The impact of participation tax rates on labor supply decisions

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Welfare states under pressure

High unemployment in Europe in the 1980s and 1990s

Political discussion in European welfare states focussed on **increasing the work incentives** inherent in tax-benefit systems

Major labor market reforms in many European countries in the 1990s and early 2000s:

1. transition to more activating labor market schemes
2. reduction of out-of-work benefits to reduce financial disincentives to take up work

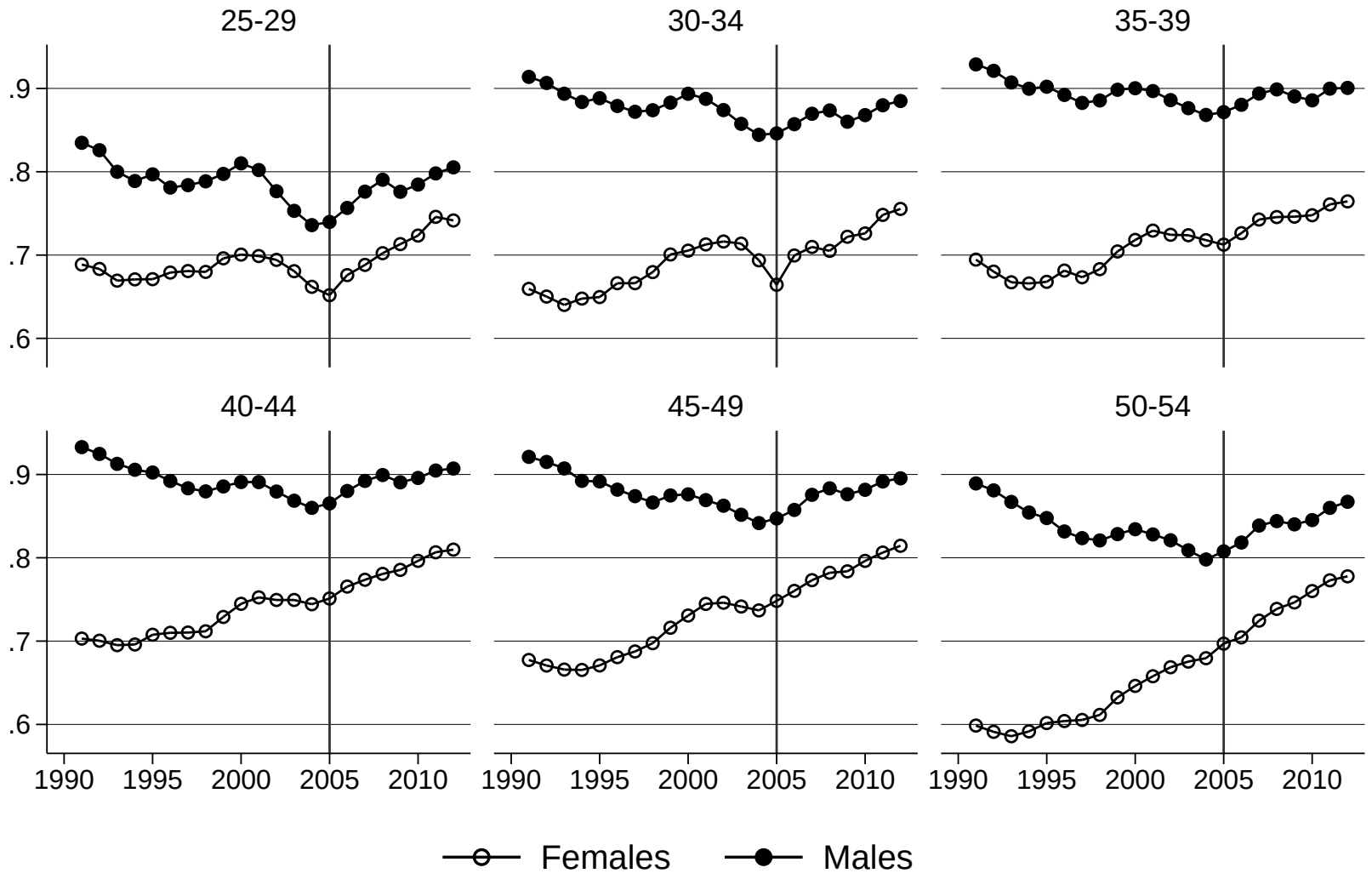
Major labor market reforms in Germany

1. Tightening of required job take-up for benefit recipients (1997, 1998)
2. Threshold for marginal employment not subject to social security contributions was raised (Hartz II, 2003),

   entitlement for unemployment benefits reduced (Hartz III, 2004),

   earnings-related unemployment assistance was replaced with means-tested social assistance (Hartz IV, 2005)

Labor market participation in Germany by age



Source: Mikrozensus.

Research question

Have **increased work incentives** inherent in tax-benefit systems contributed to **raise labor market participation**?

Measure for Work Incentives

Optimal tax theory: A tax-benefit system should be fair minimising disincentive effects (Mirrlees, 1971).

Efficiency loss of a tax-benefit system depends on

	Behavioral response	Tax-transfer system inherent incentives
Intensive margin	Intensive labor supply elasticity	Marginal tax rate (MTR)
Extensive margin	**Extensive labor supply elasticity**	**Participation tax rate (PTR)**

Literature

Some of the following studies have analyzed PTR as a measure for work incentives

- **over time** for the UK (Adam/Brewer/Shephard, 2006; Brewer/Saez/Shephard, 2008) and for Germany (Bartels, 2013) ,
- **across European countries** (Immervoll/Kleven/Kreiner/Saez, 2007; Immervoll/Kleven/Kreiner/Verdelin, 2009; O'Donoghue, 2011) and
- **short-term vs. long-term** (Bartels, 2013).

Studies analyze effect of work incentives

- on **aggregate unemployment** (e.g., Bassanini/Duval, 2009)
- on **unemployment duration** (e.g., Caliendo et al., 2013)
- on **labor market participation** within particular social insurance programs such as pensions (e.g., Börsch-Supan, 2000; Staubli/Zweimüller, 2013)

Data

Data Source: SOEP (German Socio-Economic Panel)

- Years: 1994 to 2012
- Sample includes only individuals who
  - are between 25 and 54 years old
  - have contributed to social security system (no self-employed, no civil servants)
  - are not disabled
  - live in one of the four household types
    - single
    - married couple without children
    - single parent
    - married couple with one or two children

Number of observations

		1999	2004	2009	1999-2009
	all	4,650	4,897	4,620	50,497
	all	91.5%	88.9%	92.2%	90.0%
E	males	95.2%	91.6%	93.0%	92.6%
	females	87.9%	86.3%	91.6%	87.5%
	all	8.5%	11.1%	7.8%	10.0%
U	males	4.8%	8.4%	7.0%	7.4%
	females	12.1%	13.7%	8.4%	12.5%
	all				3.9%
U $\rightarrow$ **E**	males				3.2%
	females				4.6%

Source: SOEP, own calculations.
Note: Shares are weighted.

Participation tax rate

Participation tax rate:	**Household net tax:**
$PTR = \frac{T(y_h^E) - T(y_h^U)}{y_i^{E,w}}$	$T(y_h) = t_h - b_h$

PTR $= 0 \leftrightarrow T(y_h^E) = T(y_h^U)$

$\rightarrow$ incentives to take up work are not distorted

But: income support in U generates $t_h < b_h \rightarrow T(y_h^U) < 0$

PTR $= 1 \leftrightarrow T(y_h^E) - T(y_h^U) = y_i^{E,w}$

$\rightarrow$ no financial gain from working

Notation:

t_h:	Household income taxes	b_h:	Household public transfers
y_h^E:	Gross household income in E	y_h^U:	Gross household income in U
$T(y_h^E)$:	Net tax in E	$T(y_h^U)$:	Net tax in U
$y_i^{E,w}$:	Individual labor earnings in E		

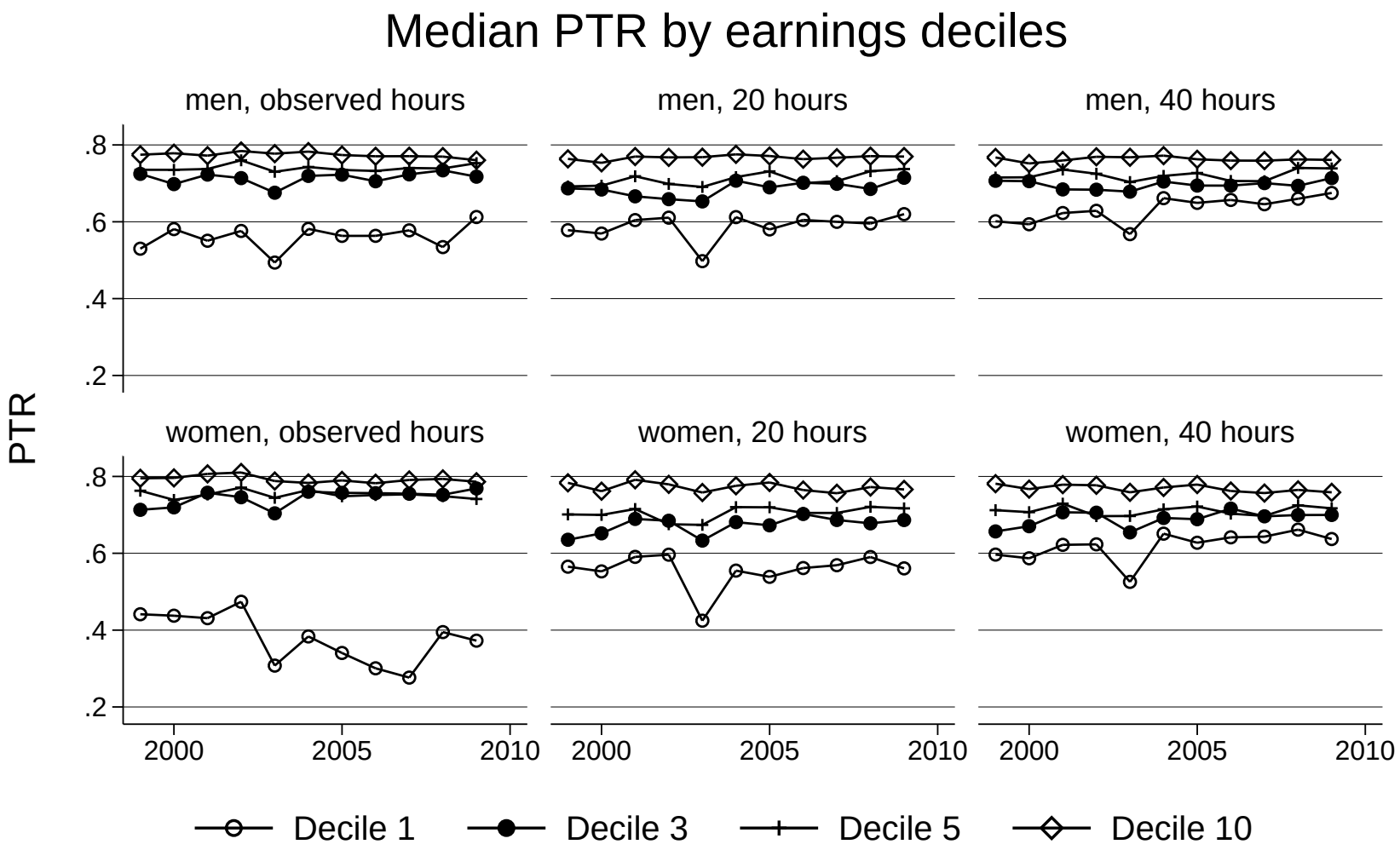
Simulation

Three scenarios to compute PTRs:

1. Take y_h^E and $y_i^{E,w}$ from the data, simulate y_h^U
2. Simulate $y_i^{E,w}$ for 20 hours of work, then compute y_h^E and y_h^U
3. Simulate $y_i^{E,w}$ for 40 hours of work, then compute y_h^E and y_h^U

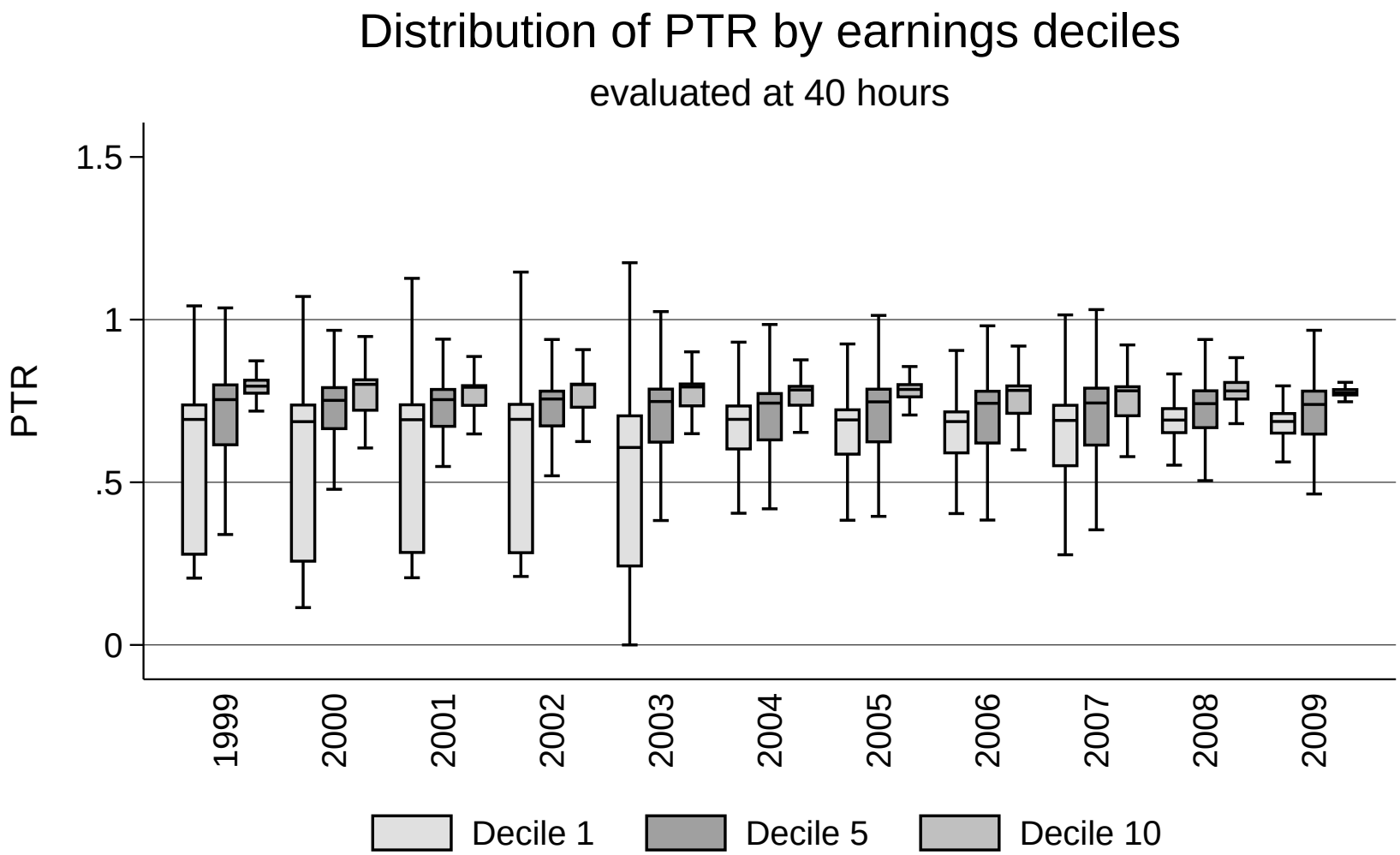
Then apply **tax-benefit rules** of respective year to obtain $T(y_h^E)$ and $T(y_h^U)$ for all three scenarios.

PTR by simulation type



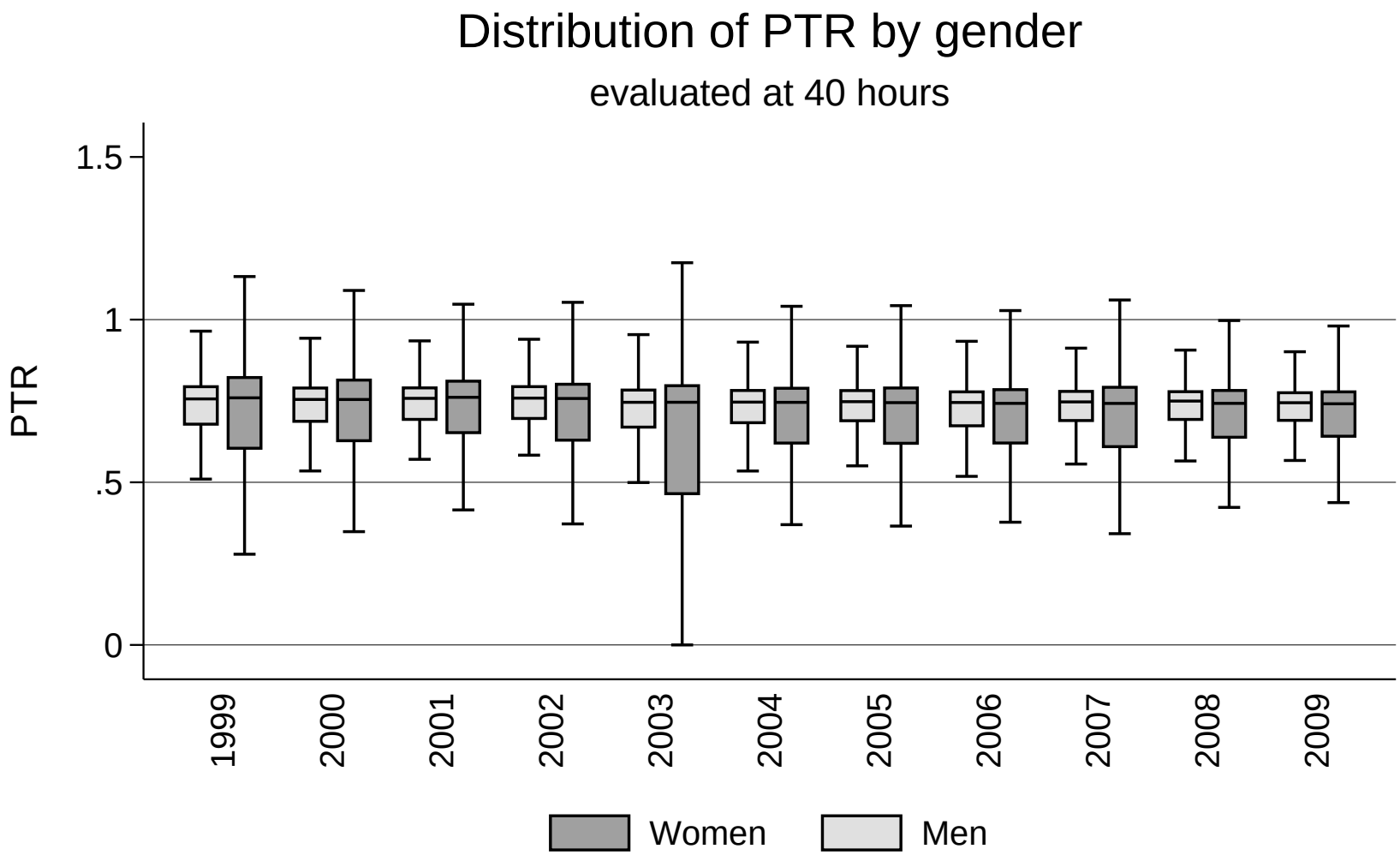
Source: SOEPv28 & IZAΨMOD, own calculations.

PTR by decile



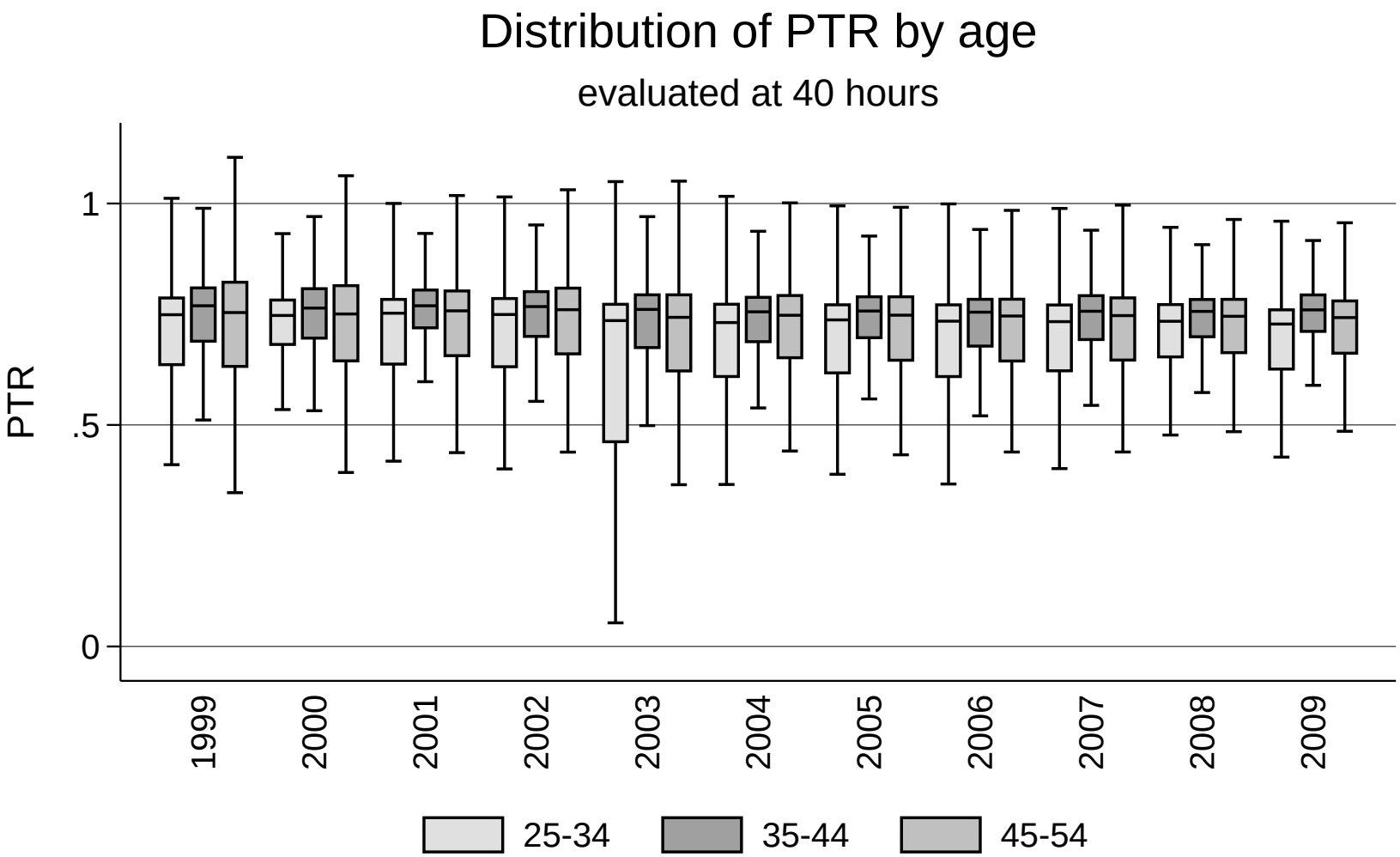
Source: SOEPv28 & IZAΨMOD, own calculations.

PTR by gender



Source: SOEPv28 & IZAΨMOD, own calculations.

PTR by age



Source: SOEPv28 & IZAΨMOD, own calculations.

Estimation strategy

1. Do **high work incentives, i.e. low PTRs,** contribute to **raise** probability of labor market participation (E)?

   $$P(E) = X'_{it}\beta + \gamma PTR_{it} + \delta PTR_{it} * age + \alpha_i + \mu_t + \epsilon_{it}$$

2. Do **increased work incentives, i.e. reduced PTRs,** contribute to **raise** probability to take up work ($U \rightarrow E$)?

   $$P(U \rightarrow E) = X'_{it}\beta + \gamma \Delta PTR_{it} + \delta \Delta PTR_{it} * age + \alpha_i + \mu_t + \epsilon_{it}$$

Notation:

X_{it}:	Observed characteristics	α_i:	Individual fixed effects
μ_t:	Year effects	ϵ_{it}:	Error term
PTR_{it}:	Participation tax rate	ΔPTR_{it}:	$PTR_{it} - PTR_{it-1}$

Regression results: E, 40 hours

	(1) OLS all	(2) FE all	(3) OLS males	(4) FE males	(5) OLS females	(6) FE females
PTR	0.491***	0.161***	0. 440***	0.213***	0.521***	0.119***
Age 25-34 (base)						
Age 35-44	-0.236***	-0.059*	-0.231***	0.020	-0.223***	-0.099**
Age 45-54	-0.367***	-0.010	-0.356***	-0.054	-0.369***	0.023
PTR*age 25-34 (base)						
PTR*age 35-44	0.313***	0.084	0.302***	-0.032	0.306***	0.147
PTR*age 45-54	0.458***	0.006	0.460***	0.033	0.444***	-0.015
East	-0.005	-0.052*	-0.029***	-0.007	0.021***	-0.084*
High-Skilled (base)						
Skilled	-0.032***	-0.163***	-0.028***	-0.150***	-0.030***	-0.168***
Unskilled	-0.098***	-0.157***	-0.086***	-0.140***	-0.093***	-0.169***
Singles (base)						
Single Parents	-0.017**	-0.020	0.034**	-0.040	-0.041***	-0.023
Couples	-0.015***	-0.019***	0.018***	-0.013*	-0.052***	-0.011
Families	-0.055***	-0.057***	0.003	-0.022*	-0.129***	-0.074***
Constant	0.619***	0.940***	0.666***	0.921***	0.586***	0.933***
Year Dummies	yes	yes	yes	yes	yes	yes
Adjusted R^2	0.203	0.024	0.169	0.028	0.232	0.025
Log-Likelihood	-9485.842	19461.231	-654.493	12163.970	-7888.247	8386.362
Observations	67443	67443	31498	31498	35945	35945

Note: * p<.1; ** p<.05; *** p<.01

Regression results: U $\rightarrow$ E, 40 hours

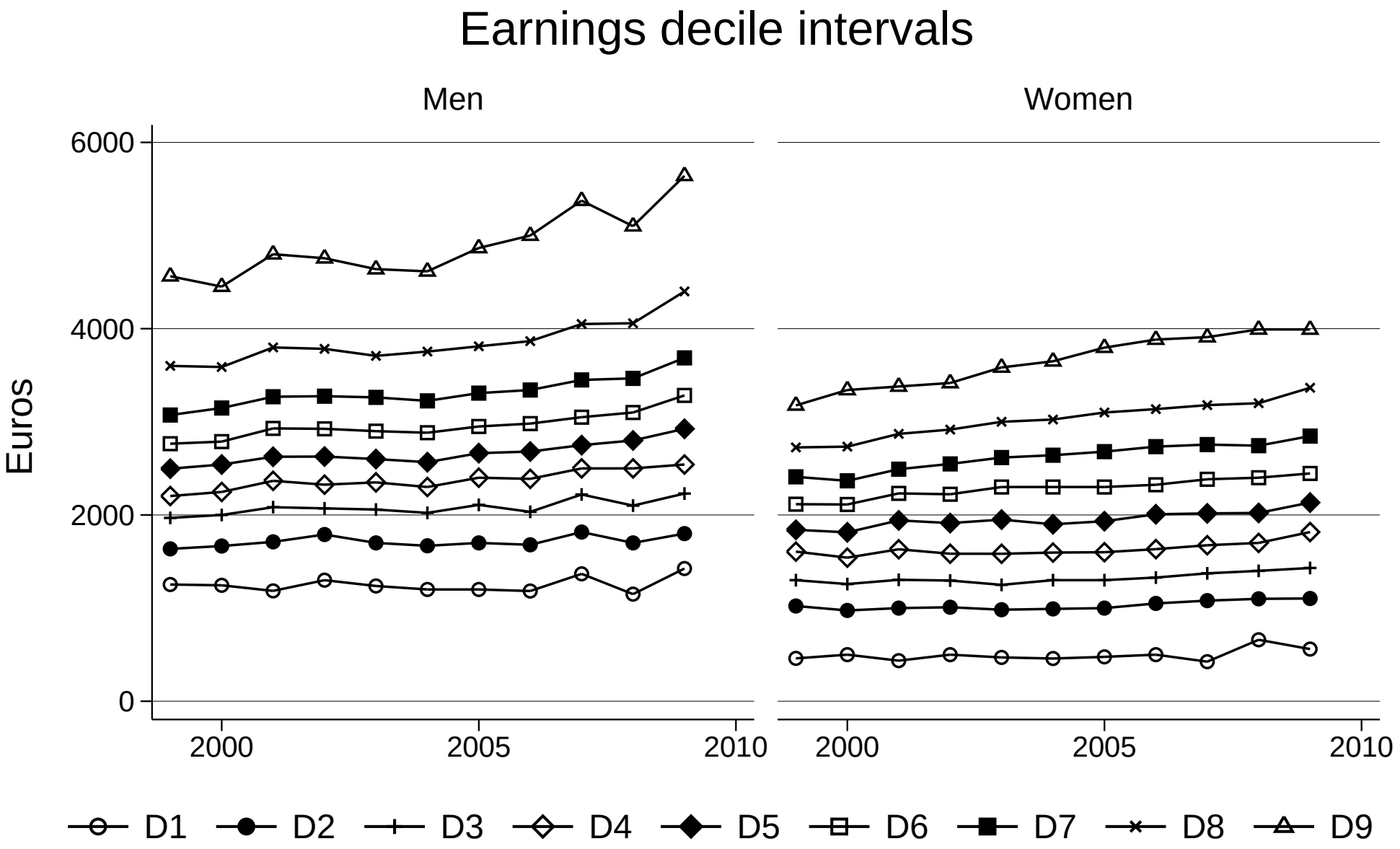
	(1) OLS all	(2) FE all	(3) OLS males	(4) FE males	(5) OLS females	(6) FE females
Δ PTR	-0.112***	-0.155***	-0.068***	-0.096***	-0.146***	-0.202***
Age 25-34 (base)						
Age 35-44	-0.025***	-0.010**	-0.023***	-0.001	-0.027***	-0.018**
Age 45-54	-0.025***	0.002	-0.024***	0.015	-0.026***	-0.007
Δ PTR*age 25-34 (base)						
Δ PTR*age 35-44	0.077***	0.063**	0.065	0.035	0.087**	0.090*
Δ PTR*age 45-54	0.062**	0.077**	0.034	0.035	0.085**	0.114**
East	0.011***	-0.030	0.013***	-0.006	0.009**	-0.032
High-Skilled (base)						
Skilled	0.004*	-0.018	0.008	-0.005**	0.001	-0.033
Unskilled	0.018***	-0.019	0.013***	-0.012	0.019***	-0.028
Singles (base)						
Single Parents	0.024**	0.008	0.005	0.031	0.027***	0.007
Couples	0.009***	-0.001	0.005	-0.009	0.013***	0.006
Families	0.015***	0.000	0.003	-0.008	0.028***	0.000
Constant	0.038***	0.093***	0.028***	0.064***	0.047***	0.118***
Year Dummies	yes	yes	yes	yes	yes	yes
Adjusted R^2	0.012	0.014	0.008	0.010	0.015	0.019
Log-Likelihood	16047.308	25464.835	9728.575	14305.209	6563.002	11563.797
Observations	52178	52178	24310	24310	27868	27868

Note: * p<.1; ** p<.05; *** p<.01

Concluding remarks

- High PTRs are associated with higher participation probability.
- The probability of changing labor market status to participation increases, if work incentives increase, i.e. PTR falls.
- Decreasing the PTR by 10%-points, increases probability U $\rightarrow$ E by about 1%-point.
- Larger responses for females and for young individuals.
- To Do: Participation response to long-term PTR.

Monthly gross earnings deciles



PTR examples by household type

Single: $y_i^{E,w} = 72,000$

year	t_h^E	b_h^E	t_h^U	b_h^U	PTR
1995	42,213	0	0	17,872	0.83
2005	37,364	0	0	20,781	0.81

Two-earner couple: $y_i^{E,w} = 4,500$, $y_j^{E,w} = 72,000$

year	t_h^E	b_h^E	t_h^U	b_h^U	PTR
1995	35,004	0	32,018	2,133	1.14
2005	32,149	0	30,514	0	0.37

Regression results: E → U, 40 hours

	(1) OLS all	(2) FE all	(3) OLS males	(4) FE males	(5) OLS females	(6) FE females
Δ PTR	-0.010	0.008	-0.013	0.005	-0.007	0.008
Age 25-34 (base)						
Age 35-44	-0.005**	-0.007	-0.003	-0.009	-0.007**	-0.007
Age 45-54	-0.001	-0.009	-0.002	-0.013	-0.001	-0.005
Δ PTR*age 25-34 (base)						
Δ PTR*age 35-44	-0.022	-0.035	-0.019	-0.016	-0.026	-0.042
Δ PTR*age 45-54	0.006	0.021	0.015	0.042	-0.002	0.010
East	0.012***	0.023	0.010***	0.012	0.013***	0.029
High-Skilled (base)						
Skilled	0.013***	0.044***	0.016***	0.050**	0.009***	0.033
Unskilled	0.020***	0.016	0.024***	0.012	0.015***	0.013
Singles (base)						
Single Parents	0.009*	0.016	-0.002	0.003	0.013**	0.026
Couples	-0.001	0.008*	-0.005*	0.006	0.002	0.009
Families	0.006	0.022***	-0.001	-0.005	0.014***	0.033**
Constant	0.012**	-0.031**	0.007	-0.034	0.018**	-0.019
Year Dummies	yes	yes	yes	yes	yes	yes
Adjusted R^2	0.006	0.005	0.006	0.007	0.006	0.004
Log-Likelihood	21891.967	30375.787	11720.332	16143.079	10257.012	14652.617
Observations	52178	52178	24310	24310	27868	27868

Note: * p<.1; ** p<.05; *** p<.01