

Female Labour Supply, Human Capital and Welfare Reform

(NBER Working Paper, also on my webpage)

Richard Blundell, Monica Costa-Dias, Costas Meghir and
Jonathan Shaw

Institute for Fiscal Studies and University College London

July 2014

Issues to be addressed:

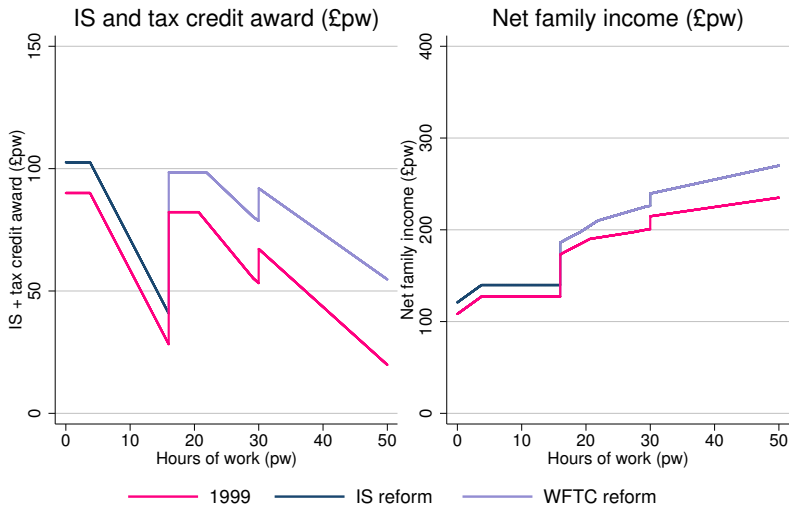
- ① How should **labour supply, work experience dynamics and education decisions** be accounted for in the evaluation of tax and welfare reform?
 - ① Especially in the design, and in the impact evaluation, of **transfers to low wage families** in the form of 'in-work benefits' or 'earned income tax credits'.
 - ② Focus here is on the *labor supply, experience and education decisions of women.*
- ② What is the '**insurance value**' of **redistributive policies** of this kind? And how does the trade-off between insurance and incentives play out?
- ③ Unravel the way the two aspects of **human capital interact with labour supply decisions at the extensive and intensive margin.**

Tax and Welfare Reform in the UK:

- We study a specific reform - **Working Families Tax Credit (WFTC) and Income Support (IS)** in 1999/2000.
- This involved an **increase in the generosity of the welfare and earned income tax credit system** for families with children.
- A motivation for these policies is that by incentivising women into work, even when they have young children, **preserves labour market attachment and reduces skill depreciation**.
- An additional peculiarity of the UK tax-credit system is the **minimum hours eligibility rules** that focus incentives on part-time work.

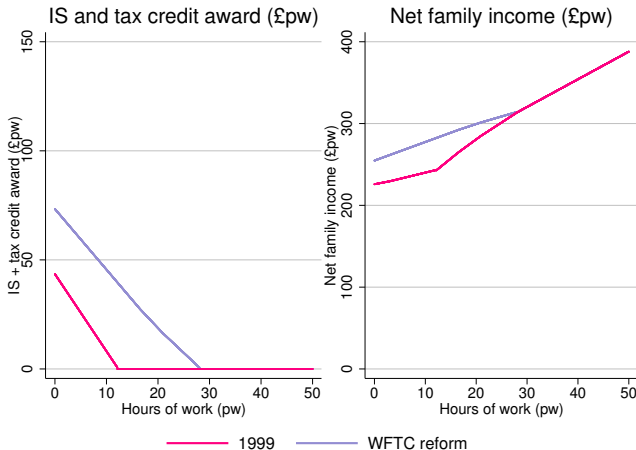
The UK (WFTC) Tax Credit and IS Reform

IS and Tax credit award for lone parent with 1 child



Impact on married women in couples

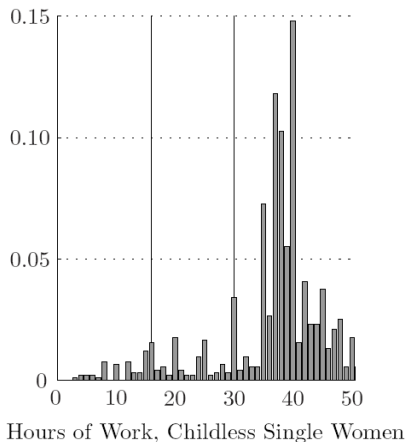
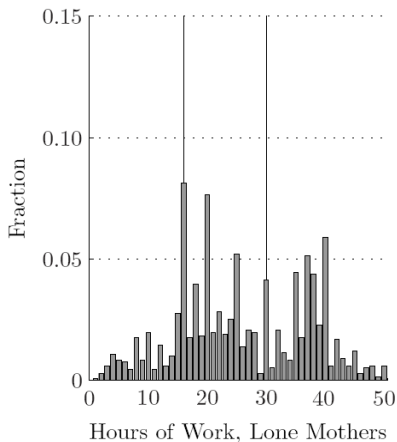
The budget constraint for second-earner parents



Do the hours rules impact on observed behaviour?

The Distribution of Weekly Hours of Work: 1993 FRS

Low Education Single Women with and without Children.



The key question we ask is:

- How do the features of this broad kind of tax, tax-credit and welfare benefit system affect education choices, experience capital accumulation, employment and hours of work over the life-cycle?

The approach we take:

- A structural evaluation/estimation approach, using the time series of tax, tax credit, welfare benefit and tuition reforms for new cohorts of women to identify parameters. Conditioning on life-history family background variables.
- Comparing with Diff-in-Diff/quasi-experimental contrasts where possible.

British Household Panel Survey (BHPS)

Unbalanced panel of 4,200 females over 17 waves, 1991-2007

Measures of education, labour market outcomes, work-related and not-work-related training, childcare, detailed demographics, (limited) assets information.

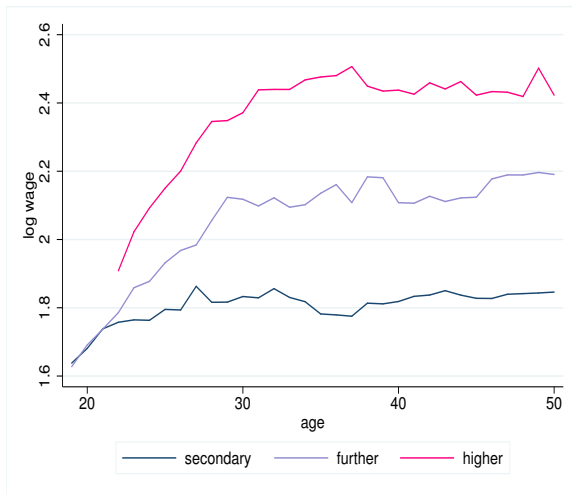
IFS taxben working on every wave:

- Taxes: income tax, NI, council tax
- Benefits: child benefit, maternity grant, tax credits, income support, housing benefit, council tax benefit, free school meals

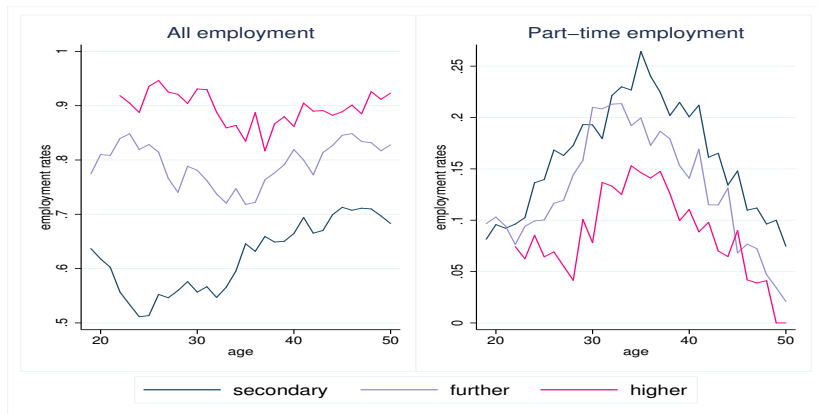
Linked life histories capture choices at age 16: educational qualifications; and detailed family background measures, including

- parental education, number of siblings, sibling order, whether lived with parents when aged 16, books at home as a child, etc

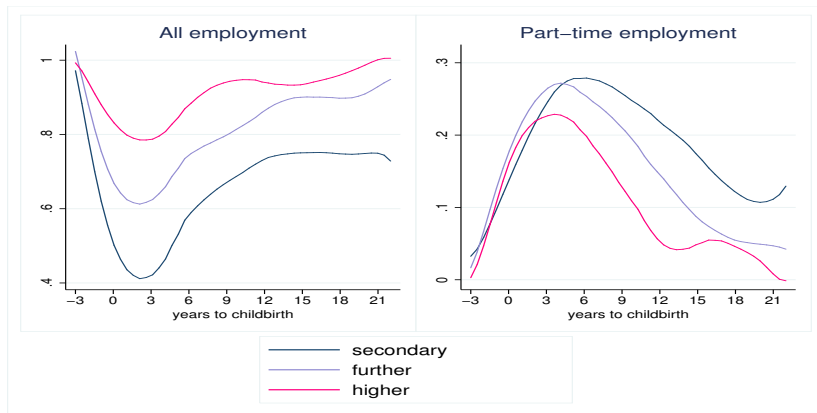
Wage Profiles by Education by Age



Employment over the life-cycle



Employment of mothers



Estimate a dynamic model of labour supply and human capital.

Life in three stages:

- **Education 's=0,1,2'**: three levels chosen sequentially up to age 18/21
 - secondary (GCSE-level at 16), further/high school (A-levels or vocational at 18), higher (university and college at 21)
- **Working life:**
 - consumption 'c' and asset 'a' accumulation
 - labour supply 'l' (0, part-time or full-time)
 - experience accumulation
 - partnering
 - childbearing
- **Retirement:** pension incomes take effect exogenously at age 60

Model: female earnings

Wage equation for individual 'i', age 't', in each birth cohort;
with school level 's', experience 'e', labour supply 'l'

$$\ln w_{sit} = \ln W_{sit} + \gamma_s \ln(e_{sit} + 1) + v_{sit} + \xi_{sit}$$

$$v_{sit} = \rho_s v_{sit-1} + \mu_{sit}$$

$$e_{sit} = e_{sit-1} (1 - \delta_s) + g_s(l_{sit})$$

- $g(l_{sit})$ set to unity for full-time, part-time is estimated.
- persistence of shocks - distinguish heterogeneity from state dependence (experience effects).
- ξ_{sit} is a transitory shock/measurement error.
- correlation of initial shock with preferences.
- concave profile of experience effects.
- depreciation of human capital - cost of not working.

Children:

- Children are born with an (weakly) exogenous arrival rate,

$$\text{Prob} \left[t^k = 0 \mid t, s, k_{t-1}, t_{t-1}^k, m_{t-1} \right]$$

Partner:

- Arrival rate depending on level of education and age,

$$\text{Prob} \left[s_t^m \mid t, s, m_{t-1}, s_{t-1}^m, k_{t-1} \right]$$

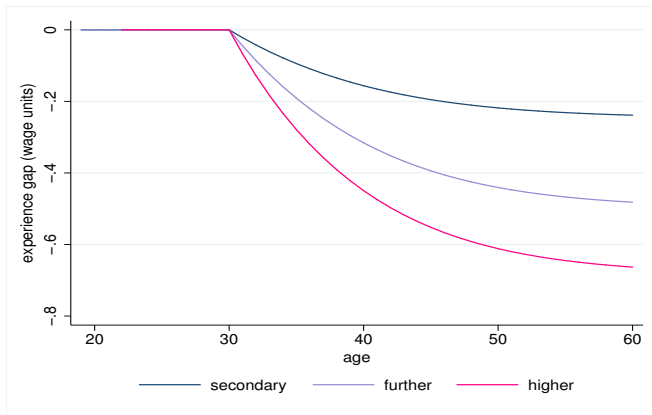
=>> Feed these into a dynamic discrete choice model for labour supply and human capital with net worth borrowing constraints and unobserved heterogeneity.

Female wage equation estimates

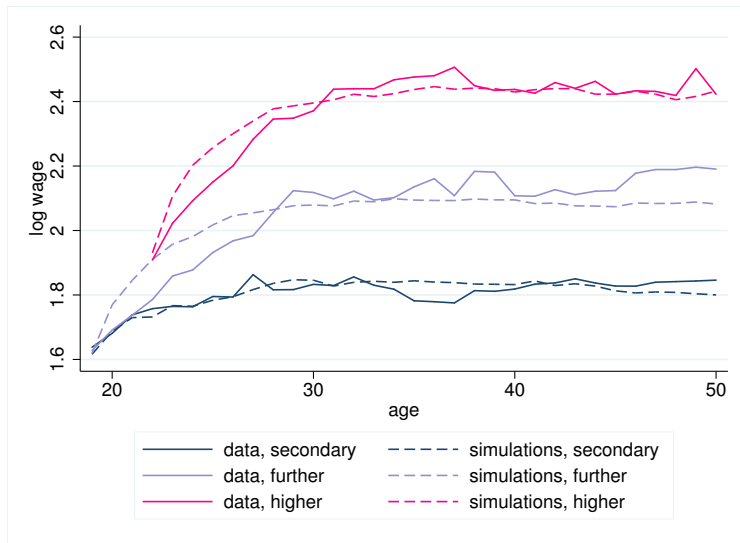
(Method of Simulated Moments)

	Secondary	Further	Higher
wage rate (0 experience)	4.5 (.01)	4.9 (.02)	6.3 (.03)
returns to experience	.14 (.01)	.23 (.01)	.28 (.01)
autocorrelation coef	.92 (.00)	.95 (.00)	.89 (.01)
se innovation	.13 (.00)	.13 (.00)	.12 (.01)
initial prod	.10 (.01)	.10 (.01)	.20 (.01)
initial productivity: se	.30 (.01)	.26 (.01)	.26 (.03)
depreciation rate	.12 (.02)	.11 (.01)	.11 (.03)
accumulation of HC in PTE	.15 (.01)	.12 (.01)	.10 (.01)

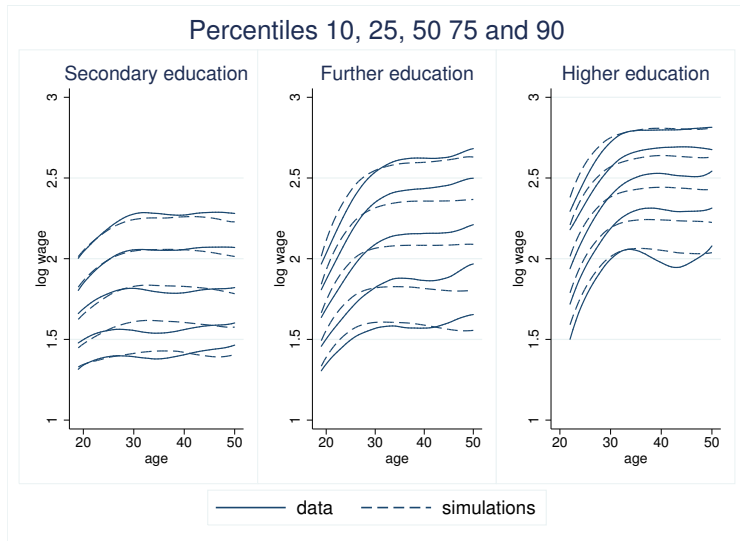
Part-time Experience Penalty



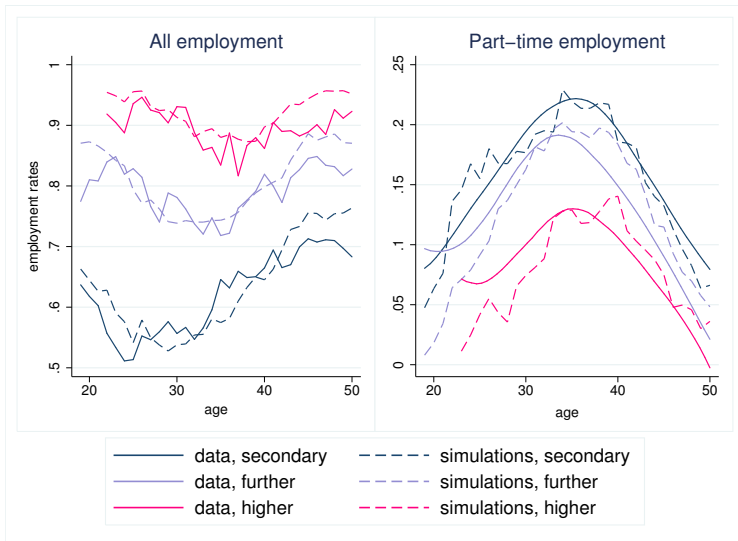
Life-cycle profiles of wages



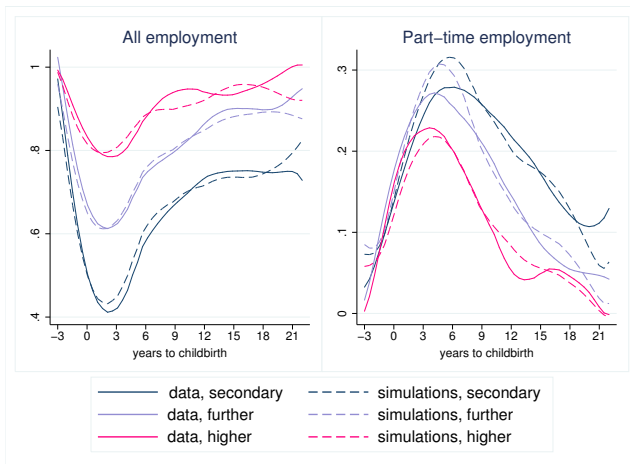
Distribution of female wage rates by age



Employment over life-cycle



Employment of mothers

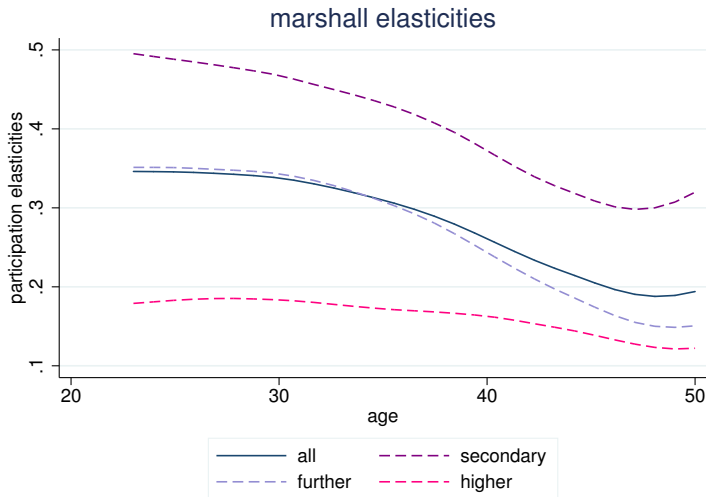


WFTC and IS Reforms for Lone Mothers

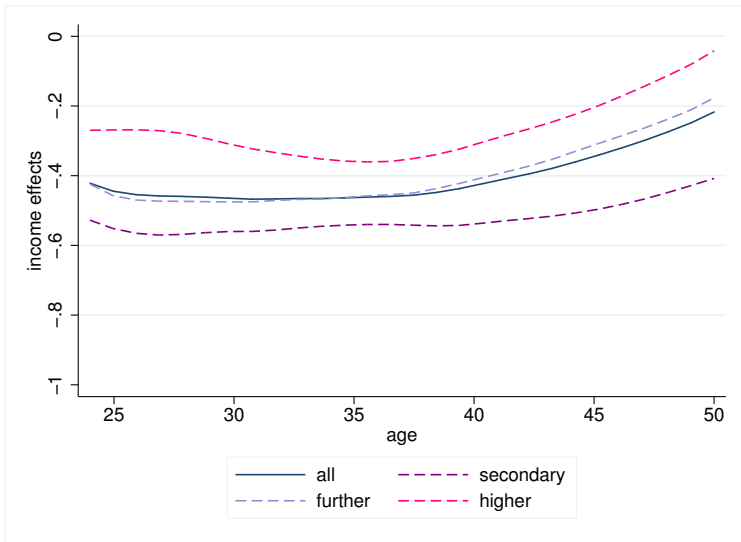
% Point employment impact and matched diff-in-diff for low educated lone parents:

1999 - 2002	Average Impact
Simulations	+3.9
Matched Diff-in-diff	+3.6 (0.5)

Marshallian Elasticities by Age: Extensive



Income Effects at Extensive Margin by Age



Results: Impact of WFTC & Child IS Reform

Revenue Neutral Reform, basic tax rate adjustment

I. Impact on Employment of Younger Women:

No Education Choice						
	Single Mother			Couple with Kids		
	Sec.	Fur.	Uni.	Sec.	Fur.	Uni.
employment	3.8	1.5	-0.5	-2.5	-1.2	-0.8

II. Impact on Education Shares:

	Sec.	Fur.	Uni.
1999	30.4	47.5	22.1
2002	31.2	47.2	21.6

Results: Impact of WFTC & Child IS Reform

Revenue Neutral Reform, basic tax rate adjustment

I. Impact on Employment of Younger Women:

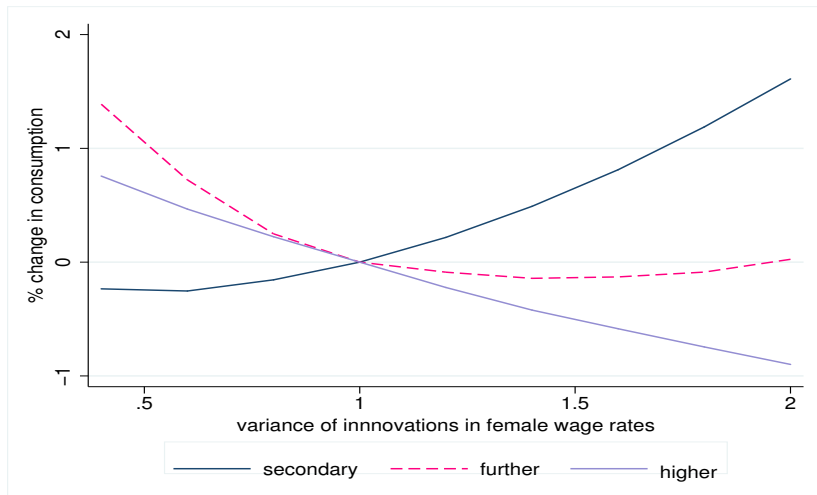
No Education Choice						
	Single Mother			Couple with Kids		
	Sec.	Fur.	Uni.	Sec.	Fur.	Uni.
employment	3.8	1.5	-0.5	-2.5	-1.2	-0.8

II. Impact on Education Shares:

	Sec.	Fur.	Uni.
1999	30.4	47.5	22.1
2002	31.2	47.2	21.6

Risk Aversion and the Value of Insurance

Willingness to pay in consumption



Summary and Discussion

- Experience effects are lower for the lower educated and for those in part-time work, *explaining the part-time penalty*.
- Women with low labour market attachment have more elastic labour supply at younger ages and large income responses.
- There is a small effect of tax credits on education choice, with some women obtaining less education, and attenuating the employment gains of the reform.
- The insurance value of the welfare program is substantial, *particularly for the lowest education/skill groups*.
- The results can explain previous structural and quasi-experimental results for the WFTC/IS, and similar, reforms.
- Next steps: sector choice, training, and frictions.

Training participation rates by age and education

Work-related training participation rates (50h+)

