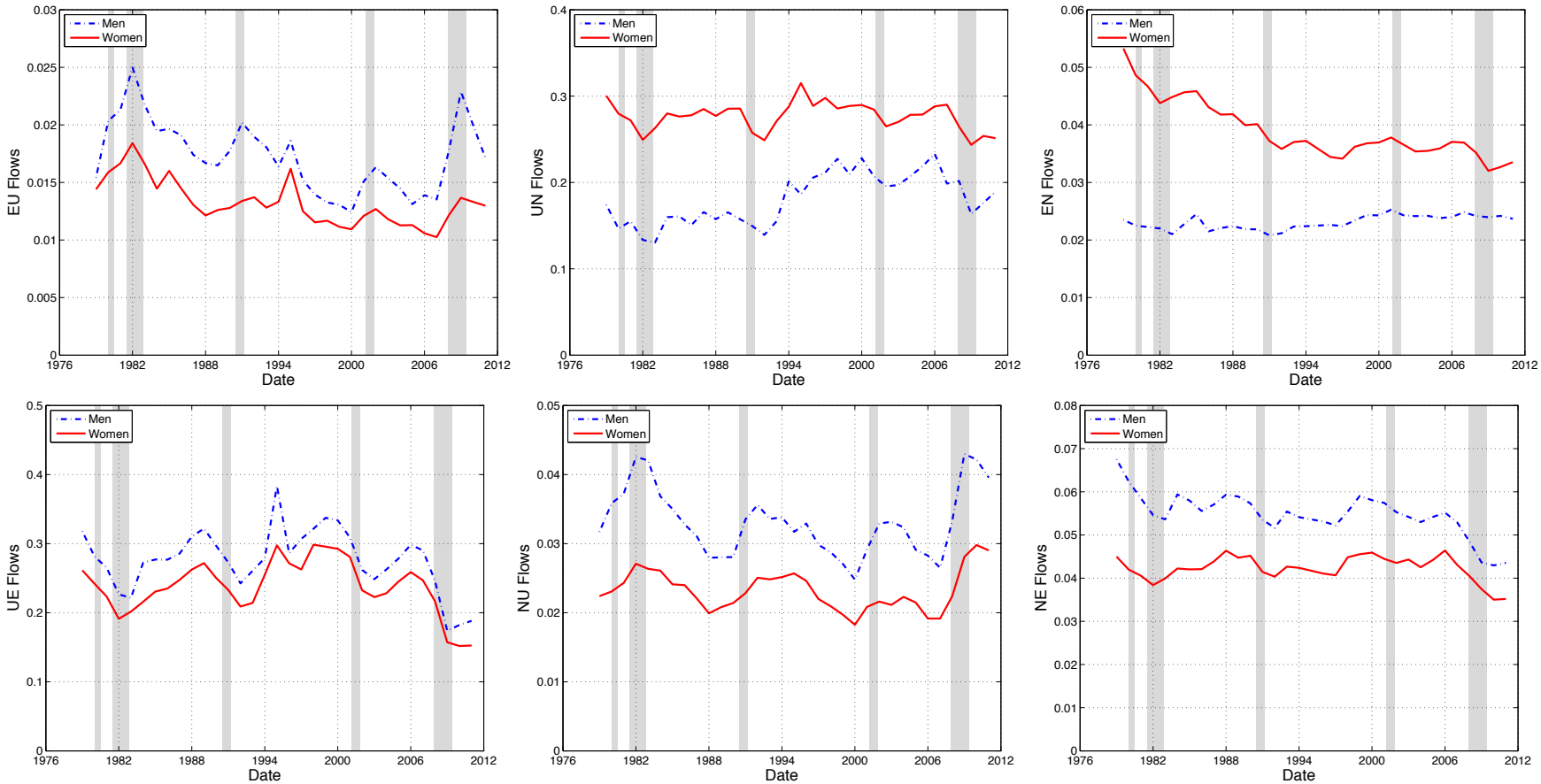
Source: Current Population Report on "Maternity leave and Employment Patterns of First Time Mothers: 1961-2003," US Census Bureau 2008.

Convergence in Labor Force Attachment

Flow Rates by Gender

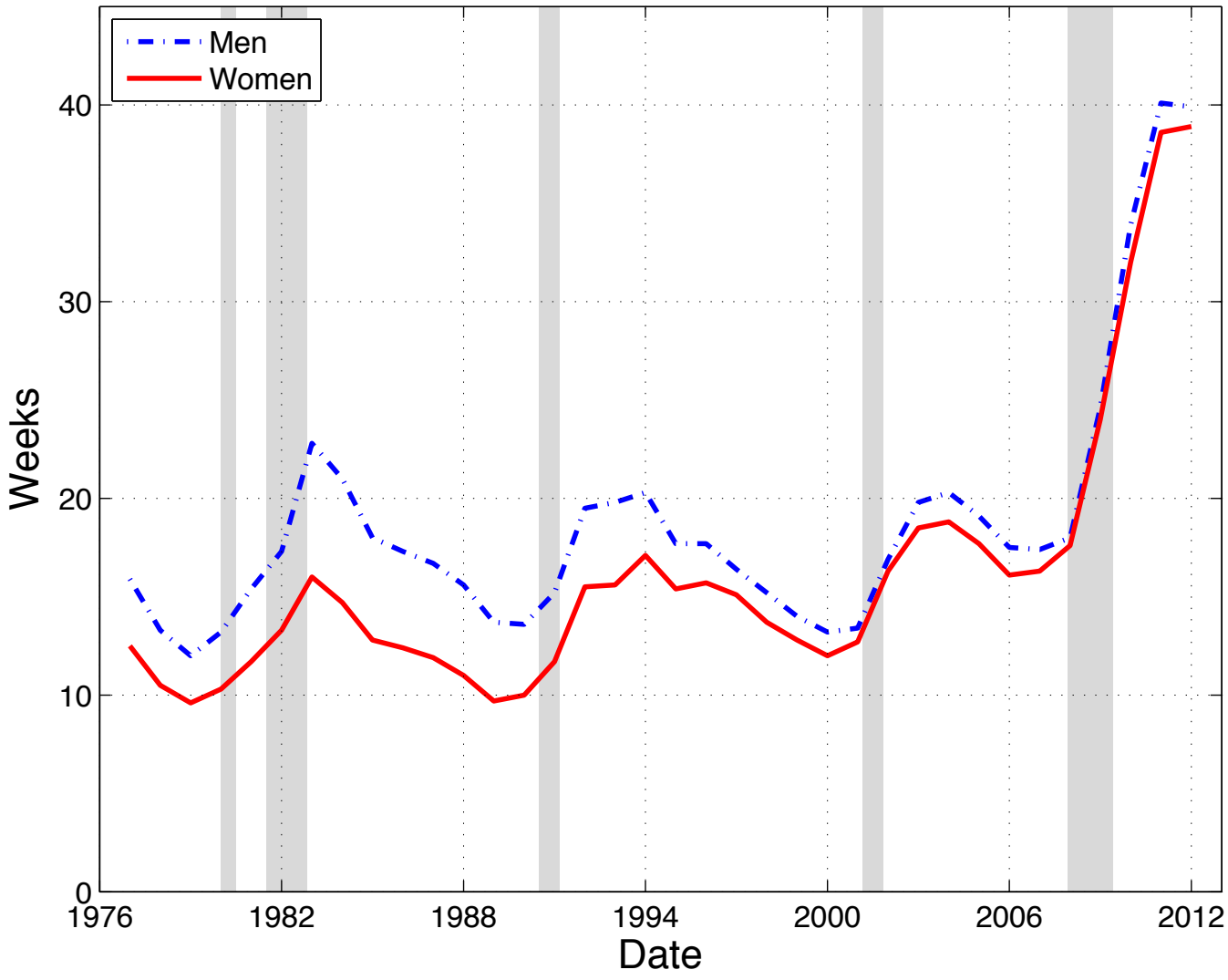
- Flow rates involving the participation decision for men and women have steadily converged (Abraham and Shimer, 2002).
  - NE $\uparrow$ and EN $\downarrow$ for women relative to men $\Longrightarrow$ E $\uparrow$ for women relative to men.
  - NU $\downarrow$ and UN $\uparrow$ for men relative to women $\Longrightarrow$ U $\uparrow$ for women relative to men.
  - Unemployment duration has increased for women relative to men.

Convergence in Flow Rates



Source: BLS.

Convergence in Unemployment Duration



Median months. Source: BLS

Convergence in Labor Force Attachment

Flow Rates by Gender

- Flow rates involving the participation decision for men and women have steadily converged (Abraham and Shimer, 2002).
- There has been no systematic convergence in flow rates between employment and unemployment.

Convergence in Labor Force Attachment

Flow Rates by Gender

- Flow rates involving the participation decision for men and women have steadily converged (Abraham and Shimer, 2002).
- There has been no systematic convergence in flow rates between employment and unemployment.

- The gender unemployment gap declines because the effect on E prevails, and E/U rises:

$$u = \frac{U}{E+U} = \frac{1}{\frac{E}{U}+1}$$

Other Contributing Factors: Composition of the Labor Force

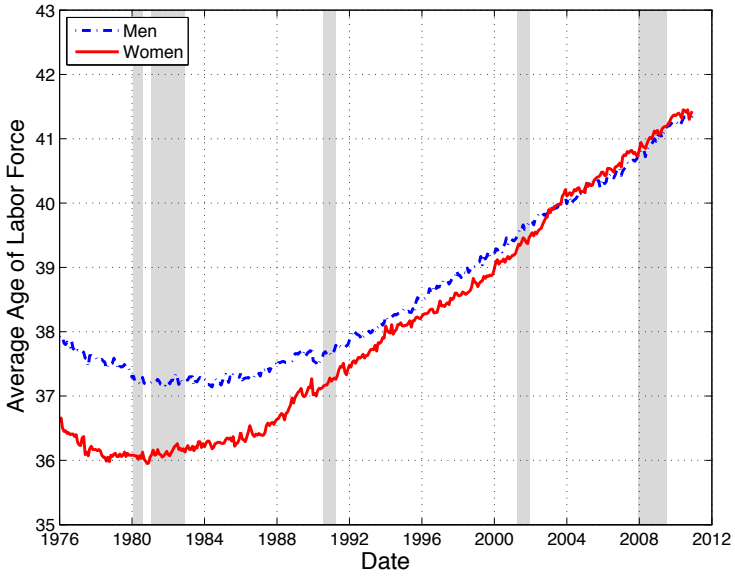
- Well-documented patterns for unemployment:
  - Skill: Low-skilled workers tend to have higher unemployment rates.
  - Age: Younger workers tend to have higher unemployment rates

  [Mincer (1991), Shimer (1998)]

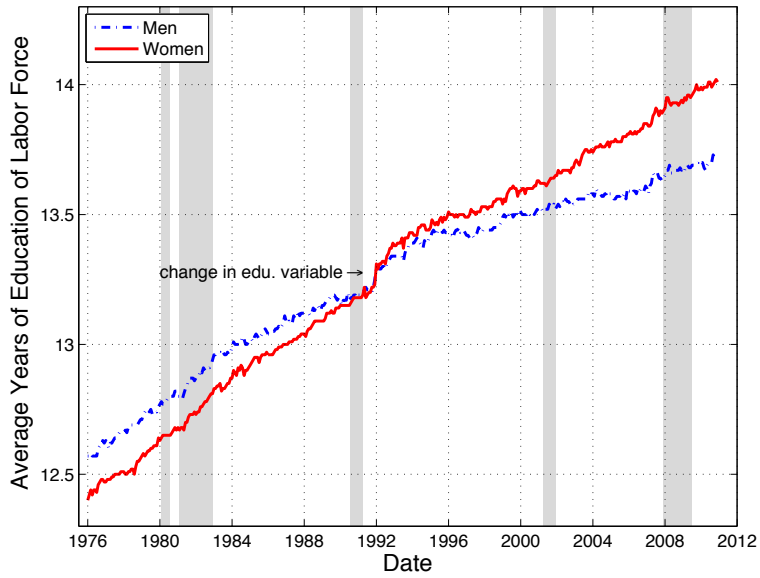
- Female workers were relatively younger and less educated earlier

  $\Longrightarrow$ higher female unemployment rate

Average Age and Education by Gender



Age



Skill

- Female workers were younger and relatively less educated earlier.

Can Age and Skill Composition Explain the Evolution of the Gap?

- Unemployment rate at month t for women is:

$$u_{f,t} = \sum_s u^s_{f,t} \frac{L^s_{f,t}}{L_{f,t}}$$

where $u^s_{f,t}$ is the unemployment rate for group s and $L^s_{f,t}/L_{f,t}$ is labor force share of group s for women at month t.

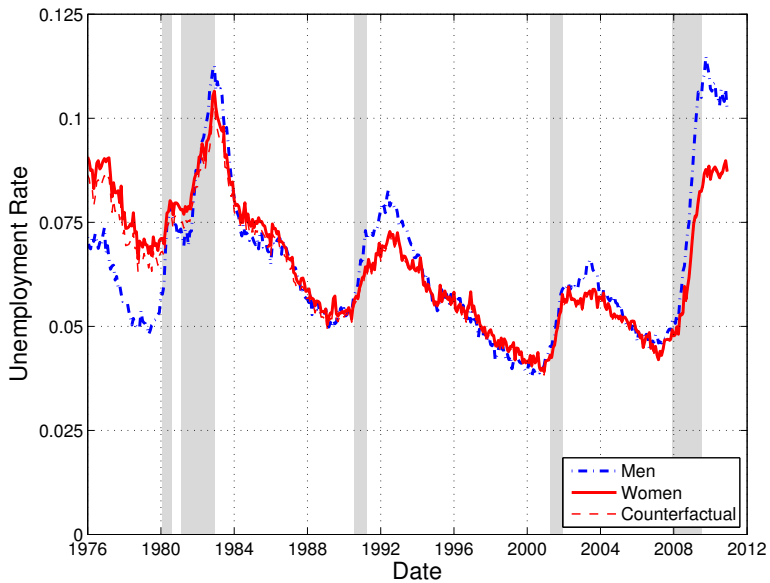
- *Counterfactual* unemployment rate for women is:

$$u^C_{f,t} = \sum_s u^s_{f,t} \frac{L^s_{m,t}}{L_{m,t}}$$

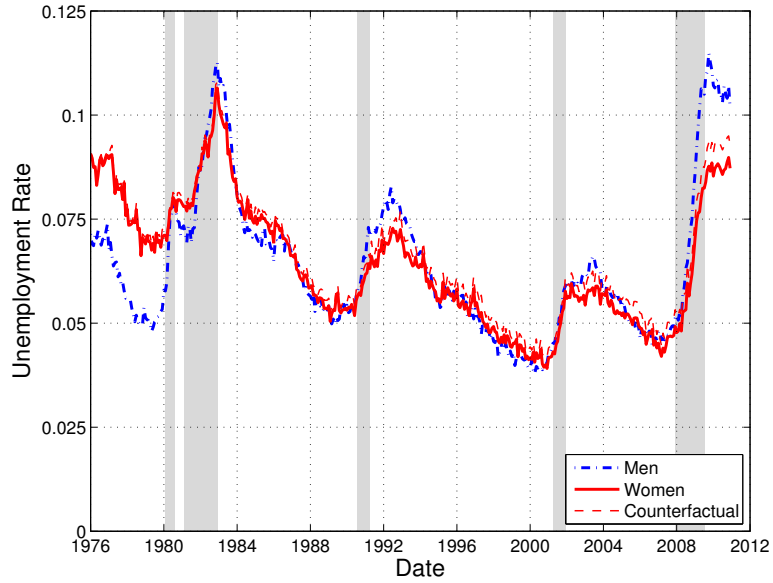
where $L^s_{m,t}/L_{m,t}$ is the share of group s for men.

- Age groups: $\{16-24, 25-54, 55+\}$
- Skill Groups: <HS, HS, Some college, College+ for age 25+

Can Age and Skill Composition Explain the Evolution of the Gap?



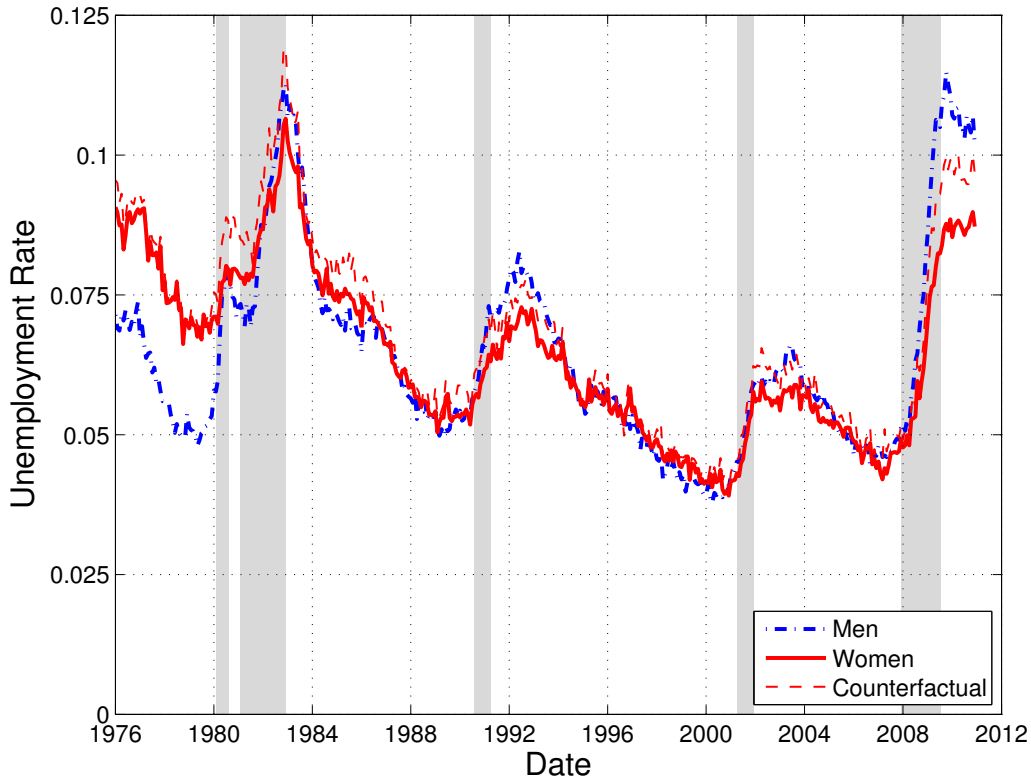
Age



Skill

- Small quantitative effect of gender differences in age and skill composition

Can the Industry Composition Explain the Evolution of the Gap?



- Higher share of men in goods producing sector.
- Industry composition explains approximately half of the gender gap in unemployment *during recessions*.

Quantitative Analysis

Quantitative Analysis

- To explore the link between convergence in attachment and the gender unemployment gap, we develop a 3-state search model of the labor market that captures gender differences in labor market attachment.

- Main model ingredients:
  - Male and female individuals
  - Skill heterogeneity by sex: skilled (college graduate), unskilled (less than college)
  - Opportunity cost of work, $x \geq 0$, stochastic, differs by sex to reflect differences in home production opportunities

Model

Gender Differences in Attachment

- Opportunity cost of work, $x \geq 0$, stochastic, differs by sex to reflect differences in home production opportunities
  - x distribution, $F_j(x)$ for $j = f, m$, iid
  - x higher on average, with fatter right tail for women
- New value of x drawn in each period with probability λ_{ij} for $j = f, m$ and $i = s, u$
- Examples of x shocks:
  - Poor health/disability (own or for family members)
  - Pregnancy and childbirth
  - Change in income of household members
- Gender differences in x capture relative barriers to women's labor force participation and differences in attachment by sex

Model

Agents

- The flow values depend on agents' realized value of opportunity cost of work (x) and their labor market status.
  - Non-participant:
    $$v_{ij}^{N}(x) = x$$
  - Unemployed:
    $$v_{ij}^{U}(x) = (1 - s)x$$
  - Employed:
    $$v_{ij}^{E}(x) = w + (1 - e)x$$

    for $i = s, u$ and $j = f, m$
    where
    w is the wage,
    $e \in (0, 1]$ is the fraction of time devoted to market work if E,
    $s \in [0, 1]$ is the fraction of time devoted to job search if U.

Model

Timing

- Employed agents may experience an exogenous separation shock δ_i.
- Unemployed agents may receive a job offer with probability p_{ij}.
- Each individual draws a new value of opportunity cost of work in each period with probability λ_{ij}.
- The opportunity cost of work, separation and job finding shocks are all realized at the same time *before* the agents make any decisions.

Model

Agents' Decisions

- Value functions:
  - Employed: $V_{ij}^{E}(x)$
  - Unemployed: $V_{ij}^{U}(x)$
  - Out of the labor force: $V_{ij}^{N}(x)$

Model

Agents' Decisions

- Value functions:
  - Employed: $V_{ij}^{E}(x)$
  - Unemployed: $V_{ij}^{U}(x)$
  - Out of the labor force: $V_{ij}^{N}(x)$
- Employed:

$$
\begin{aligned}
V_{ij}^{E}(x) = v_{ij}^{E}(x) & \\
& + (1-\lambda_{ij})\beta \left[(1-\delta_i) V_{ij}^{E}(x) + \delta_i max \left\{ V_{ij}^{U}(x), V_{ij}^{N}(x) \right\} \right] \\
& + \lambda_{ij}\beta \int_{\underline{x}_j}^{\overline{x}_j} \left[(1-\delta_i) max \left\{ V_{ij}^{E}(x'), V_{ij}^{U}(x'), V_{ij}^{N}(x') \right\} \right. \\
& \left. + \delta_i max \left\{ V_{ij}^{U}(x'), V_{ij}^{N}(x') \right\} \right] dF_j(x')
\end{aligned}
$$

Model

Agents' Decisions

- Unemployed:

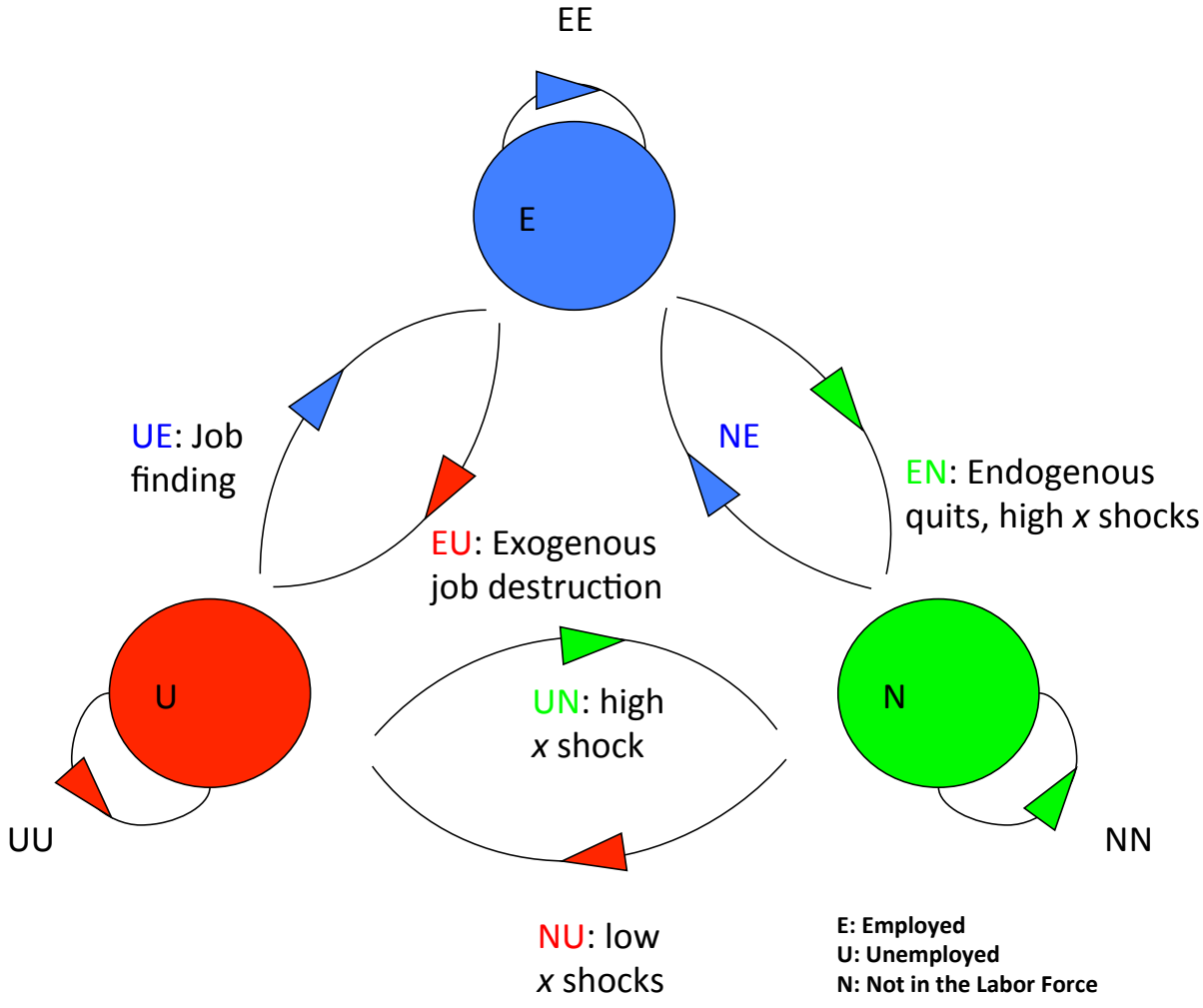
$$V_{ij}^{U}(x) = v_{ij}^{U}(x)$$
$$+(1-\lambda_{ij})\beta\left[p_{ij} * max\left\{V_{ij}^{E}(x), V_{ij}^{U}(x)\right\} + (1-p_{ij})V_{ij}^{U}(x)\right]$$
$$+\lambda_{ij}\beta\int_{\underline{x}_j}^{\overline{x}_j}\left[p_{ij} * max\left\{V_{ij}^{E}(x'), V_{ij}^{U}(x'), V_{ij}^{N}(x')\right\} + (1-p_{ij})max\left\{V_{ij}^{U}(x'), V_{ij}^{N}(x')\right\}\right] dF_j(x')$$

- Out of the labor force:

$$V_{ij}^{N}(x) = v_{ij}^{N}(x) + (1-\lambda_{ij})\beta V_{ij}^{N}(x)$$
$$+\lambda_{ij}\beta\int_{\underline{x}_j}^{\overline{x}_j} max\left\{V_{ij}^{U}(x'), V_{ij}^{N}(x')\right\} dF_j(x')$$

Model

Shocks and Decisions: Flows Between Employment States



- All shocks are all realized at the same time *before* the agents make any decisions.

Model

Firms

- Firms post vacancies to hire workers. There is free entry.
  - Unemployed workers meet firms according to a matching function, $M(u; v)$.
  - If a firm is matched with a worker, the worker produces in that period.
  - Next period, the worker may quit or the job may be exogenously destroyed.

Model

Firms

- Firms post vacancies to hire workers. There is free entry.
  - Unemployed workers meet firms according to a matching function, $M(u; v)$.
  - If a firm is matched with a worker, the worker produces in that period.
  - Next period, the worker may quit or the job may be exogenously destroyed.
- Value of a filled job:

$$J_{ij} = y_i - w_{ij} + \beta \left\{ \int_{\underline{x}_j}^{x_{ij}^q} \left[(1 - \delta_i) J'_{ij} + \delta_i V_i \right] dF_j(x') + \int_{x_{ij}^q}^{\bar{x}_j} V_i \, dF_j(x') \right\}$$

Model

Wage Determination

- Labor markets are segmented by skill.
- *Male wages*: Set by standard surplus splitting scheme within each skill group.
- *Female wages*: Women have higher opportunity cost of work and higher quit rates for given wage $\Longrightarrow$ surplus of a firm with a female employee is lower for given wage and skill.
  - Baseline: Female wages set to render firms *indifferent* between hiring workers of a given skill level $\Longrightarrow$ $p_{if} = p_{im}$ and $w_{if} < w_{im}$, no segmentation by gender.
  - Alternatives:
    - Surplus splitting by skill and gender, with same bargaining power.
    - Exogenous gender wage gap.
    - Different bargaining power, set to match the gender wage gap.

Model

Wage Determination

- Individual opportunity cost of work, x, private information. Distribution of x by gender publicly known.
- Low x workers earn informational rents, which reduce the surplus of the firm.
- Firm trade-off:
  - Lower offered wage shrinks the pool of workers that will accept, and makes workers more likely to quit, conditional on accepting.
  - Lower offered wage increases current profits for the firm.

Model

Equilibrium Wage for Men

- For candidate equilibrium wage w_{im}, firms choose $\hat{w}_{ij}$ to solve the following:

$$w_{im} = argmax_{\hat{w}} \left[\int_{\underline{x}_{\boldsymbol{m}}}^{min\{x^{\boldsymbol{a}}_{\boldsymbol{im}}(w_{\boldsymbol{m}}),\, x^{\boldsymbol{q}}_{\boldsymbol{im}}(w_{\boldsymbol{im}})\}} S_{im}(x; \hat{w}) dF_m(x) \right]^{\gamma} \times \left[J_{im}(\hat{w}) Q_{im}(\hat{w}, w_{im}) - V_i \right]^{1-\gamma},$$

  where

  - $S_{im}(x; \hat{w}) =$ $max\left\{0, \left(W_{im}(x; \hat{w}) - max\left\{H_{im}(x; \hat{w}), S_{im}(x; \hat{w})\right\}\right)\right\}$ = worker surplus
  - $Q(\hat{w}_{ij}, w_{ij})$ = fraction of workers of type ij in the labor force given w_{ij}, who would accept a job at wage $\hat{w}_{ij}$

- Equilibrium wage: $w^*_{im} = \hat{w}_{im}(w^*_{im})$.
- In the baseline case, female wages satisfy: $J_{if} = J_{im}$.

Model

Qualitative Implications

- Gender differences in the distribution of the opportunity cost of market work determine the gender gaps in labor force participation and unemployment in equilibrium:
  - Women's greater opportunity cost of work implies that they have lower participation and more frequent spells of unemployment.
- For the baseline female wage determination mechanism, the gender wage gap is also endogenous:
  - Women's higher quit rates imply lower female wages and the labor market is not segmented by gender.
- For the other wage schemes the gender wage gap by skill is exogenous or counterfactual.

Convergence in Attachment and Unemployment

Exercise: Convergence in Labor Force Attachment

- 1978 chosen as a base year
  - Model calibrated to match:
    - Educational composition of the labor force by skill and gender
    - skill premium, and *EU* rates by skill
    - participation and unemployment rates by gender

Exercise: Convergence in Labor Force Attachment

- 1978 chosen as a base year
  - Model calibrated to match:
    - Educational composition of the labor force by skill and gender
    - skill premium, and *EU* rates by skill
    - participation and unemployment rates by gender
- 1996 chosen as year by which convergence in attachment has mostly occurred
  - Model calibrated to match:
    - Educational composition of the labor force by skill and gender
    - skill premium, and *EU* rates by skill
    - participation rates by gender
- Question: Can the model account for the convergence in unemployment rates between 1978 and 1996?

Exercise: Convergence in Labor Force Attachment

1978 Calibration

- Monthly model, age range 25+
- $F_j(x)$ is Pareto, with parameters κ_j and $\bar{x}_j$
- Parameters set based on empirical evidence:
  - Educational composition of the labor force by skill and gender
  - Other variables: time devoted to work and job search
  - Matching function parameters
- Workers' bargaining power set equal to the elasticity of the matching function with respect to unemployment
- Remaining parameters calibrated to match:
  - participation and unemployment rates by gender, skill premium
  - *EE* by gender and *EU* rates by skill

Exercise: Convergence in Labor Force Attachment

1978 Calibration

Parameters based on independent evidence								
e	s	β	α	γ	μ	c	$\underline{x}_f$	$\underline{x}_m$
0.625	0.15	0.996	0.72	0.72	0.15	8.7	0	0

Parameters calibrated to match data moments							
		Pop. share	δ	λ	$\bar{x}$	κ	y_s/y_u
Women	Unskilled	0.465	0.0042	0.0096	9.73	50	1.46
	Skilled	0.067	0.0048	0.0123			
Men	Unskilled	0.375	0.0084	0.0120	7.13	5	1.46
	Skilled	0.093	0.0042	0.0100			

Exercise: Convergence in Labor Force Attachment

1978 Calibration: Data Targets and Model Outcomes

	Data		Model	
	Women	Men	Women	Men
Unemployment	0.052	0.034	0.052	0.034
LFP	0.468	0.788	0.468	0.788
EU Rate	0.010	0.009	0.010	0.009
EE Rate	0.95	0.98	0.96	0.98
Skill premium	1.49		1.49	
	Data		Model	
	Skilled	Unskilled	Skilled	Unskilled
EU Rate	0.005	0.010	0.006	0.010
EE Rate	0.98	0.96	0.98	0.97

Exercise: Convergence in Labor Force Attachment

1978 Calibration: Flows

- 3-state models typically have difficulty matching U-to-N flows.

  Garibaldi and Wasmer (2006), Krusell, Mukoyama, Rogerson, and Şahin (2010, 2011)

- Some part of these flows is likely to be due to misclassification error, more so for women.

  (Abowd and Zellner 1985, Poterba and Summers 1986)

Exercise: Convergence in Labor Force Attachment

1978 Calibration: Flows

- 3-state models typically have difficulty matching U-to-N flows.

  Garibaldi and Wasmer (2006), Krusell, Mukoyama, Rogerson, and Şahin (2010, 2011)

- Some part of these flows is likely to be due to misclassification error, more so for women.

  (Abowd and Zellner 1985, Poterba and Summers 1986)

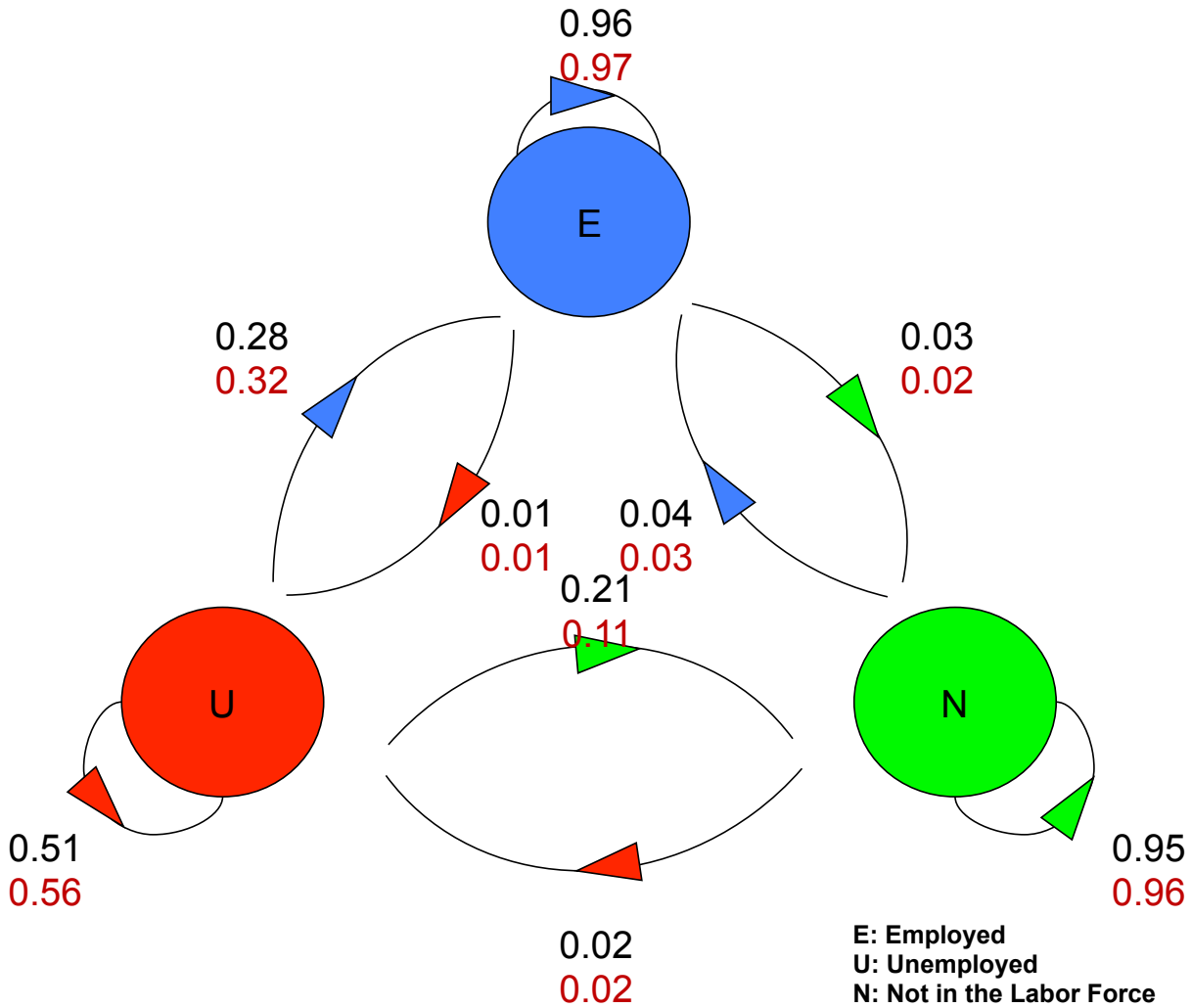
True status	Recorded status	True status	Recorded status
Males	N	Females	N
U	7.8%	U	11.5%
E	0.7%	E	1.5%

Source: Abowd and Zellner (1985)

- We introduce misclassification error to the outcomes of our model, following Abowd and Zellner (1985).

Exercise: Convergence in Labor Force Attachment

1978 Aggregate Flow Rates: Data and Model



Exercise: Convergence in Labor Force Attachment

1996 Economy

- We make the following changes in our calibration to match 1996 data:
  - Composition of the population by skill and gender.
  - Productivity differences between the high skill and low skill workers to match the skill premium.
  - *EU* transition rate (same for both genders).

Exercise: Convergence in Labor Force Attachment

1996 Economy

- We make the following changes in our calibration to match 1996 data:
  - Composition of the population by skill and gender.
  - Productivity differences between the high skill and low skill workers to match the skill premium.
  - *EU* transition rate (same for both genders).
- We then change $\overline{x}_f$ and $\overline{x}_m$ to match participation rates by gender in 1996, *without* targeting unemployment.
- By matching attachment, we can fully account for the decline in the gender unemployment gap.

Exercise: Convergence in Labor Force Attachment

- Parameters of the distribution on x by gender set to match the convergence in participation between 1978 and 1996.

	1978		1996	
Labor Force Participation Rate	Data	Model	Data	Model
Women	46.8%	46.8%	58.8%	58.8%
Men	78.8%	78.8%	76.3%	76.3%
Gap (ppts)	32	32	17.5	17.5
Percentage Gap	51.8%	51.8%	26.1%	26.1%

Exercise: Convergence in Labor Force Attachment

The Gender Unemployment Gap

- Unemployment rates in 1978 matched in calibration.
- In 1996, by matching convergence in participation rates, the model can account for most of the convergence in unemployment rates.

	1978		1996	
Unemployment Rate	Data	Model	Data	Model
Women	5.2%	5.2%	4.5%	4.9%
Men	3.4%	3.4%	4.2%	4.5%
Gap (ppts)	1.8	1.8	0.3	0.4
Percentage Gap	41%	41%	7.0%	8.5%

Exercise: Convergence in Labor Force Attachment

Convergence in Flows

- The model captures the convergence in labor market flows involving the participation decision.

	1978		1996	
	Data	Model	Data	Model
EN	3.38	2.55	1.80	2.08
EU	1.11	1.11	0.92	0.92
NU	0.82	0.61	0.84	0.74
NE	0.82	0.45	0.87	0.85
UN	2.10	1.61	1.58	1.45
UE	0.80	0.89	0.93	0.95

Table: Ratio of female flow transition rates to male transition rates in the data and the model.

Exercise: Convergence in Labor Force Attachment

Other Contributing Factors

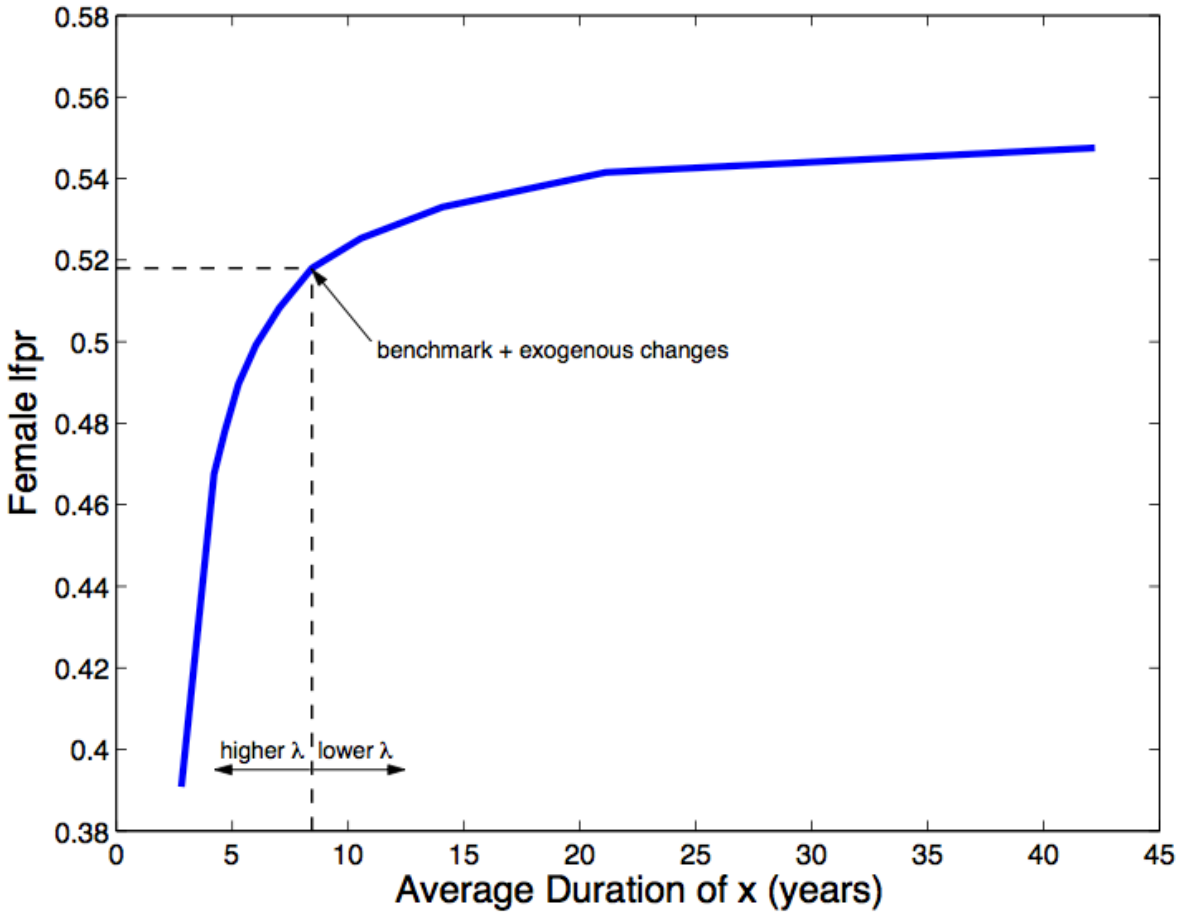
- Other factors cannot account for the convergence in participation or unemployment rates by sex.

	LFPR		Unemployment Rate	
	Gender Gap (ppts)	Gender Gap (fraction of *lfpr*)	Gender Gap (ppts)	Gender Gap (fraction of *u*)
1996 Data	17.5	26.1%	0.3	7.0%
Benchmark	17.5	26.1%	0.4	8.5%
EU	29.2	45.3%	1.0	20.4%
Skill comp.	31.8	50.3%	1.6	40.0%
Skill premium	32.4	50.2%	1.7	41.5%

Exercise: Convergence in Labor Force Attachment

Role of λ

- Female participation increases with x duration, but changes in λ_{jf} are not sufficient to generate convergence in participation. Similar result for changes in the shape parameter κ_j.



Exercise: Convergence in Labor Force Attachment

Alternative Wage Setting Mechanisms

- We calibrate the model to 1978 with the alternative wage determination mechanisms, and replicate the same exercise.

	Unemployment Rate		Gender Gap	
	Men	Women	ppts	as a fraction of u
1996 Data	4.2%	4.5%	0.3	7.0%
Baseline	4.5%	4.9%	0.4	8.5%
Surplus splitting by gender	4.6%	4.8%	0.2	4.5%
Exogenous gender wage gap	4.6%	4.7%	0.1	2.8%
Different bargaining power	4.6%	4.7%	0.1	2.0%

Exercise: Convergence in Labor Force Attachment

The Gender Wage Gap

Ratio of men's wages to women's wage for baseline case:

	1978		1996	
	Data	Model	Data	Model
Unskilled	1.65	1.10	1.40	1.02
Skilled	1.72	1.12	1.49	1.01

- The baseline wage determination mechanism captures only a small fraction of the gender wage gap in 1978. No gender differences in wages in 1996.
- What is the contribution of rising female wages to the change in the gender unemployment gap?

Exercise: Convergence in Labor Force Attachment

Contribution of the Closing Gender Wage Gap

Model with exogenous female wages:

	LFPR		Unemployment Rate	
	Gender Gap (ppts)	Gender Gap (fraction of *lfpr*)	Gender Gap (ppts)	Gender Gap (fraction of *u*)
1996 Data	17.5	26.1%	0.3	7.0%
GWG only	26.9	42.1%	1.7	40.4%
EU, Skill c., Skill p., GWG	25.9	38.4%	0.8	17.53%

- The closing of the gender wage gap accounts for only a small fraction of the convergence in attachment and unemployment rates.

Attachment and the Unemployment Rate

Implications for the Great Recession

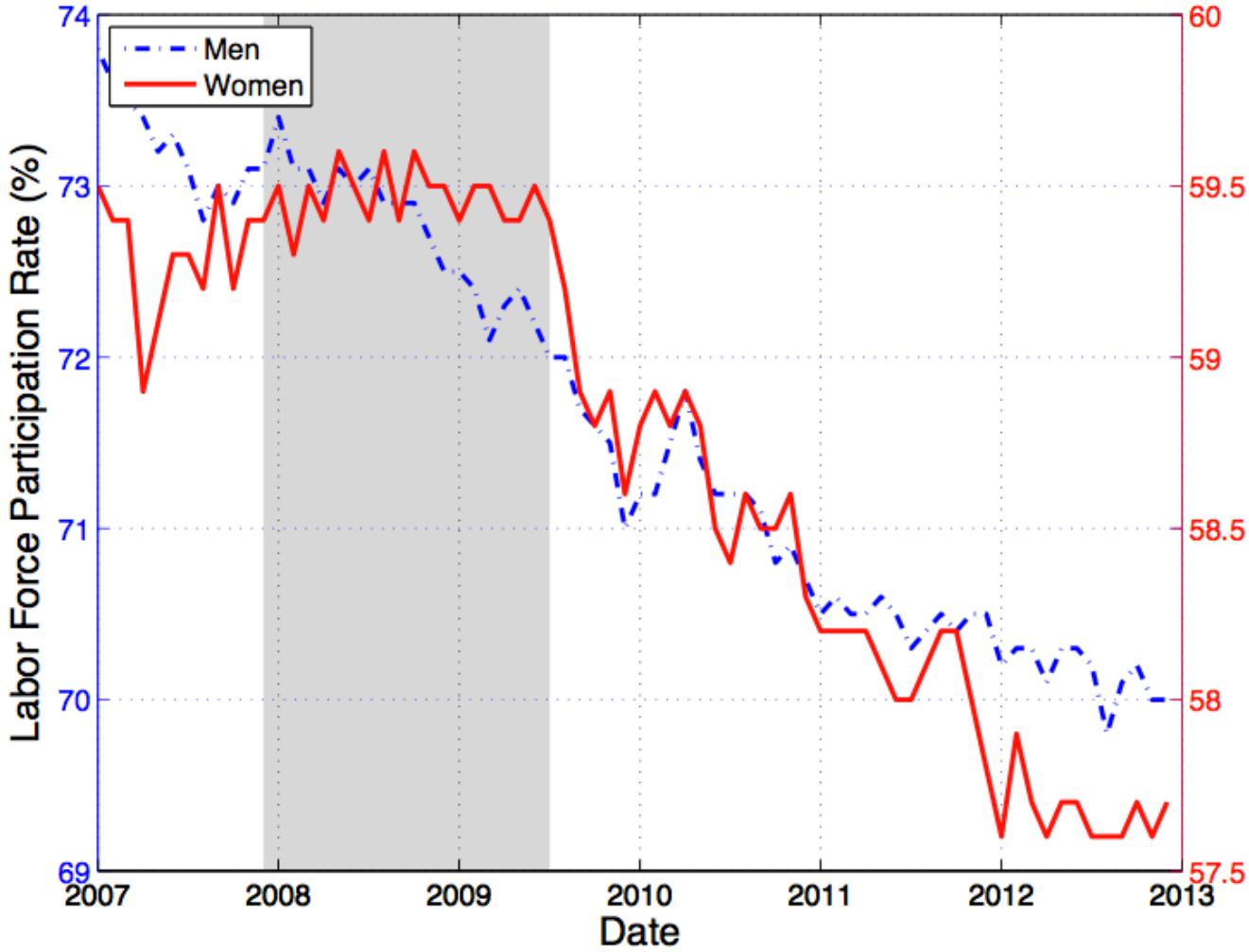


Figure: Participation by sex during the recent cycle

Attachment and the Unemployment Rate

Implications for the Great Recession

- Participation rates have been declining for both men and women during the recovery from the Great Recession.
  - Our model suggests that the decline in participation would determine a rise in the unemployment rate, other things equal.
  - This factor could have contributed to the slow decline in the unemployment rate.

	Total		Men		Women	
	lfpr	*u*	*lfpr*	*u*	*lfpr*	*u*
2009	67%	7.6%	75%	8.5%	60%	6.8%
3 ppts decline	64%	7.7%	72%	8.6%	57%	6.9%
5 ppts decline	62%	7.8%	70%	8.7%	55%	7.0%

Table: Predicted effect of declining labor force participation on unemployment rates in 2009.

International Evidence

International Evidence

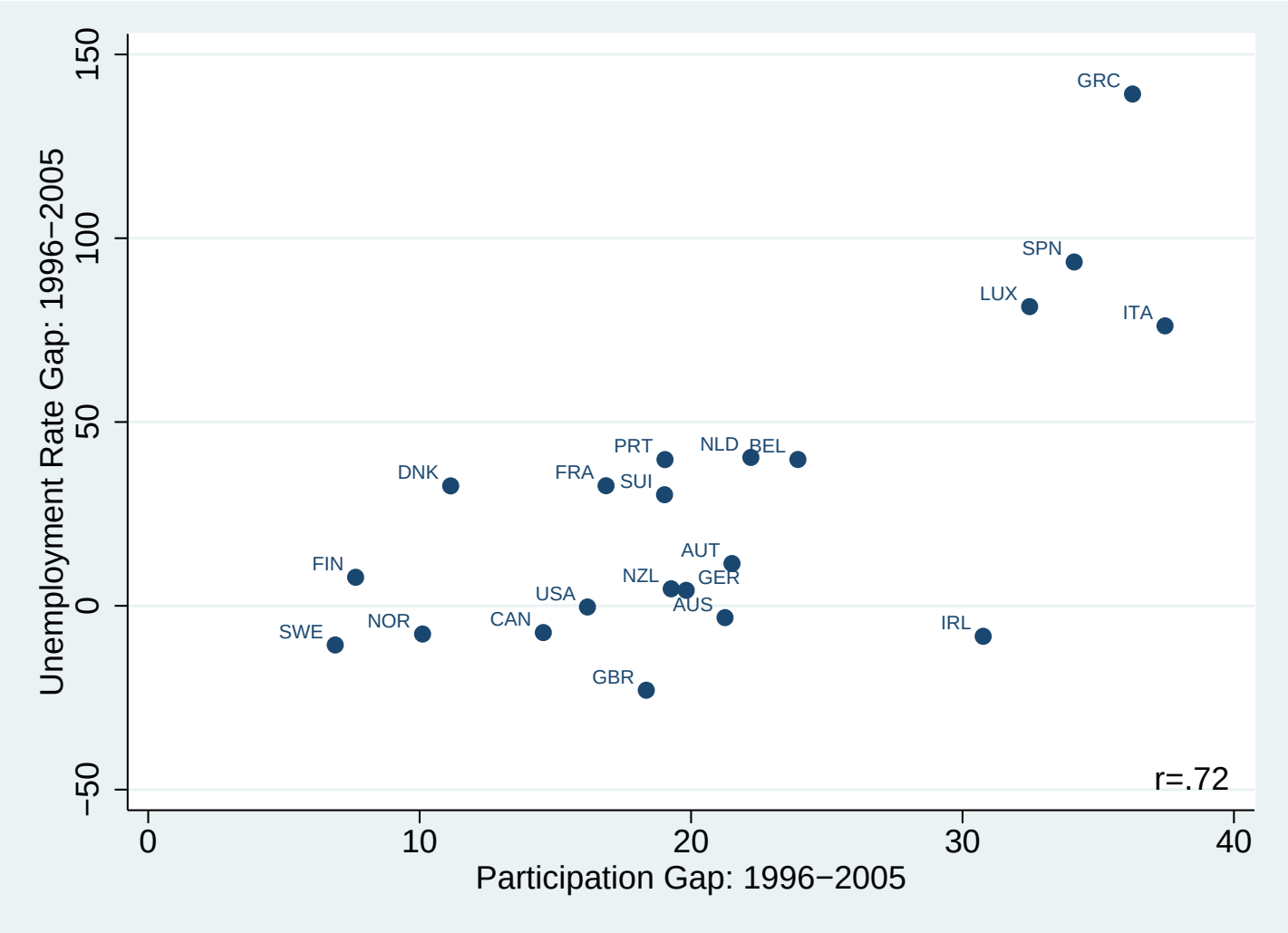
Participation and Unemployment Gaps

- A decline in the gender participation gap is associated with a decline in the gender unemployment gap.
- The gender unemployment gap disappears in countries that have achieved a substantial convergence in participation by gender.

- *Countries in which the current participation gap is still substantial display large gender unemployment gaps.*

International Evidence

Participation and Unemployment Gaps



Source: OECD.

Unemployment Gender Gaps and Aggregate Unemployment

- Countries with currently large gender unemployment gaps also display very high *aggregate unemployment rates*.

Source: OECD.

Unemployment Gender Gaps and Aggregate Unemployment

- Countries with currently large gender unemployment gaps also display very high *aggregate unemployment rates*.

  $\Longrightarrow$ These countries could achieve substantial reductions in the *aggregate unemployment rate* by reducing those gaps.

- Since large gender unemployment gaps are associated with low female labor force participation, countries with currently large gender unemployment gaps could reduce aggregate unemployment by *increasing female labor force participation*.

Cyclical Properties

Cyclical Properties

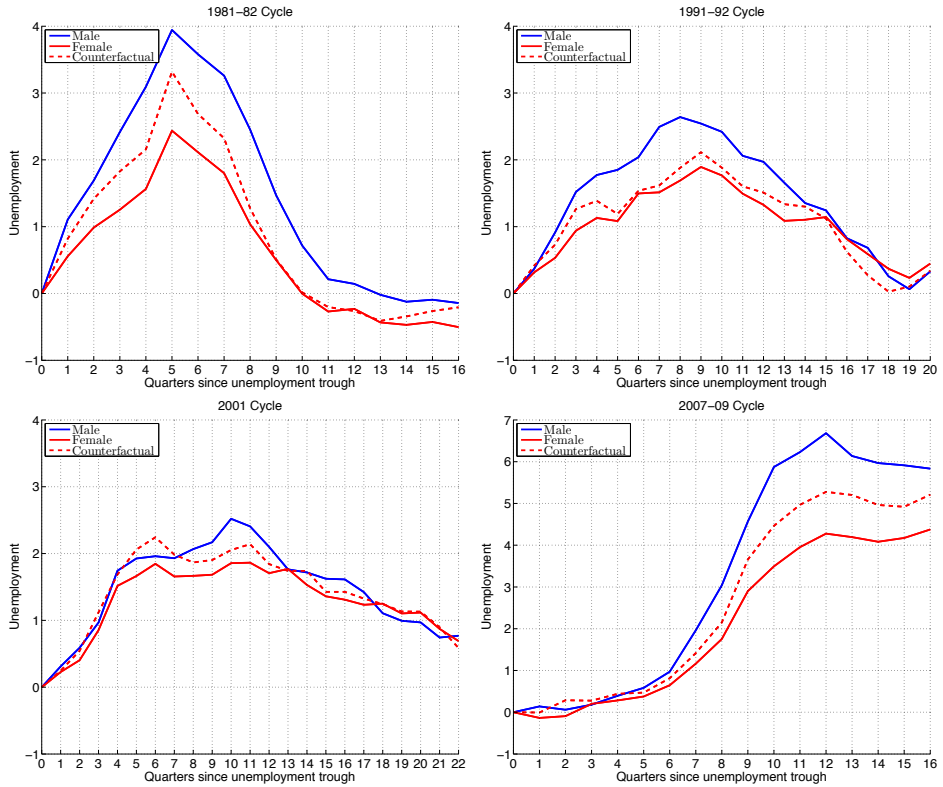
The US Experience

- Men experience greater job losses in recessions, causing a reverse gender unemployment gap at the unemployment peak.
  - Industry composition plays a large role for this difference in recent cycles.
  - Differences by sex in participation trends play a large role in explaining gender differences in employment growth in early cycles.
- The convergence in participation trends by sex can explain the sluggish employment growth in recent *jobless recoveries*.

Cyclical Properties

Industry Composition: Household Data

- Industry composition can account for approximately half of the gender gap in unemployment during recessions. (See also Shin 2000.)



Cyclical Properties

Industry Composition: Payroll Data

Actual and counterfactual employment changes during recessions:

Recessions	Men Actual	Women Actual	Women Counterfactual
12/1969-12/1970	-1.35%	+0.69%	-0.65%
10/1973-5/1975	-3.26%	+2.16%	-0.31%
5/1979-7/1980	-2.04%	+3.11%	-1.86%
7/1981-11/1982	-4.97%	-0.52%	-2.28%
7/1990-6/1992	-2.74%	0.81%	-1.70%
12/2000-6/2003	-3.16%	-0.72%	-4.72%
8/2007-10/2009	-8.34%	-3.28%	-7.47%

- Industry composition can explain virtually all the gender difference in employment change in the last three recessions, it is less important for earlier recessions.

Cyclical Properties

Industry Composition: Payroll Data

Actual and counterfactual employment changes during recoveries:

Recoveries	Men Actual	Women Actual	Women Counterfactual
12/1970-12/1973	+8.06%	+14.12%	+16.22%
5/1975-5/1978	+9.31%	+18.72%	+20.83%
7/1980-7/1983	-2.84%	+5.52%	+4.11%
11/1982-11/1985	+8.13%	+14.42%	+14.59%
6/1992-6/1995	+7.92%	+7.81%	+7.04%
6/2003-6/2006	+5.98%	+3.38%	+3.24%
10/2009-4/2012	+5.17%	+2.25%	+0.77%

- Industry composition does not explain the gender difference in employment change in recoveries.

Cyclical Properties

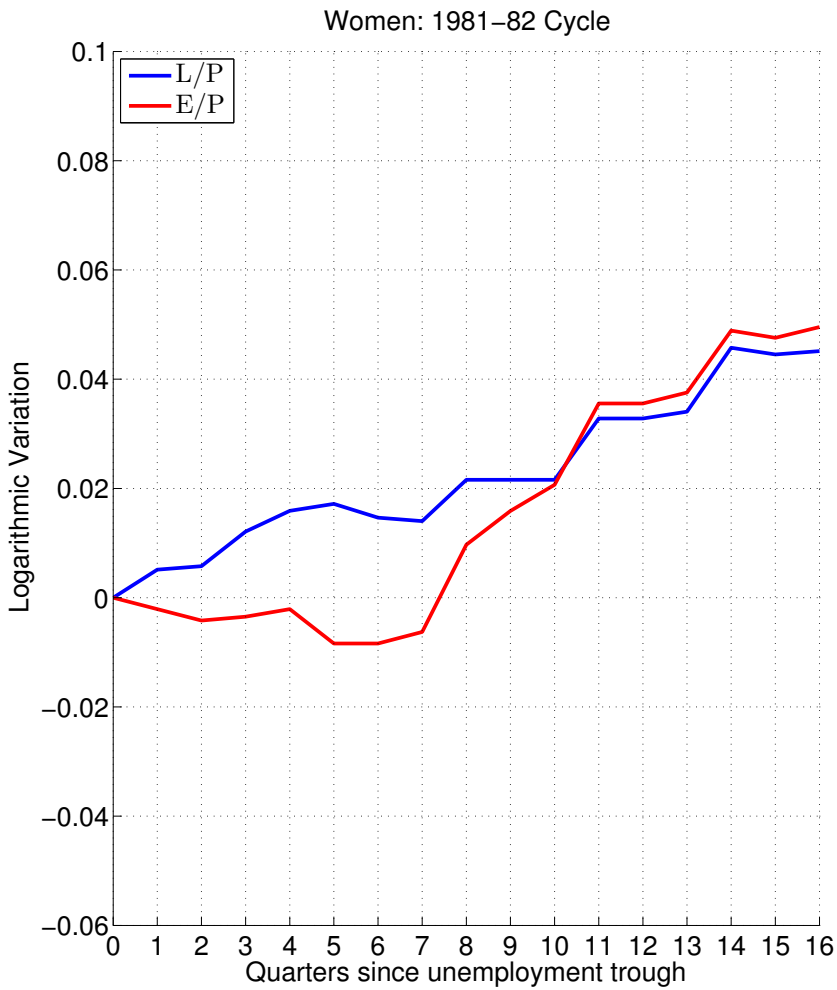
Participation, Employment and Unemployment

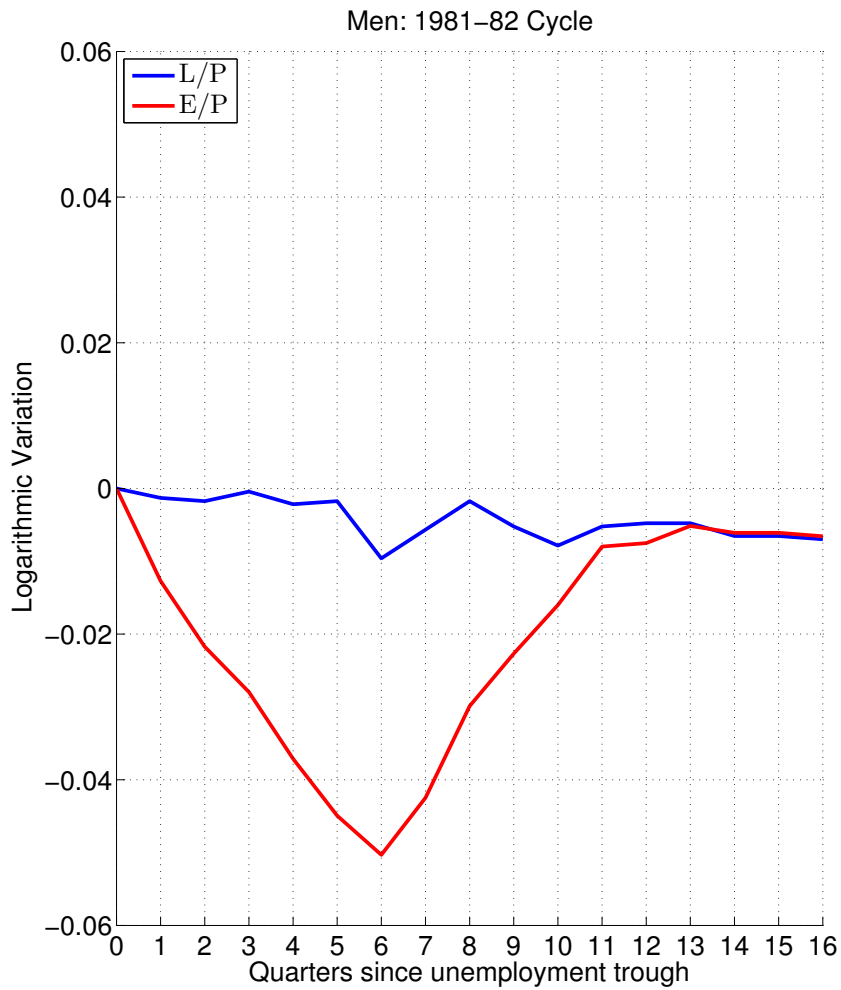
- Gender differences in employment growth during recessions and recoveries are associated with *changes over time in the trend in female participation*.
- In early cycles, female employment was stable in recessions and strongly rising in recoveries, following the positive trend in participation.

Participation and Employment: Early Cycles

The 1981-1982 Cycle

- Trend growth in female participation fuels female employment growth. Similar pattern in 1970 and 1974-1975 cycles.





Source: Current Population Survey

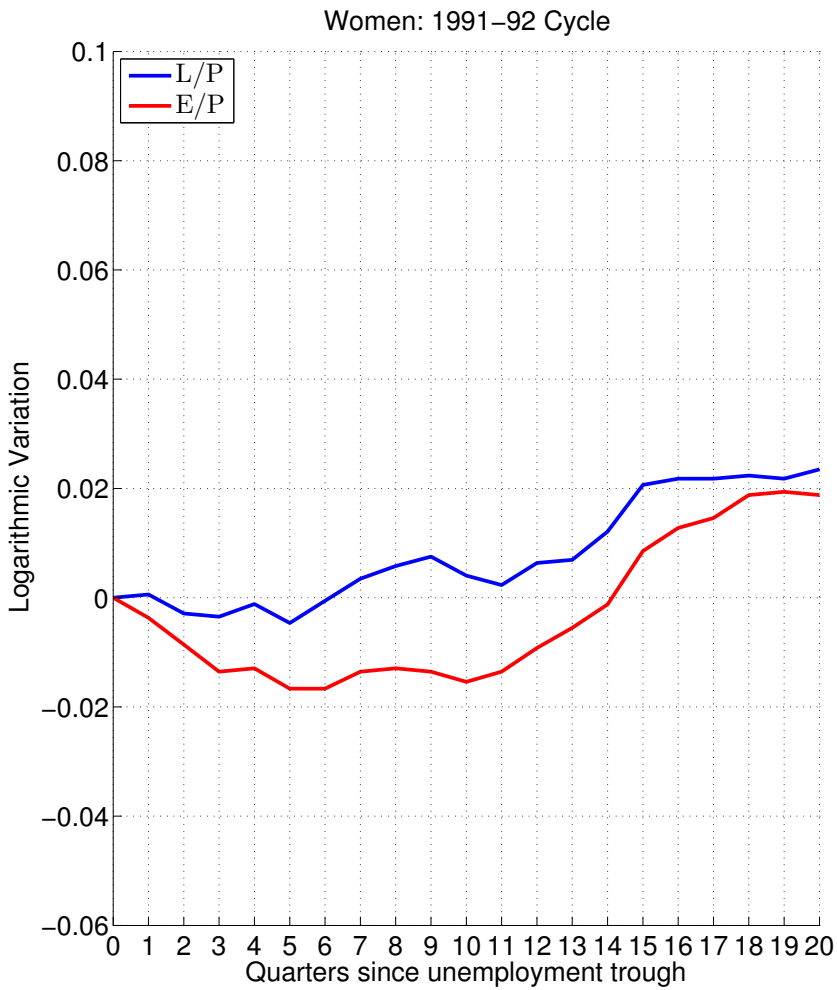
Changing Participation Trends and Business Cycles

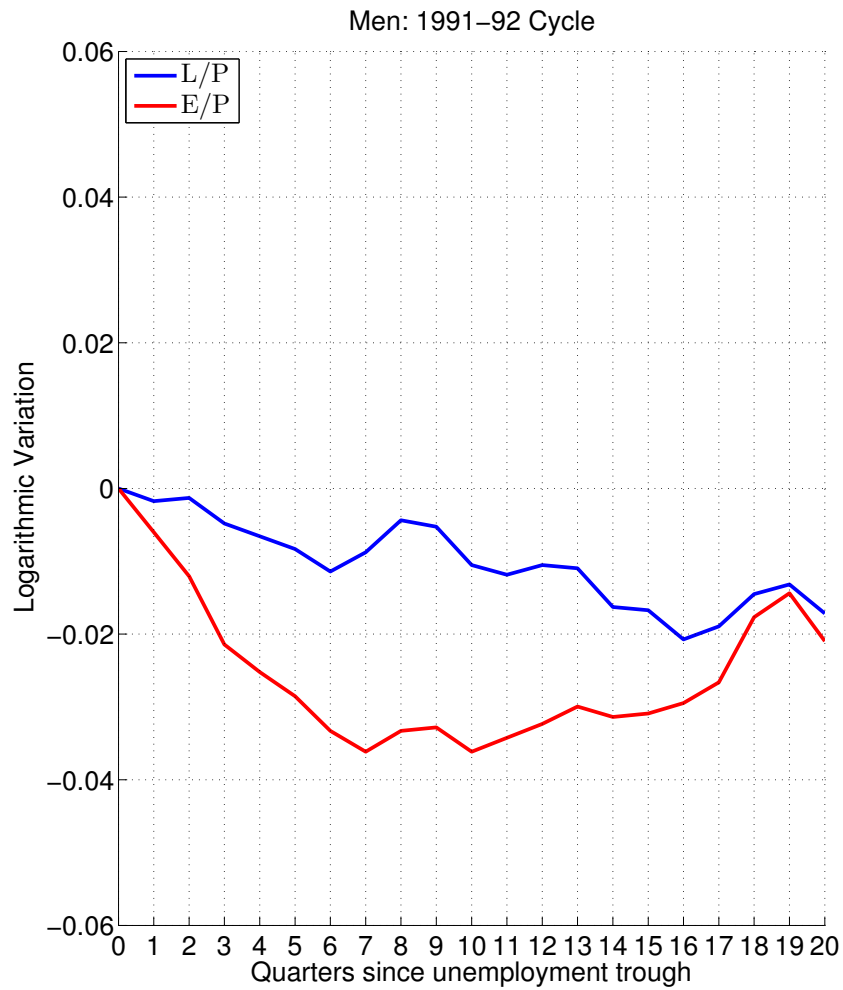
- Gender differences in employment growth during recessions and recoveries are associated with *changes over time in the trend in female participation*.
- In early cycles, female employment was stable in recessions and strongly rising in recoveries, following the positive trend in participation.
- Male participation and employment behavior are similar in early and recent cycles.
- In recent cycles, *female participation stopped rising, making the cyclical behavior of female employment similar to men's.*

Participation and Employment: Recent Cycles

The 1991-92 Cycle

- Female participation stopped rising in 1995, reducing the gender differences in the cyclical behavior of employment.

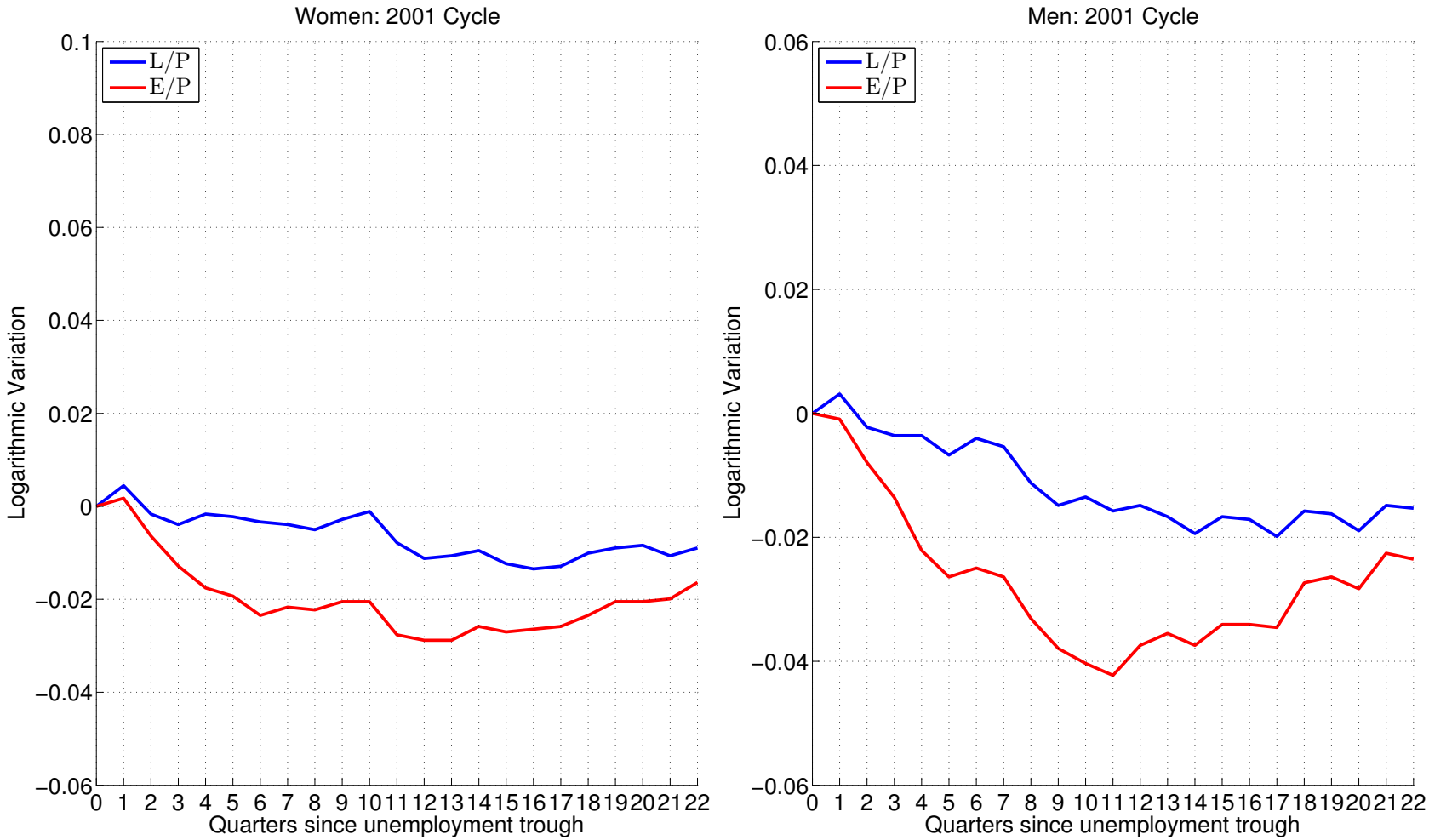




Source: Current Population Survey

Participation and Employment: Recent Cycles

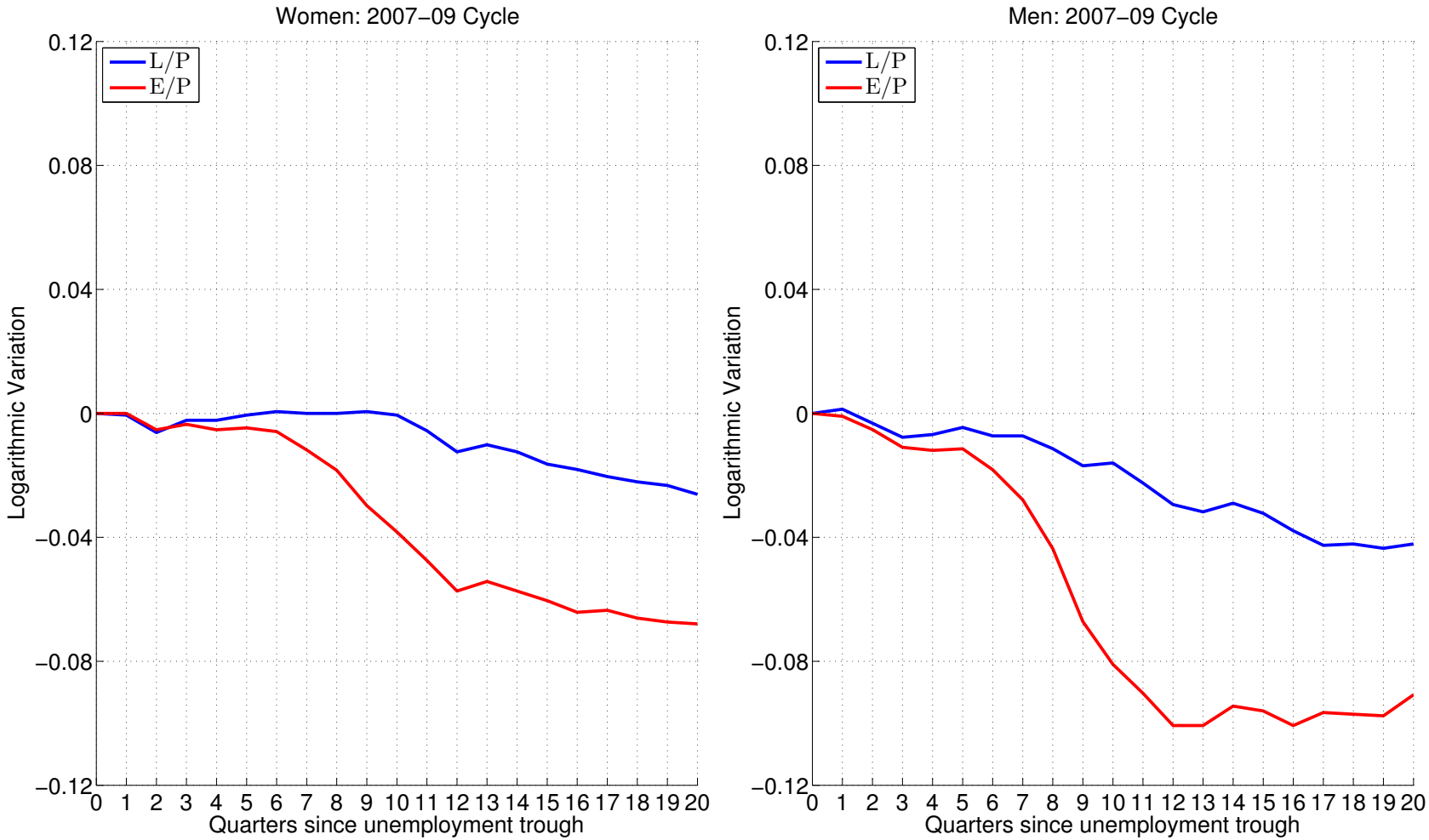
The 2001 Cycle



Source: Current Population Survey

Participation and Employment: Recent Cycles

The 2007-09 Cycle



Source: Current Population Survey

Participation, Employment and Unemployment

Implications for Aggregate Employment

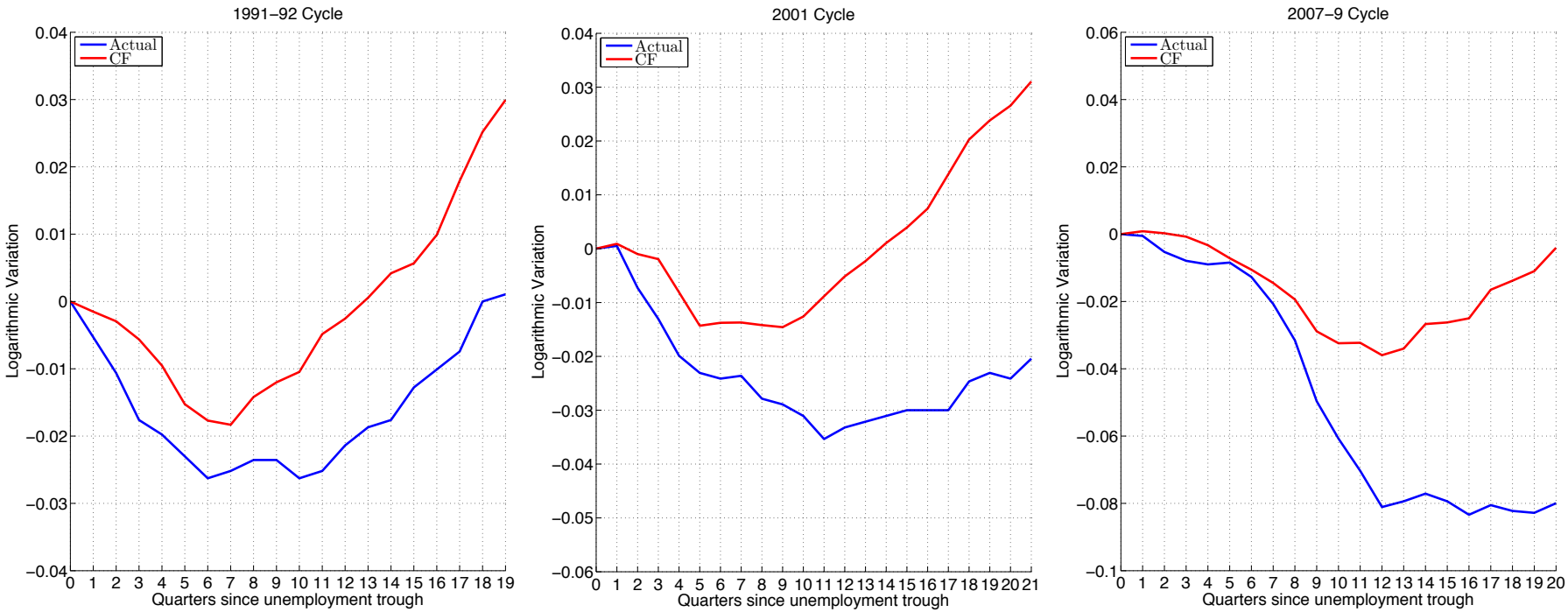
- The strong growth in female participation until the early 1990s contributed to shallow recessions and very strong recoveries for aggregate employment in early cycles

  $\Longrightarrow$ *The flattening of female labor force participation since the early 1990s has made recoveries in recent cycles appear jobless.*

Implications for Aggregate Employment

Jobless Recoveries in Recent Cycles

- Imposing that female employment growth is the same as the average in early cycles, recent cycles exhibit much stronger employment growth in the recovery.



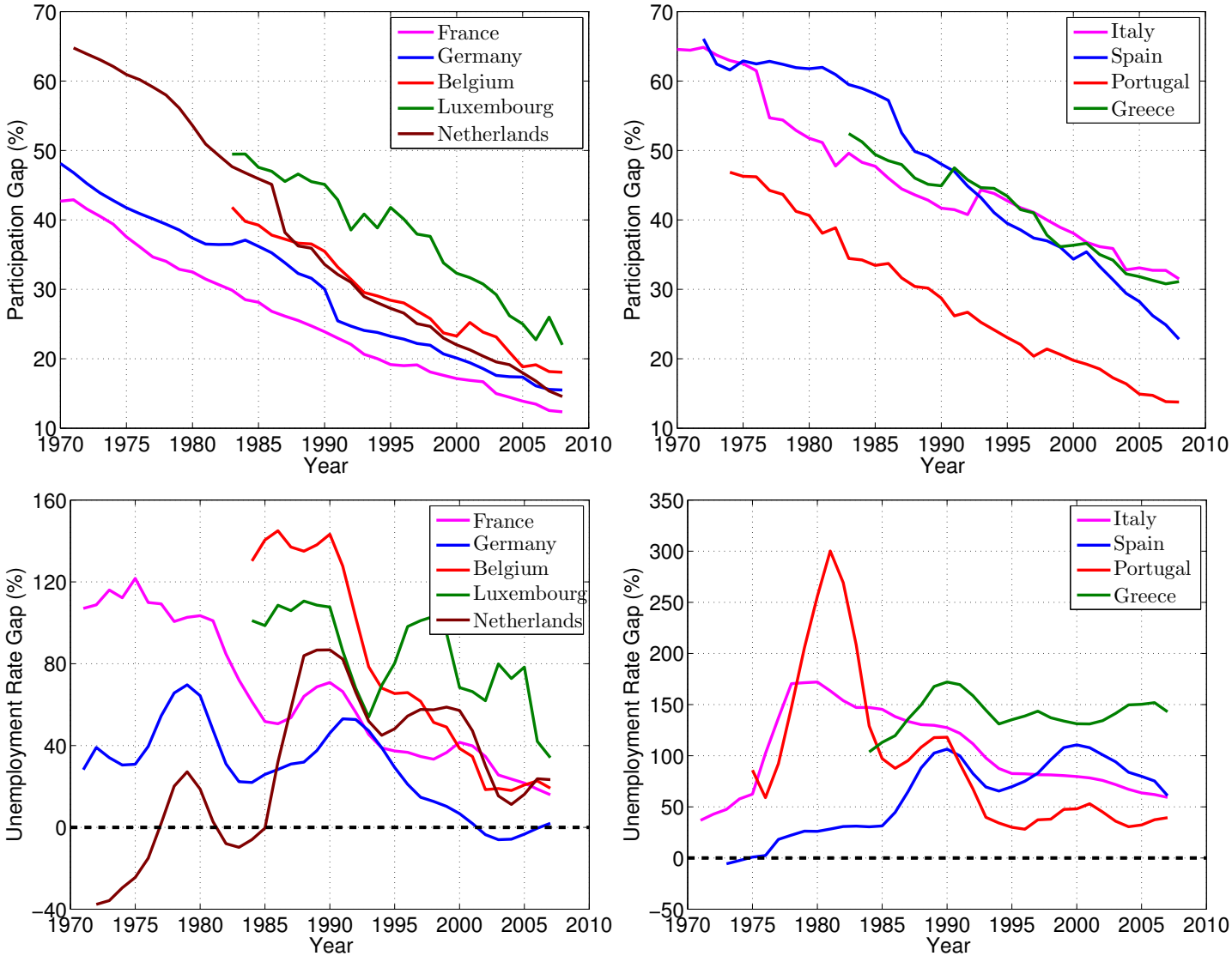
Counterfactual E/P : Female E/P replaced with average for early cycles.

Conclusions

- Trends:
  - The convergence in labor force attachment by gender is the main factor explaining the decline in the gender unemployment gap in the US.
  - This link is supported by evidence from OECD countries.
- Cycles:
  - Gender differences in industry distribution account for a large fraction of the gender unemployment gap in recent recessions for the US.
  - The growth in women's attachment until the early 1990s in the US contributed to dampen recessions and boost recoveries in early cycles, making recent recoveries seem sluggish.

More International Evidence

Participation and Unemployment Gaps



Source: OECD. *Participation Gap* $= \frac{L_m - L_f}{L_m}$, *Unemployment Gap* $= \frac{u_f - u_m}{u_m}$.

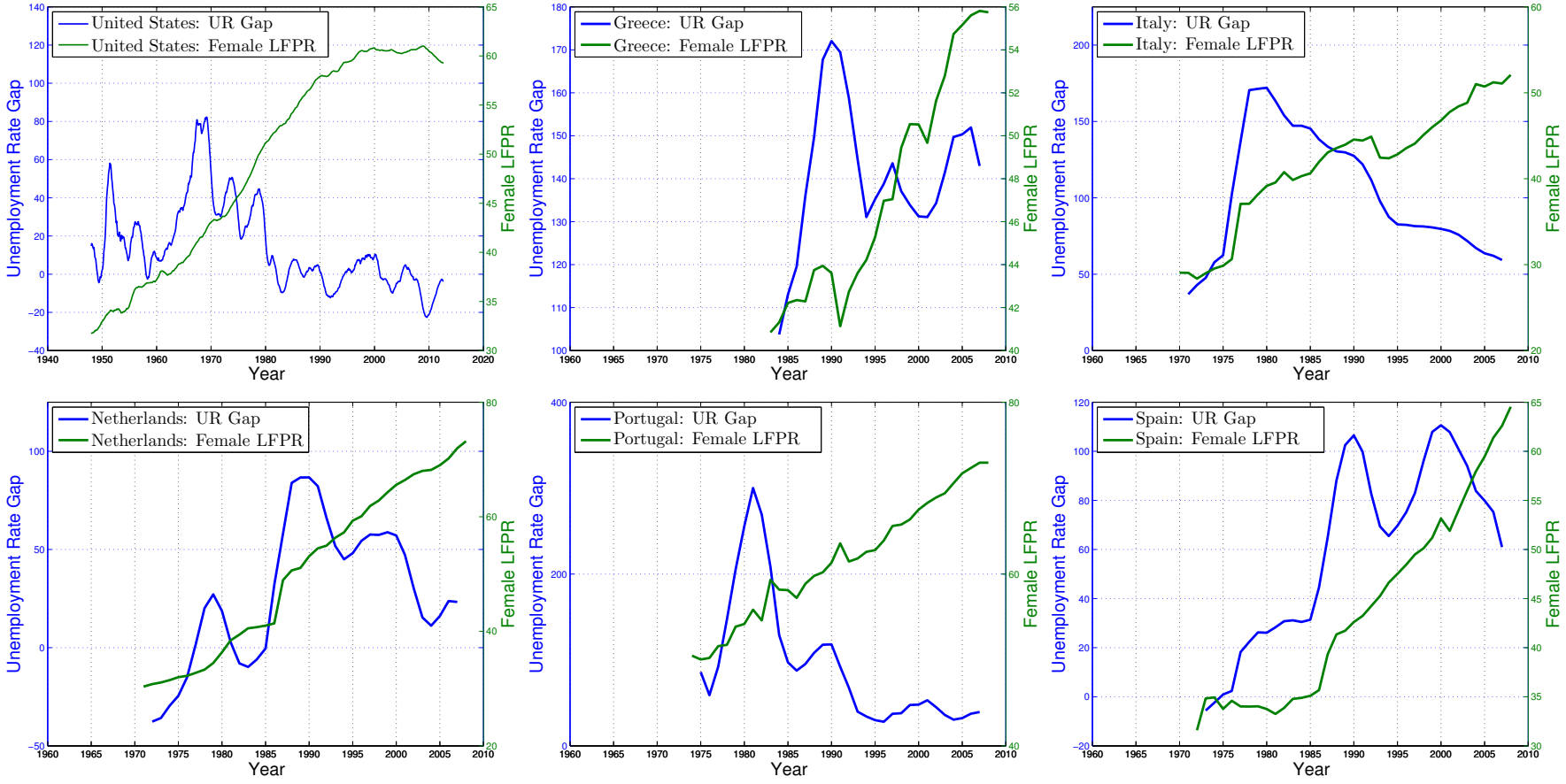
More International Evidence

Participation and Unemployment Gaps

- Countries with relatively large participation gap in the 1970s display a rising unemployment gap in early years.
  - Initial temporary rise in the gender unemployment gap is associated with an acceleration in female participation.

More International Evidence

Participation and Unemployment Gaps



Female Labor Force Participation, $\textit{Unemployment Gap} = \frac{u_f - u_m}{u_m}$.

Source: BLS and OECD.

More International Evidence

Participation and Unemployment Gaps

- Countries with relatively large participation gap in the 1970s display a rising unemployment gap in early years.
  - The initial temporary rise in the gender unemployment gap is associated with an acceleration in female participation.
- This phenomenon also occurred in countries with currently low participation and unemployment gaps (US, Nordic countries).
- The rise in fraction of *married* women in the female labor force accounts for this initial rise.
  $\Longrightarrow$ Married women are initially more subject to non-participation spells than never married women, but they become more attached over time.

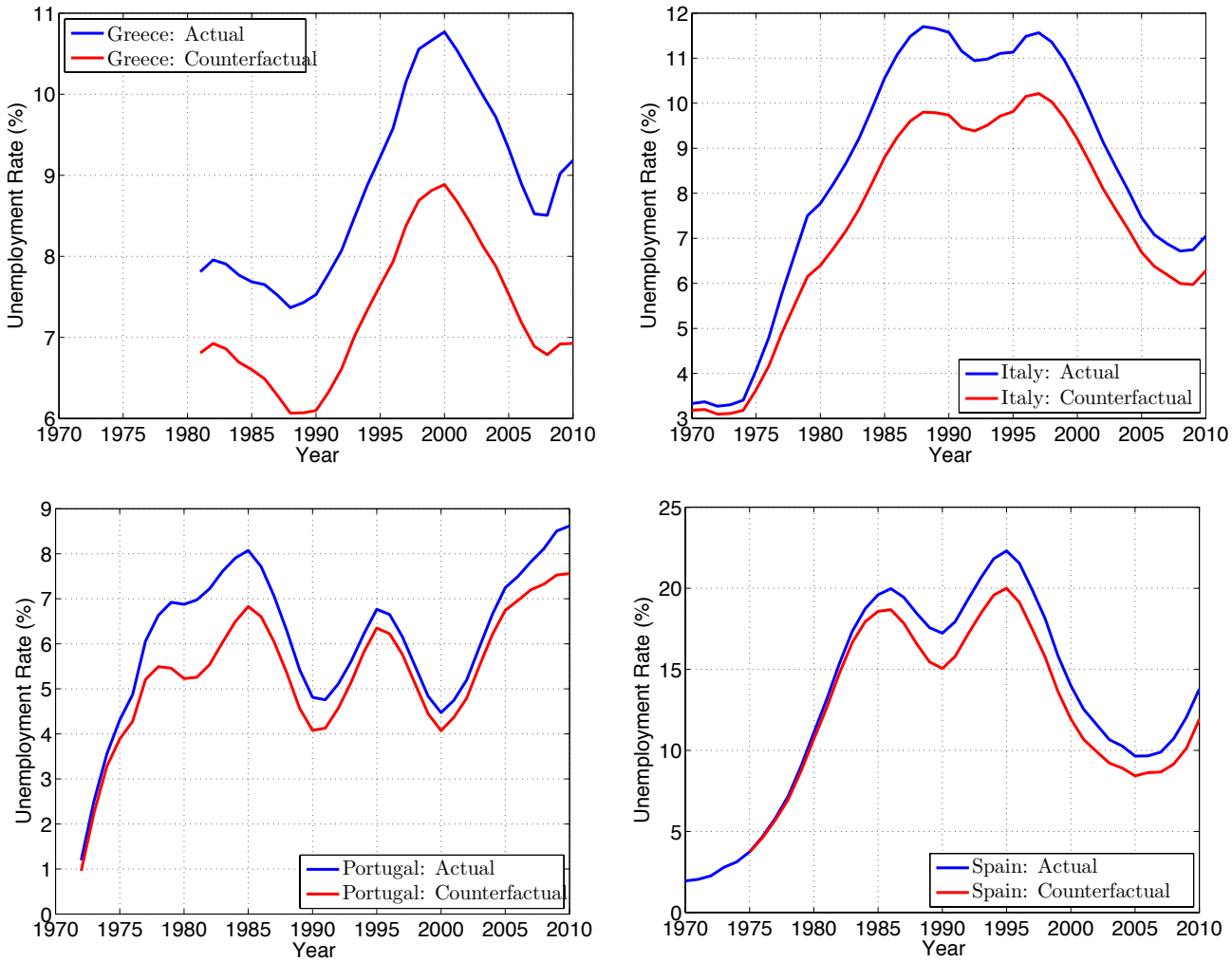
Unemployment Gender Gaps and Aggregate Unemployment

- Countries with currently large gender unemployment gaps also display very high *aggregate unemployment rates*.

  $\Longrightarrow$ These countries could achieve substantial reductions in the *aggregate unemployment rate* by reducing those gaps.

Unemployment Gender Gaps and Aggregate Unemployment

- Counterfactual aggregate unemployment rate assumes that the gender unemployment gap is reduced by 50% in all years.



Source: OECD.