

From housewives to independent earners: can the tax system help Italian women to work?

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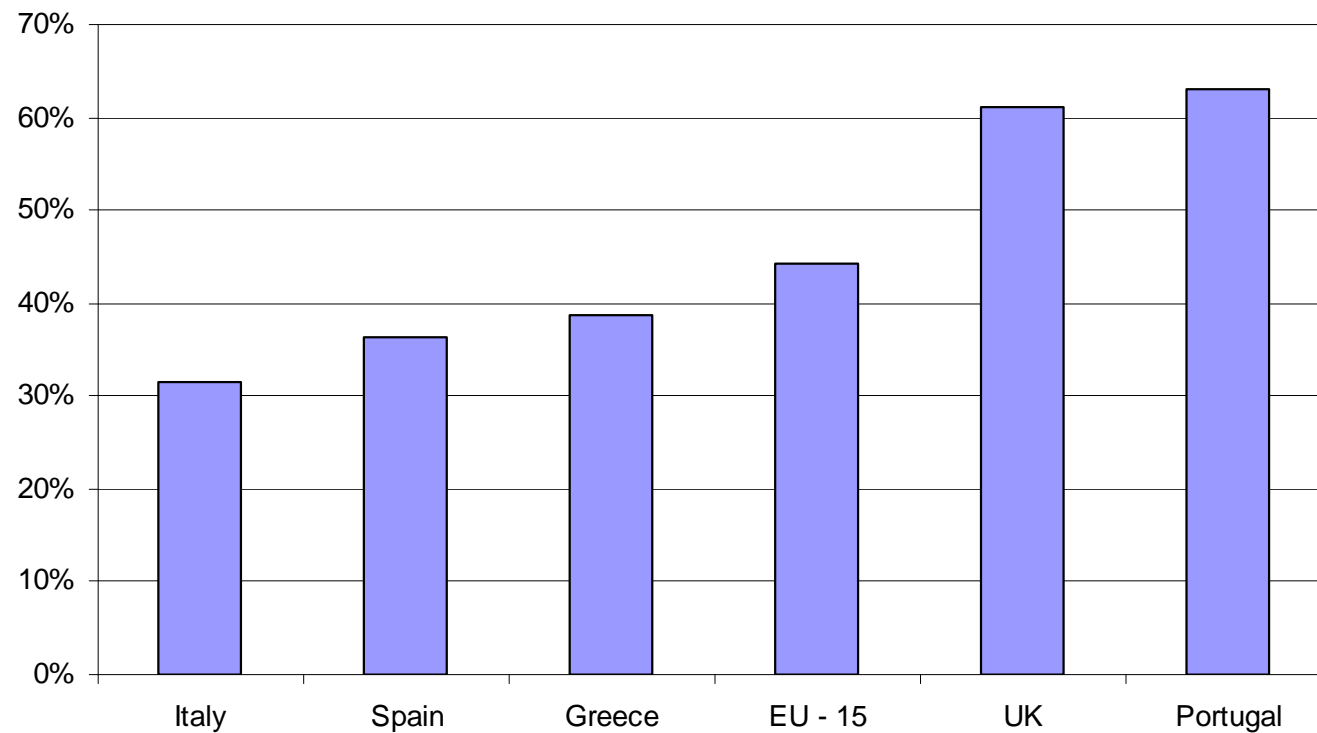
Motivations

- Low female labour market participation
 - All women: 47%. EU-15 average: 60%
 - Low educated: 31%. EU-15 average: 44%
- Need of incentives to make work pay (and reconcilable with caring responsibilities)

- High poverty and inequality
 - Poverty rate: 19%. EU-15 average: 17%
 - Gini 0.33. EU-15 average: 0.30
- High in-work poverty
 - In-work poverty rate: 10%. EU-15 average: 8%
- Need of redistribution towards the “working poor”

Female labour market participation

Low educated - 2003



Aim

- Explore the potential scope to enhance both the incentive and the redistributive effects of the Italian tax system
- Marginal reform: **Tax credit for dependent person** replaced by **in-work benefits**
 - Taking into account behavioural effects
 - Guarantying revenue neutrality
- **In-work benefits**
 - Means-tested cash transfers conditional on the employment status
 - Intended to enhance incentives to accept a job and to redistribute resources to low income groups
 - Introduced in many countries (Immervoll and Pearson 2009)

2003 tax-benefit system and the reform

- 2003
 - Individual
 - Tax credit for dependent spouse (€546 per year) and other adults (not children, € 303 per year)
 - (Di)sincentive effects
 - Support not well targeted
 - Horizontal (in)equity
- Reform
 - Current tax credit for dependent person replaced by:
 - Family based IWB
 - Individual IWB

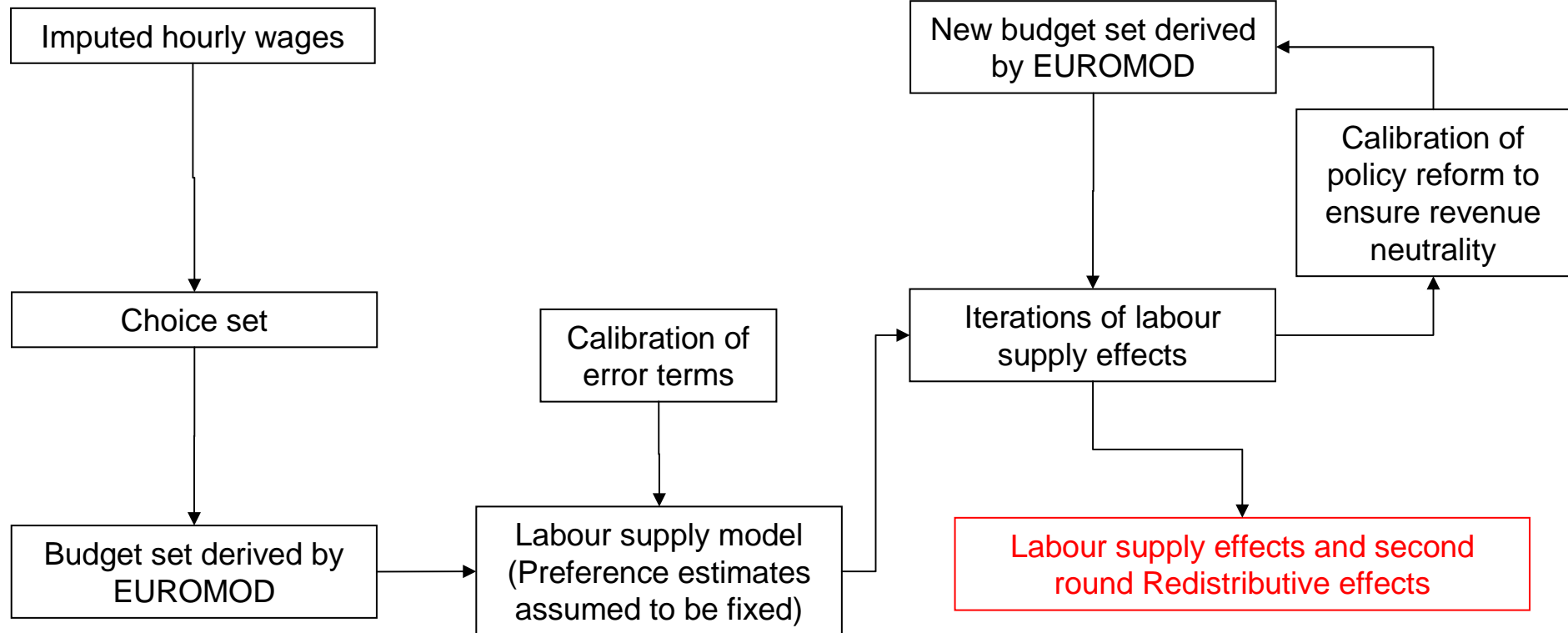
Methods and data

- **EUROMOD**
 - a **multi-country** tax-benefit microsimulation model for EU-19
 - **static model**: individual behaviour (employment, childcare, saving, ...) assumed to be exogenous to the tax-benefit system
- **Labour supply model is fully integrated with the static calculations**
 - to derive the budget set under the baseline and reformed scenarios
 - to impose revenue neutrality conditions taking into account the behavioural reactions
- **ITALY**
 - Baseline fiscal system: 2003
 - Data: IT-SILC 2004 (2003 income)

Behavioural Tax-Benefit Model

Pre reform

Post reform



Labour supply model (1)

- Static **structural discrete choice** model of labour supply (Aaberge et al. 1995; Van Soest 1995)
- **Direct estimation of preferences over hours and income**
- **Preferences expressed over discrete hours choices (i.e. choice set):**
 - Men labour supply fixed
 - 5 choices for women (actual choice + 4 alternatives sampled from the empirical density function of the hours observed within 4 intervals - Dagsvik 1995)
- **Sample:**

Couples with both partners and lone mothers in working age (18-65), not receiving any pension and self-employment income:

 - 4820 couples
 - 682 lone mothers

Labour supply model: hours discretization

Each woman chooses 5 alternatives

Choice	Interval	Hours observed	Hours predicted
1	0 - 7		0
2	8 - 19		19
3	20 - 30	24	24
4	31 - 40		36
5	41+		48

- 1 observed hours (actual choice)
- 4 alternatives sampled from the empirical density function of the hours observed within each interval
 - the choice sets may differ across households
 - taking into account relative (within interval) demand side constraints

Labour supply model: data

ID	Hours	Hours	Observed	Income
	observed	predicted	choice	
1	40	0	0	1,588
1	40	9	0	2,040
1	40	20	0	2,471
1	40	40	1	2,961
1	40	50	0	3,173
3	19	0	0	1,820
3	19	19	1	2,326
3	19	30	0	2,565
3	19	36	0	2,673
3	19	51	0	2,975
6	0	0	1	5,286
6	0	19	0	6,115
6	0	23	0	6,258
6	0	40	0	6,832
6	0	52	0	7,228

Labour supply model (2)

A woman chooses the number of hours of work in order to maximise the utility of the couple on the basis of 'preferences' over hours H and net income Y ,

$$H_f^* = \max U = U(H, Y)$$

subject to

$$Y(H_f) = E_f(w_f, H_f) + E_m + N + B(E_f, E_m, N | X) - t(E_f, E_m, N, B | X)$$

Net income (Y) depends on partners' earnings (E), other incomes (N), benefits (B) and taxes (t)

Labour supply model: estimation

Quadratic form for the deterministic part of the utility function:

$$V_j = \alpha Y_j + \beta Y^2 + \gamma H_j + \delta H^2 + \lambda Y_j H_j$$

Observed and **unobserved heterogeneity** enters through the linear utility parameter:

$$\begin{aligned}\alpha &= \alpha_0 + \alpha_1'X + v_\alpha \\ \gamma &= \gamma_0 + \gamma_1'X + v_\gamma\end{aligned}$$

X = Aged over 40, Education level, No. of children, Fixed cost of working.

Conditional logit (no unobserved heterogeneity) and **mixed logit** with v_α and v_γ assumed to be normal distributed with variances σ_α σ_γ and correlated.

Predicted choice probability is maximized at the observed state by using 100 draws of the stochastic term (maximum probability rule).

Preference estimates: women in couples

	Conditional logit	Mixed logit
Income	1.1391 ***	2.1750 ***
x Aged over 40	-0.0135 ***	-0.0228 ***
x Primary education	-0.4534 ***	-0.9928 ***
x Lower Secondary education	-0.1933 **	-0.6054 ***
x Higher Secondary education	-0.1072	-0.3387 **
x Children	0.0913 **	0.0855
Income ²	-0.0014 *	-0.0014
Hours	-0.3323 ***	-0.5597 ***
x Aged over 40	0.0023 ***	0.0038 ***
x Primary education	0.1204 ***	0.2813 ***
x Lower Secondary education	0.0748 **	0.2134 ***
x Higher Secondary education	0.0532 **	0.1455 ***
x Children	-0.0439 ***	-0.0557 **
Hours ²	0.0002 *	-0.0005 *
Income x Hours	0.0008	0.0006
Fixed cost of work	1.6652 ***	1.7744 ***
x Children	-0.0244	-0.0301
Std. Dev. Income		0.5052 ***
Std. Dev. Hours		0.1207 ***
Log-Likelihood	-6663.76	-6648.59

Preference estimates: lone mothers

	Conditional logit	Mixed logit
Income	1.1799 ***	1.5644 ***
x Aged over 40	0.0013	-0.0102 *
x Primary education	0.0177	-0.3389
x Lower Secondary education	0.0079	-0.2527
x Higher Secondary education	0.0443	-0.2774
x No of children	0.0437 **	-0.1819 ***
Income ²	0.0005	-0.0030
Hours	-0.3418 ***	-0.4423 ***
x Aged over 40	-0.0091 *	0.0014
x Primary education	-0.1103	0.0875
x Lower Secondary education	-0.0417	0.0719
x Higher Secondary education	-0.1595	0.0827
x No of children	-0.1688 ***	0.0485 **
Hours ²	0.0014 **	0.0013 *
Income x Hours	-0.0033	-0.0020
Fixed cost of work	2.1991 ***	2.2819 ***
x No of children	-0.1585	-0.2299
Std. Dev. Income		0.3472 **
Std. Dev. Hours		0.0815 *
Log-Likelihood	-988.70	-987.37

Post-estimation checks

Utility function must respect monotonicity and quasi-concavity with respect to income. Such conditions are checked ex-post rather than being imposed.

Monotonicity:
$$\frac{\partial U_{ij}}{\partial Y_{ij}} = \alpha + 2\beta Y_{ij} + \lambda Y_{ij} Hf_{ij} > 0$$

It is respected by **~98 %** of individual-choices after conditional logit and by **~90% (~99%)** of women in couples (lone mothers) after mixed logit.

Quasi-concavity:
$$\frac{\partial^2 U_{ij}}{\partial Y_{ij}^2} = 2\beta \leq 0 \Leftrightarrow \beta < 0$$

Calibration of stochastic component

Maximum probability rule

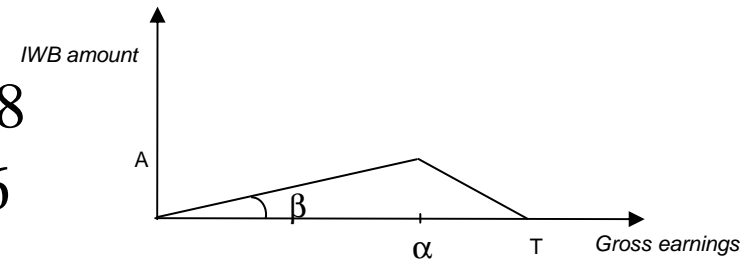
Given the estimated preferences, I resample the error terms 100 times

- a) 100 selected draws allow the predicted choice probability to be maximized at the observed state
- b) The same draws are applied to derive the preferred choice after the reform (maximum probability rule)
- c) Individual transitions probabilities can be approximated by taking the mean of the predicted transitions between states over the repetitions.

Policy reform: parameters (€/year)

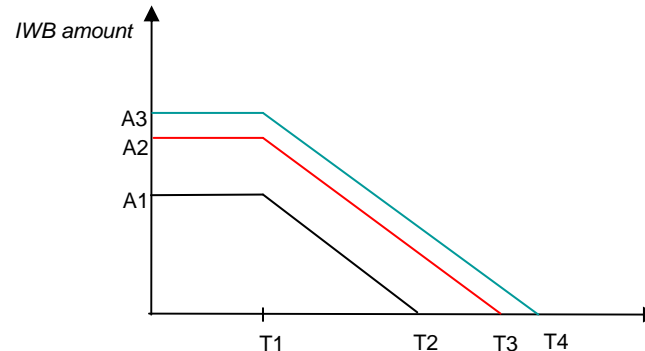
Individualised IWB

α	9,647
β (%)	21.1378
T	15,156



Family based IWB

T1	5,512
A1 (Single, FT)	1,661
T2	10,002
A2 (Lone/couple, PT)	3,296
T3	14,420
A3 (Lone/couple, FT)	3,971
T4	16,245



Policy reform: evaluation women in couples

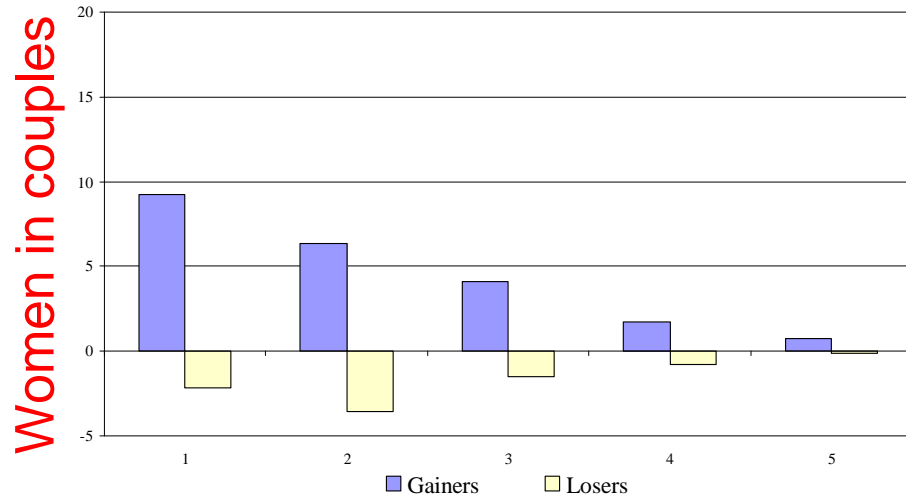
	Pre reform	Family based IWB	Individualised IWB
Labour supply, %			
0 - 7 hr	42.76	39.79	37.17
8 - 19 hr	5.46	6.67	9.11
20 - 30 hr	19.00	19.68	21.30
31 - 40 hr	26.49	27.30	26.11
41+ hr	6.29	6.56	6.30
Poverty rates			
40%	6.43	4.03	4.78
60%	14.53	12.48	12.40

Policy reform: evaluation lone mothers

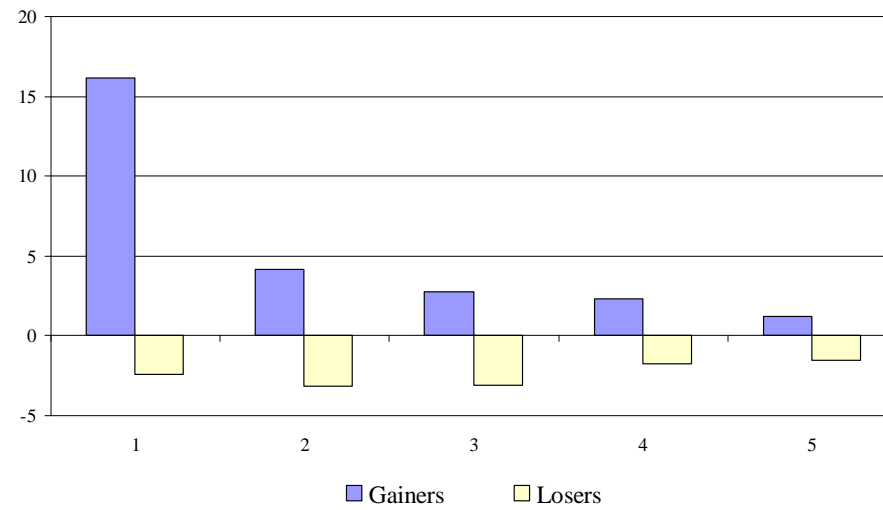
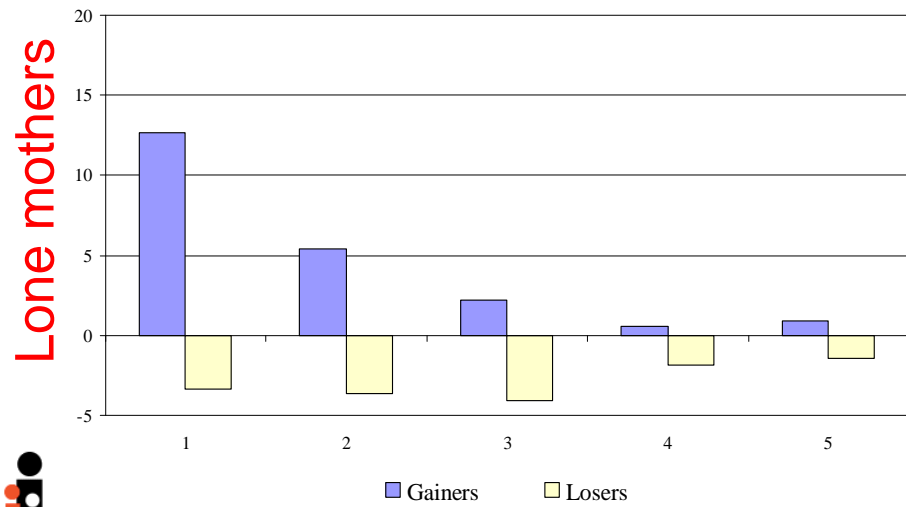
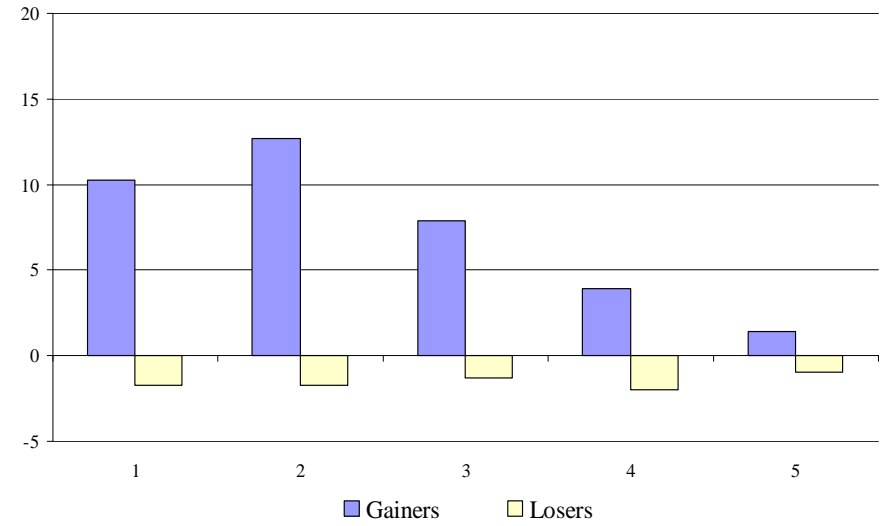
	Pre reform	Family based IWB	Individualised IWB
Labour supply, %			
0 - 7 hr	27.71	23.89	26.43
8 - 19 hr	5.72	8.22	7.89
20 - 30 hr	19.35	23.39	20.52
31 - 40 hr	36.95	35.87	35.55
41+ hr	10.26	8.63	9.61
Poverty rates			
40%	15.99	11.89	13.21
60%	27.40	21.58	24.44

Gainers and losers

IWB family



IWB individual



Transition matrix - IWB family: women in couples

All couples

Pre reform	Post reform					
	0	8	20	35	41	
0	39	1	1	1	1	43
8	0	5	0	0	0	5
20	0	0	19	0	0	19
35	0	0	0	26	0	26
41	0	0	0	0	6	6
	40	7	20	27	7	

1st quintile group

Pre reform	Post reform					
	0	8	20	35	41	
0	81	2	2	1	0	86
8	0	3	0	0	0	4
20	0	0	4	0	0	5
35	0	0	0	3	0	4
41	0	0	0	0	1	2
	82	5	7	4	1	

5th quintile group

Pre reform	Post reform					
	0	8	20	35	41	
0	9	0	0	0	0	10
8	0	5	0	0	0	5
20	0	0	23	0	0	23
35	0	0	0	47	0	47
41	0	0	0	0	15	15
	9	5	23	47	15	

Transition matrix - IWB family: lone mothers

All lone

Pre reform	Post reform					
	0	8	20	35	41	
0	25	1	1	0	0	28
8	0	5	0	0	0	6
20	0	0	19	0	0	19
35	0	1	1	34	0	37
41	0	1	1	0	9	10
	25	9	22	35	9	

1st quintile group

Pre reform	Post reform					
	0	8	20	35	41	
0	59	3	3	1	0	66
8	0	7	0	0	0	7
20	0	0	11	0	0	12
35	0	1	0	8	0	9
41	0	0	0	0	4	5
	59	11	16	10	5	

5th quintile group

Pre reform	Post reform					
	0	8	20	35	41	
0	11	0	0	0	0	11
8	0	7	0	0	0	7
20	0	0	12	0	0	13
35	0	1	1	46	0	47
41	0	1	1	0	20	22
	11	9	14	46	20	

Transition matrix - IWB individual: women in couples

All couples

Pre reform	Post reform					
	0	8	20	35	41	
0	37	2	2	1	1	43
8	0	5	0	0	0	5
20	0	0	19	0	0	19
35	0	1	1	25	0	26
41	0	0	0	0	6	6
	37	9	21	26	6	

1st quintile group

Pre reform	Post reform					
	0	8	20	35	41	
0	78	3	3	1	0	86
8	0	4	0	0	0	4
20	0	0	5	0	0	5
35	0	0	0	3	0	4
41	0	0	0	0	1	2
	78	7	8	4	2	

5th quintile group

Pre reform	Post reform					
	0	8	20	35	41	
0	9	0	0	0	0	10
8	0	5	0	0	0	5
20	0	1	22	0	0	23
35	0	1	1	45	0	47
41	0	0	0	0	14	15
	9	8	24	45	14	

Transition matrix - IWB individual: lone mothers

All lone

Pre reform	Post reform					
	0	8	20	35	41	
0	26	1	1	0	0	28
8	0	6	0	0	0	6
20	0	0	19	0	0	19
35	0	1	1	35	0	37
41	0	0	0	0	10	10
	26	8	21	36	10	

1st quintile group

Pre reform	Post reform					
	0	8	20	35	41	
0	63	2	2	0	0	66
8	0	7	0	0	0	7
20	0	0	11	0	0	12
35	0	0	0	9	0	9
41	0	0	0	0	5	5
	63	9	13	9	5	

5th quintile group

Pre reform	Post reform					
	0	8	20	35	41	
0	11	0	0	0	0	11
8	0	7	0	0	0	7
20	0	0	12	0	0	13
35	0	2	0	45	0	47
41	0	1	0	0	21	22
	11	9	13	45	21	

Conclusions

- Scope for improving equity and efficiency of the tax system after replacing the existing tax credit with IWB benefits
- Women in couples:
 - Individual IWB has slightly higher incentive effects; redistributive effects equivalent to those of family based IWB
 - Family based IWB does not show disincentive effects
- Lone mothers:
 - Family based IWB has higher incentive and redistributive effects
- Positive labour supply effects concentrated at the bottom of the distribution
- Demand side constraints not considered (role of family based IWB in the economic downturn)
- Childcare provision and costs