The Effects of Labor Market Conditions on Working Time: the US-EU Experience

Claudio Michelacci Josep Pijoan-Mas

CEMFI and CEPR

ECB, December 2008

Motivation

Changes in hours per employee

- The evolution of total working time in the US and in the major European economies has differed enormously since the early 70's
- Today total hours in the US are around 25% larger than in Europe
- This is due to the different evolution of
  - (i) participation rate
  - (ii) unemployment rate
  - (iii) hours per employee
- Differences in hours per employee are remarkably important
- For instance, in France and Germany they account for between one third and one half of the relative fall of total hours compared to the US

Motivation

What else has changed?

Starting in the 70s

- In the US there has been (Eckstein and Nagypal, 2004)
  - An increase in the return to skill
  - An increase in the within-skill wage inequality
- In Europe there has been (Blanchard and Wolfers, 1999)
  - An increase in the unemployment rate

We measure these changes in the data and show that they can explain the different evolution of hours per employee

Empirical evidence

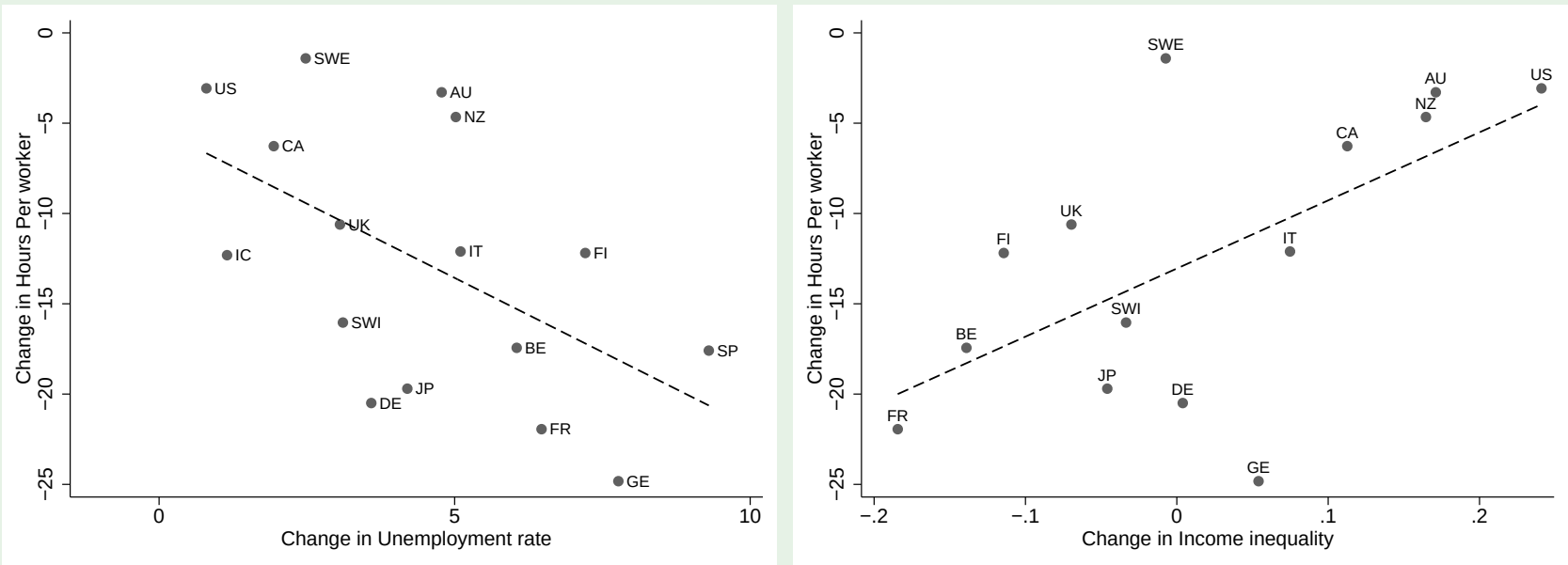
Changes in hours worked, unemployment, and wage inequality

There is suggestive evidence that changes in hours per employee, in unemployment rates and in wage inequality are correlated

Empirical evidence

Changes in hours worked, unemployment, and wage inequality

There is suggestive evidence that changes in hours per employee, in unemployment rates and in wage inequality are correlated



Changes over the 1970-2002 period. Source OECD

Empirical evidence

Inequality and hours worked, within country

There is also *within country* evidence that wage inequality and hours worked are correlated

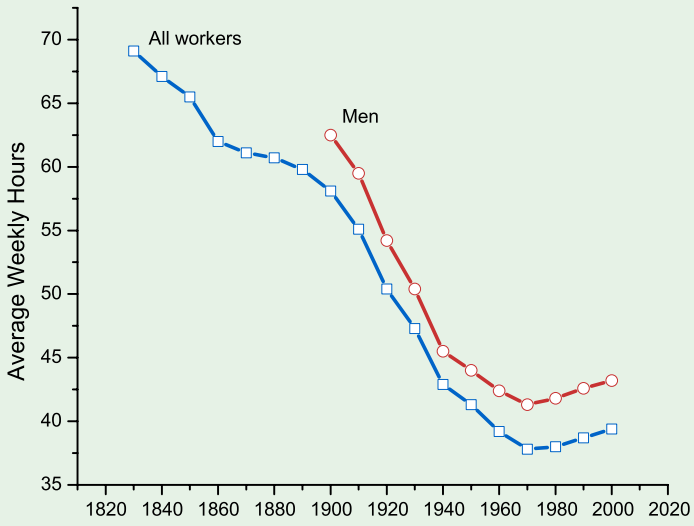
- Workers in occupations with larger wage inequality work longer hours both in the US and in Germany

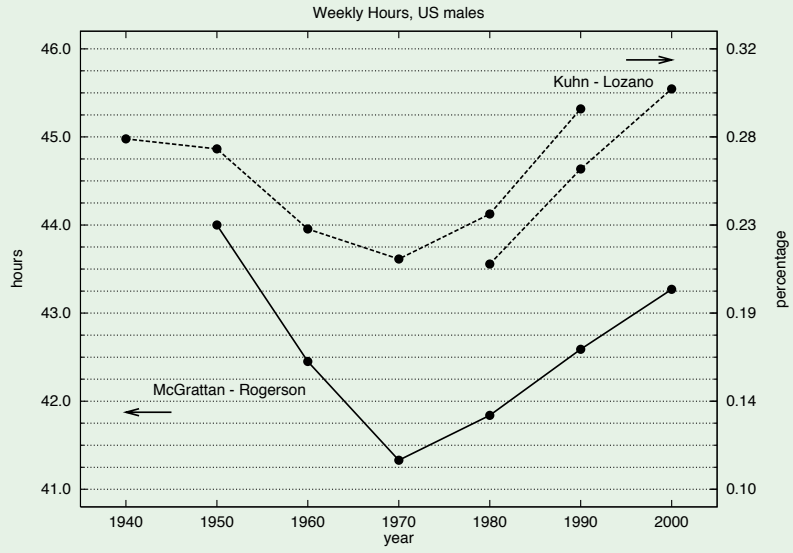
  Bell and Freeman (2001)

- In the US hours per male worker have increased since the 70's, thereby reverting a trend of secular decline. More so in occupations that experienced greater increases in within skill wage inequality

  McGrattan and Rogerson (2004) and Kuhn and Lozano (2005)

US historical evidence





Research project

The idea

We propose a novel theory where:

- There are labor market frictions (McCall search)
- Working hours are a means of accumulating human capital (learning-by-doing)

  Shaw (1989), Imai and Keane (2004)

- Human capital increase productivity and thereby helps in getting job offers due to firms' ranking of candidates

  Montgomery (1991), Peters (1991), Blanchard and Diamond (1994), Shimer (2005)

Then, the return to working hours is (partly) inter-temporal and it is influenced by labor market tightness and wage inequality

Research project

The idea

We propose a novel theory where:

- There are labor market frictions (McCall search)
- Working hours are a means of accumulating human capital (learning-by-doing)

  Shaw (1989), Imai and Keane (2004)

- Human capital increase productivity and thereby helps in getting job offers due to firms' ranking of candidates

  Montgomery (1991), Peters (1991), Blanchard and Diamond (1994), Shimer (2005)

Then, the return to working hours is (partly) inter-temporal and it is influenced by labor market tightness and wage inequality

Research project

Plan

- We write a simple two-period model to highlight theoretical links
- We extend the model and we calibrate it to match evidence from the PSID and other micro data on job flows and wage dynamics in the 70's
- We use data to measure changes in aggregate labor market conditions
- We use the calibrated model to assess the quantitative importance of our theory for the US vs Europe experience
- We use the model to test further predictions of the theory

Research project

Some implications

The model can explain some facts about the evolution of hours worked in the US and in Europe.

- Why US males now work longer hours than they used to do back in the 70's (McGrattan and Rogerson 2004, and Kuhn and Lozano, 2005)
- The emergence of discouraged males working very few hours in Europe (OECD, 2004)
- Some specific features of the age profile of hours worked (both over time and across countries) (McGrattan and Rogerson 2004)
- The evolution of the correlation of past hours worked and current wages in the US and in Germany

Related work

Other explanations

- Taxes? See Prescott (2004) and Ohanian et al (2006)
  - At most one third of the differences, see Nickell (2003)
  - Bad fit if replacement rates, see Ljungqvist and Sargent (2006)
  - Evolution in the *gross* return to working hours
  - How can account for the trend reversal in hours per male worker?
- Leisure choice and preferences? See Blanchard (2004)
  - But is it preferences or incentives?
- Work sharing? See Alesina, Glaeser, and Sacerdote (2005)
  - Is this a political equilibrium?
  - Surveys on desired working time

Related work

Other explanations

- Taxes? See Prescott (2004) and Ohanian et al (2006)
  - At most one third of the differences, see Nickell (2003)
  - Bad fit if replacement rates, see Ljungqvist and Sargent (2006)
  - Evolution in the *gross* return to working hours
  - How can account for the trend reversal in hours per male worker?
- Leisure choice and preferences? See Blanchard (2004)
  - But is it preferences or incentives?
- Work sharing? See Alesina, Glaeser, and Sacerdote (2005)
  - Is this a political equilibrium?
  - Surveys on desired working time

Related work

Other explanations

- Taxes? See Prescott (2004) and Ohanian et al (2006)
  - At most one third of the differences, see Nickell (2003)
  - Bad fit if replacement rates, see Ljungqvist and Sargent (2006)
  - Evolution in the *gross* return to working hours
  - How can account for the trend reversal in hours per male worker?
- Leisure choice and preferences? See Blanchard (2004)
  - But is it preferences or incentives?
- Work sharing? See Alesina, Glaeser, and Sacerdote (2005)
  - Is this a political equilibrium?
  - Surveys on desired working time

Related work

Other explanations

- Taxes? See Prescott (2004) and Ohanian et al (2006)
  - At most one third of the differences, see Nickell (2003)
  - Bad fit if replacement rates, see Ljungqvist and Sargent (2006)
  - Evolution in the *gross* return to working hours
  - How can account for the trend reversal in hours per male worker?
- Leisure choice and preferences? See Blanchard (2004)
  - But is it preferences or incentives?
- Work sharing? See Alesina, Glaeser, and Sacerdote (2005)
  - Is this a political equilibrium?
  - Surveys on desired working time

Two-period model

Assumptions

Workers are initially employed with human capital H and they choose working hours h

- They have utility: $u(c,h) = \ln c - \lambda h$
- Current income is equal to: $\omega H^{\alpha} h^{\theta}$
- Next period human capital is accumulated as: $H' = (1-\delta)H + a\,h$

In the second period, three things can happen to the worker:

- w.p. ϕ she can lose her job
- w.p. $(1-\phi)\,p_e(H')$ she can get a new offer ω'
- w.p. $(1-\phi)\,(1-p_e(H'))$ she keeps her job and gets no new offer

$\triangleright$ Hours worked in the first period matter for getting new offers

Two-period model

The individual problem

- In the second period the hours decision is intra-temporal.
- In the first period all workers face the following problem:

Two-period model

The individual problem

- In the second period the hours decision is intra-temporal.
- In the first period all workers face the following problem:

$$
\begin{aligned}
V_1(H,\omega) &= \max_h \Bigg\{ u\left(\omega H^{\alpha} h^{\theta}, h\right) + \beta\phi b + \beta(1-\phi) V_2(H',\omega) \\
&+ \beta(1-\phi) p_e(H') \int_{\omega}^{\infty} \Big[V_2(H',s) - V_2(H',\omega) \Big] dF(s) \Bigg\} \\
\text{s.t.} \quad & H' = (1-\delta) H + ah
\end{aligned}
$$

▷ Notice the inter-temporal component in the return to working hours

Two-period model

Some simplifications

In order to obtain closed-form solutions, we assume that:

1. The functional form of F is given by

$$\omega = \begin{cases} \omega_1 & \text{with probability 1-q} \\ \omega_2 & \text{with probability q} \end{cases}$$

2. The probability of getting a new offer is approximated by

$$p_e\left(H'\right) \simeq p_0 + p_1\left(\ln H' - \ln \overline{H}\right)$$

3. Full depreciation, $\delta = 1$

Two-period model

The choice of hours

$$h = \frac{\theta}{\lambda} + \beta \frac{(1-\phi)\left[\alpha + p_1\, q\, \left(\ln \omega_2 - \ln \omega\right)\right]}{\lambda}$$

- The first term is the conventional intra-temporal return
- The second is the inter-temporal return, which is larger if

Two-period model

The choice of hours

$$h = \frac{\theta}{\lambda} + \beta \frac{(1-\phi)\left[\alpha + p_1\, q\, \left(\ln \omega_2 - \ln \omega\right)\right]}{\lambda}$$

- The first term is the conventional intra-temporal return
- The second is the inter-temporal return, which is larger if
  - (i) the productivity elasticity to human capital is larger (greater α)

Two-period model

The choice of hours

$$h = \frac{\theta}{\lambda} + \beta \frac{(1-\phi)\left[\alpha + p_1\, q\, (\ln \omega_2 - \ln \omega)\right]}{\lambda}$$

- The first term is the conventional intra-temporal return
- The second is the inter-temporal return, which is larger if
  - (i) the productivity elasticity to human capital is larger (greater α)
  - (ii) within-skill wage inequality is larger (greater $\ln \omega_2 - \ln \omega$)

Two-period model

The choice of hours

$$h = \frac{\theta}{\lambda} + \beta \frac{(1-\phi)\left[\alpha + p_1\, q\, \left(\ln \omega_2 - \ln \omega\right)\right]}{\lambda}$$

- The first term is the conventional intra-temporal return
- The second is the inter-temporal return, which is larger if
  - (i) the productivity elasticity to human capital is larger (greater α)
  - (ii) within-skill wage inequality is larger (greater $\ln \omega_2 - \ln \omega$)
  - (iii) the labor market is tighter (greater $(1-\phi)$ and p_1)

Two-period model

The choice of hours

$$h = \frac{\theta}{\lambda} + \beta \frac{(1-\phi)\left[\alpha + p_1\, q\, \left(\ln \omega_2 - \ln \omega\right)\right]}{\lambda}$$

- The first term is the conventional intra-temporal return
- The second is the inter-temporal return, which is larger if
  - (i) the productivity elasticity to human capital is larger (greater α)
  - (ii) within-skill wage inequality is larger (greater $\ln \omega_2 - \ln \omega$)
  - (iii) the labor market is tighter (greater $(1-\phi)$ and p_1)

Two-period model

The choice of hours

$$h = \frac{\theta}{\lambda} + \beta \frac{(1-\phi)\left[\alpha + p_1\, q\, \left(\ln \omega_2 - \ln \omega\right)\right]}{\lambda}$$

- The first term is the conventional intra-temporal return
- The second is the inter-temporal return, which is larger if

Two-period model

US vs Europe

$$h = \frac{\theta}{\lambda} + \beta \frac{(1-\phi)\left[\alpha + p_1\, q\, \left(\ln \omega_2 - \ln \omega\right)\right]}{\lambda}$$

- We claim that
  - In the US there has been an increase in α and in $(\ln \omega_2 - \ln \omega)$
  - In Europe there has been a fall in p_1 and in $(1-\phi)$
- Therefore, career prospects have improved in America but worsen in Europe
- We will measure these changes in the data and use our quantitative model to assess the predicted response of working time

Two-period model

US vs Europe

$$h = \frac{\theta}{\lambda} + \beta \frac{(1-\phi)\left[\alpha + p_1\, q\, \left(\ln \omega_2 - \ln \omega\right)\right]}{\lambda}$$

- We claim that
  - In the US there has been an increase in α and in $(\ln \omega_2 - \ln \omega)$
  - In Europe there has been a fall in p_1 and in $(1-\phi)$
- Therefore, career prospects have improved in America but worsen in Europe
- We will measure these changes in the data and use our quantitative model to assess the predicted response of working time

Two-period model

US vs Europe

$$h = \frac{\theta}{\lambda} + \beta \frac{(1-\phi)\left[\alpha + p_1\, q\, \left(\ln \omega_2 - \ln \omega\right)\right]}{\lambda}$$

- We claim that
  - In the US there has been an increase in α and in $(\ln \omega_2 - \ln \omega)$
  - In Europe there has been a fall in p_1 and in $(1-\phi)$
- Therefore, career prospects have improved in America but worsen in Europe
- We will measure these changes in the data and use our quantitative model to assess the predicted response of working time

The quantitative model

We extend the model

(i) Infinite time horizon and recurrent unemployment spells

(ii) Endogenous exit rate from unemployment

(iii) Downward trend on hours worked

(iv) More general functional forms

- Partial equilibrium

  The wage offer distribution F is exogenous

- We focus on steady states

  Due to ranking of job candidates, the distribution matters

General model

Employed workers

When a worker with human capital H holds a job with wage rate ω, his decision problem is given by

$$\begin{aligned} W(H,\omega) &= \max_{\hat{h}} \left\{ u\left(c,\hat{h}\right) + \beta\, p_s V\left(H',\bar{b}_0\right) \right. \\ &+ \beta\left(1-p_s\right)\left[1-p_e\left(H',G\right)\left(1-F\left(\omega\right)\right)\right] W\left(H',\omega\right) \\ &+ \left. \beta\left(1-p_s\right) p_e\left(H',G\right) \int_{\omega}^{\infty} W\left(H',s\right) dF\left(s\right) \right\} \end{aligned}$$

$$\begin{aligned} \text{s.t.} \quad & c = \omega H^{\alpha} \hat{h}^{\theta} \\ & H' = \left(1-\delta\right) H + a\hat{h} \end{aligned}$$

General model

Unemployed workers

When a worker with human capital H is unemployed with utility flow b, his decision problem is given by

$$\begin{aligned} V(H,b) &= \max_{\omega_r} \left\{ b + \beta \Big[1 - p_u(H', G)\left(1 - F(\omega_r)\right) \Big] V(H', b') \right. \\ &+ \left. \beta p_u(H', G) \int_{\omega_r}^{\infty} W(H', s)\, dF(s) \right\} \\ \text{s.t.} \quad & H' = (1-\delta) H \\ & b' = b - \bar{b}_1 \end{aligned}$$

General model

Functional forms

- Preferences

$$u\left(c,\hat{h}\right)=\log c-\lambda\frac{\hat{h}^{1+\eta}-1}{1+\eta}$$

- Wage offer distribution

$$\log\omega\sim N\left(-\frac{\nu}{2},\nu\right)$$

- Probability of offers

$$\begin{aligned} p_i\left(H,G\right) &= \bar{p}_i\, S\left(H,G\right), \quad i=u,e \\ S\left(H,G\right) &= 4\left(1+e^{-\gamma(H-\psi(G))}\right)^{-1} \quad \text{with } \psi\left(G\right)=\overline{H} \end{aligned}$$

(See: ranking picture, decision rule, hours and age)

Calibration

The quantitative exercise

- We calibrate the model economy to US in the 70's
- We assume that European economies were like the US in the 70's
- We change parameters to reproduce the increase in wage inequality in the US and in unemployment in Europe in the 00's

  (we solve for two new steady states, which represent US and Europe in the 00's)

US and Europe, 70's

General strategy

- We look at data for males and set length of period to one month
- Our model economy is characterized by 15 parameters
- We impose $\eta = 2$ (but robustness), $\beta = 0.99$ and a such that $\overline{H} = 1$
- The remaining 12 parameters are calibrated to match 12 statistics from data (indirect inference)
- We have an array of extensions, all of them recalibrated

US and Europe, 70's

Targets and identification

Labor market transitions $(p_s,\ \bar{p}_u,\ \bar{p}_e,\ \gamma)$. We target:

- job market flows as reported by Fallick and Fleischman (2001):
  - the job separation probability
  - the probability of leaving unemployment
  - the probability of a job-to-job transition

- correlation between job-to-job transitions and human capital
  (after controlling for education, experience, and year dummies)

$$\text{job-to-job} = \text{ct.} + \psi_4 \ln H_{-1}$$

we estimate ψ_4 to be around 0.03 in the PSID (and GSOEP)

US and Europe, 70's

Targets and identification

Utility flow of unemployment ($\bar{b}_0$ and $\bar{b}_1$). We target:

- the average acceptance rate of job offers
  Blau and Robins (1990) and Barron, Bishop and Dunkelberg (1985)
- the fraction of long term unemployment in the CPS

Weight of leisure (λ and μ). We target:

- the fraction of time spent working in our PSID sample
- the rate of fall of hours between the 50's and the 70's
  McGrattan and Rogerson (2004)

US and Europe, 70's

Targets and identification

Offer distribution (ν). We target:

- the standard deviation (in logs) of hourly wages after an unemployment spell (PSID)

Unobserved fixed heterogeneity (υ). We target:

- The autocorrelation (in logs) of annual hourly wages in the PSID at a five year time horizon

US and Europe, 70's

Targets and identification

Depreciation of human capital (δ). We target:

- The correlation between reemployment wage losses and duration of unemployment (after controlling for education, experience and year dummies)

$$\text{wage losses} = \text{ct.} + \psi_5 \text{ duration}$$

Addison and Portugal (1989) report ψ_5 to be around 0.08 in the CPS

We find a similar number in the PSID

US and Europe, 70's

Targets and identification

Income function (α, θ)

- We look at direct evidence of α and θ in the PSID
- For those workers who do not change job between two periods, our model implies that

$$\triangle \ln w_{i,t} = \alpha \triangle \ln H_{i,t} - (1-\theta) \triangle \ln h_{i,t}$$

- Therefore, regressing changes of wages on changes of human capital and changes of hours gives α and θ (look at findings)

US and Europe, 70's

Model fit

Model and data statistics

Statistic	Data	Model
Average separation rate	0.013	0.013
Avge. prob. leaving unemployment	0.333	0.335
Average prob. of a job-to-job transition	0.028	0.028
Elasticity of job-to-job transition to past hours	0.030	0.030
Avge. acceptance rate of offers by unemployed	0.750	0.749
Fraction of long term unemployed ($\tau > 22$ m)	0.034	0.034
Standard deviation of reemployment wages	0.500	0.503
Elasticity wage losses wrt. duration	0.080	0.082
Wage growth on change of current hours	-0.700	-0.684
Wage growth on change of human capital	0.040	0.042
Trend in hours worked in the job (1950-1970)	0.033	0.033
Average hours worked in the job	0.400	0.399

(see parameters)

US in the 00's

- In the PSID we find that
  - the return to human capital increases by 3-4 percentage points
  - wage dispersion upon reemployment increases by 0.20 points
  - (autocorrelation of wages at a five year time horizon changes little)
- We choose α and ν to replicate these increases in the model.
- In the economy with fixed heterogeneity we increase the dispersion of the fixed effect to keep the autocorrelation of wages unchanged

(see parameters)

Europe in the 00's

- Little evidence of an increase in wage inequality

  No evidence in the GSOEP of an increase in wage dispersion

- Increase in unemployment rates (mainly due to a lower exit rate from unemployment)

- We choose $\bar{p}_u$ and $\bar{p}_e$ to replicate a fall in the employment rate by 7-8 percent

(see parameters)

Results

Changes in hours per worker

- Hours per employee increase in the US and fall in Europe
- The differential increase between US and EU is equal to 17.2 percentage points, see picture

Economy	Average hours $\times 10^{-2}$	Diff to (1) (%)	US-EU diff (%)
(1) US in 1970	40.0	-	-
Hours per worker			
(2) US in 2000	41.3	3.25	-
(3) EU in 2000	34.4	-13.95	17.2
Detrended hours			
(4) US in 2000	43.3	8.5	-
(5) EU in 2000	36.5	-8.7	17.2

(See: decision rules, distributions)

Results

Comparison to data

- Hours per employee in Germany and France have fallen by 21 and 17 percent relative to the US (12 and 11 percent in the men only population)

  We get a relative fall of 17.2 percent

- Hour per employee for males have increased 4.5 percent in the US and fallen around -11 in Germany and France

  We get an increase of 3.3 percent in the US and a fall of -14.0 in Europe

Results

Decompositions

- The bulk of the change in the US is due to the increase in ν, the dispersion of offers (up to 90 percent); see decomposition
- The bulk of the change in Europe is due to the fall in $\bar{p}_e$, the offer probability while employed (up to 70 percent); see decomposition
- Parameter changes induce changes in hours also through the change in the distribution of human capital

  The shift of the distribution of human capital accounts for around one third of the overall change in the US-EU differential; see decomposition

Some further implications

The model reproduces

- the intertemporal wage regression by Bell and Freeman (1995) and its evolution over time, both in the US and in Germany:

$$\ln w_{i,t} = \psi_0 + \psi_1 \ln w_{i,t-1} + \psi_2 \ln h_{i,t} + \psi_3 \ln h_{i,t-1} + \varepsilon_{i,t}$$

  See full sample evidence; see time series evidence for US (PSID), and for Germany (GSOEP)

- the increase in the US in the fraction of males working more than 50 hours per week (up by 8 percentage points) and of average hours in general (up by 4.5 percentage points), which reverts a trend of secular decline
- the increase in the fraction of European males working around 30 hours.
- time changes and cross country comparisons in the age profile of hours; see hours and age

Some robustness exercises

We checked that results change little when

- We increase η up to three.
  Some problems with standard estimates of the Frisch elasticity
- We decrease γ and try with different specifications for the function ψ

Some robustness exercises

We checked that results change little when

- We increase η up to three.
  Some problems with standard estimates of the Frisch elasticity
- We decrease γ and try with different specifications for the function ψ

Conclusions

- A novel theory for the determination of hours per employee:
  - Hours worked increase human capital
  - Human capital increases productivity and thereby helps in getting job offers

  The theory predicts that aggregate labor market conditions are important determinants of the choice of hours
- We calibrate the model to individual data on job flows and wage dynamics from the PSID
- The theory can account for the different evolution of hours per employee in the US and major Continental European economies

Conclusions

It is also consistent with

- The findings of Bell and Freeman (2001) that both in Germany and the US people work longer hours in occupations with larger wage inequality
- The increase, starting in the mid 80's, in the fraction of European males working very few hours; see OECD (2004)
- The findings by Kuhn and Lozano (2005) that the fraction of people working very long hours has increased substantially in the US and more so in occupations with greater increases in wage inequality
- Some properties of the age profile of hours worked (both over time and across countries)
- The evolution of the correlation of past hours worked and current wages in the US and in Germany

Thanks for your attention !

Empirical evidence

Changes in hours (all workers)

$$\frac{h}{pop} = \frac{h}{emp} \times \frac{emp}{part} \times \frac{part}{wa} \times \frac{wa}{pop}$$

Total Population, Percent changes over the 1970-2001 period

	$\frac{h}{pop}$	$\frac{h}{emp}$	$\frac{emp}{part}$	$\frac{part}{wa}$	$\frac{wa}{pop}$
Relative changes					
US	15	-5	0	13	7
France	-22	-23	-6	3	4
Germany	-24	-26	-7	4	6
Spain	-6	-14	-9	10	10
Difference to US					
France	-37	-17	-6	-10	-3
Germany	-39	-21	-7	-9	-1
Spain	-21	-9	-9	-3	3

Source: OECD

Empirical evidence

Changes in hours (male workers)

$$\frac{h}{pop} = \frac{h}{emp} \times \frac{emp}{part} \times \frac{part}{wa} \times \frac{wa}{pop}$$

Men Only, Percent changes over the 1970-2001 period

	$\frac{h}{pop}$	$\frac{h}{emp}$	$\frac{emp}{part}$	$\frac{part}{wa}$	$\frac{wa}{pop}$
Relative changes					
US	3	.5	-.5	-5	8
France	-24	-10	-5	-13	4
Germany	-24	-11	-7	-14	8
Spain	-23	-12	-7	-16	12
Difference to US					
France	-27	-10.5	-4.5	-8	-4
Germany	-27	-11.5	-6.5	-9	0
Spain	-26	-12.5	-6.5	-11	4

Source: OECD and ILO

The intertemporal return

	PSID				GSOEP			
	Annual		Usual weekly		Annual		Usual weekly	
	[1]	[2]	[1]	[2]	[1]	[2]	[1]	[2]
φ_1	0.81	0.48	0.81	0.43	0.65	0.15	0.67	0.09
	(192.4)	(3.57)	(189.2)	(2.7)	(73.76)	(2.0)	(73.8)	(1.4)
φ_2	-0.43	-0.56	-0.35	-0.56	-0.63	-1.05	-0.64	-1.03
	(-41.4)	(-10.5)	(-34.2)	(-10.1)	(-24.7)	(-11.0)	(-24.2)	(-10.2)
φ_3	0.51	0.42	0.49	0.75	0.56	0.23	0.61	0.24
	(45.7)	(5.3)	(35.06)	(4.2)	(23.1)	(2.9)	(22.9)	(2.1)
i.r.	0.16	0.15	0.21	0.62	0.15	0.07	0.18	0.15
n	31,636	28,105	31,633	28,101	6,371	5,515	6,120	5,261

Notes: The dependent variable is the logged real hourly wage. The first two columns use total annual hours in all jobs whereas the second two columns use usual weekly hours worked in main job. Hours and wages are measured as five years averages. In column [1] OLS estimates, in column [2] fixed effects estimates. Fixed effects estimates are based on the two steps Arellano and Bond (1991) estimator (difference GMM estimator). Standard errors are corrected for finite sample bias as in Windmeijer (2005). t-statistics in parentheses. Instruments are lagged values of past five years averages. All regressions include year and education dummies and potential experience (in levels and squared).

Evolution of the inter-temporal return, PSID

Hours measure:	Annual		Usual weekly	
	[1]	[2]	[1]	[2]
$\psi_{3,70-75}$	0.43	0.41	0.44	0.58
$\psi_{3,76-80}$	0.47	0.41	0.47	0.58
$\psi_{3,81-85}$	0.46	0.40	0.42	0.56
$\psi_{3,86-90}$	0.51	0.41	0.49	0.56
$\psi_{3,91-95}$	0.58	0.50	0.61	0.67
$\psi_{3,96-00}$	0.60	0.51	0.59	0.64
$\psi_{3,70-80}$	0.46	0.42	0.45	0.75
	(25.1)	(5.3)	(20.1)	(4.3)
$\psi_{3,81-90}$	0.49	0.40	0.45	0.74
	(33.7)	(5.3)	(23.6)	(4.2)
$\psi_{3,91-00}$	0.59	0.50	0.61	0.86
	(31.4)	(5.6)	(25.9)	(4.6)
Test:				
$\psi_{3,70-80} = \psi_{3,81-90}$	.17	.39	.50	.50
$\psi_{3,70-80} = \psi_{3,91-00}$	.00	.07	.00	.09
$\psi_{3,81-90} = \psi_{3,91-00}$	.00	.00	.00	.03

Notes: [1], OLS estimates, [2], fixed effects estimates.

Evolution of the inter-temporal return, GSOEP

	Annual Hours		Usual weekly hours	
	[1]	[2]	[1]	[2]
$\psi_{3,84-88}$	0.53	0.27	0.57	0.30
$\psi_{3,89-93}$	0.60	0.27	0.71	0.30
$\psi_{3,94-98}$	0.57	0.22	0.56	0.26
$\psi_{3,84-91}$	0.58	0.25	0.63	0.28
	(19.3)	(2.9)	(20.0)	(1.97)
$\psi_{3,92-02}$	0.56	0.19	0.58	0.22
	(17.8)	(2.3)	(17.1)	(1.8)
Test:				
$\psi_{3,85-92} = \psi_{3,93-02}$	.63	.09	.17	0.10

Notes: [1], OLS estimates, [2], fixed effects estimates .

Determination of α and θ, PSID

	$\delta = .01$	$\delta = .013$	$\delta = .016$	$\delta = .02$
$\Delta \ln H$	.051	.054	.055	0.058
	(4.6)	(4.9)	(5.5)	(5.3)
$\Delta \ln h$	-.68	-.68	-.68	-.68
	(-94.7)	(-94.7)	(-94.7)	(-94.7)
Time evolution				
$\Delta \ln H_{70-80}$	.039	.040	.041	.042
	(1.9)	(2.0)	(1.9)	(1.9)
$\Delta \ln H_{81-90}$	.044	.046	.048	.05
	(2.9)	(3.0)	(3.2)	(3.2)
$\Delta \ln H_{91-00}$	.071	.075	.080	.081
	(4.1)	(4.2)	(4.1)	(4.4)
n	16,019	16,019	16,019	16,019
Test:				
$\psi_{1,70-80} = \psi_{1,81-90}$	.81	.82	.82	.80
$\psi_{3,81-90} = \psi_{3,91-00}$	.18	.19	.17	.10

Notes: OLS estimates. t-statistics in parentheses. All regressions include year and education dummies and potential experience (in levels and squared). The dependant variable is the within job real wage growth of workers. In the lower panel education and experience are interacted with time dummies to allow their return to change over time.

Probability of changing job

	Annual hrs		Usual weekly hrs	
	[1]	[2]	[1]	[2]
A) PSID				
Log past hours	0.03	0.02	0.03	0.02
	(4.22)	(3.04)	(2.64)	(2.88)
B) GSOEP				
Log past hours	0.05	0.03	0.07	0.05
	(4.37)	(2.01)	(5.46)	(3.50)

In column [1] OLS estimates, in column [2] GLS fixed-effects estimates. t-statistics in parentheses. All regressions include year and education dummies and potential experience (in levels and squared). Hours are measured as five year averages.

Dynamics of SD of start-up wages after unemployment

	Only time dummies	More controls
A) PSID		
$SD_{3,70-80}$	0.52	0.49
$SD_{3,81-90}$	0.62	0.58
$SD_{3,91-02}$	0.77	0.70
B) GSOEP		
$SD_{3,84-91}$	0.43	0.43
$SD_{3,92-02}$	0.43	0.42

Standard Deviation of logged real hourly wage of workers who experienced an unemployment spell in the year. In column 2 we also control for years and education dummies, tenure (in levels and squared) and potential experience (in levels and squared).

Parameter values: benchmark economy

Parameter values in baseline calibration

Parameter	Definition	Value
p_s	separation probability	0.013
$\bar{p}_u$	tightness parameter, unemployed	1.118
$\bar{p}_e$	tightness parameter, employed	0.847
γ	job offers sensitivity to human capital	10.125
$\bar{b}_0$	initial unemployment utility	-1.071
$\bar{b}_1$	rate of decay of unemployment utility	0.015
ν	variance of job offer distribution	0.348
δ	depreciation human capital	0.013
θ	elasticity of income to hours	0.300
α	elasticity of income to human capital	0.040
a	learning-by-doing rate	0.034
μ	trend in hours worked $(\times 10^{-4})$	1.485
β	discount factor	0.99
λ	weight of leisure	14.446
η	curvature leisure	2

Changes in parameter values

Changes in parameters

Parameter	US70	US00	EU00
α	0.040	0.075	0.040
ν	0.348	0.668	0.348
$\bar{p}_e$	0.847	0.847	0.409
$\bar{p}_u$	1.117	1.117	0.539

Notes: Parameters whose value changes in either the US00 or the EU00 economy. The other parameter values remain unchanged.

Results

Decomposing the changes due to wage inequality

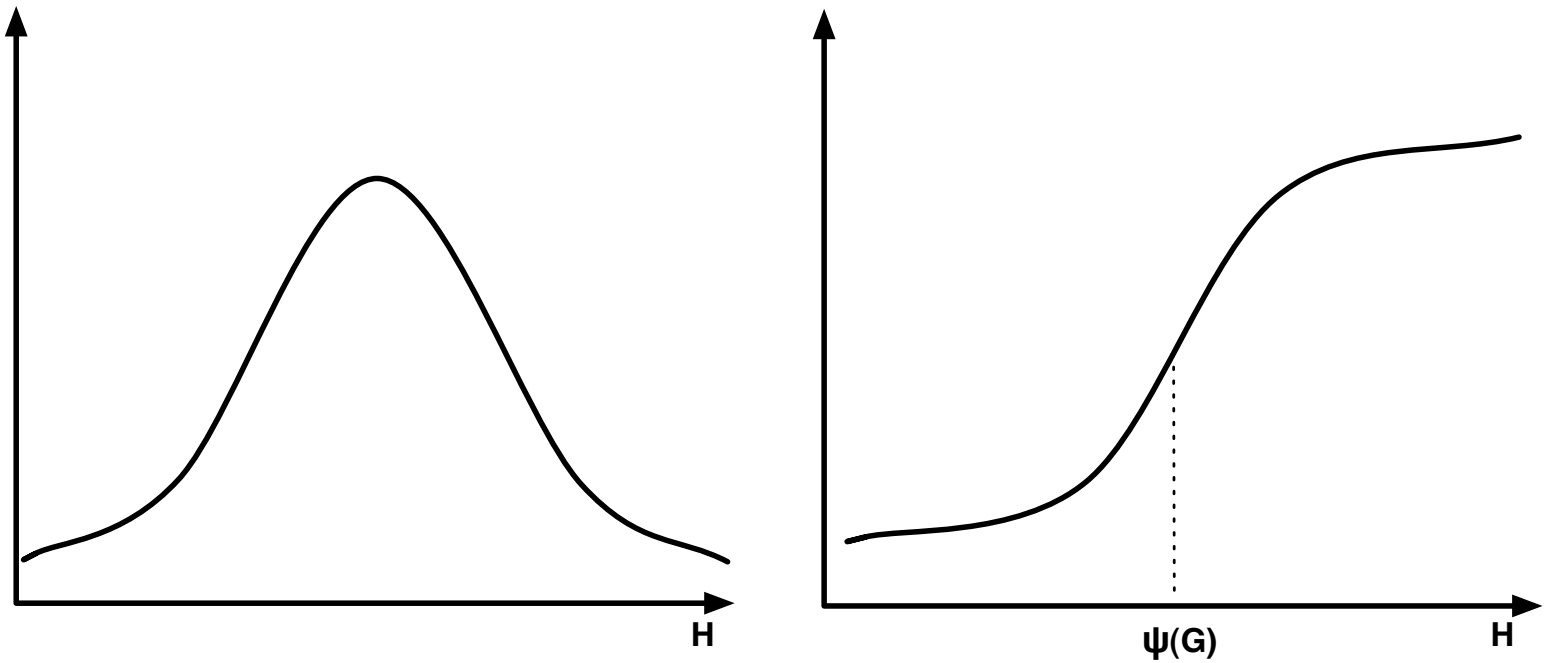
Economy	Average hours $\times 10^{-2}$	Diff to (1) (%)	Relative change (%)
(1) US70	40.0	-	-
(2) US00	43.3	8.5	-4.4
(3) $\Delta\alpha$	40.4	1.3	14.7
(4) $\Delta\nu$	43.0	7.6	89.7
(5) EU00	36.5	-8.7	19.1
(6) $\Delta\bar{p}_e$	37.5	-6.1	70.1
(7) $\Delta\bar{p}_u$	39.6	-0.9	10.8

Results

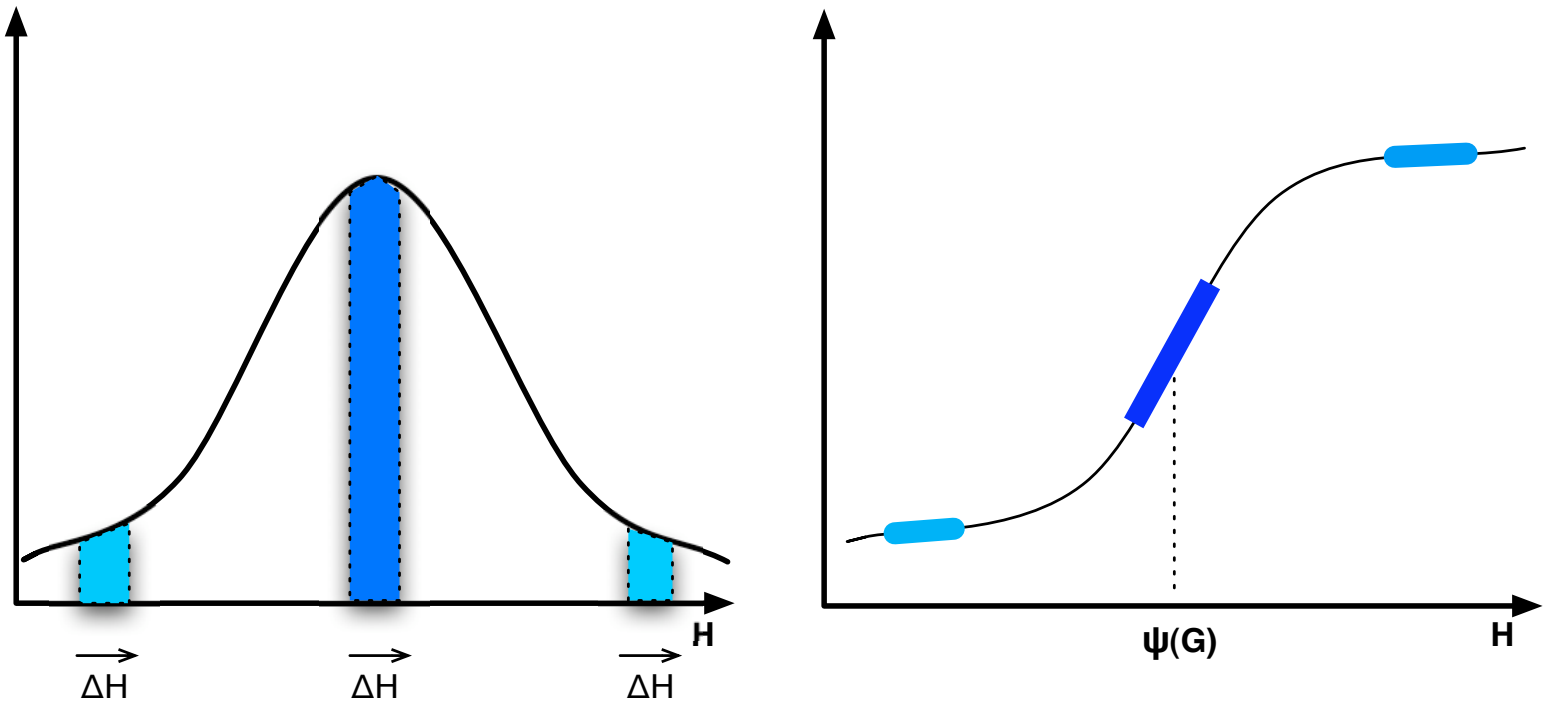
Decomposing the changes due to the distribution of human capital

Economy	Average hours $\times 10^{-2}$	Diff to (1) (%)	US-EU diff (%)
(1) US in 1970	40.0	-	-
Benchmark model, $S(H, G)$			
(2) US in 2000	43.3	8.5	-
(3) EU in 2000	36.5	-8.7	17.2
Fixed G, $S(H, G_{70})$			
(4) US in 2000	41.8	4.6	-
(5) EU in 2000	37.3	-6.7	11.3

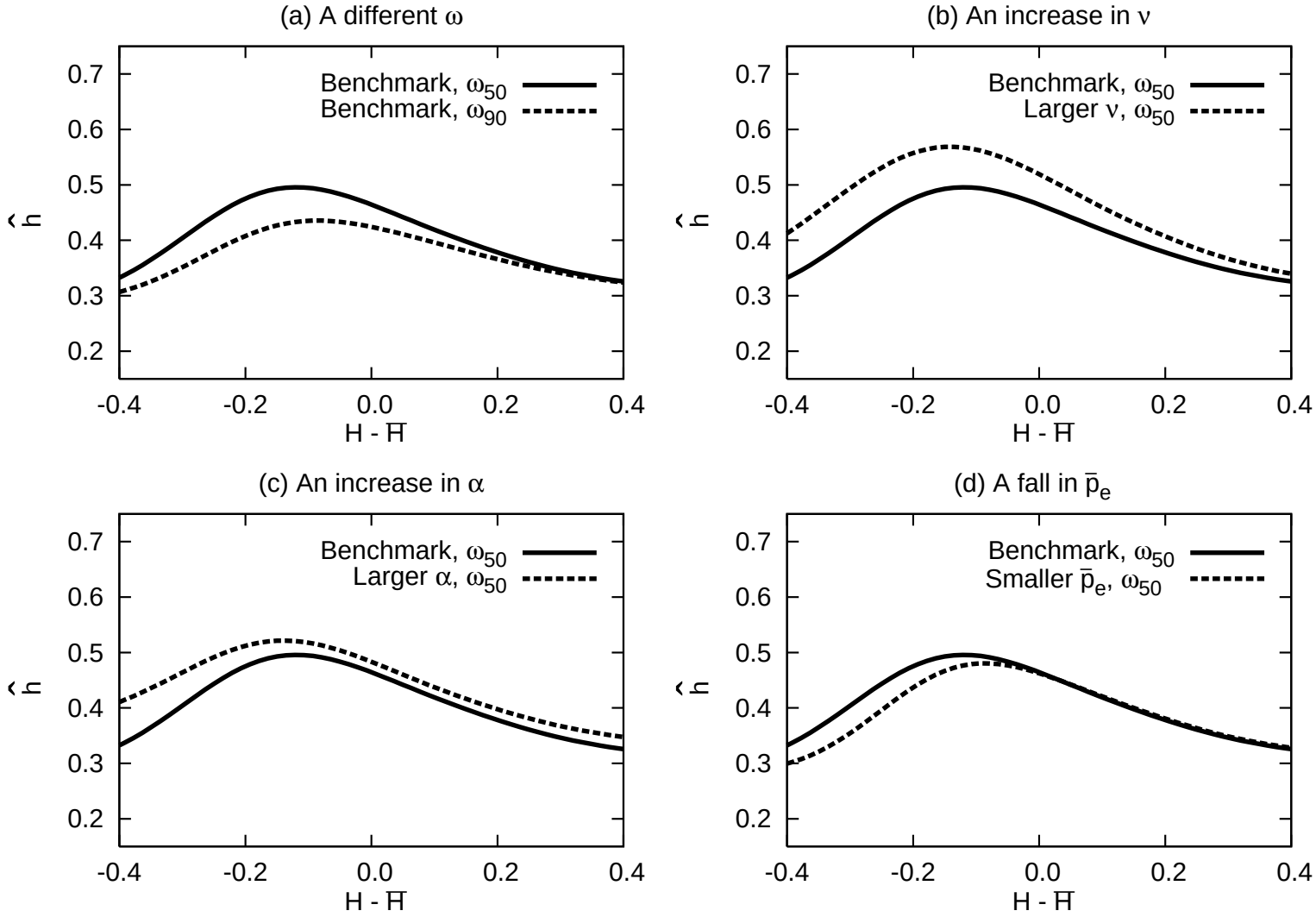
Distribution of human capital and ranking



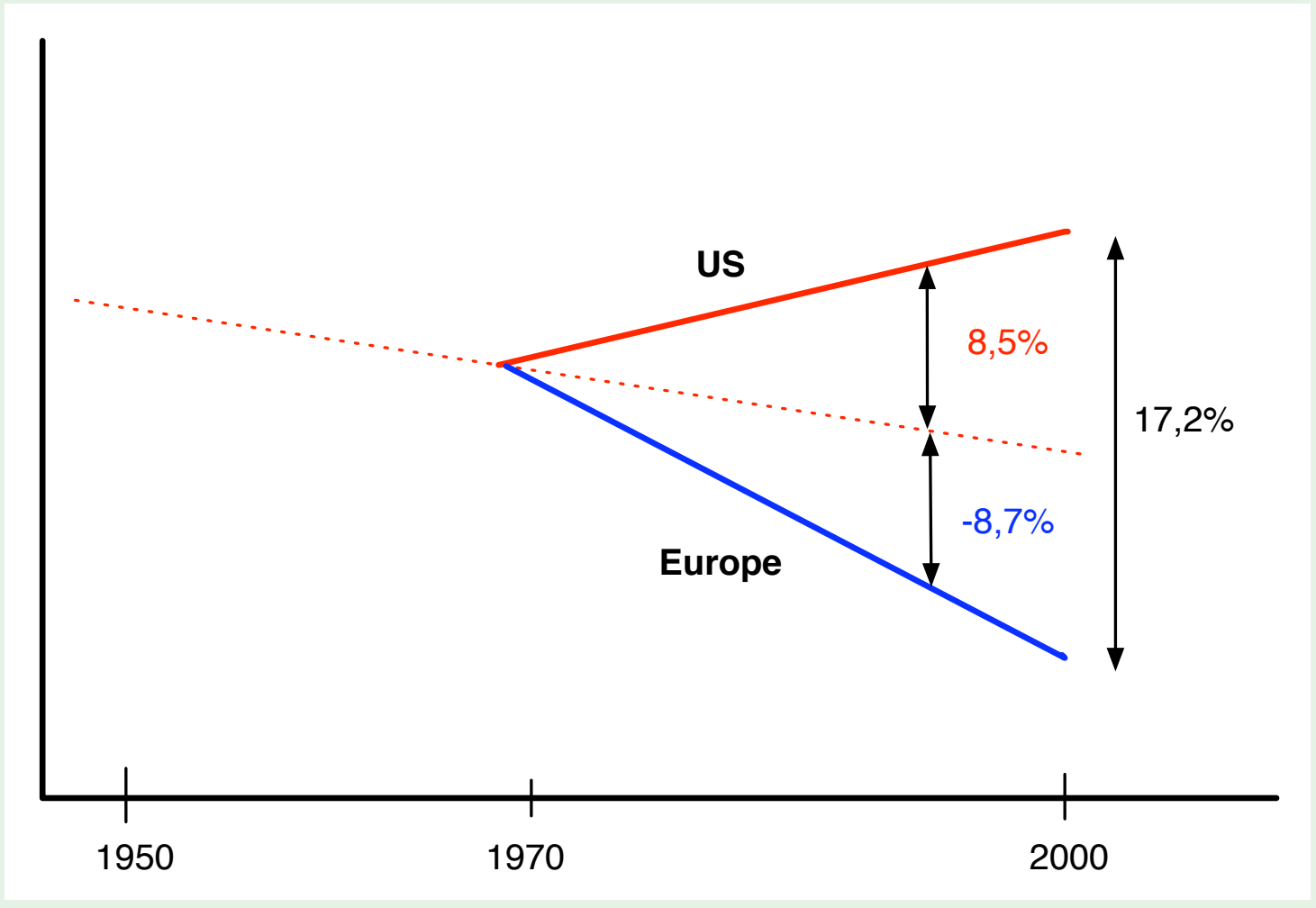
Distribution of human capital and ranking



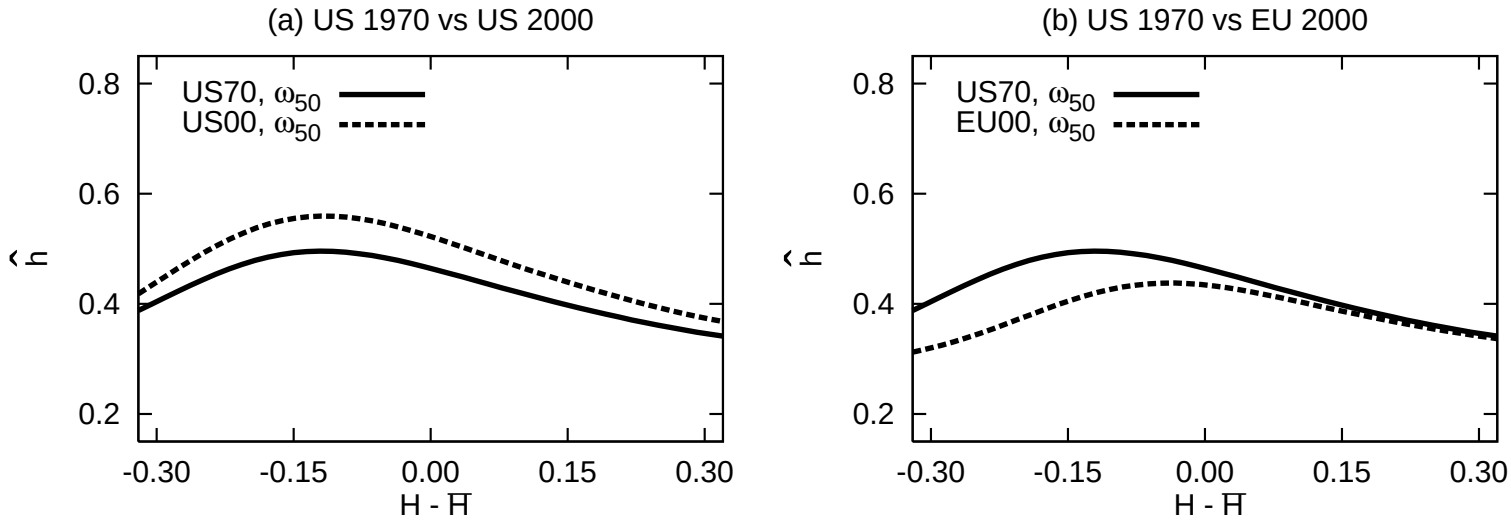
Decision rule for hours



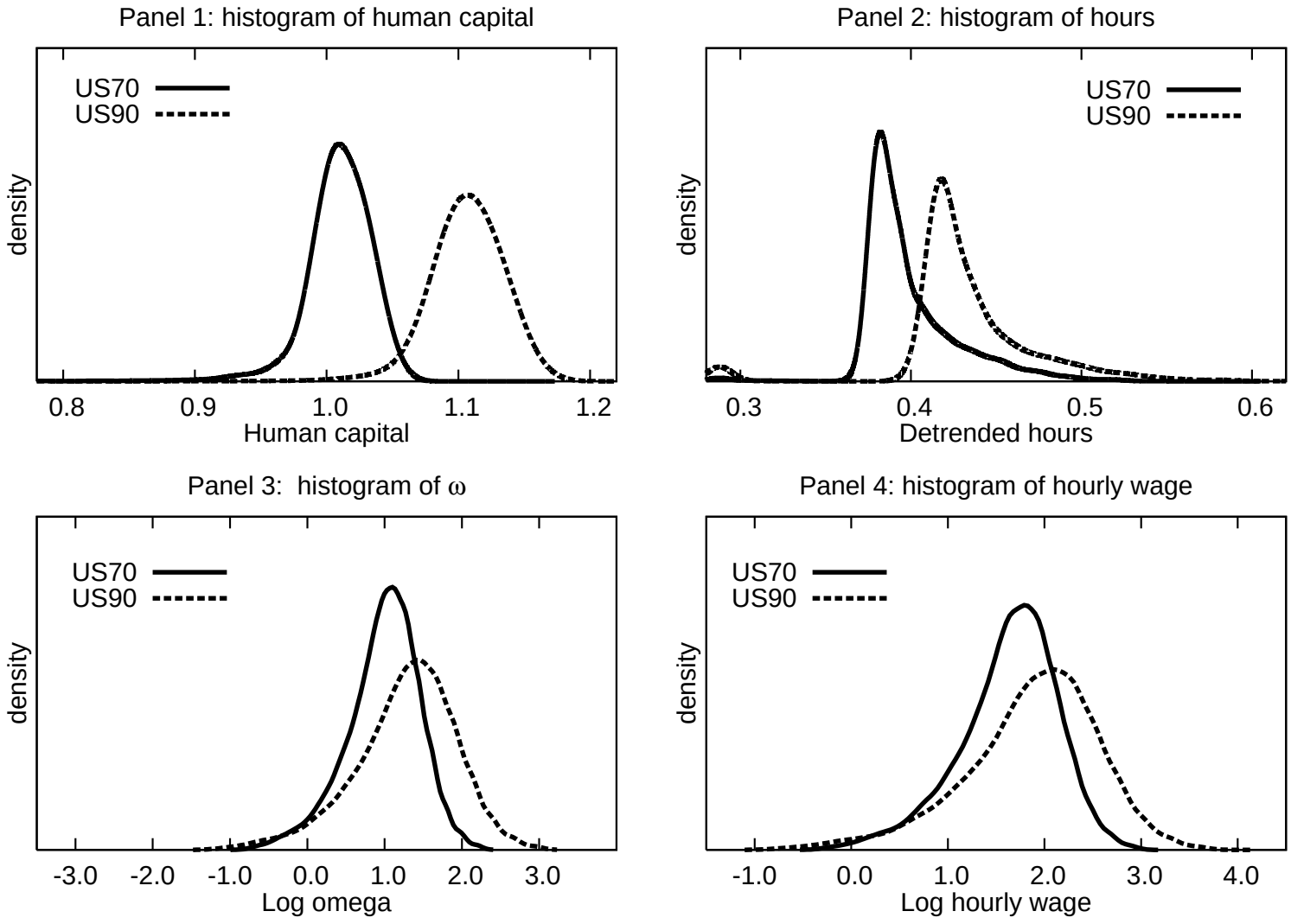
Changes in hours with respect to trend



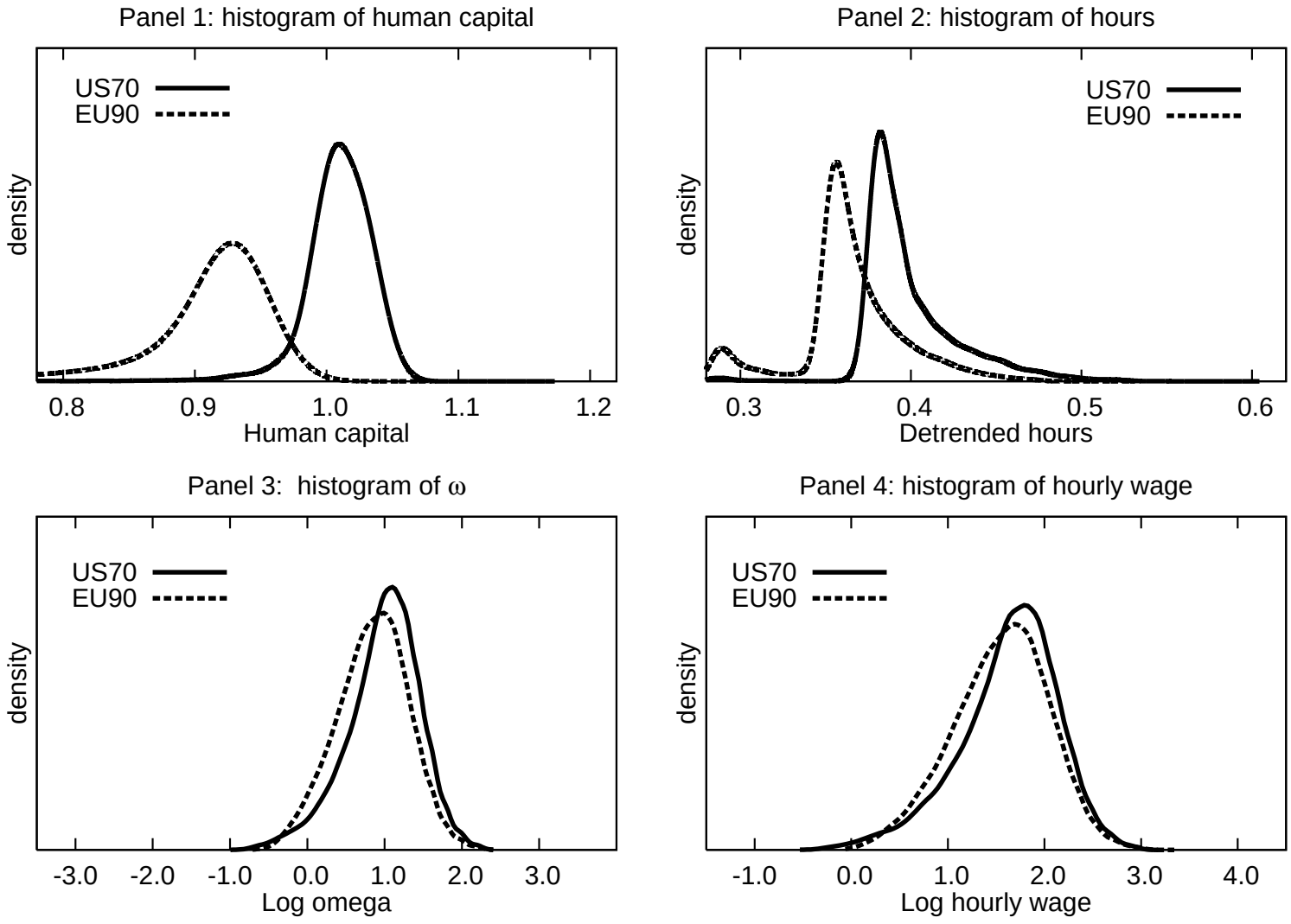
Decision rule for hours: US 2000 and EU 2000



Densities: US 70's vs US 00's



Densities: US 70's vs EU 00's



Hours per worker and worker's age