Designing an Optimal Welfare System for the Low Skilled: An Evaluation of Employment Tax-Credits

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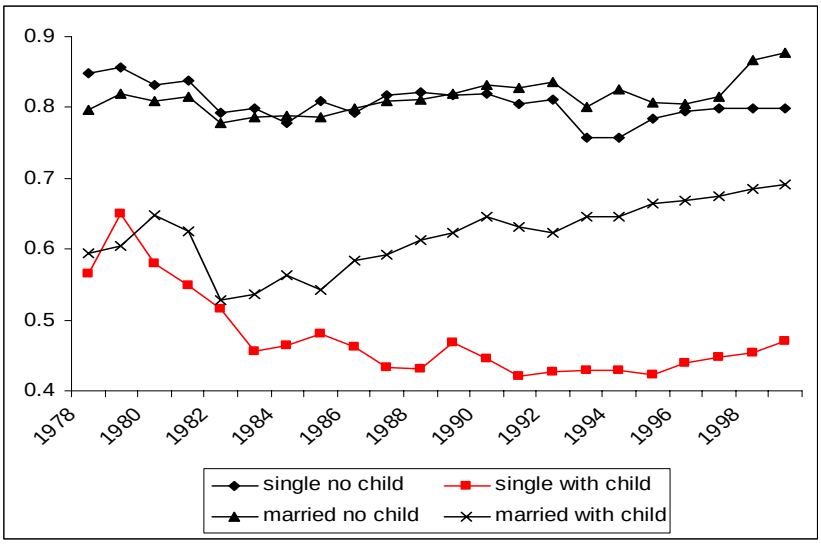
Design and Reform

- The policy issue: low labour market attachment and low wages of lower skilled workers:
  - young low educated
  - older low skilled
  - single mothers
- Aim: to evaluate the optimality of employment tax-credit reforms – using the UK reforms:
  - the Working Families Tax Credit – WFTC
  - Working Tax Credit/Child Tax Credit – WTC/CTC

The Policy Issue: Employment Trends for Women in the UK



Issues of Design and Reform

- Employment Tax Credit vs Negative Income Tax
- ETC is in the class of ‘make work pay’ reforms
- Focus on a ‘work condition’ for benefit receipt
- Balance poverty reduction and employment incentives

Questions?

- What is the likely impact of an ETC reform?
- What is the optimal structure of an ETC?

Issues of Design and Reform

- The impact of an ETC reform depends on:
  - Changes in the budget constraint
  - The reactions of individuals to that change
- The optimal design depends on:
  - Extensive labour supply elasticities
  - Intensive labour supply elasticities
  - Social welfare weights – income to families out-of-work vs those in-work

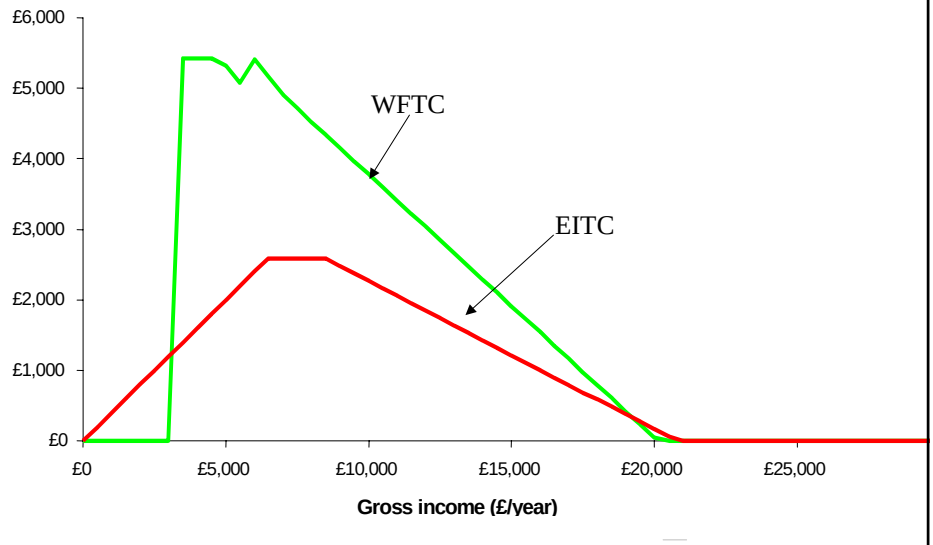
Issues of Design and Reform

- A Structural model is required for estimating elasticities and for simulating individual reactions
- But how robust is the model?
  - Compare structural model to natural experiment results.
- Key features of a structural model:
  - Heterogeneity, fixed costs, stigma/hassle/information costs

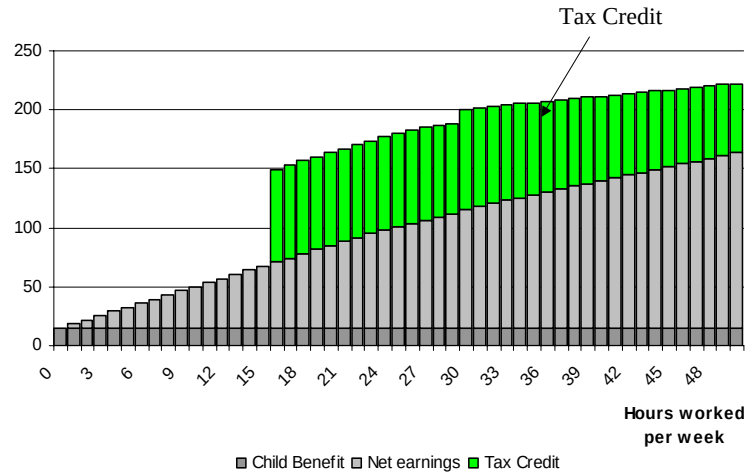
Issues of Design and Reform

- What is the ‘typical’ design of tax-credits to ‘make-work-pay’?

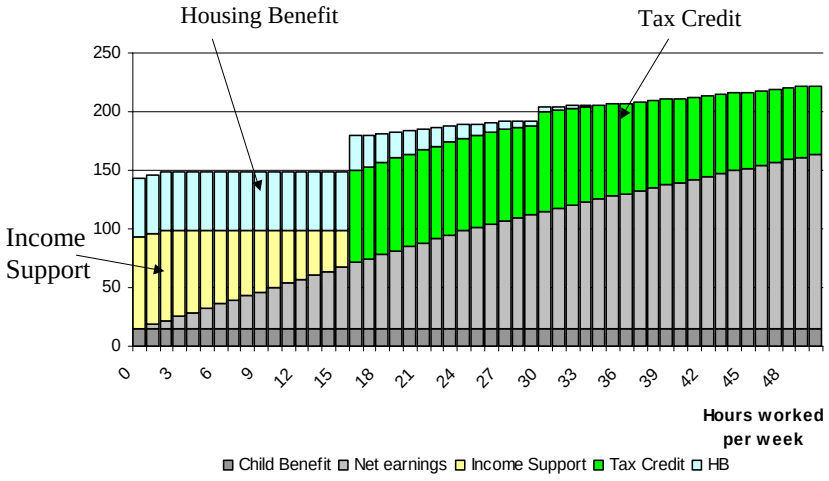
The US Earned Income Tax Credit and the UK WFTC compared



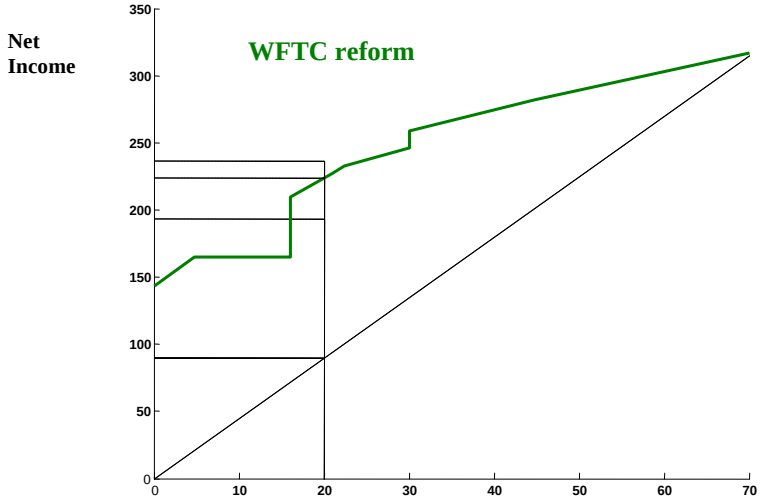
WFTC budget constraint (single parent on minimum wage)



WFTC interactions with other taxes and benefits



Transfers and Taxes under the WFTC Reform (lone parent, min wage)



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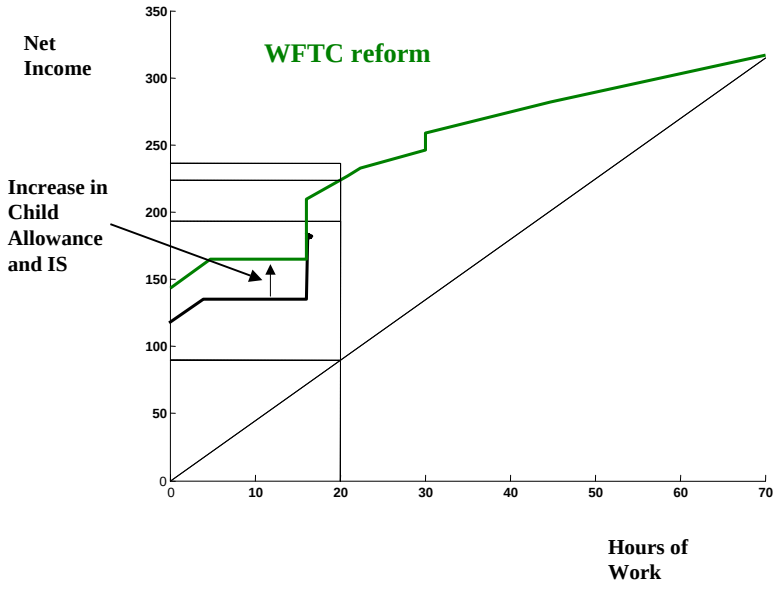
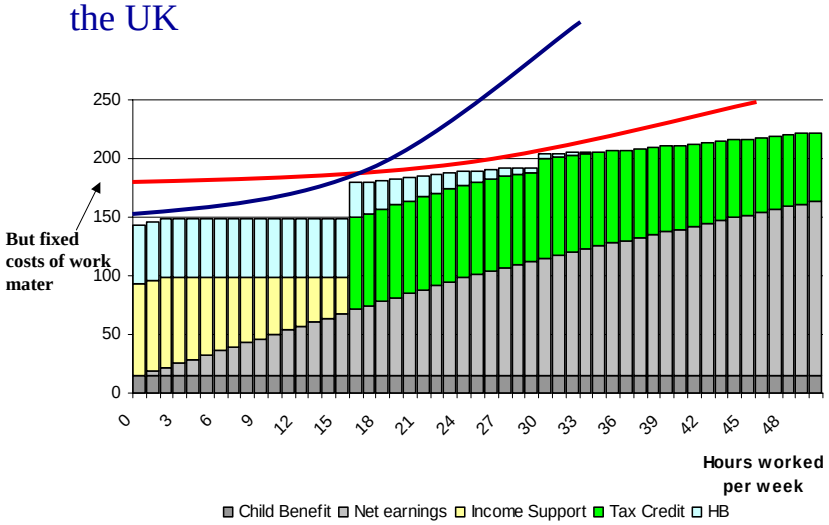


WFTC interactions with other taxes and benefits in the UK



Is the design 'optimal'?

- Given elasticities at extensive and intensive margin, what social welfare weights make current system 'optimal'?
- What is the likely impact of the tax-credit reform?

The Structural Model

main elements:

- preferences
- heterogeneity
- fixed costs
- stigma/hassle costs
- childcare costs

Net Income

P: program participation

$$y_{hP} = wh + I - \Gamma(wh, I|Z_\Gamma) + \Psi(w, h, I, P|Z_\Psi)$$

Tax Transfers

Utility

$$u(h, y_{hP}) = \alpha_{11} y_{hP}^2 + \alpha_{22} h^2 + \alpha_{12} y_{hP} h + \beta_1 y_{hP} + \beta_2 h$$

in which

heterogeneity terms

$$\beta_1 = X_1\beta_{1x} + u_y$$
$$\beta_2 = X_2\beta_{2x} + u_h$$
$$\alpha_{11} = X_{11}\alpha_{11x}$$
$$\alpha_{22} = X_{22}\alpha_{22x}$$
$$\alpha_{12} = X_{12}\alpha_{12x}$$

Stochastic specification and discrete hours

I. discrete hours alternatives: $h \in \{h_1, \ldots, h_J\}$

II. 'utility' for each hours point:

$$U(h, y_{hP}) \approx \alpha_{11} y_{hP}^2 + \alpha_{22} h^2 + \alpha_{12} y_{hP} h + \beta_1 y_{hP} + \beta_2 h + \varepsilon_{hP}$$

III. Probability of each hours point:

$$\Pr(h = h_j | X, w, u_y, u_h) = \Pr[U(h_j, y_{h_j}; X, w, u_y, u_h) > U(h_k, y_{h_k}; X, w, u_y, u_h) \; \forall \, h_k \neq h_j]$$

IV. Likelihood:

$$\log \mathcal{L} = \sum_i \log \int_{u_w} \int_{u_y} \int_{u_h} \prod_{j=1}^{J} \Pr(h = h_j | X, X_w, u_y, u_h, u_w)^{1(h=h_j)} f(u_h) f(u_y) f(u_w) du_h du_y du_w$$

Fixed Costs of Work and Childcare Costs

Part time fixed costs

$$WRC_1 = X_{f1} \beta_{f1} + u_f$$

and for full time.

including Childcare costs

$$C(h; X_f, X_{cc}, p_c, u_f) = WRC_1 \cdot I_{h1} + WRC_2 \cdot I_{h2} + p_c \cdot h_{cc}$$

=>

$$U(h, y_h; C) = \alpha_{11}(y_h - C)^2 + \alpha_{22} h^2 + \alpha_{12}(y_h - C) \cdot h + \beta_1 (y_h - C) + \beta_2 h + \varepsilon_h$$

where *y* contains the value of the childcare disregard (under FC) or the childcare tax credit (under WFTC)

Take-up Rates

	Lone parents	
	As % caseload	As % expenditure
2000/1	80	85
1998/9	81	88
1997/8	77	84
1996/7	81	88
1995/6	80	91
1994/5	80	90
1993/4	77	86
1992	73	66
1990-1991	68	62

Take-up and hassle/stigma costs

$$y_{hP} = wh + I - \Gamma(wh, I|Z_\Gamma) + \Psi_0(w, h, I|Z_\Psi) + P \cdot \Psi_1(w, h, I|Z_\Psi)$$

transfers with and without participation in wftc

$$= \tilde{y}_h + P \cdot \Psi_1(w, h, I|Z_\Psi)$$

$$U_P(h, y_{hP}, P; C) = \alpha_{11}(\tilde{y}_h + P \cdot \Psi_1 - C)^2 + \alpha_{22}h^2 + \alpha_{12}(\tilde{y}_h + P \cdot \Psi_1 - C) \cdot h + \beta_1(\tilde{y}_h + P \cdot \Psi_1 - C) + \beta_2 h + \varepsilon_{hP} - (P \cdot E_h) \cdot \eta$$

$$= U(h, \tilde{y}_h + P \cdot \Psi_1 - C) - (P \cdot E_h) \cdot \eta,$$

where $E_h = 1(\Psi_1 > 0)$

and $\eta = X_\eta \beta_\eta + u_\eta$ we include wftc reform dummy in X

claim at h_j if $U_P(h_j, \tilde{y}_{h_j} + \Psi_1 - C, P = 1) > U(h_j, \tilde{y}_{h_j} - C)$

Table 4.1: Observed and Predicted Participation Rates

	Observed (%)	Predicted (%)
Lone Parents	42.9	42.2
Married Women	68.1	66.9
Married Men	89.9	88.1

Structural Simulation Results: Lone Parents

	All	Age of Youngest			
		0-2	3-4	5-10	11+
WFTC Only:					
Change in participation rate (ppt)	**4.66**	**3.60**	**5.15**	**5.64**	**3.98**
Average change in hours per worker					
Unconditional	**1.63**	**1.10**	**1.56**	**1.97**	**1.65**
Workers only	**0.69**	**0.75**	**0.70**	**0.91**	**0.65**
All reforms:					
Change in participation rate (ppt)	**3.37**	**2.12**	**2.99**	**4.08**	**3.70**
Average change in hours per worker					
Unconditional	**1.22**	**0.66**	**0.91**	**1.45**	**1.56**
Workers only	**0.57**	**0.47**	**0.40**	**0.68**	**0.63**

Robustness: Difference-in-Differences

- Estimate impact of WFTC by comparing outcomes of those who are eligible versus those who are not
- Choose similar individuals without children as the relevant control group
- Can identify impact of WFTC assuming common shocks between eligible and non-eligible groups

Difference-in-Differences Results

Single Women	Marginal Effect	Standard Error	Sample Size
Family Resources Survey	**0.037**	**0.014**	**25,163**
Labour Force Survey	**0.036**	**0.005**	**233,208**

Data: FRS, 45,000 adults per year, Spring 1996 – Spring 2002

Probit: post WFTC dummy, plus age, education, youngest child, region, ethnicity,…

Drop: Summer 1999 – Spring 2000 inclusive

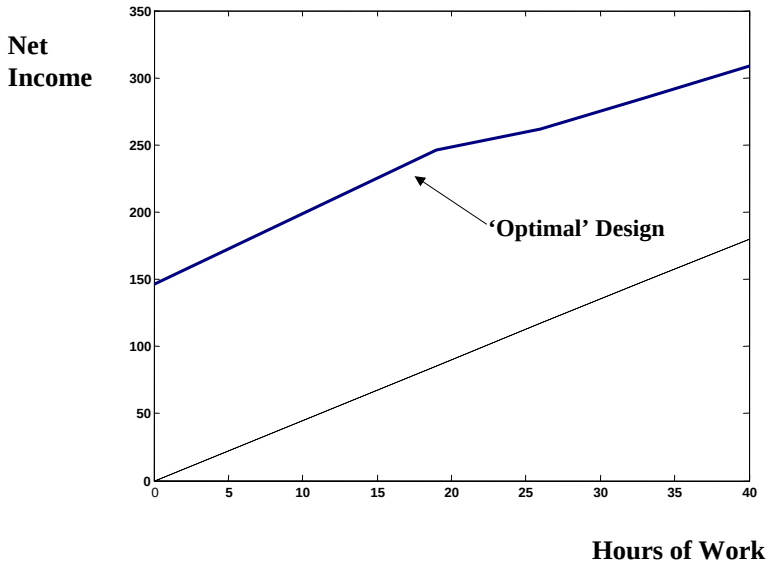
Some Labour Supply Elasticities

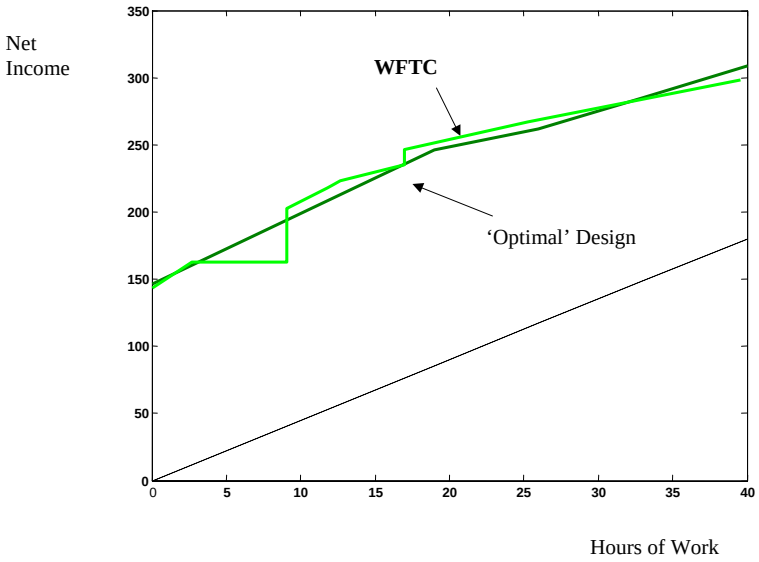
	19	26	33	40
Extensive	**0.52**	**0.53**	**0.58**	**0.61**
Intensive		**0.32**	**0.19**	**0.08**

Social Welfare Weights

0	19	26	33	40
1.15	**1.1**	**0.9**	**0.7**	**0.5**

Optimality





Results and Summary

- Overall question: what are the responses to employment tax credit reforms and what is the optimal design of such reforms?
- A structural model is required to simulate policy reforms and also to calculate elasticities necessary to judge optimality.
- Need to judge the robustness of the structural model – use comparison with 'difference-in-differences' results for some existing reform.
- To gauge the optimality of a tax credit system the distinction between intensive and extensive margins for labour supply is critical (Saez, 2002).

Results and Summary

- Structural evaluation results of ETC reforms in the UK showed smaller effects than expected.
- But results appear robust - both structural model and difference-in-differences estimate an similar response.
- Due to interaction with other taxes and benefits rather than ‘small’ elasticities.
- And the rise in family allowances – which are given without a work condition.

Results and Summary

- UK reform is close to an optimal ETC structure, provided relatively high social welfare weights are placed on families with children.
- Contrast with implicit welfare weights for the ETC reforms in the US.

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