



Institute for
Fiscal Studies

A lifetime perspective on the distributional and incentive effects of UK personal taxes

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Background

- Tax/benefit reform often driven by
 - Redistributive purposes
 - Desire to encourage certain behaviours – labour supply, education
- Heterogeneous and complex responses
 - Depend on how economic incentives are affected
 - Overall tax policy environment
 - Individual idiosyncratic circumstances that vary over the course of life
 - and how incentives influence behaviour
 - Present and future costs and gains
 - (Market conditions)
- To understand the effects of tax reform need to consider
 - heterogeneous incentives in a complex net of taxes and benefits
 - heterogeneous responses to incentives
 - lifetime consequences of such responses

Background

Two related branches of the literature

1. Studies assessing the impact of personal taxes allowing for heterogeneous effects and behavioural responses
 - Effect of work-contingent benefits on labour supply of parents (Brewer et al., 2006, Francesconi and van der Klaauw (2007) and others)
 - Optimal taxation of low income families with children (Blundell and Shephard, 2009)
- Static framework: individuals disregard future consequences of their actions
- Yet, many individual decisions are dynamic in nature
 - Education and human capital formation, labour supply, marriage and child bearing
 - Large changes in incentives may have life-cycle effects
 - Progressive taxation and the value of education and human capital
 - Work-contingent subsidies: human capital formation and job-attachment
 - Insurance value of taxation and insurance value of human capital
- Often dependence of results on tax environment not clearly established

Background

2. Studies of the lifecycle and cross-sectional distribution of income and tax burden
 - Progressivity of tax system from life-cycle and cross section perspectives (Bengtsson and others, 2011, Piketty and Saez, 2007)
 - Distribution of top incomes (Atkinson, 2005, Dell, 2006)
- Focus on how the tax system changes the income distribution
- Consider all sources of income and pay, with particular attention to top incomes
- But no attempt to understand how taxation changes incentives and affects behaviour

This project

- Aims to bring together the two branches of the literature
 - To characterise the transfer system from a lifetime perspective
 - Who pays and at what stage of the lifecycle
 - Implied redistribution
 - Insurance role
 - While understanding how the transfer system shapes working and education incentives
 - How incentives change over time
 - And the induced behavioural responses and dynamic lifecycle consequences
 - Which partly explain the observed lifetime patterns in public transfers
- Study UK personal tax system
 - Focus on earned income
 - Using a detailed description of personal taxes and subsidies
 - Analysis relevant for the bottom 95% of the income distribution
 - *But* disregard retirement pensions

Some questions

1. How do financial work incentives change over lifecycle?
 - Build on previous “snapshot” studies of METR and PTR
 - Describe distributions of METR and PTR by age and other factors
 - Cross-section versus lifetime incentives
2. How do financial work incentives vary over the income distribution?
 - Annual versus lifetime income
 - Relation to tax progressivity
 - Changes over time
3. How is tax burden distributed over the lifecycle and population?
 - Lifecycle tax burden and its distribution across life periods
 - Distribution of lifecycle tax burden over population and relation to history of family composition, education and initial family background
 - Implied level of lifecycle redistribution of current UK tax system

Framework

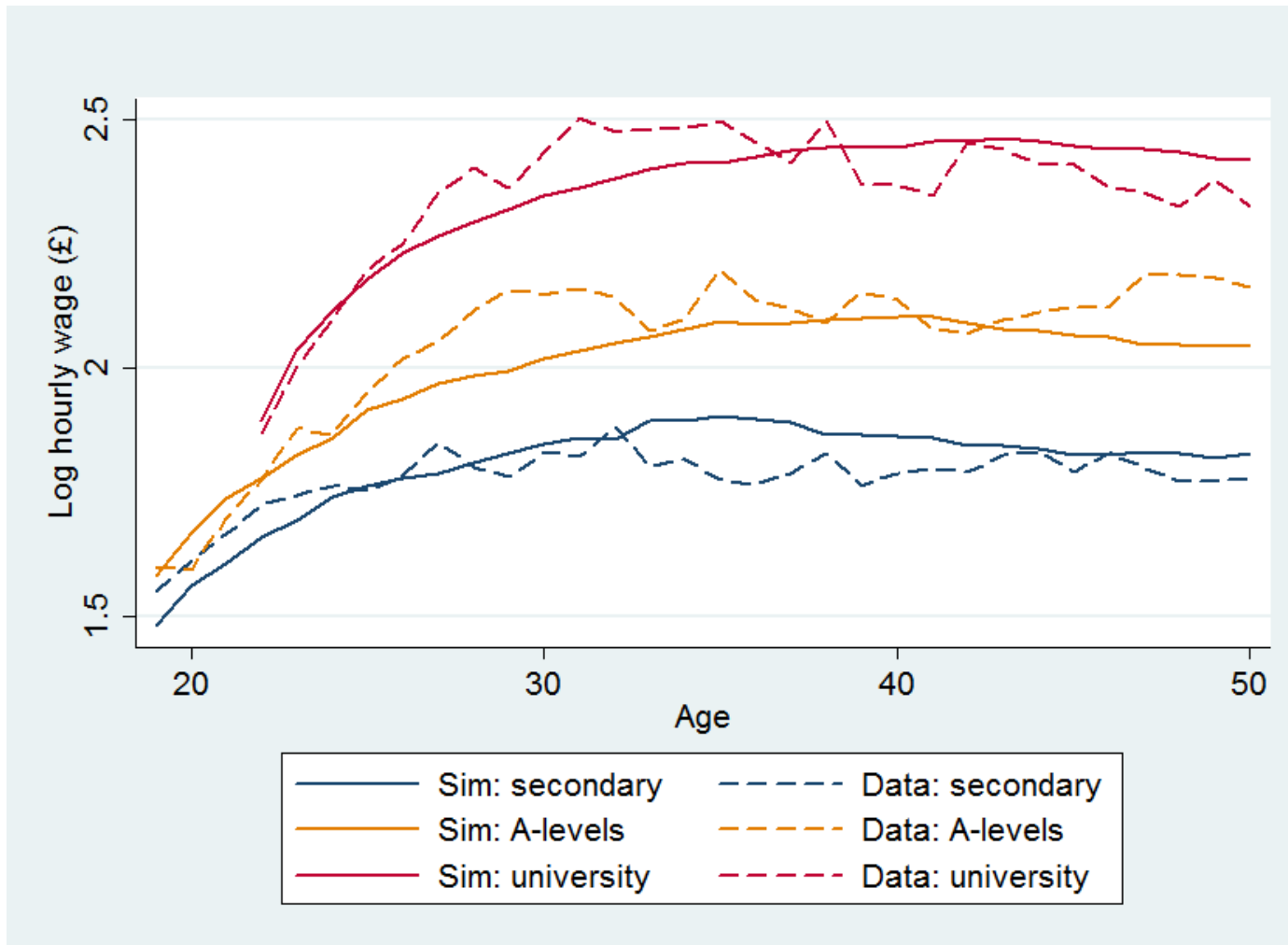
- Structural dynamic model of education, labour supply and savings
 - Coupled with detailed description of personal tax system
 - Allowing for study of current system, consequences of recent changes and counterfactual analysis of hypothetical reforms
- Focus on women, for whom behavioural responses are more important
 - Role of family composition
 - Importance of childcare costs
- Life in three stages
 1. Education (up to 18/21)
 - Secondary, A-levels or university (determines type of human capital)
 2. Working life (18/21-59)
 - Labour supply {0, PT, FT} and consumption
 - Marriage and childbearing
 3. Retirement (60-69)
 - Deterministic at age 60

Framework (2)

- Heterogeneous individuals
 - Start of life: preferences for work/study, ability, initial wealth
 - During life: family formation, productivity (health)
- Uncertainty faced by individuals
 - Own productivity (health)
 - Family dynamics: partnering/separation, child bearing
 - Partner employment and income
 - Personal insurance mechanisms include human capital and savings
- Individual decisions conditioned by market failures: insurance and credit markets
- Role for policy
 - Redistribution: *ex-ante* inequality and permanent productivity shocks
 - Mutualising risk by facilitating life-cycle transfers
 - transitory income shocks in the presence of market failures

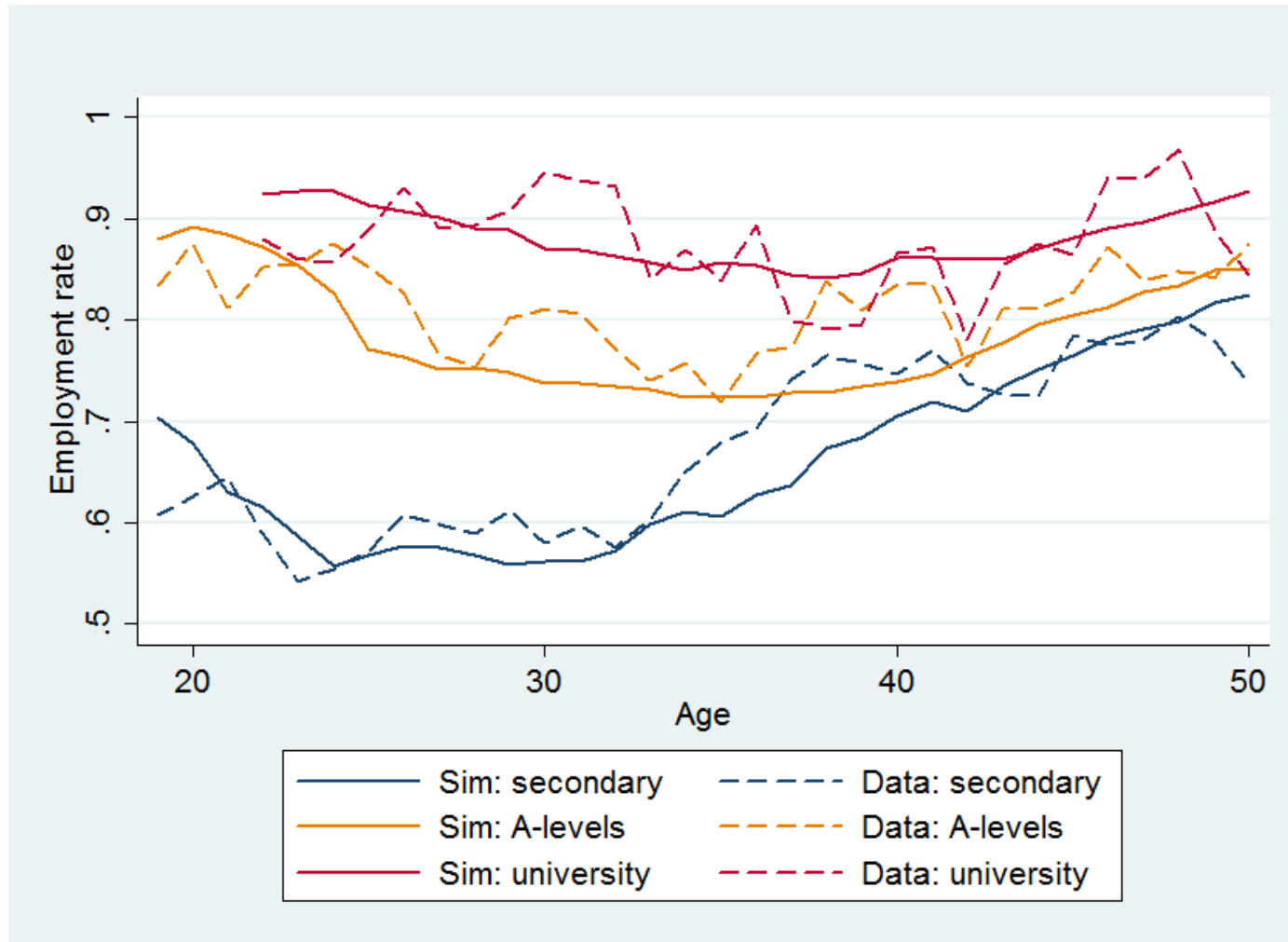
Model fit (1)

Log hourly wage over the lifecycle by education level



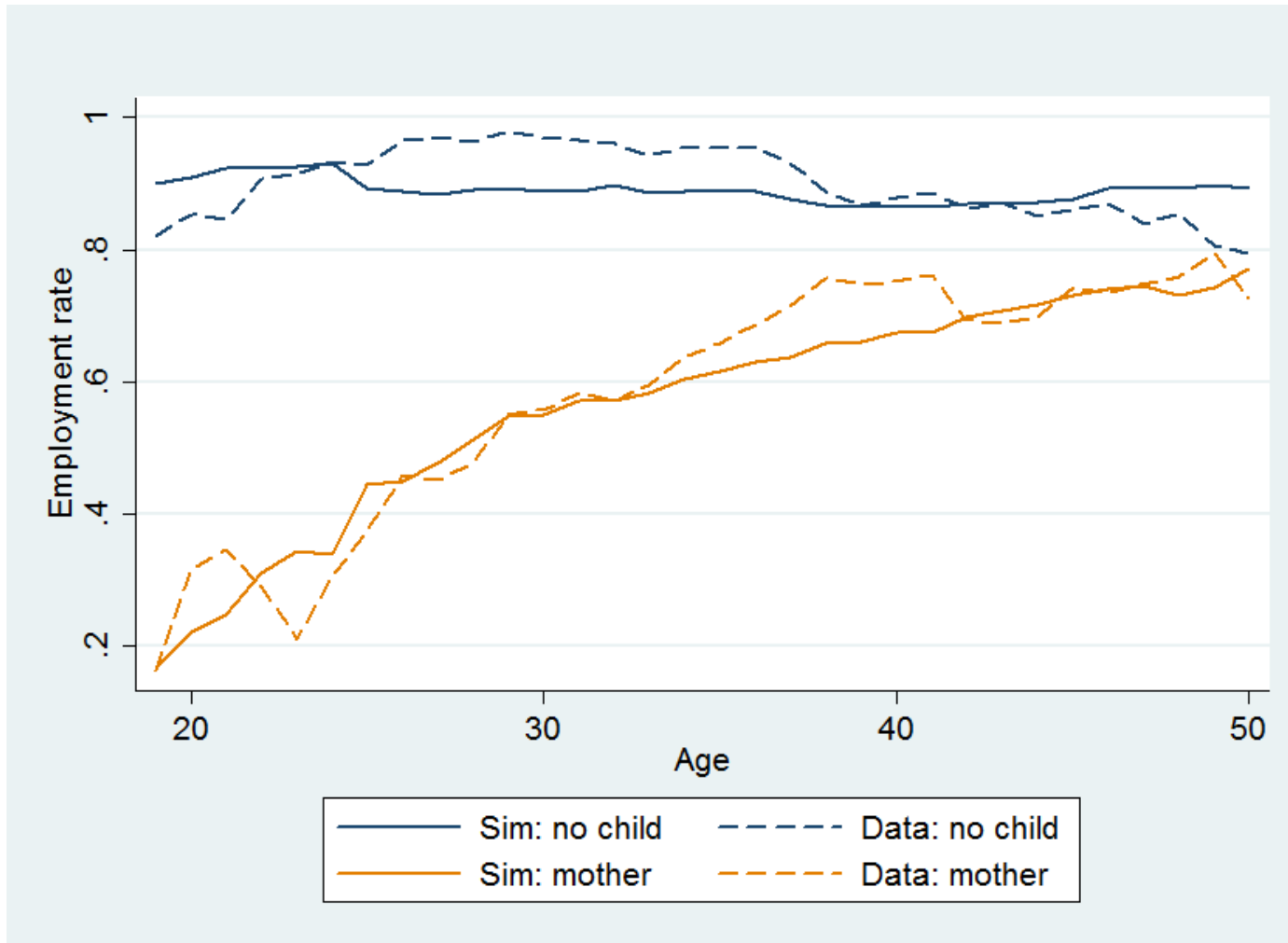
Model fit (2)

Employment rate over the lifecycle by education level



Model fit (3)

Employment rate over the lifecycle by presence of child



Model fit (4)

Impact of WFTC reform on employment

Combined effect of WFTC and other reforms between 1999 and 2002

	Our model	BBS (2005)	FRK (2009)	BDSS (2006)
Lone mothers	+4.4%	+3.6%		+3.7%
Women in couples				
All	-2.0%		+0.7%	-0.4%
Partner working	-3.0%	-0.1%	+0.1 to +0.6%	
Partner not working	+4.1%	+2.6%	+3.1%	

BBS (2005) = Blundell, Brewer and Shephard (2005); reduced form estimate

FRK (2009) = Francesconi, rainer and van der Klaauw (2009); reduced form estimate

BDSS (2006) = Brewer, Duncan, Shephard and Suarez (2006); static structural estimate

METR and PTR

- Definition: proportion of the change in gross family earnings from changing hours of work lost to increased taxes and reduced benefits
- Difference between METR and PTR is size of hours change

$$METR / PTR = 1 - \frac{Y_1 - Y_0}{E_1 - E_0}$$

E_0 = gross family earnings

E_1 = incremented gross family earnings

Y_0 = net family earnings

Y_1 = incremented net family earnings

- We treat childcare in two ways:
 - “No childcare costs”
 - “Varying childcare costs” – treated like a tax
- METR based on working one extra hour

ATR including subsidies

- Definition: tax burden as a proportion of gross family earnings
- Tax burden is net of subsidies
- Excludes foregone subsidies while unemployed

$$ATR = \frac{T}{E}$$

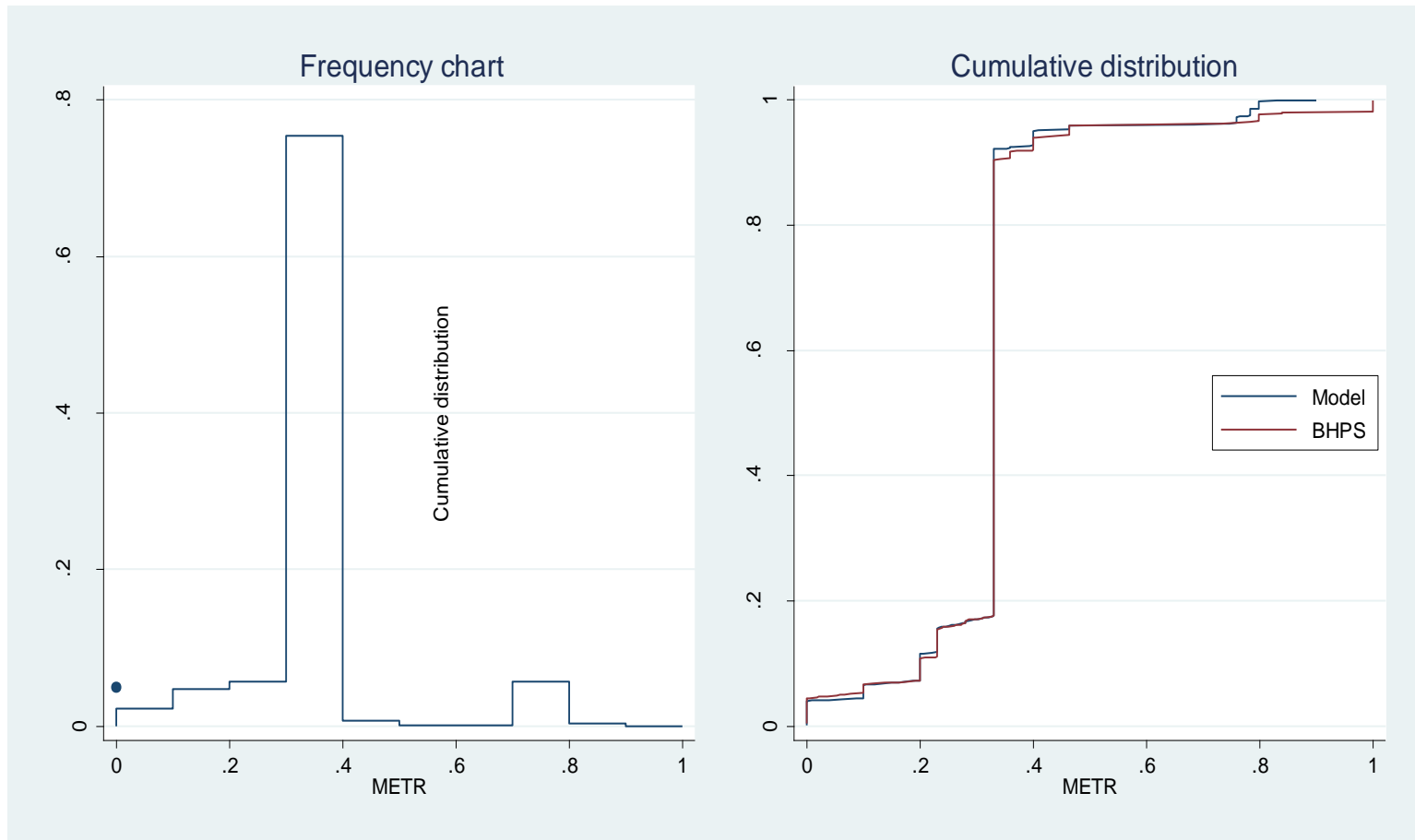
T = family tax burden net of subsidies
 E = gross family earnings

- We treat childcare in two ways:
 - “No childcare costs”
 - “Varying childcare costs” – treated like a tax

METR for working females (no childcare costs)

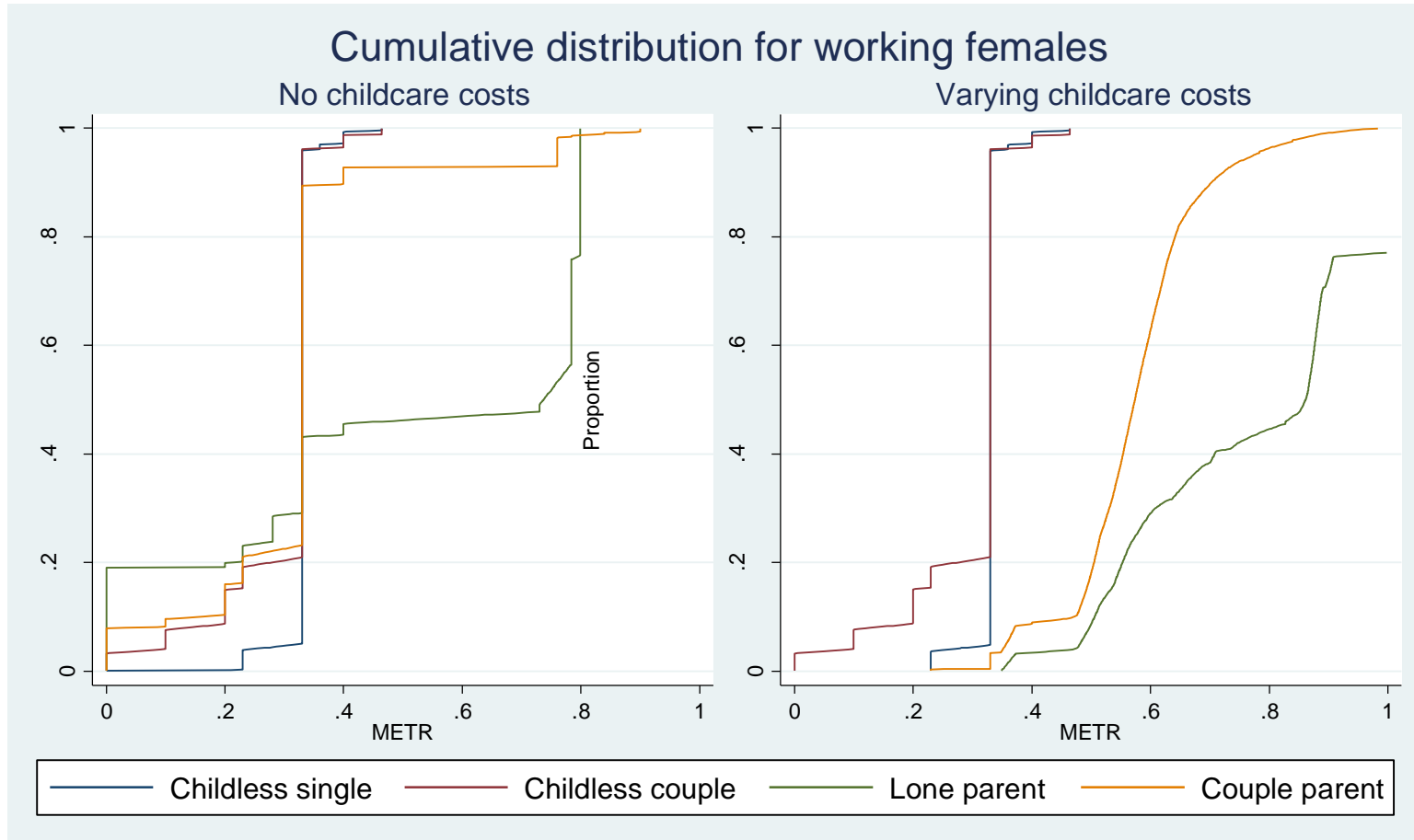
Model versus BHPS data

1999 tax system



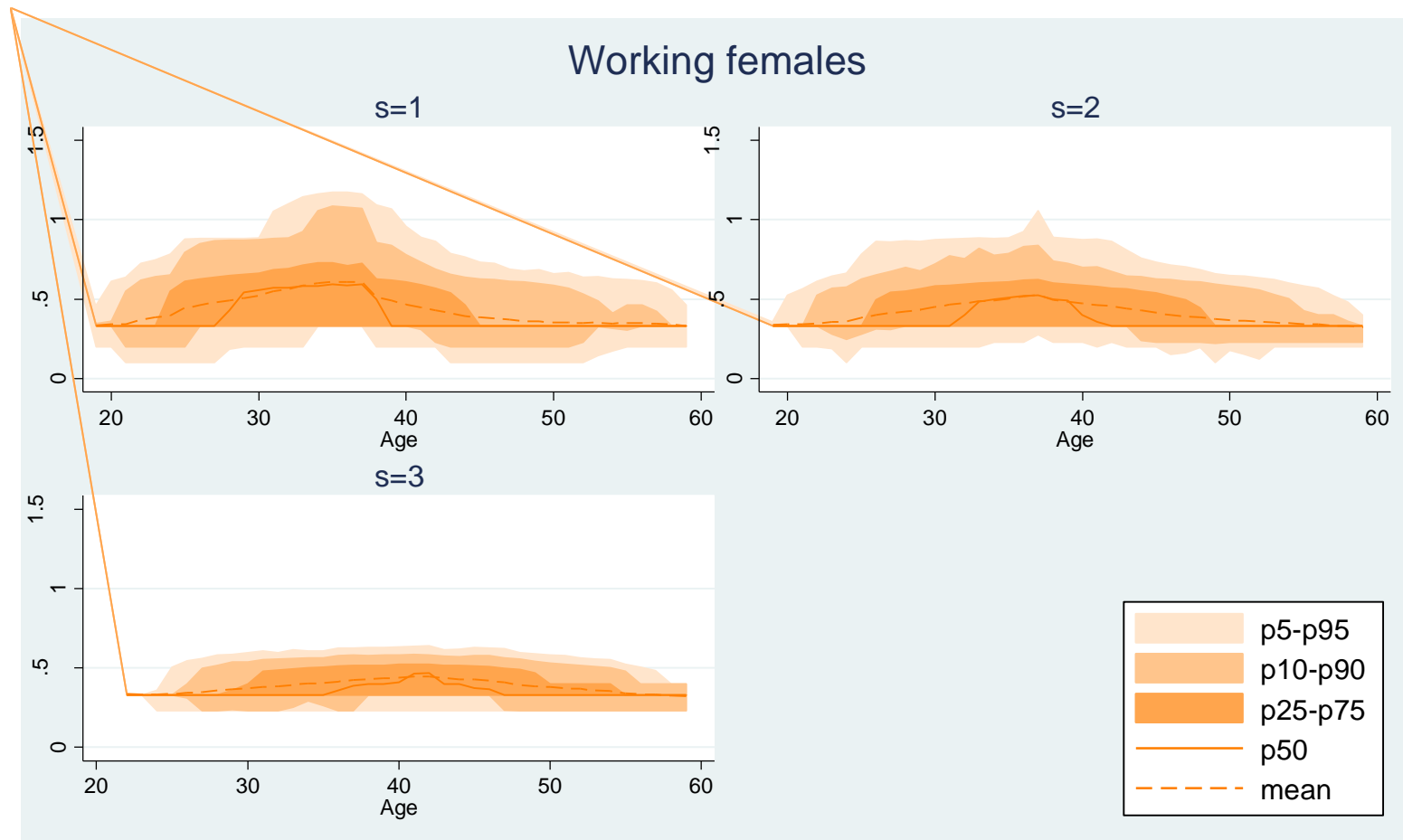
METR by family type

1999 tax system



METR by age and education

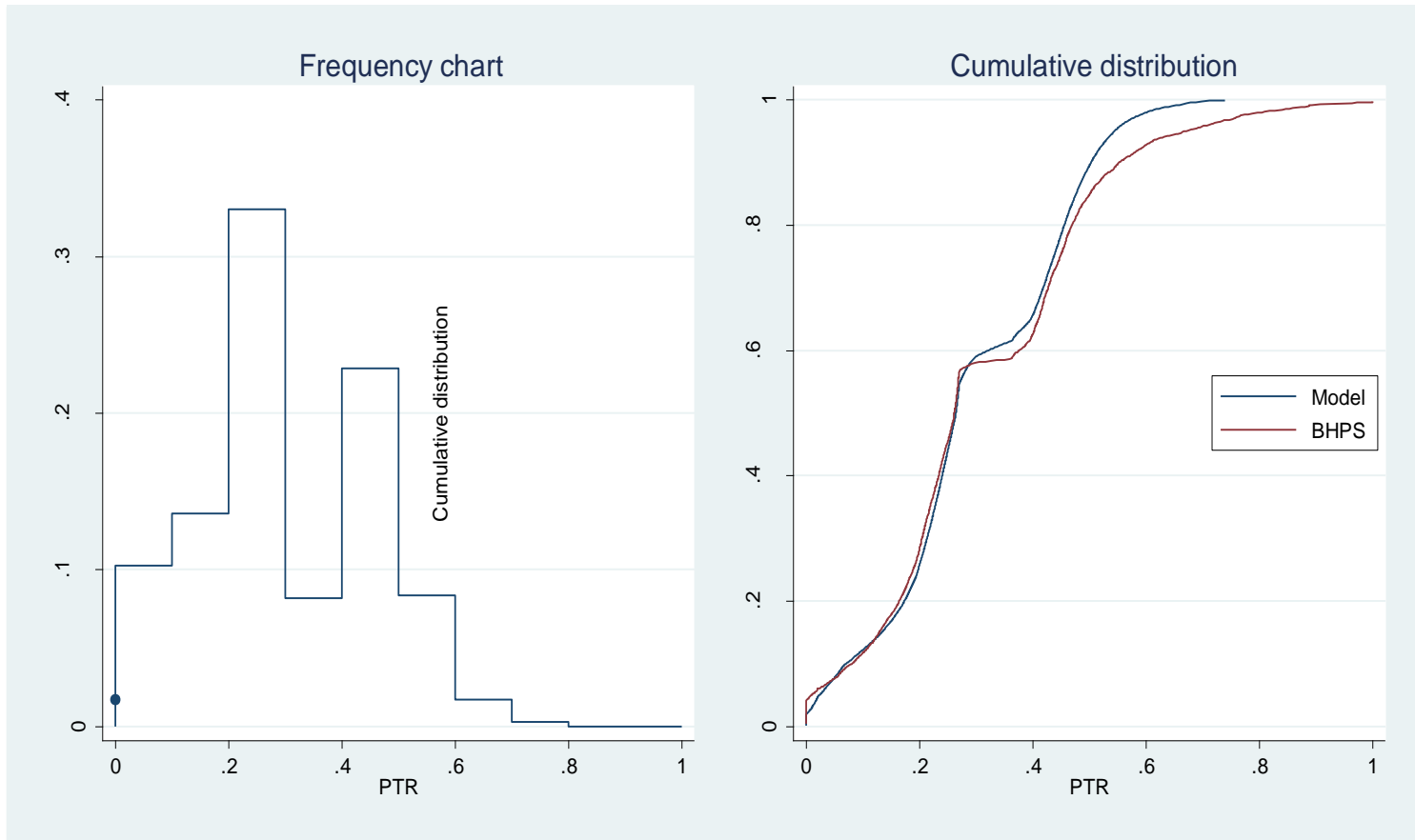
Varying childcare, 1999 tax system



PTR for working females (no childcare costs)

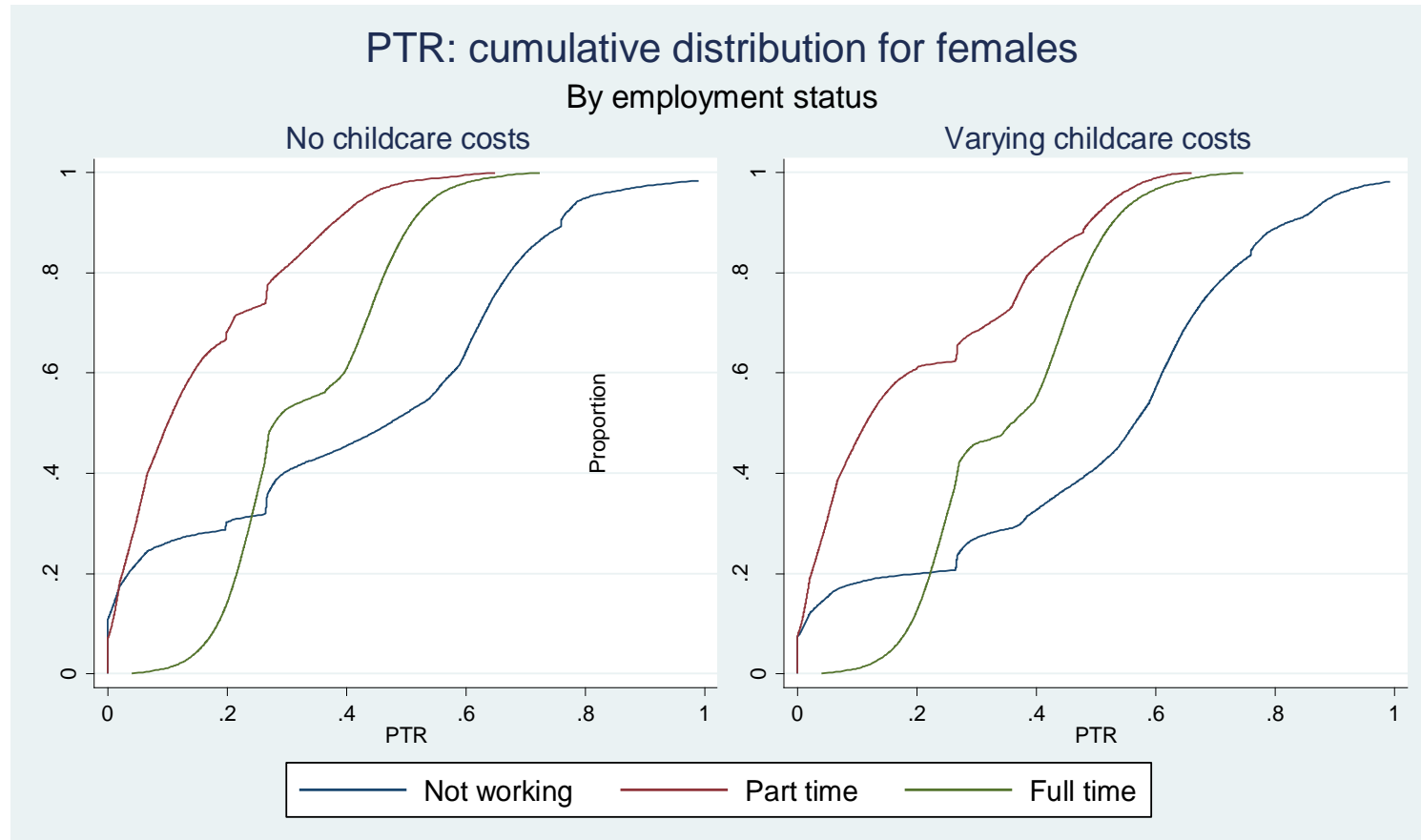
Model versus BHPS data

1999 tax system



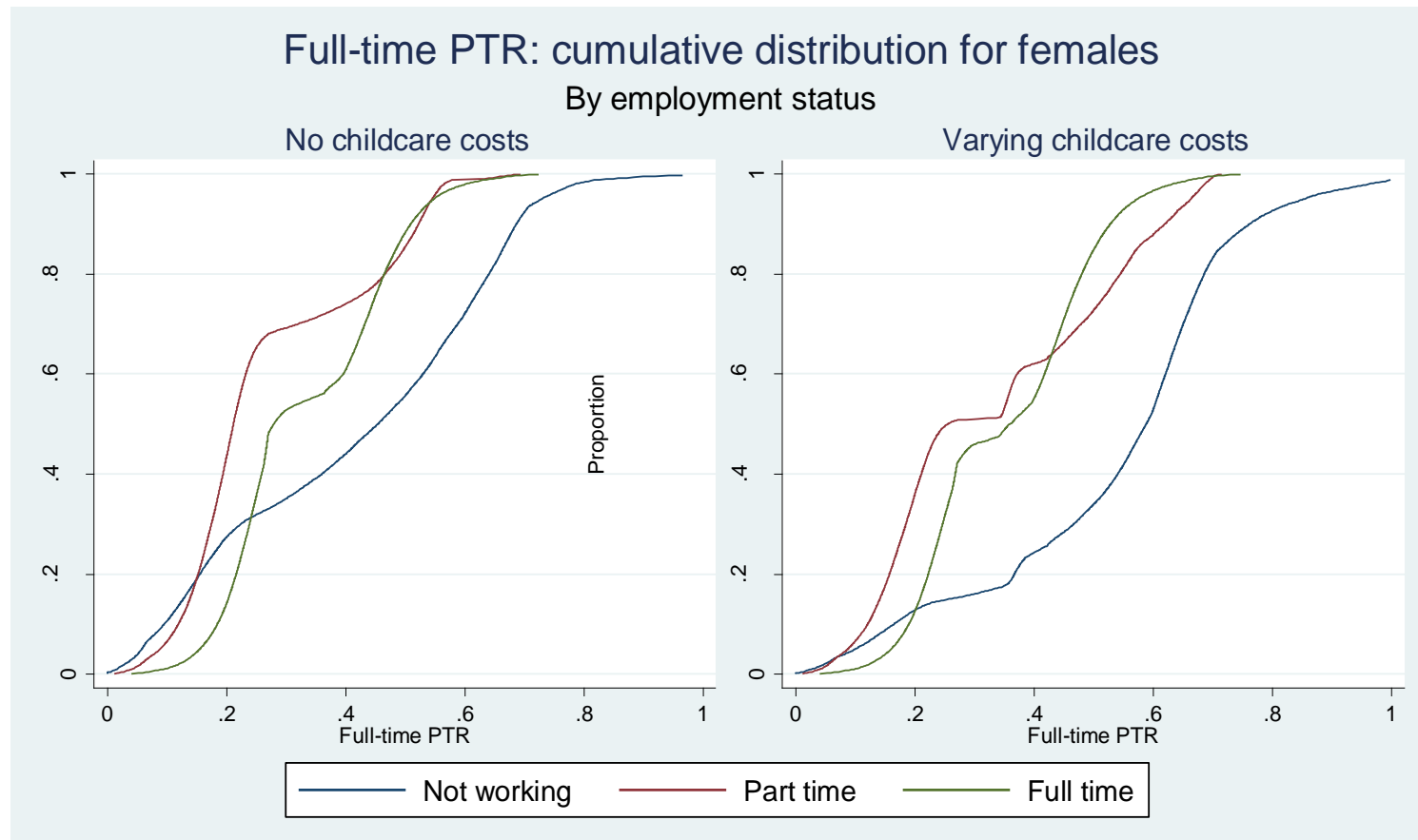
PTR by employment status

All females, 1999 tax system



PTR by employment status: full-time work

All females, 1999 tax system



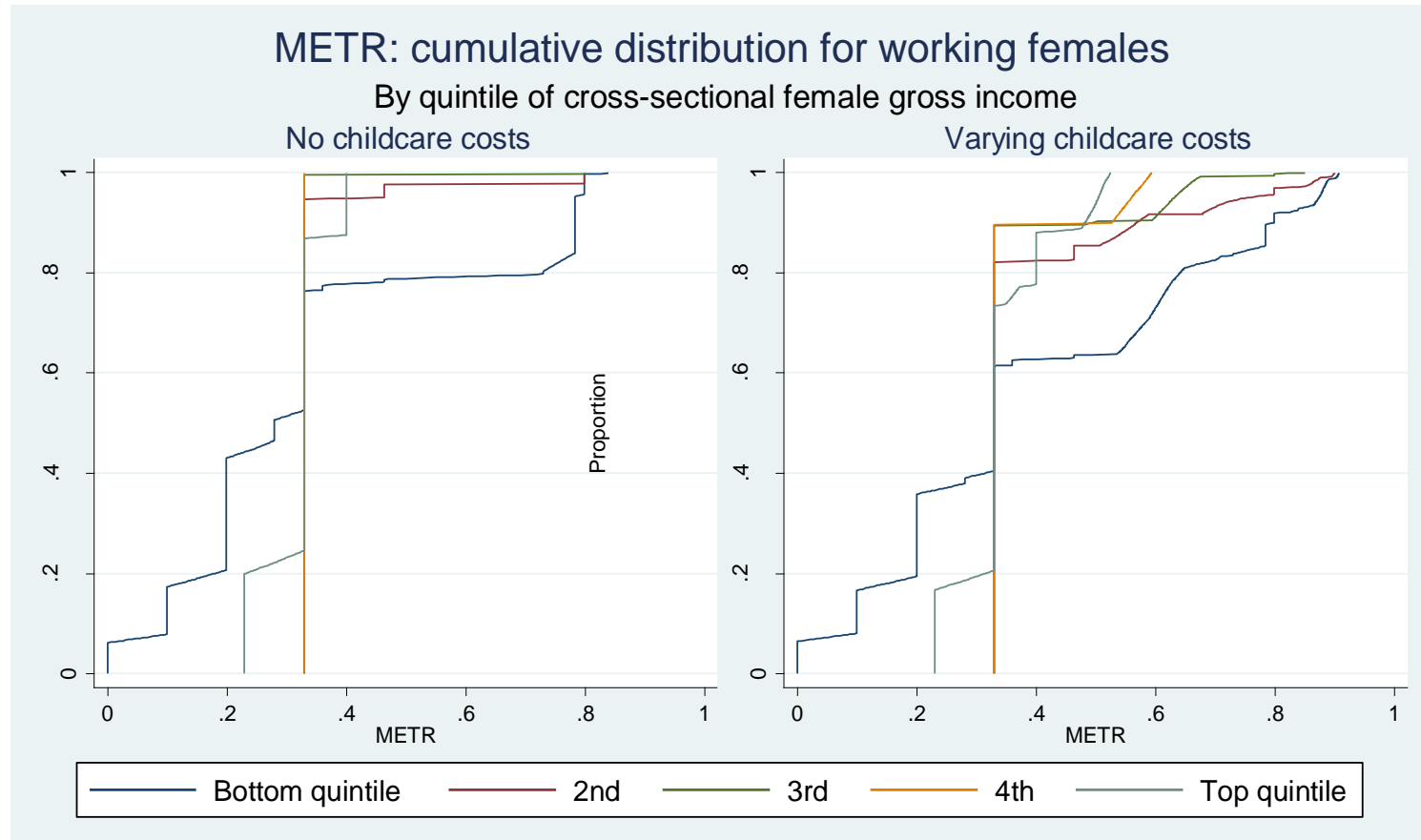
Working incentives

1999 tax system

- Over 70% of working females face same METR
- Mothers, especially lone mothers, face largest disincentives at the intensive margin
- Disincentives are stronger for low-skilled workers, who are more likely to be on taper regions for Family Credit
- We predict women respond to incentives at the extensive and intensive margins:
 - Unemployed women face higher PTR
 - Women in part-time work face especially low PTRs for PT work

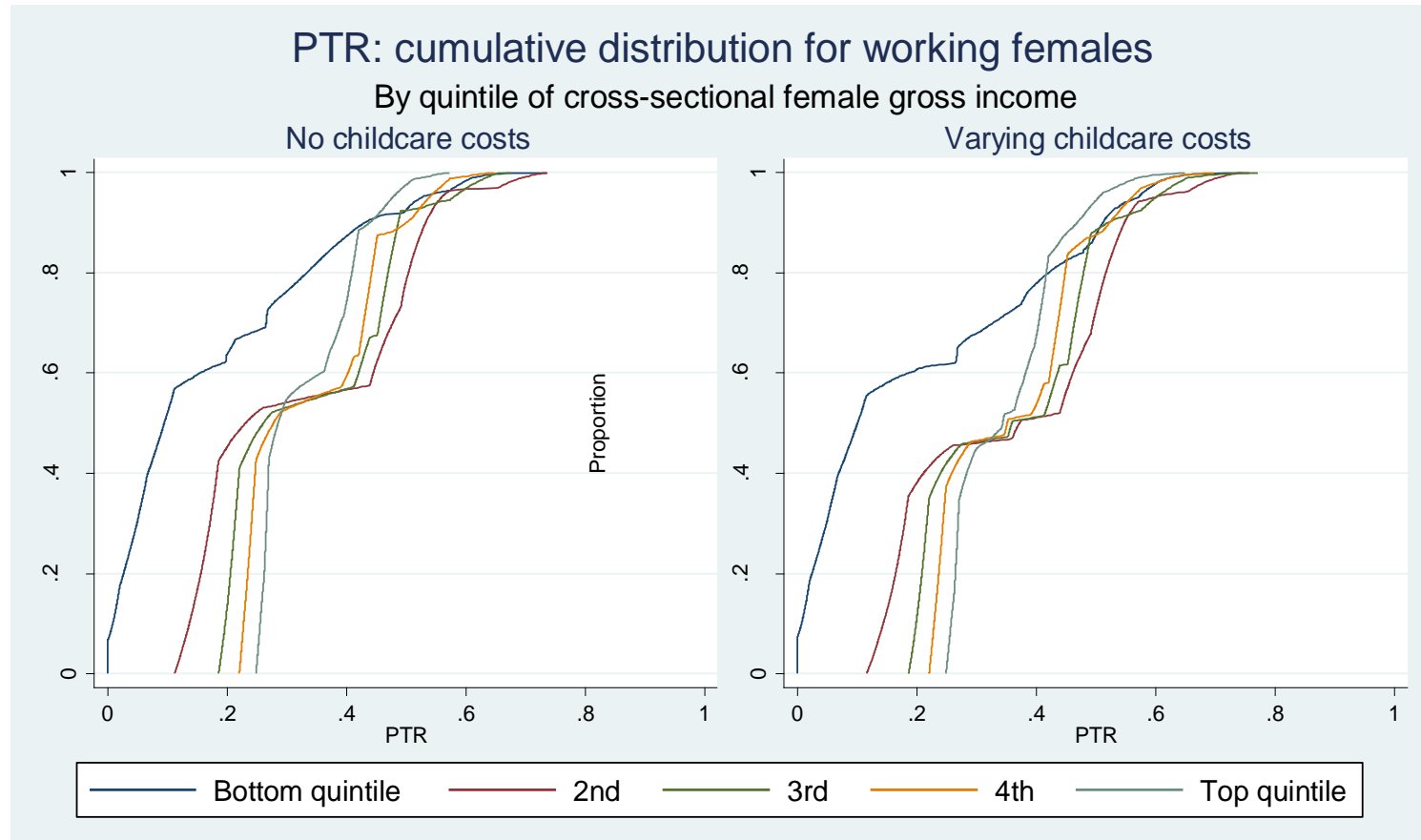
METR by annual earnings

Working females, 1999 tax system



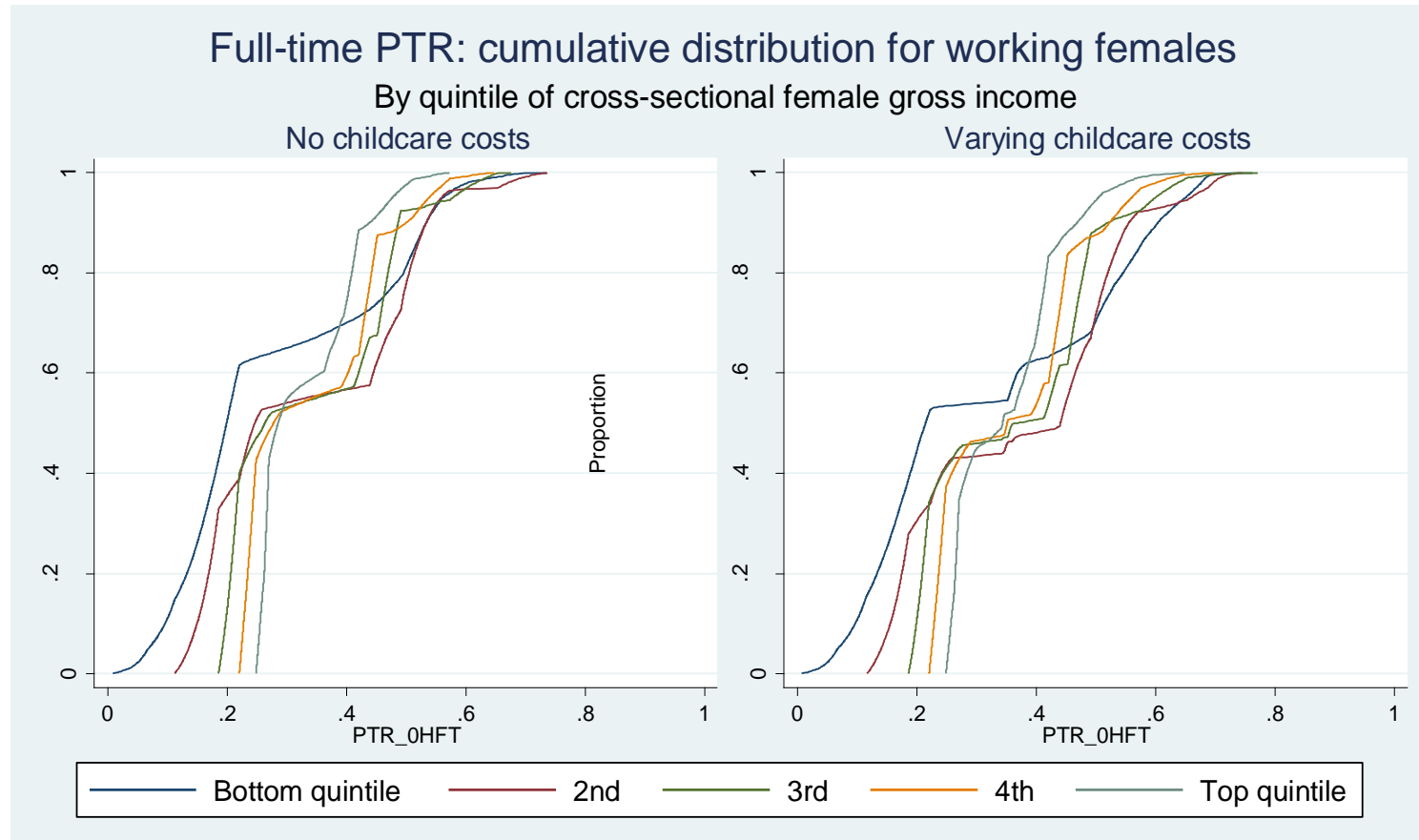
PTR by annual earnings

Working females, 1999 tax system



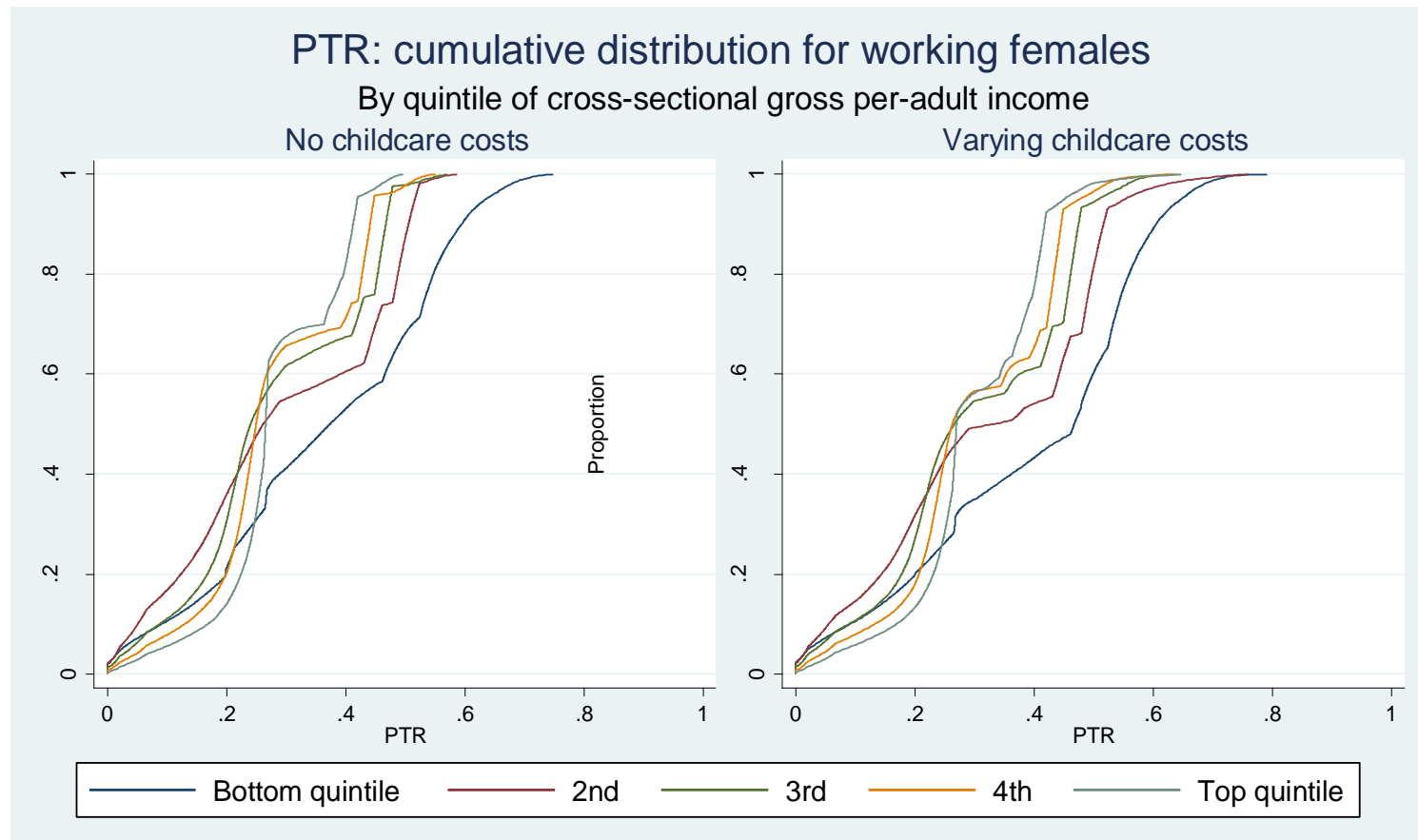
PTR by annual earnings: full-time work

Working females, 1999 tax system



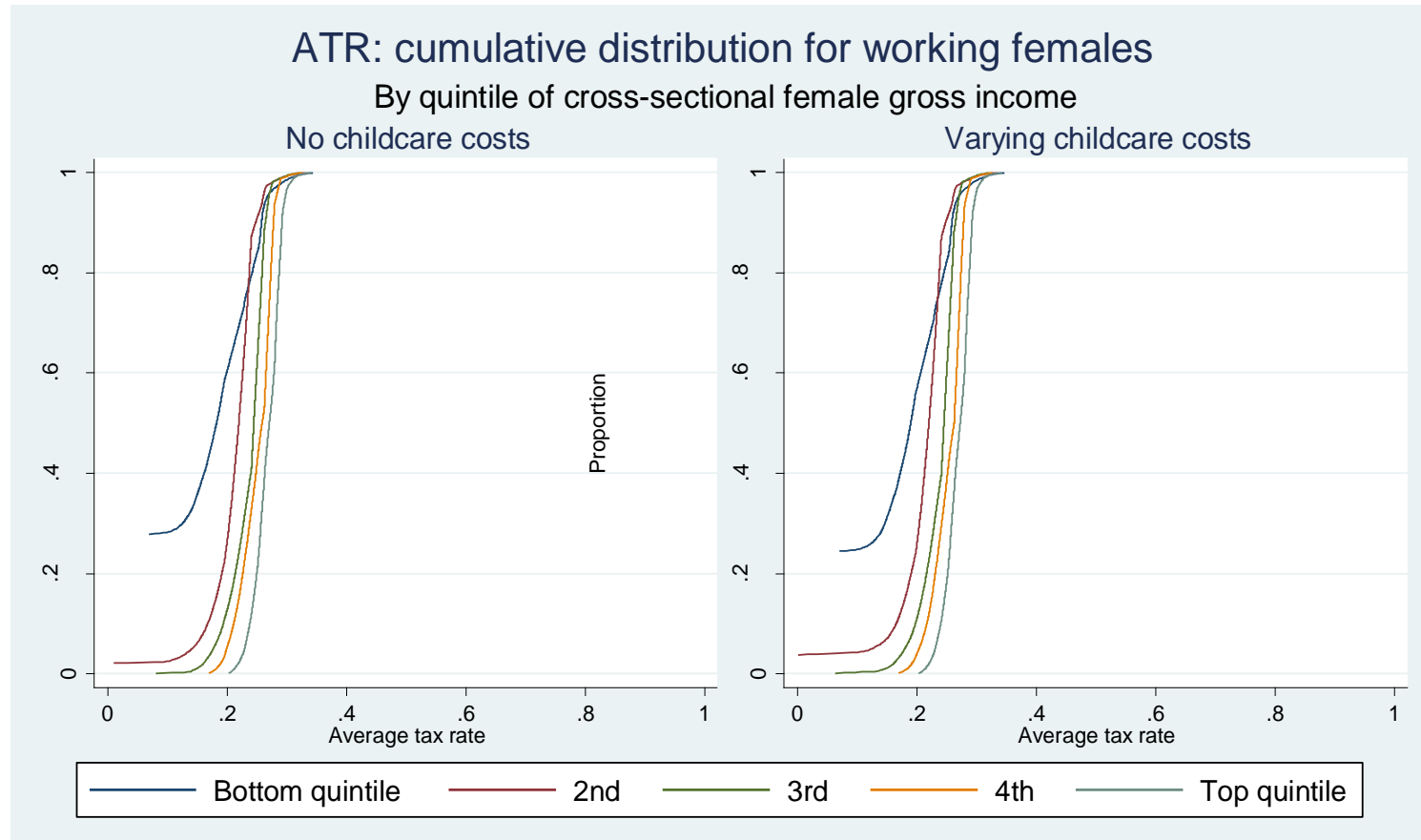
PTR by annual family earnings

Working females, 1999 tax system



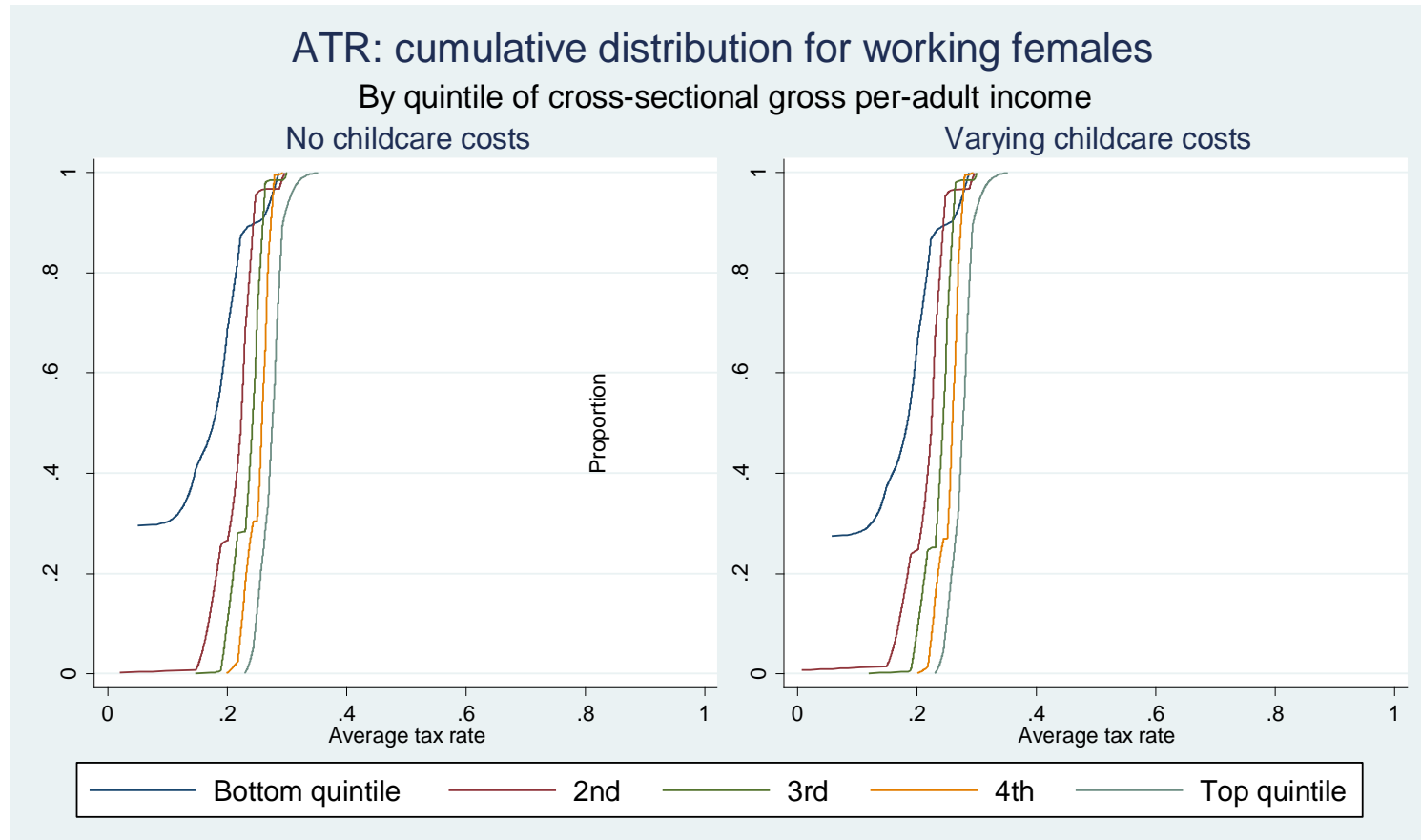
ATR (including subsidies) by annual earnings

Working females, 1999 tax system



ATR (including subsidies) by annual family earnings

Working females, 1999 tax system



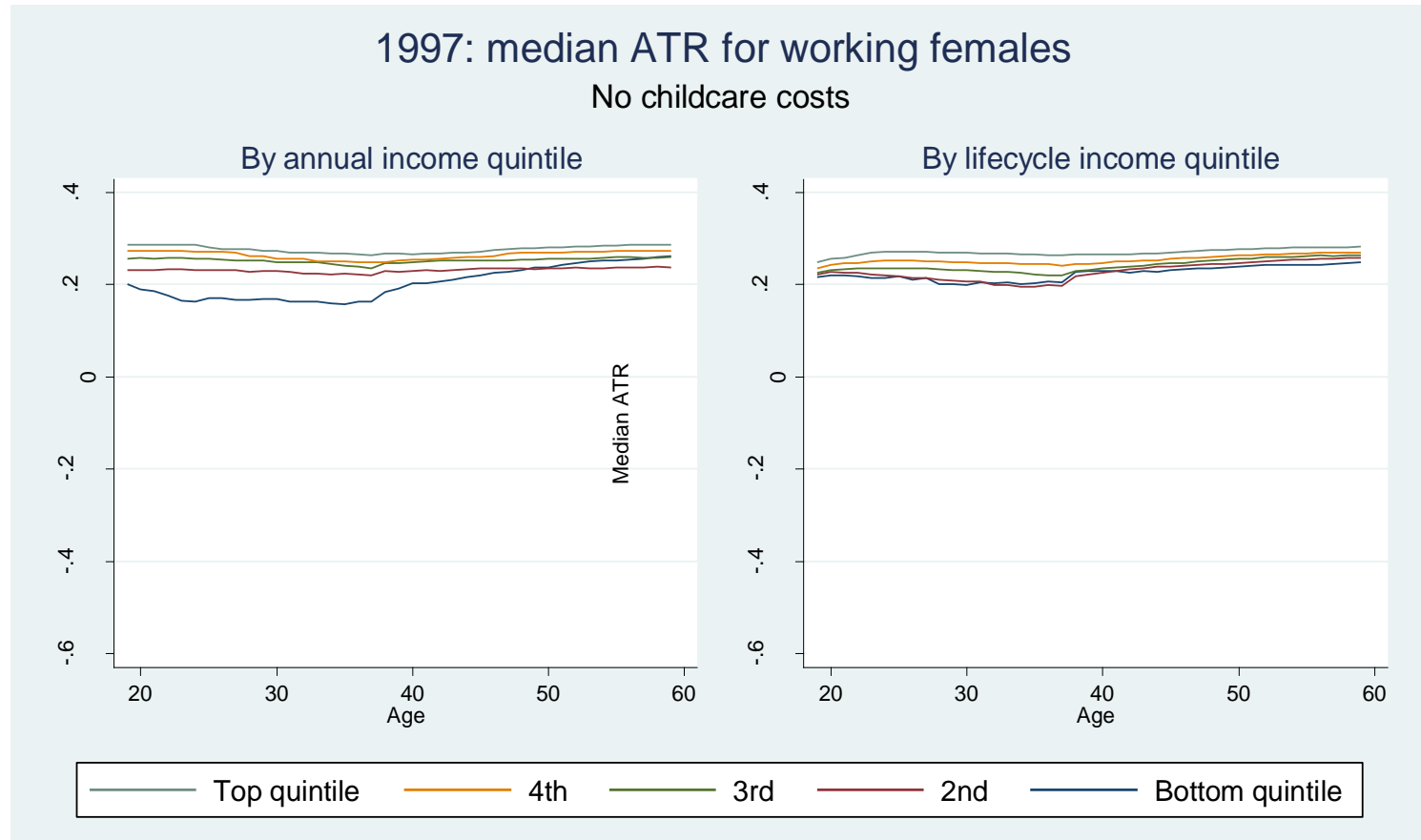
Work incentives and progressivity

1999 tax system

- High taxes at the intensive labour supply margin affect disproportionately the bottom of the earnings distribution
 - Likely to be exposed to benefit and tax credit withdrawal
- At the extensive margin, the women on lower earnings face lower PTRs
 - But partly due to choice of lower hours of work
- However, when considering family income quintiles, high PTRs affect the lowest quintile more
- But the tax system looks mildly progressive from an annual perspective, with ATRs increasing with income among working women
- Although ATRs much more homogeneous than METR or PTRs

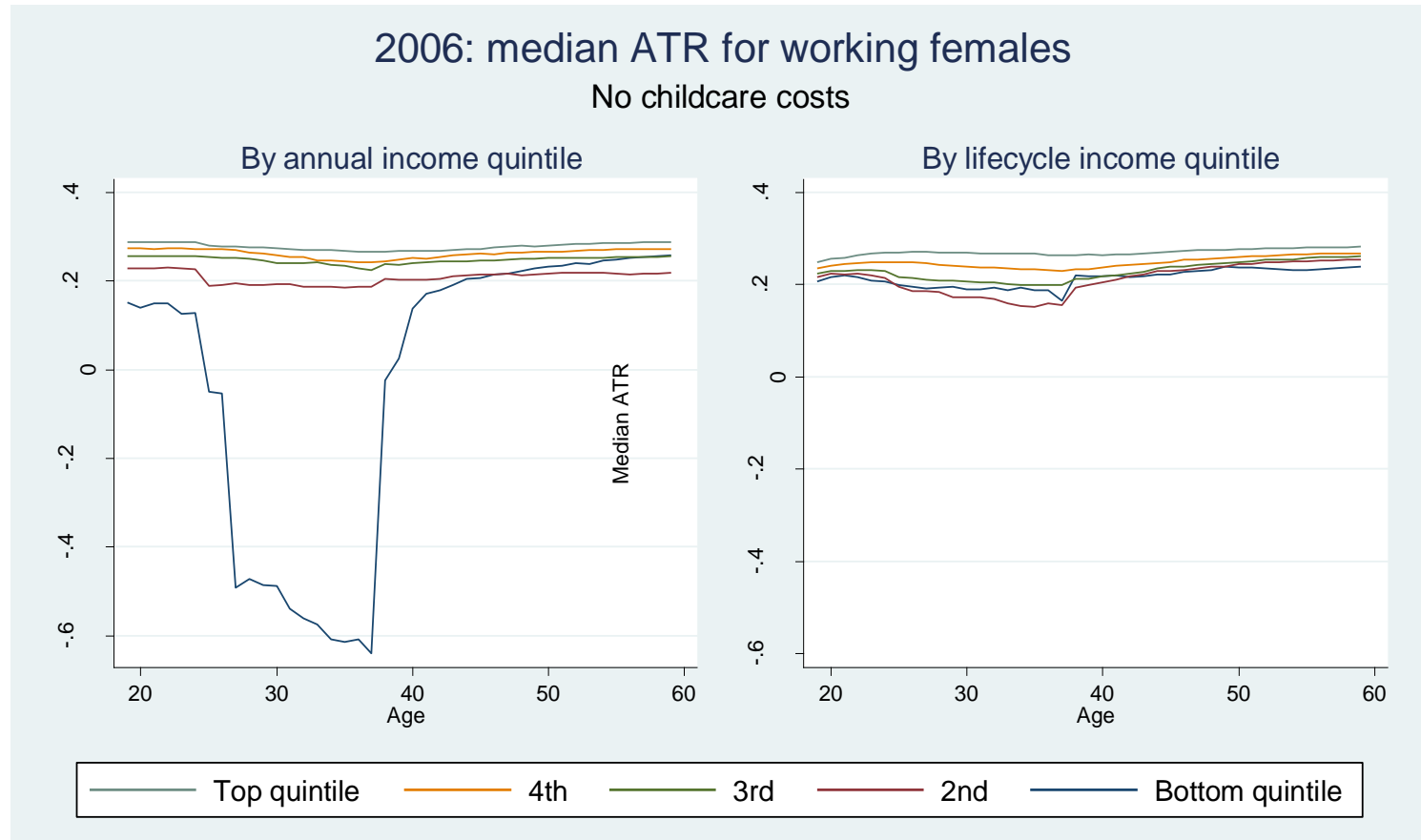
ATR (including subsidies) by age

Annual vs lifetime income, 1997 tax system



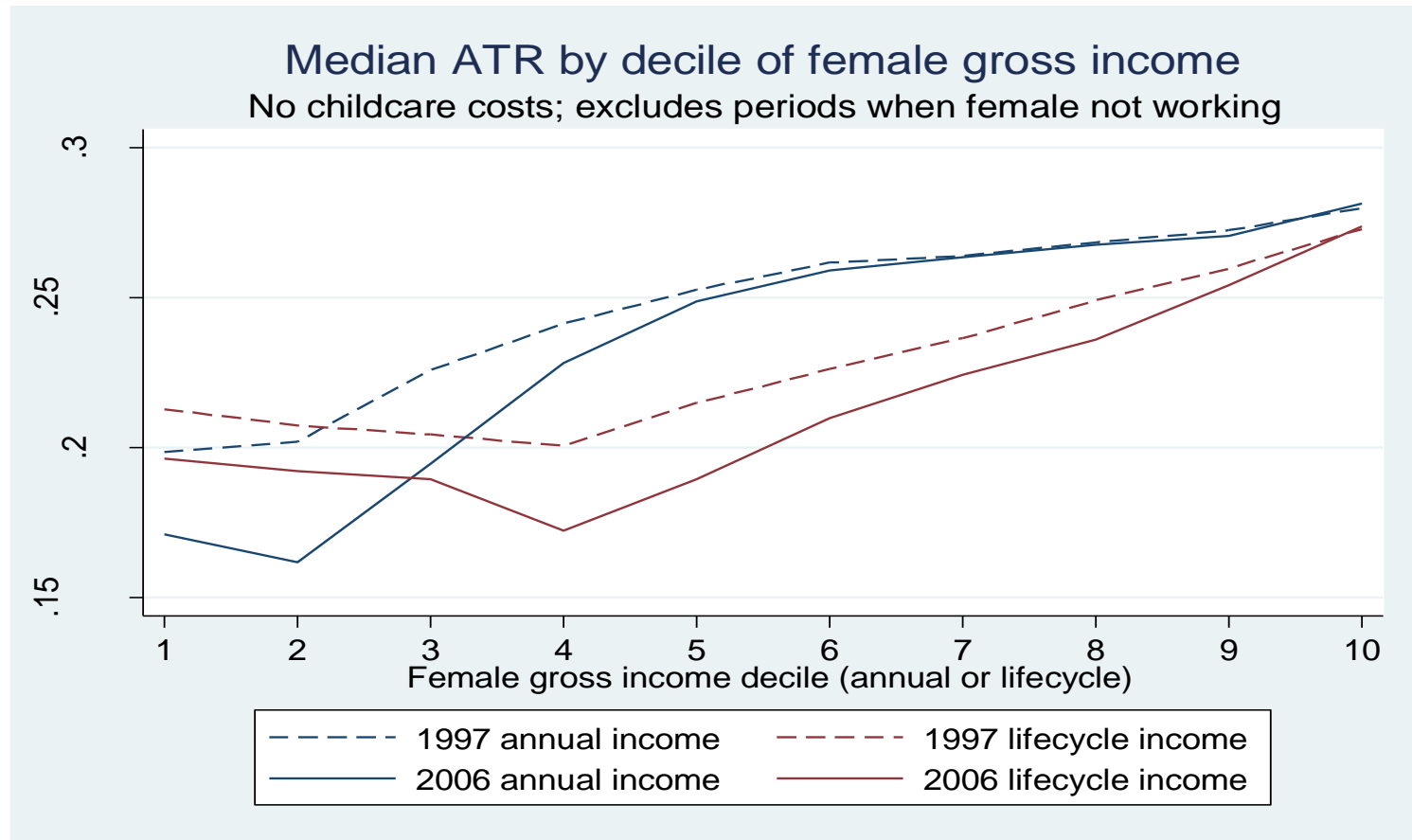
ATR (including subsidies) by age

Annual vs lifetime income, 2006 tax system



ATR (including subsidies) by income decile

2006 versus 1997 tax systems



Lifetime versus annual tax progressivity

1997 versus 2006 tax systems

- Among workers, the personal tax system is more progressive from an annual perspective
- And became much more so in the early 2000s with the increasing generosity of tax credits targeted at families
- Major differences at the bottom quintile during childbearing years
 - Mobility across income deciles during lifetime
 - Large subsidies towards families with children affect women with very different earnings ability
 - The effective ATRs of the bottom 3 lifetime income quintiles look almost identical
- But this analysis excludes women out of work

Concluding remarks

- Strong heterogeneity in working incentives, even when restricting attention to working women
- While working women on low earnings face lower PTRs, this is in part a consequence of their choice of lower hours
 - Mothers are heavily represented in this group
 - But working women in low income families face high PTRs with the withdrawal of (unemployment) benefits
- Among working women, the transfer system seems to be mildly progressive
 - Became more so in the early 2000s
 - While increasing transfers across lifecycle periods
 - And creating strong incentives to move across income levels to benefit from generous benefits during childbearing years