

TAXATION AND FEMALE LABOR FORCE PARTICIPATION: THE CASE OF ITALY

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MOTIVATION (1)

Table: Labor Force Participation for 26-54 years old, 2007-2008

	Women	Men	Married women		Unmarried women	
			w/children	w/o children	w/children	w/o children
Average	75.69	94.04	68.81	74.63	82.54	87.71
Italy	69.95	95.06	62.46	66.06	81.13	85.41
France	84.03	96.14	80.68	85.14	86.91	92.74
Spain	75.25	95.78	69.14	68.63	86.06	90.89
U.K.	74.72	78.01	75.43	81.68	71.50	77.40
Germany	82.35	96.86	71.95	86.69	90.16	94.52

Source: Authors' computations from EU-SILC data (2007-2008)

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Italy	69.95	95.06	62.46	66.06	81.13	85.41
France	84.03	96.14	80.68	85.14	86.91	92.74
Spain	75.25	95.78	69.14	68.63	86.06	90.89
U.K.	74.72	78.01	75.43	81.68	71.50	77.40
Germany	82.35	96.86	71.95	86.69	90.16	94.52

Source: Authors' computations from EU-SILC data (2007-2008)

⇒ *Lowest* Female Labor Force Participation

MOTIVATION (2)

Table: Employment Rates for 26-54 years old, by gender, 2007-2008

	Men			Women		
	Total	Full-time	Part-time	Total	Full-time	Part-time
Average	93.21	89.75	3.46	73.88	50.51	23.37
Italy	94.77	91.60	3.17	67.28	52.10	15.18
France	96.04	92.25	3.80	83.47	55.89	27.58
Spain	95.16	92.25	2.91	73.40	58.64	14.76
U.K.	79.83	76.36	3.47	75.44	46.38	30.06
Germany	96.43	91.79	4.64	88.98	38.97	42.01

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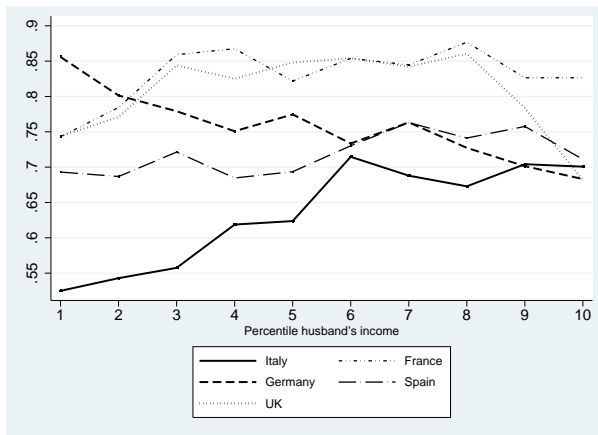
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	Total	Full-time	Part-time	Total	Full-time	Part-time
Average	93.21	89.75	3.46	73.88	50.51	23.37
Italy	94.77	91.60	3.17	67.28	52.10	15.18
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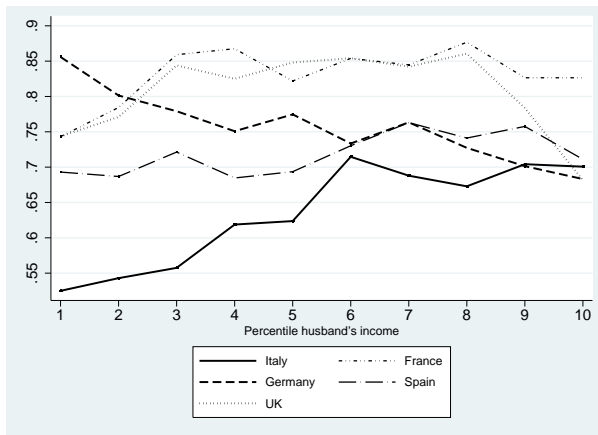
Figure: Participation Rate of Women by Percentile of Husband's Income



Source: Authors' computations from EU-SILC data (2007-2008).

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⇒ *Positive Correlation*

MOTIVATION (3), CONT.D

Table: Probit - Marginal Effects

$Y = 1$ (in labor force)	Italy	France	Spain	U.K.	Germany
Husband's Earnings	4.21e-07* (2.17e-07)	-7.49e-07** (3.09e-07)	5.54e-08 (2.68e-07)	-5.52e-07*** (1.16e-07)	-1.23e-06*** (1.48e-07)
Household Non-Labor Income	-6.94e-07*** (1.78e-07)	-2.70e-06*** (3.31e-07)	-1.34e-06*** (3.06e-07)	-1.82e-06*** (1.99e-07)	-2.37e-06*** (2.37e-07)
Controls	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Log Likelihood	-9316.05	-1529.787	-5565.040	-3287.689	-4191.827
Obs.	17644	4228	12207	7597	10158

Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

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- What are the effects of alternative tax systems?

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- *Gender-Based* taxation boosts participation rates, especially of skilled women

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- Tax schedule

Tax Schedule	
Bracket (EUR)	Rate (%)
Up to 15,000	23
Over 15,001 up to 28,000	27
Over 28,001 up to 55,000	38
Over 55,001 up to 75,000	41
Over 75,001	43

ITALIAN TAX SYSTEM, CONT.D

Tax Credits for Family Dependents (earning less than EUR 2,840.51)

Level of Taxable Income (EUR)	Amount of Tax Credit (EUR)
Up to 15,000	$800 - 110 * \text{Taxable Income} / 15,000$
From 15,001 to 29,000	690
From 29,001 to 29,200	700
From 29,201 to 34,700	710
From 34,701 to 35,000	720
From 35,001 to 35,100	710
From 35,101 to 35,200	700
From 35,201 to 40,000	690
From 40,001 to 80,000	$690 * (80,000 - \text{Taxable Income}) / 40,000$
Over 80,000	0

Tax Credits for Dependent Children

	Younger than 3 years old	Older than 3 years old
1 child	$900 * (95,000 - \text{Taxable Income}) / 95,000$	$800 * (95,000 - \text{Taxable Income}) / 95,000$
2 children	$900 * (110,000 - \text{Taxable Income}) / 110,000$	$800 * (110,000 - \text{Taxable Income}) / 110,000$
3 children	$900 * (125,000 - \text{Taxable Income}) / 125,000$	$900 * (125,000 - \text{Taxable Income}) / 125,000$
4 children and over	200	200

Universal Cash Transfers

		Number of Children		
		1	2	3
Both parents	Max amount (EUR)	137.50	258.33	375.00
Single parent	Max amount (EUR)	137.50	258.33	458.33
	Max household income (EUR)	65,210	71,445	83,494

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- $Tax(y_m, y_f)$ is total taxes paid by the household if both work
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- If unit of taxation is individual, $SET = \frac{Tax(y_f)}{y_f}$

SECOND EARNER TAX RATE IN ITALY

$$\begin{aligned} SET &= \frac{\text{Tax}(y_f)}{y_f} + \text{distortion}(\text{TaxCred}, \text{UnivCash}) \\ &= \frac{\text{Tax}(y_f)}{y_f} \\ &\quad + \frac{\text{TaxCred}(y_m, 0) - \text{TaxCred}(y_m, y_f)}{y_f} \\ &\quad + \frac{\text{UnivCash}(y_m, 0) - \text{UnivCash}(y_m, y_f)}{y_f} \end{aligned}$$

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If she does not work, tax credit of 720 euros;
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SET is 10%

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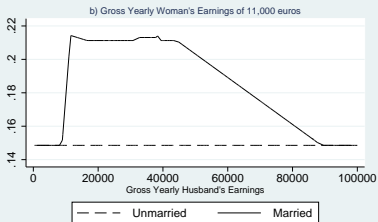
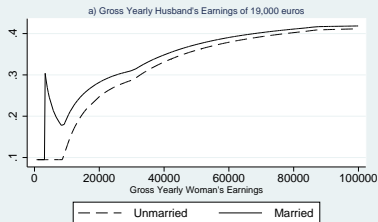
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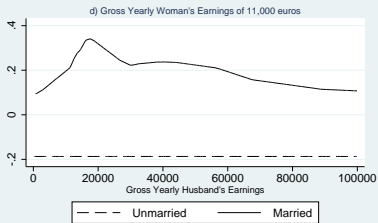
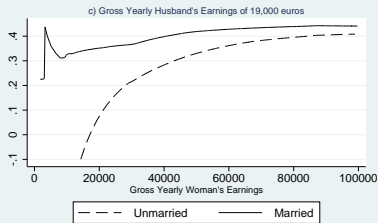
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- (4) Married woman with husband earning 100,000 euros a year.
No tax credit.
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SIMULATION OF SET BY MARITAL STATUS

Without Children

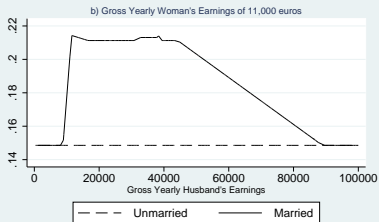
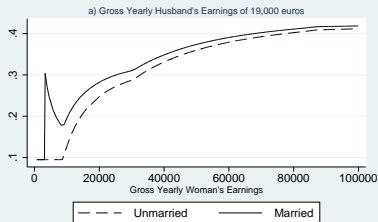


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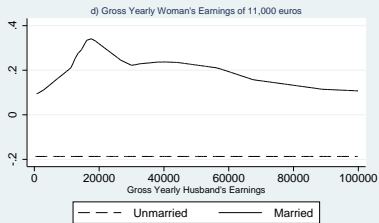
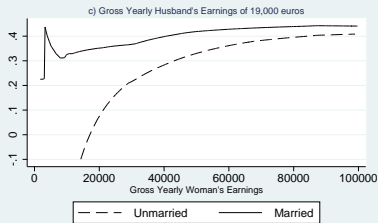


SIMULATION OF SET BY MARITAL STATUS

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Standard Mincerian equation:

$$\log(w_f|X) = \beta X + \mu + \epsilon$$

X is a vector of observed characteristics; μ is an individual characteristic (e.g. skill or ability); ϵ is a specific job component.

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- We perform a non-linear selection procedure where

$$E(\mu|s = 1, e = 1) = E(\mu|s = 1) = f(\Pr(s = 1|X))$$

$$E(\epsilon|s = 1, e = 1) = g(\Pr(e = 1|s = 1, X), \Pr(s = 1|X))$$

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$$q(X) = \Pr(s = 1|X), p(X) = \Pr(e = 1|s = 1, X)$$

- Second stage: estimate the wage equation, $f(\cdot)$ and $g(\cdot, \cdot)$ are step functions, constant within decile intervals

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- Consumption is assumed to equate disposable income:

$$D = w_f(h) + w_m + y - T(w_f(h), w_m, mar, chi)$$

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- Household preferences described by a quadratic utility functions

$$U^{mar}(h, D(\cdot), Z) = \alpha_h^{mar} + \beta^{mar} D + \beta_2^{mar} D^2 + \gamma_h^{mar} Z + \epsilon_h^{mar}$$

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$$\max\{U^{mar}(0, D(0, w_m, y, mar, chi), Z), E[V^{mar}(w_m, y, Z)] - c\}$$

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- SECOND STAGE: she receives a job offer $w_f(h)$ for every possible working time $h \in H \subset \mathfrak{R}^+$
- A woman in the labor market will maximize utility

$$V^{mar}(w_m, y, Z) = \max_h U^{mar}(h, D(w_f(h), w_m, y, mar, chi), Z)$$

EMPIRICAL SPECIFICATION

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- If ϵ is i.i.d. according to a type I extreme value distribution, the probability of observing a woman in the labor market, opting for a choice $h = k$ is

$$Pr_k = Pr(h = k) = \frac{e^{U^{mar}(k, D(w_f(k), w_m, y, mar, chi), Z)}}{\sum_h e^{U^{mar}(h, D(w_f(h), w_m, y, mar, chi), Z)}}$$

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- The probability of being in the labor market is

$$Pr(s = 1) = \frac{e^{E[V(w_m, y, Z)] - c}}{e^{U^{mar}(0, D(0, w_m, y, mar, chi), Z)} + e^{E[V(w_m, y, Z)] - c}}$$

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For a given observation sample

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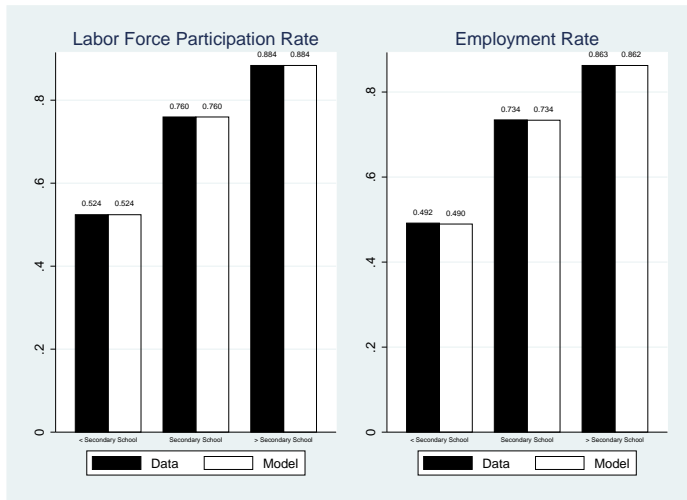
$$\begin{aligned} L(\{z_i\}_{i \in I}) &= \sum_i (1 - s_i) [\log(1 - \Pr(s_i = 1))] \\ &+ s_i \left[\log(\Pr(s_i = 1)) + \sum_k \mathbf{1}_k(h_i) \log(\Pr(h = k)) \right] \end{aligned}$$

where

$$\mathbf{1}_k(h_i) = \begin{cases} 1 & \text{if individual } i \text{ chooses } h = k, \\ 0 & \text{otherwise} \end{cases}$$

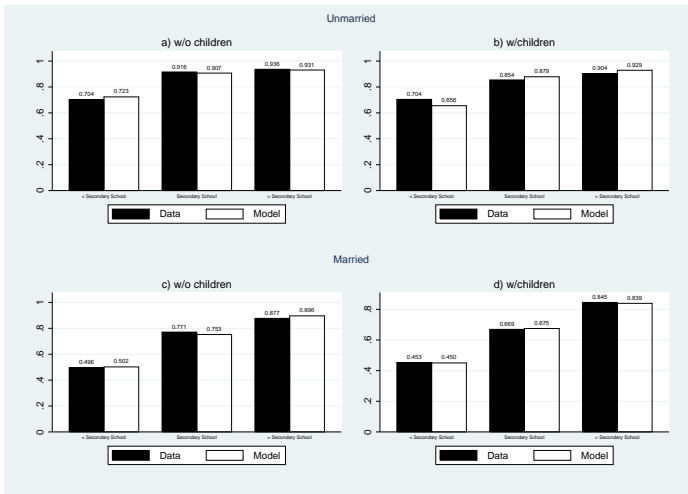
RESULTS

Figure: Results by Education Level - Data vs Model



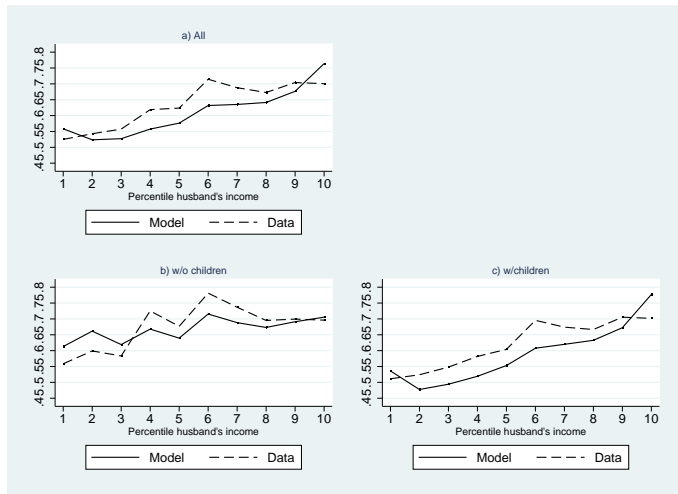
RESULTS, CONT.D.

Figure: Labor Force Participation Rate by Marital Status, Presence of Children, and Education Level - Data vs Model



RESULTS, CONT.D.

Figure: Labor Force Participation by Percentile of Husband's Earnings - Data vs Model



ALTERNATIVE (REVENUE NEUTRAL) TAX SYSTEMS

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- Joint family taxation (e.g. France, Portugal, Germany)
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- Gender-based taxation (Alesina et al. (2011))
- Mixture of individual and joint (e.g. U.S.)

JOINT FAMILY TAXATION

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Bracket (euros)	Rate	Individual Tax Credit	Tax Credit for Dependent Spouse	Tax Credit for Dependent Children	Universal Cash Transfers
<i>Italian Taxation System</i>					
0-15,000	23%	between 0 and 1,840 euros, decreasing in income	between 0 and 800 euros,	800 euros per child,	137.50 euros monthly per child,
15,000-28,000	27%		decreasing in	decreasing in	decreasing in
28,000-55,000	38%		income	income	income
55,000-75,000	41%				
more than 75,000	43%				
<i>Joint Tax System</i>					
0-15,000	23%	between 0 and 1,840 euros,	0	0	0
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28,000-55,000	38%	income	income	income	family income
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more than 75,000	43%				

- *Quotient familial* is equal to the number of family members

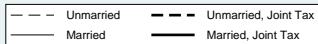
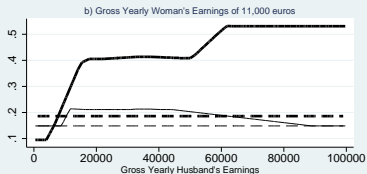
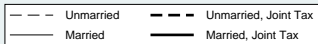
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0-15,000	23%	between 0 and 1,840 euros, decreasing in income	between 0 and 800 euros, decreasing in income	800 euros per child, decreasing in income	137.50 euros monthly per child, decreasing in family income
15,000-28,000	27%				
28,000-55,000	38%				
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more than 75,000	43%				
<i>Joint Tax System</i>					
0-15,000	23%	between 0 and 1,840 euros, decreasing in income	0	0	0
15,000-28,000	27%				
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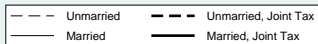
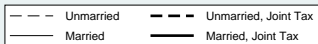
- *Quotient familial* is equal to the number of family members
- Tax is $qt((y_m + y_f)/q)$ instead of $t(y_m) + t(y_f)$

SET - JOINT FAMILY TAXATION

Without Children



With Children



WORKING TAX CREDIT

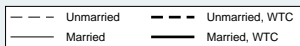
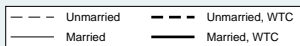
WORKING TAX CREDIT

Bracket (euros)	Rate	Individual Tax Credit	Tax Credit for Dependent Spouse	Tax Credit for Dependent Children	Universal Cash Transfers
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0-15,000	23%	between 0 and 1,840 euros,	between 0 and 800 euros,	800 euros per child,	137.50 euros monthly per child,
15,000-28,000	27%	decreasing in	decreasing in	decreasing in	decreasing in
28,000-55,000	38%	income	income	income	family income
55,000-75,000	41%				
more than 75,000	43%				
<i>British working tax credit</i>					
0-15,000	23%	1,840 euros	0	0	137.50 euros monthly per child,
15,000-28,000	27%	independent of income			independent of income
28,000-55,000	38%				
55,000-75,000	41%				
more than 75,000	43%				

⇒ Characteristics of an *individual* tax system

SET - WORKING TAX CREDIT

Without Children



With Children



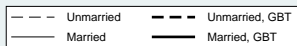
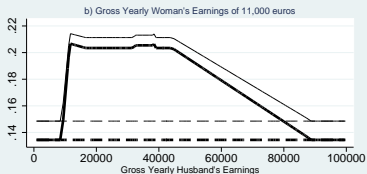
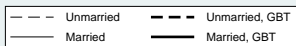
GENDER-BASED TAXATION

GENDER-BASED TAXATION

Bracket (euros)	Rate	Individual Tax Credit	Tax Credit for Dependent Spouse	Tax Credit for Dependent Children	Universal Cash Transfers
<i>Italian Taxation System</i>					
0-15,000	23%	between 0 and 1,840 euros,	between 0 and 800 euros,	800 euros per child,	137.50 euros monthly per child,
15,000-28,000	27%	decreasing in	decreasing in	decreasing in	decreasing in
28,000-55,000	38%	income	income	income	family income
55,000-75,000	41%				
more than 75,000	43%				
<i>Men and Women</i>					
0-15,000	23%	between 0 and 1,840 euros,	between 0 and 800 euros,	800 euros per child,	137.50 euros monthly per child,
15,000-28,000	27%	decreasing in	decreasing in	decreasing in	decreasing in
28,000-55,000	38%	income	income	income	family income
55,000-75,000	41%				
more than 75,000	43%				
<i>Women: the final tax is 67% of the total tax net of the standard tax credits</i>					

SET - GENDER-BASED TAXATION

Without Children

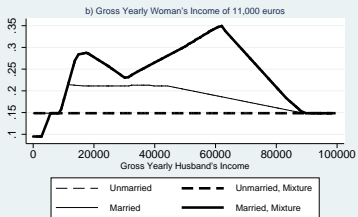
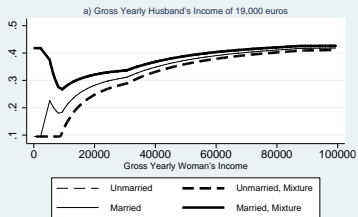


With Children

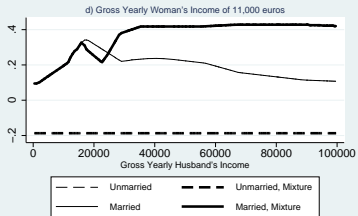


SET - MIXTURE INDIVIDUAL AND JOINT TAXATION

Without Children



With Children



SIMULATION RESULTS - AVERAGE TAX RATE

SIMULATION RESULTS - AVERAGE TAX RATE

Taxation System	Unmarried Women		Married Women		All women
	Without children	With children	Without children	With children	
Benchmark Model	22.73	11.61	22.95	12.51	16.67
Joint Tax	27.63	15.06	21.02	15.54	19.25
Working Tax Credit	22.08	12.46	19.82	10.44	15.01
Gender-Based Tax	19.37	8.63	22.37	11.61	15.10
Mixture Benchmark and Joint	27.80	14.84	21.55	15.47	19.31

SIMULATION RESULTS - SET

SIMULATION RESULTS - SET

Taxation System	Unmarried Women		Married Women		All women
	Without children	With children	Without children	With children	
Benchmark Model	18.84	8.87	14.00	10.51	13.00
Joint Tax	22.44	11.64	15.57	12.30	15.25
Working Tax Credit	18.16	9.94	11.87	11.01	12.78
Gender-Based Tax	16.10	6.84	12.99	9.71	11.60
Mixture Benchmark and Joint	23.07	11.62	18.46	12.95	16.25

SIMULATION RESULTS - LABOR FORCE PARTICIPATION

SIMULATION RESULTS - LABOR FORCE PARTICIPATION

Taxation System	Unmarried Women		Married Women		All women
	Without children	With children	Without children	With children	
Data	85.41	81.13	66.06	62.46	69.95
Benchmark Model	86.65	81.49	66.42	62.68	70.42
Joint Tax	85.69	80.18	60.71	55.99	65.66
Working Tax Credit	86.73	81.46	69.17	64.69	71.96
Gender-Based Tax	87.36	83.28	68.79	65.12	72.41
Mixture Benchmark and Joint	86.65	80.52	67.74	58.80	68.20

SIMULATION RESULTS - EMPLOYMENT RATE: PART-TIME

SIMULATION RESULTS - EMPLOYMENT RATE: PART-TIME

Taxation System	Unmarried Women		Married Women		All women
	Without children	With children	Without children	With children	
Data	12.09	19.78	11.13	17.41	15.18
Benchmark Model	12.23	18.80	9.93	15.94	14.17
Joint Tax	12.81	16.99	9.53	12.50	12.36
Working Tax Credit	11.78	18.18	11.53	15.93	14.31
Gender-Based Tax	10.94	18.52	10.02	15.45	13.62
Mixture Benchmark and Joint	12.41	19.71	9.62	14.38	13.44

SIMULATION RESULTS - EMPLOYMENT RATE: FULL-TIME

SIMULATION RESULTS - EMPLOYMENT RATE: FULL-TIME

Taxation System	Unmarried Women		Married Women		All women
	Without children	With children	Without children	With children	
Data	70.69	58.29	52.83	42.20	52.10
Benchmark Model	70.62	57.59	52.98	42.41	52.16
Joint Tax	68.44	60.31	49.11	39.58	49.72
Working Tax Credit	70.47	61.63	55.72	45.11	54.30
Gender-Based Tax	72.20	60.72	55.50	46.34	55.22
Mixture Benchmark and Joint	70.60	58.57	55.52	40.60	51.79

WELFARE IMPLICATIONS - POVERTY MEASURES

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- Joint taxation: highest percentage of women below the poverty line
- Mixture taxation: lowest percentage of married women below poverty line, and lowest transfer needed to reach the poverty line
- Gender-based taxation: lowest percentage of unmarried women below the poverty line

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- We estimate a structural model of female labor supply
- We show that Italian tax system can explain the low participation rate and its positive correlation to husbands' earnings
- Moving towards a working tax credit system would reduce the fiscal burden of women, especially if married, and
- It would provide incentive to take up low earning jobs (maybe providing disincentives to take up irregular jobs)