



Do up-front tax incentives affect private pension saving in the UK?

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Motivation

- Interesting questions:
 - To what extent do individuals, and households, respond to complex decision-making environments
 - Up-front financial incentives are an often used policy lever to encourage retirement saving – is this an effective method?
- Our specific focus: to what extent does tax relief on private pension contributions encourage pension saving?
- Look at three instances where the ‘tax planning’ incentives differ in their *transparency* and in their *complexity*

Related literature

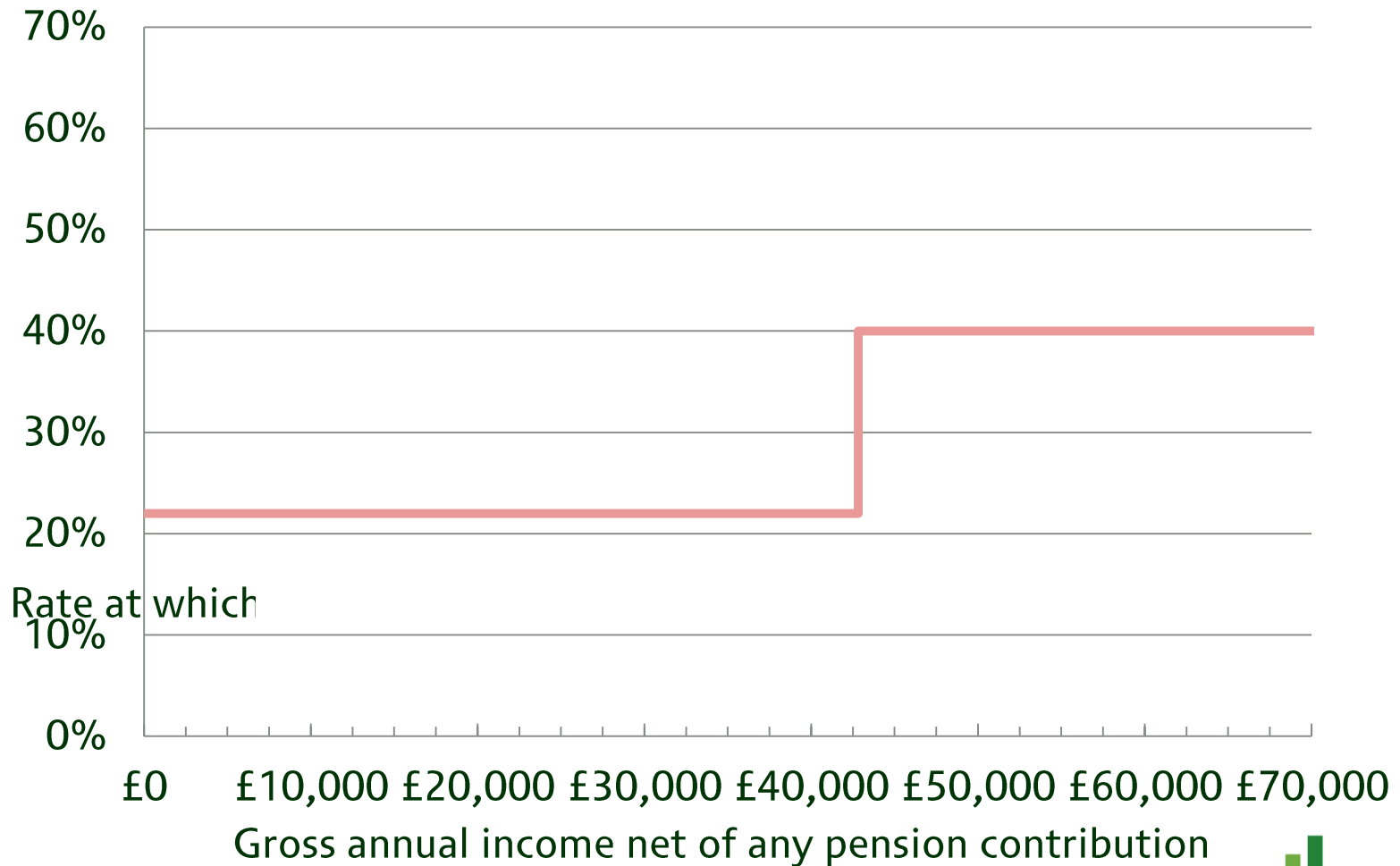
- Some US studies looking at impact of tax incentives – specifically 401(k) and IRAs – on saving
 - Bernheim & Scholz (1993); Poterba (1994); Journal of Economic Perspectives (1996); Engen, Gales & Uccello (1999); Attanasio & DeLeire (2002); Benjamin (2003); and Chernozhukov & Hansen (2004)
- Other studies have looked at the impact of particular reforms
 - Canada: Milligan (2003)
 - UK: Disney & Whitehouse (1992); Disney, Emmerson & Wakefield (2010)
- Some related UK work looking at impact of marginal tax rates on
 - Taxable income elasticity: Brewer, Saez & Shephard (2010)
 - Labour supply: (for example) Blundell, Duncan & Meghir (1998)
 - Charitable giving: Jones & Posnett (1991a,b); Scharf & Smith (2009)
- No UK work on marginal tax rates and pension coverage

What are the ‘upfront incentives to save’?

- Individual contributions to pensions are exempt from income tax, therefore £1 of pension contribution ‘costs’ $\pounds(1-MTR)$
 - Basic rate taxpayers: 78p (1999 to 2007), 80p (2008 onwards)
 - Higher rate taxpayers: 60p
- Upfront incentive to save: tax relief on pension contributions
 - Basic rate taxpayers: 22%(20%), higher rate taxpayers: 40%

Pension incentives, by current income

Up-front income tax relief on individual pension contributions



Note: X-axis values approximate for 2009–10 tax and tax credit system.

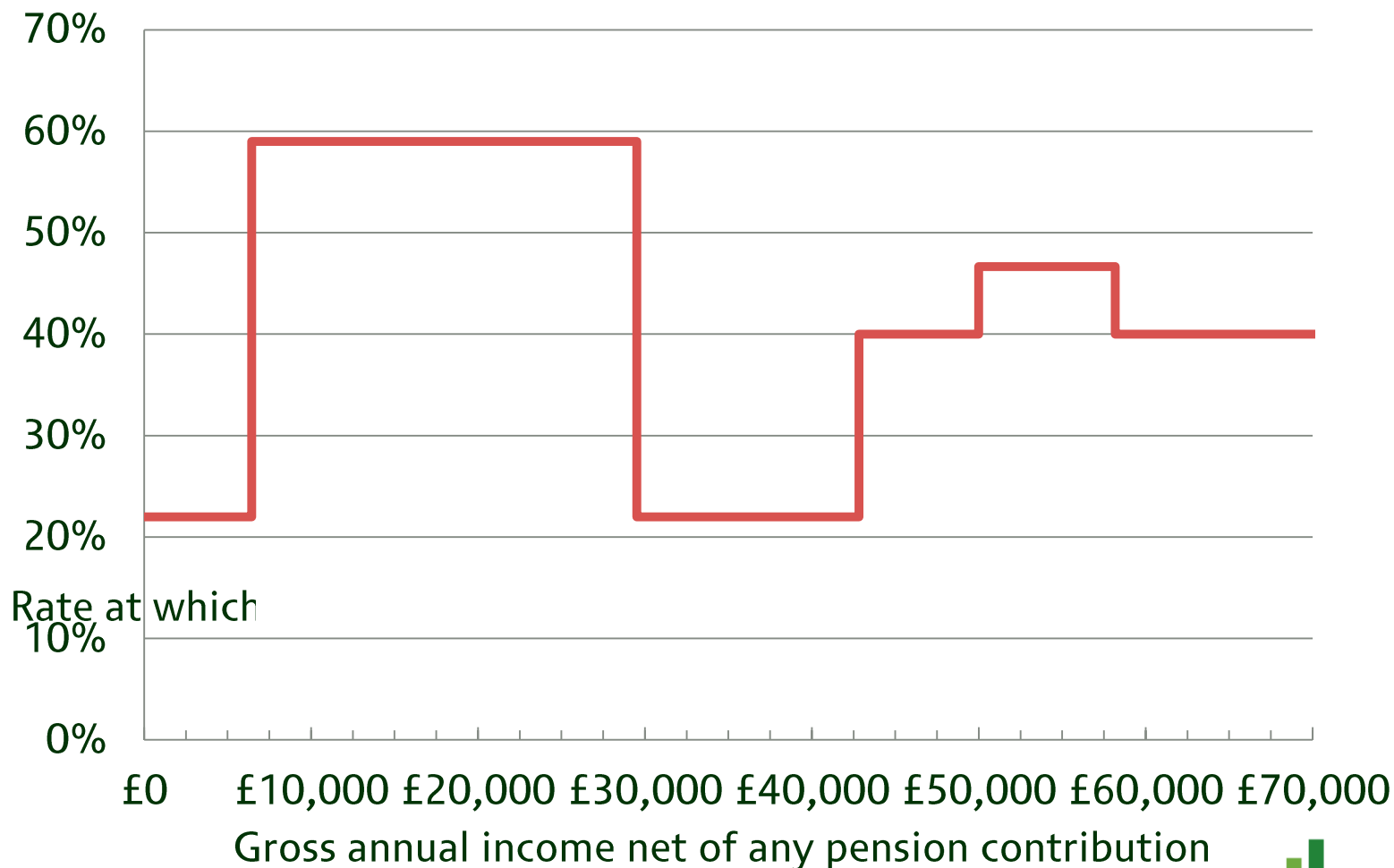
What are the ‘upfront incentives to save’?

- Contributions to pensions are also deducted from income before assessment for means-tested tax credits, therefore £1 of pension contribution ‘costs’ $\pounds(1-EMTR)$
 - For basic rate income taxpayers on WTC/CTC first taper: 41p
 - For higher rate income taxpayers on CTC second taper: 53p
- Upfront incentive to save: effective tax relief on individual pension contributions

	EMTR / effective tax relief
Basic rate taxpayer	22% (20%)
Basic rate taxpayer on WTC taper	59%
Higher rate taxpayer	40%
Higher rate taxpayer on CTC taper	46.7%

Pension incentives, by current income

Up-front income tax and tax credit relief on individual pension contributions, one-earner family with two children aged below 65



Empirical strategy (1/3)

- Focus (for now) on the discontinuity at the HRT
 - the tax relief on pension saving jumps from 22%(20%) to 40%
- Other than the tax difference those ‘just’ above the HRT and those ‘just’ below the threshold should be ‘the same’
- Therefore compare the pension saving behaviour of:
 1. Those with income just above and just below the higher rate threshold
 - Might expect those just above the HRT to be *more* likely to engage in pension saving/save more than those just below
 2. Married individuals below the HRT who have a partner just above the HRT, with married individuals below the HRT who have a partner just below the HRT
 - Might expect those below the HRT with a partner just above the HRT to be *less* likely to engage in retirement saving/save less than those with a partner just below the HRT

Empirical strategy (2/3)

- Regression discontinuity approach
 - Those ‘just’ above and ‘just’ below the HRT should be very similar in terms of their observed and unobserved characteristics
 - If pension coverage/contributions increase smoothly with income, any discontinuity at the HRT can be associated with the HRT
- Size of ‘just’ trades off individual similarity with sample sizes
 - Use 3 definitions: annual income within £10,000, within £5,000 & within £2,000

Empirical strategy (3/3)

- Operationalised using 2 methods:
 - Non parametric
Plot smoothed scatterplot curves separately above and below the HRT
 - Parametric

Model

$$A \quad Y_i = \alpha + \beta_1(X_i - c) + \tau l_i + \gamma_1(X_i - c)l_i + \varepsilon_i$$

$$B \quad Y_i = \alpha + \beta_1(X_i - c) + \beta_2(X_i - c)^2 + \tau l_i + \gamma_1(X_i - c)l_i + \gamma_2(X_i - c)l_i^2 + \varepsilon_i$$

$$C \quad Y_i = \alpha + \beta_1(X_i - c) + \tau l_i + \gamma_1(X_i - c)l_i + \theta Z_i + \varepsilon_i$$

$$D \quad Y_i = \alpha + \beta_1(X_i - c) + \beta_2(X_i - c)^2 + \tau l_i + \gamma_1(X_i - c)l_i + \gamma_2(X_i - c)l_i^2 + \theta Z_i + \varepsilon_i$$

where X_i is income, c is the HRT, l_i is an indicator of whether individual is above the HRT, Z_i is a vector of individual characteristics

Estimated using ordinary least squares regression

Empirical strategy (3/3)

- Operationalised using 2 methods:
 - Non parametric
Plot smoothed scatterplot curves separately above and below the HRT
 - Parametric

Model	Income specification	Characteristics
A	Linear	✘
B	Quadratic	✘
C	Linear	✓
D	Quadratic	✓

where X_i is income, c is the HRT, I_i is an indicator of whether individual is above the HRT, Z_i is a vector of individual characteristics

Estimated using ordinary least squares regression

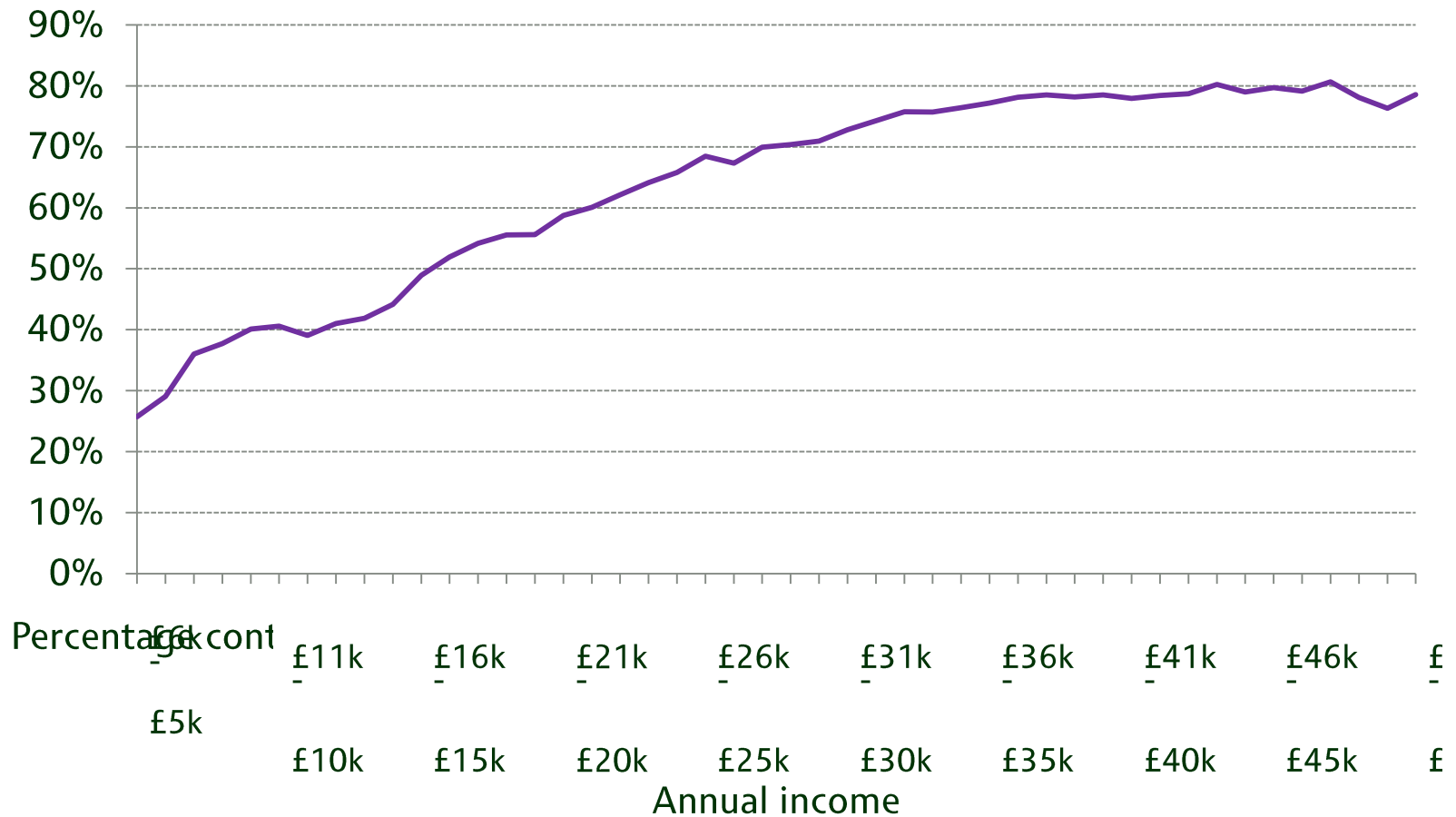
Data: Family Resources Survey

- FRS is a cross sectional survey that records detailed income information for a large sample of the GB/UK population
- Pooled 9 years of FRS: 2000/1 to 2008/9
- All nominal values (income, thresholds etc) uprated to Dec 2009 prices using RPI
- Analysis restricted to employees aged 22-59, with no self employment or pension income
- Outcomes of interest:
 - **current pension membership**: individuals only counted as being a member of a pension if they contributed in the last 12 months
 - **employee pension contributions**

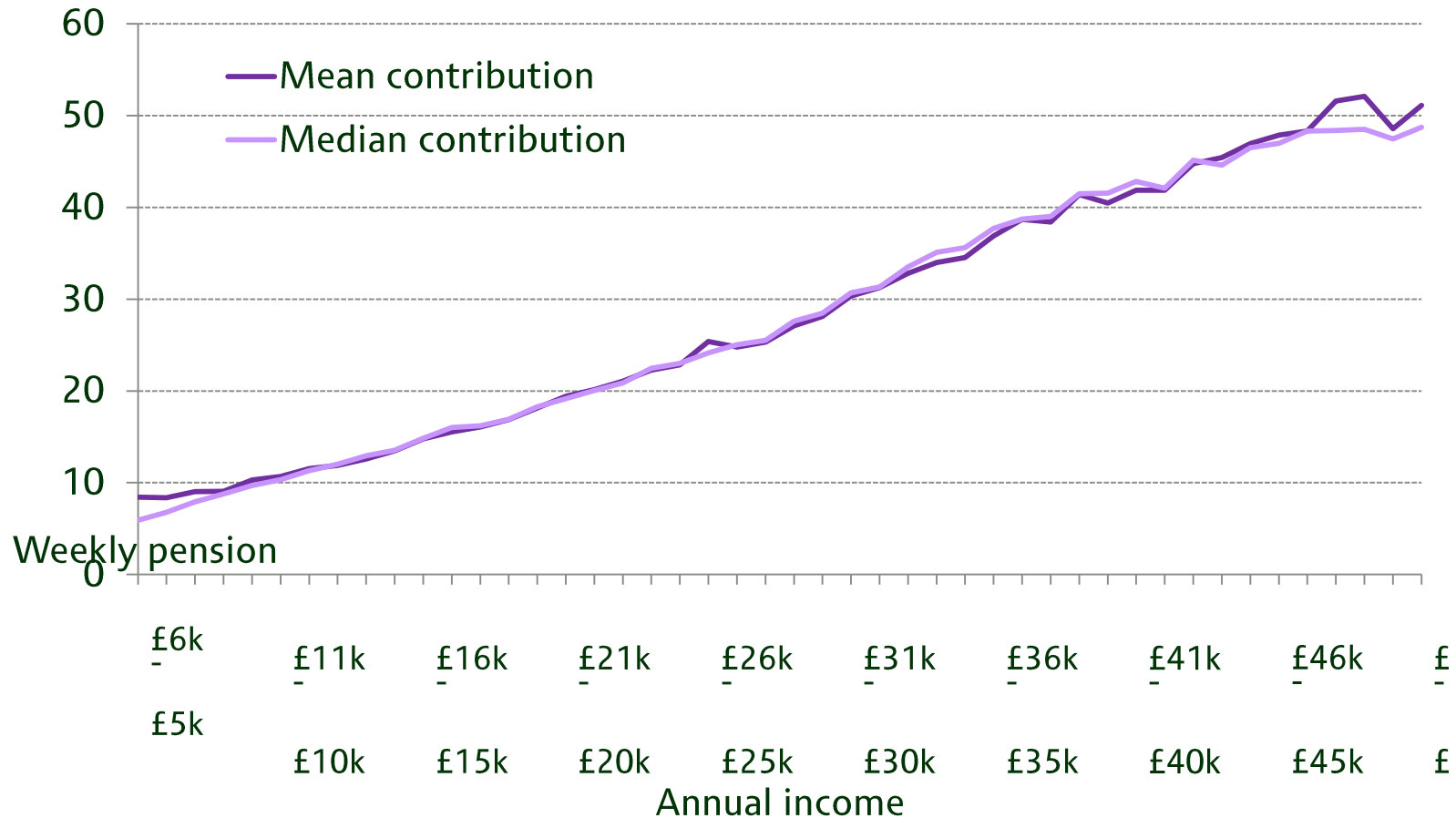
Data: Family Resources Survey

- For each individual calculate taxable income as:
 - Earnings from employment + widow's benefits + taxable interest + rental income from property + boarder/lodger payments (in excess of annual allowance) + JSA (+ self employment income + pension income)
- Do NOT deduct pension contributions
 - Want to treat income as exogenous (not manipulated to be either side of the HRT)
 - MTR is therefore the upfront incentive to save the first £1 of pension contributions
- Assume that individuals around the HRT do not manipulate their taxable income by changing wage rate or hours
- We check that background characteristics (Hours, gender, age, sex) do not change discontinuously at HRT (they don't – results available on request!)

Background statistics: pension membership



Background statistics: pension contributions



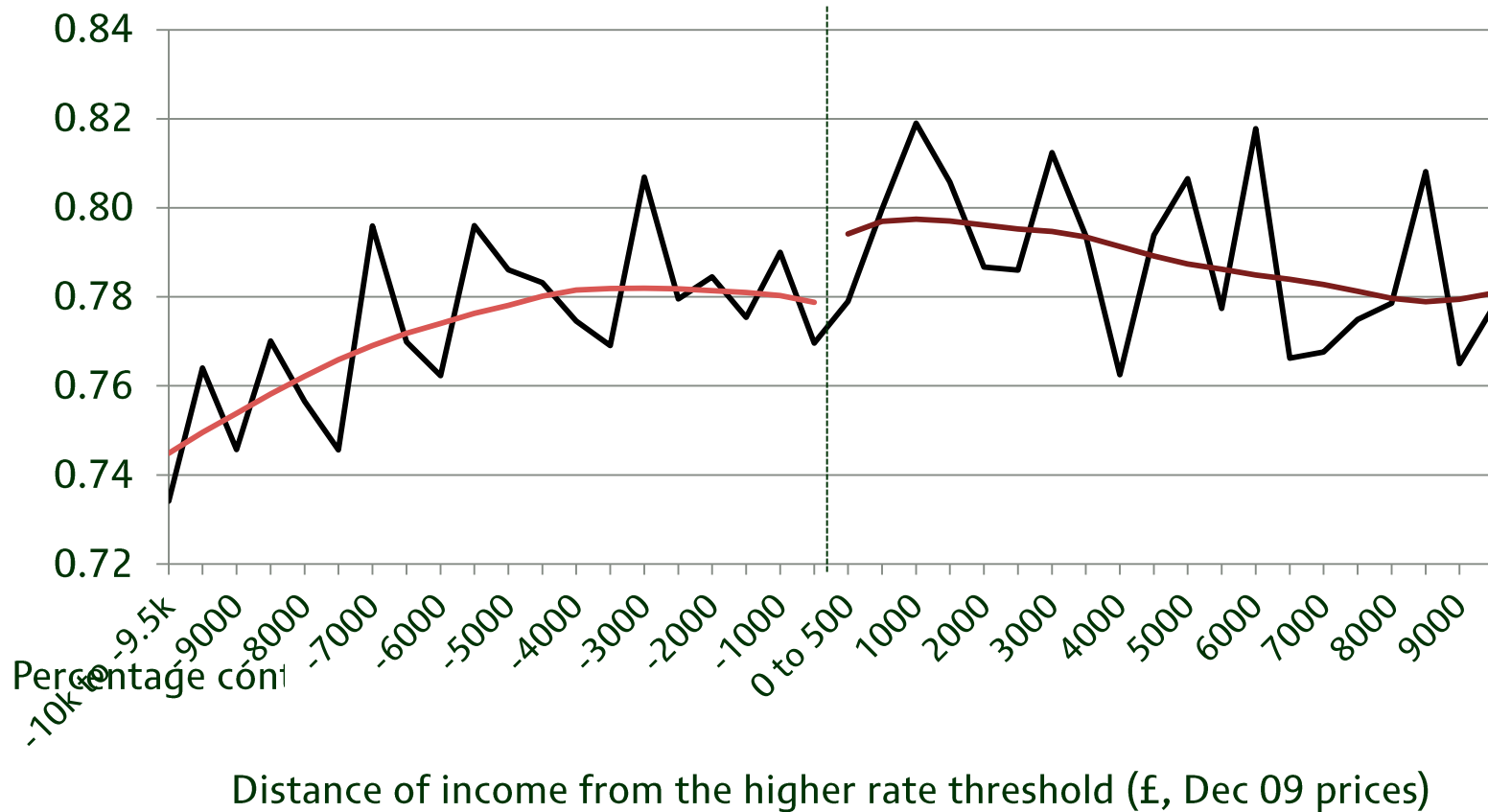
Note: Average pension contributions among pension members

1: Individual analysis

- Recall: compare pension saving behaviour of those with income just above and just below the higher rate threshold
- Expect those just above the HRT to be more likely to engage in pension saving/save more than those just below since upfront incentive to save is greater

1: Individual analysis – coverage

Non parametric method (income)



1: Individual analysis – coverage

Parametric method (income)

	H = £20,000	H = £10,000	H = £4,000
τ	0.023 (0.014)	0.021 (0.013)	0.014 (0.021)
Y_1	0.004 (0.007)	-0.002 (0.005)	0.018 (0.018)
Y_2	0.001 (0.001)		
Characteristics	x	x	x
Income specification	Quadratic	Linear	Linear
Equation	B	A	A
N	34,697	16,278	6,339

- Standard errors in parenthesis. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels respectively.

1: Individual analysis – coverage

Parametric method (income)

	H = £20,000		H = £10,000		H = £4,000	
τ	0.023 (0.014)	0.021 (0.014)	0.021 (0.013)	0.022* (0.013)	0.014 (0.021)	0.015 (0.020)
Y_1	0.004 (0.007)	0.002 (0.006)	-0.002 (0.005)	-0.002 (0.005)	0.018 (0.018)	0.013 (0.018)
Y_2	0.001 (0.001)	0.001 (0.001)				
Characteristics	x	✓	x	✓	x	✓
Income specification	Quadratic	Quadratic	Linear	Linear	Linear	Linear
Equation	B	D	A	C	A	C
N	34,697	34,673	16,278	16,267	6,339	6,334

- Standard errors in parenthesis. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels respectively.
- Individual characteristics include: age, age², sex, marital status, education, hours, partner's age difference, (age difference)², education, hours, other household income, (other household income)²

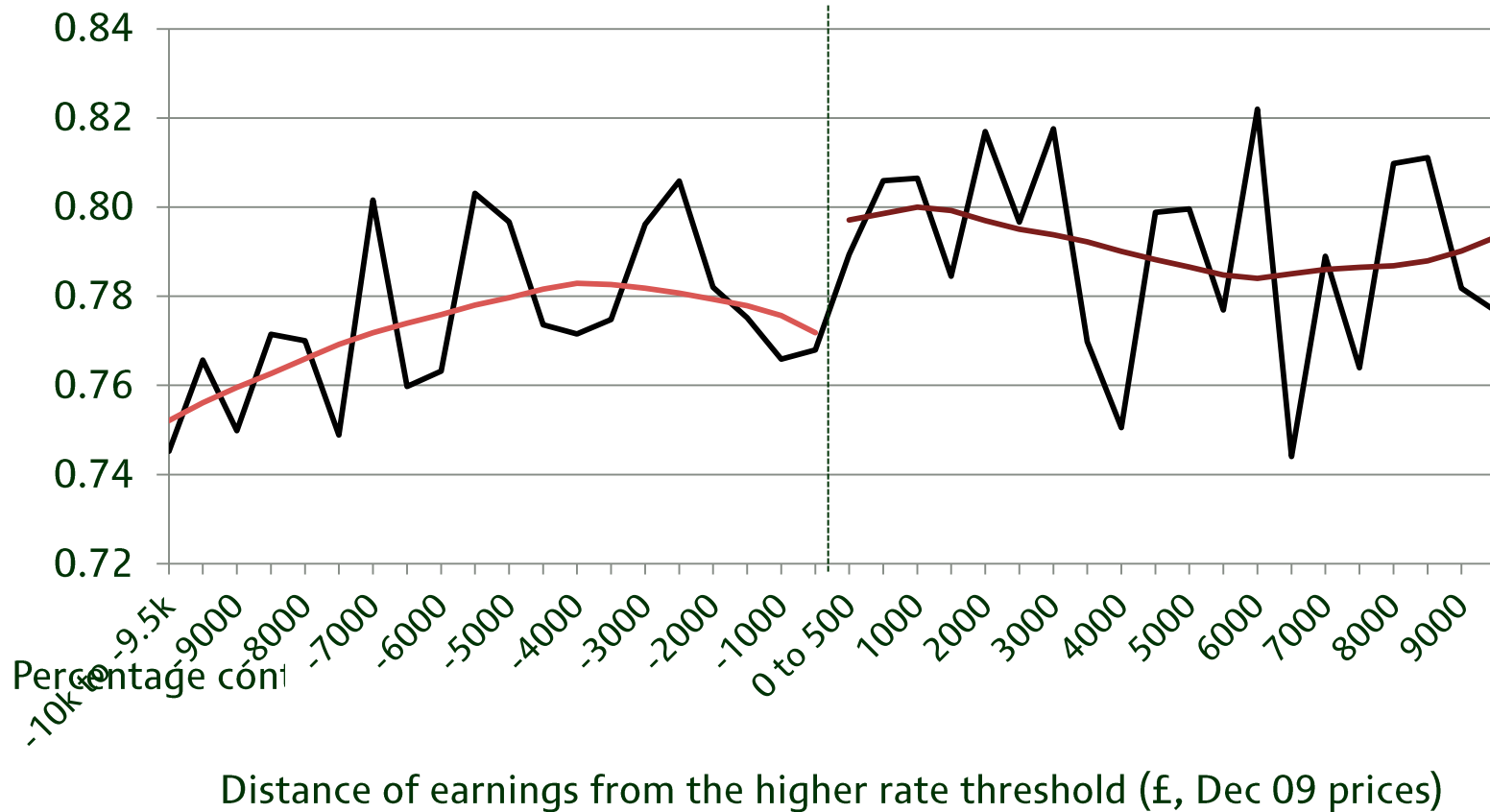
1: Individual analysis

Earnings justification

- ‘True’ upfront incentive to save in a pension depends on taxable income
- BUT:
 - Individuals may not understand their true tax position and instead approximate based on most visible sources of income
 - Also possible that individuals may not declare all income sources and so act like basic rate taxpayers (and be entitled to only basic rate tax relief) even though they have income greater than the HRT
- ⇒ Repeat analysis using earnings to calculate distance from the HRT and the upfront incentive to save
 - ⇒ For those around the HRT the difference between income and earnings is less than £1,000 in 90% of cases, with the rest typically having significant investment or rental income from property

1: Individual analysis – coverage

Non parametric method (earnings)



1: Individual analysis – coverage

Parametric method (earnings)

	H = £20,000		H = £10,000		H = £4,000	
τ	0.034***	0.031***	0.032**	0.031***	0.036*	0.034
	(0.014)	(0.014)	(0.013)	(0.013)	(0.021)	(0.021)
Y_1	0.001	0.000	-0.002	-0.001	-0.002	-0.007
	(0.007)	(0.007)	(0.005)	(0.005)	(0.019)	(0.018)
Y_2	0.001*	0.001**				
	(0.001)	(0.001)				
Characteristics	✗	✓	✗	✓	✗	✓
Income specification	Quadratic	Quadratic	Linear	Linear	Linear	Linear
Equation	B	D	A	C	A	C
N	34,015	33,993	15,893	15,882	6,185	6,179

- Standard errors in parenthesis. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels respectively.
- Individual characteristics include: age, age², sex, marital status, education, hours, partner's age difference, (age difference)², education, hours, other household income, (other household income)²

1: Individual analysis – coverage

Parametric method – placebo tests

τ (std err)	Test threshold:			
	HRT+£10k	HRT - £10k	HRT + £5k	HRT - £5k
Income				
H = £20k (model D)	-0.005 (0.021)	-0.003 (0.010)	0.016 (0.016)	-0.003 (0.011)
H = £10k (model C)	-0.001 (0.019)	-0.006 (0.009)	0.016 (0.016)	0.000 (0.011)
H = £4k (model C)	0.015 (0.031)	-0.006 (0.015)	0.052** (0.024)	0.021 (0.017)
Earnings				
H = £20k (model D)	-0.029 (0.021)	0.000 (0.010)	0.007 (0.017)	-0.004 (0.011)
H = £10k (model C)	-0.018 (0.020)	-0.001 (0.009)	0.010 (0.016)	0.004 (0.011)
H = £4k (model C)	-0.008 (0.032)	0.004 (0.015)	0.045* (0.025)	0.019 (0.017)

1: Individual analysis – coverage

Parametric method – subgroup analysis (earnings)

	H = £20,000 (model D)			H = £10,000 (model C)		
	τ	Std err	<i>N</i>	τ	Std err	<i>N</i>
All	0.031**	0.014	33,993	0.031*	0.013	15,882
Male	0.022	(0.017)	23,328	0.030	(0.016)	11,101
Female	0.050**	(0.023)	10,665	0.040*	(0.022)	4,781
Single	0.049	(0.032)	7,021	0.041	(0.030)	3,167
Couple	0.027*	(0.015)	26,972	0.030**	(0.014)	12,715
Aged 22-39	0.039*	(0.023)	15,107	0.045**	(0.022)	6,832
Aged 40-59	0.025	(0.017)	18,886	0.020	(0.016)	9,050
Low education	0.022	(0.027)	11,508	0.021	(0.025)	5,014
Mid education	0.036	(0.030)	7,669	0.034	(0.028)	3,535
High education	0.033*	(0.019)	14,816	0.036**	(0.017)	7,333

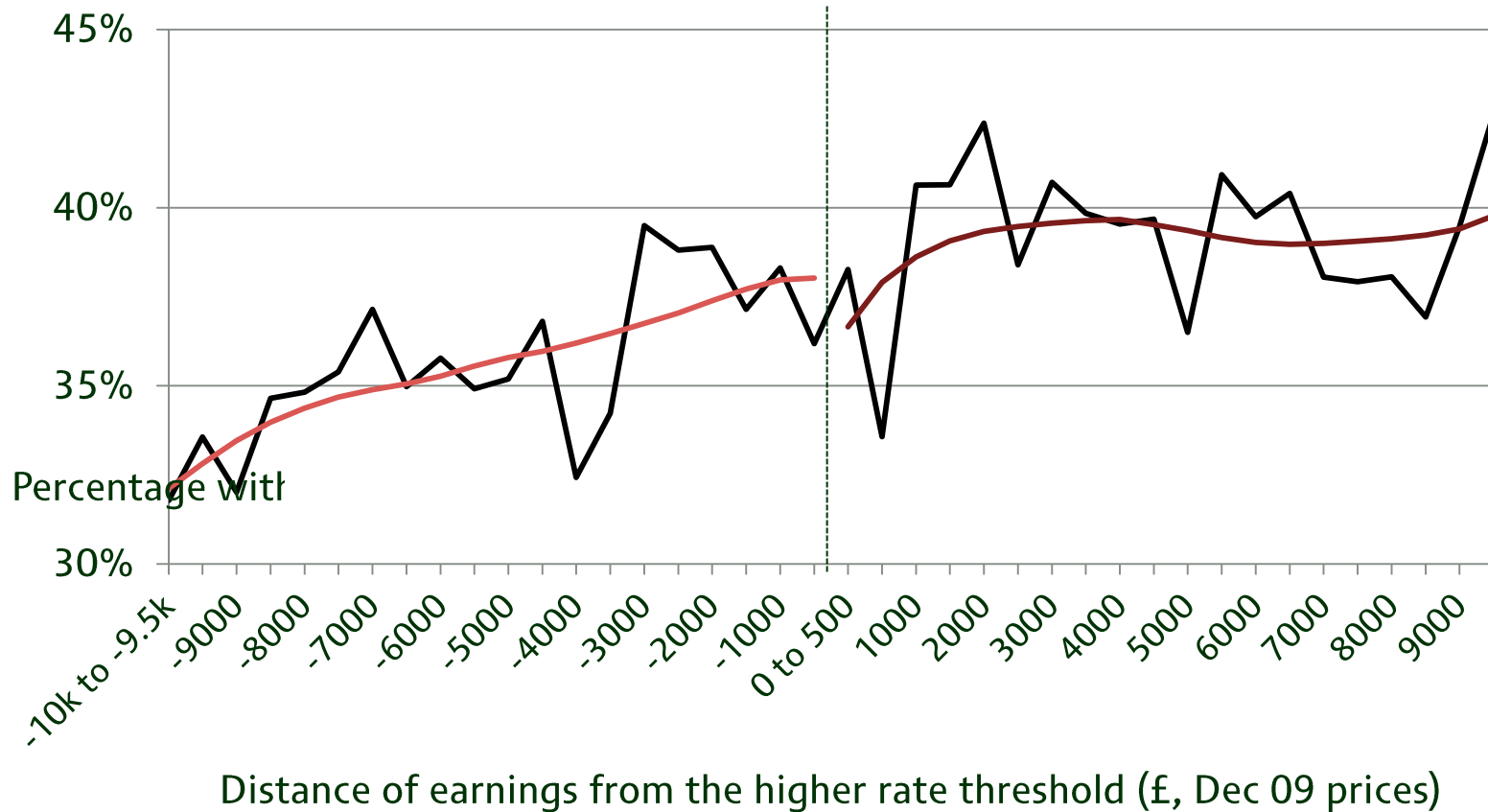
1: Individual analysis

Response to financial incentive or signalling?

- Discontinuity at the HRT does not necessarily imply individuals are responding to the greater tax incentive to save
- Becoming a higher rate taxpayer may act as a signal of the need for better tax planning or for more saving
 - More likely to take advantage of tax advantaged products even if the incentive to save in them has not increased?
- Attempt to test this by considering the effect of the HRT on saving in ISAs
 - Relative incentive to save in an ISA compared to other liquid assets increases only slightly at the HRT
 - If the HRT acts as a signal, might expect the proportion holding ISAs to increase in the same way as proportion contributing to a pension

1: Individual analysis

Response to financial incentive or signalling?



1: Individual analysis – contributions

- Two potential effects of the HRT on pension contributions:
 - Those whose membership decision is affected by the HRT may have different saving rates than those whose membership decision is not affected
 - Those whose membership decision is not affected by the HRT may change their savings rate
- Cannot distinguish these effects
 - don't know who would have saved when they were below the HRT
- Expect those whose membership decision is not affected to increase their rate of contributions above the HRT
- No *a priori* expectations for those membership decision is affected
 - May be low savers => negative discontinuity and lower rate
 - May have been anticipating => positive discontinuity and higher rate

1: Individual analysis – contributions

Non parametric method (earnings)



1: Individual analysis – contributions

Parametric method (earnings)

	Those in a pension		
τ	-0.135 (0.743)	-0.399 (1.108)	1.618 (1.722)
Y_1	-0.124 (0.141)	0.373 (0.445)	1.209 (1.448)
Characteristics	✓	✓	✓
Model	C	C	C
Sample bandwidth	£20,000	£10,000	£4,000
N	26,461	12,494	4,840

1: Individual analysis – contributions

Parametric method (earnings)

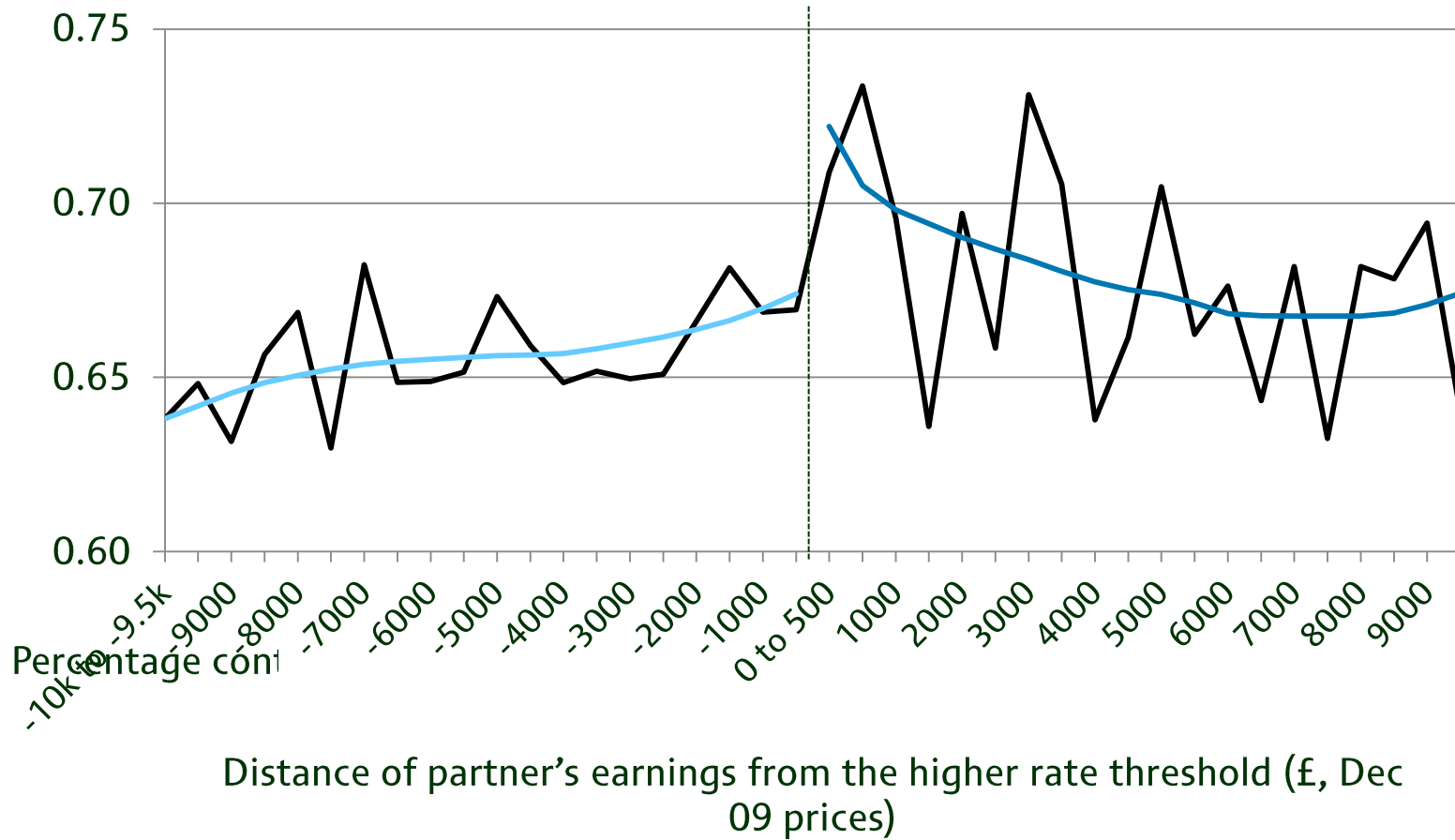
	Those in a pension			All individuals		
τ	-0.135	-0.399	1.618	0.350	0.981	2.874*
	(0.743)	(1.108)	(1.722)	(0.705)	(1.028)	(1.598)
Y_1	-0.124	0.373	1.209	-0.183	0.269	0.725
	(0.141)	(0.445)	(1.448)	(0.133)	(0.401)	(1.366)
Characteristics	✓	✓	✓	✓	✓	✓
Model	C	C	C	C	C	C
Sample bandwidth	£20,000	£10,000	£4,000	£20,000	£10,000	£4,000
N	26,461	12,494	4,840	33,993	15,882	6,179

2: Couples analysis

- Recall: Compare pensions saving behaviour of married basic rate taxpayers who have a partner just above the HRT, with those who have a partner just below the HRT
- Expect those with a partner just above the HRT to be less likely to engage in retirement saving/save less than those with a partner just below the HRT
- Caveats:
 - Availability of occupational pensions matters
 - Within-family separation risk important
- Expect these to dampen discontinuity in coverage but could still expect to see an effect on contribution levels

2: Couples analysis – coverage

Non parametric method



2: Couples analysis – coverage

Parametric method (using earnings)

	H = £20,000	H = £10,000	H = £4,000
τ	0.045* (0.023)	0.039* (0.022)	0.010 (0.035)
Y_1	-0.003 (0.011)	-0.007 (0.008)	-0.034 (0.031)
Y_2	0.001 (0.001)		
Characteristics	✓	✓	✓
Income specification	Quadratic	Linear	Linear
Equation	D	C	C
N	14,585	6,838	2,630

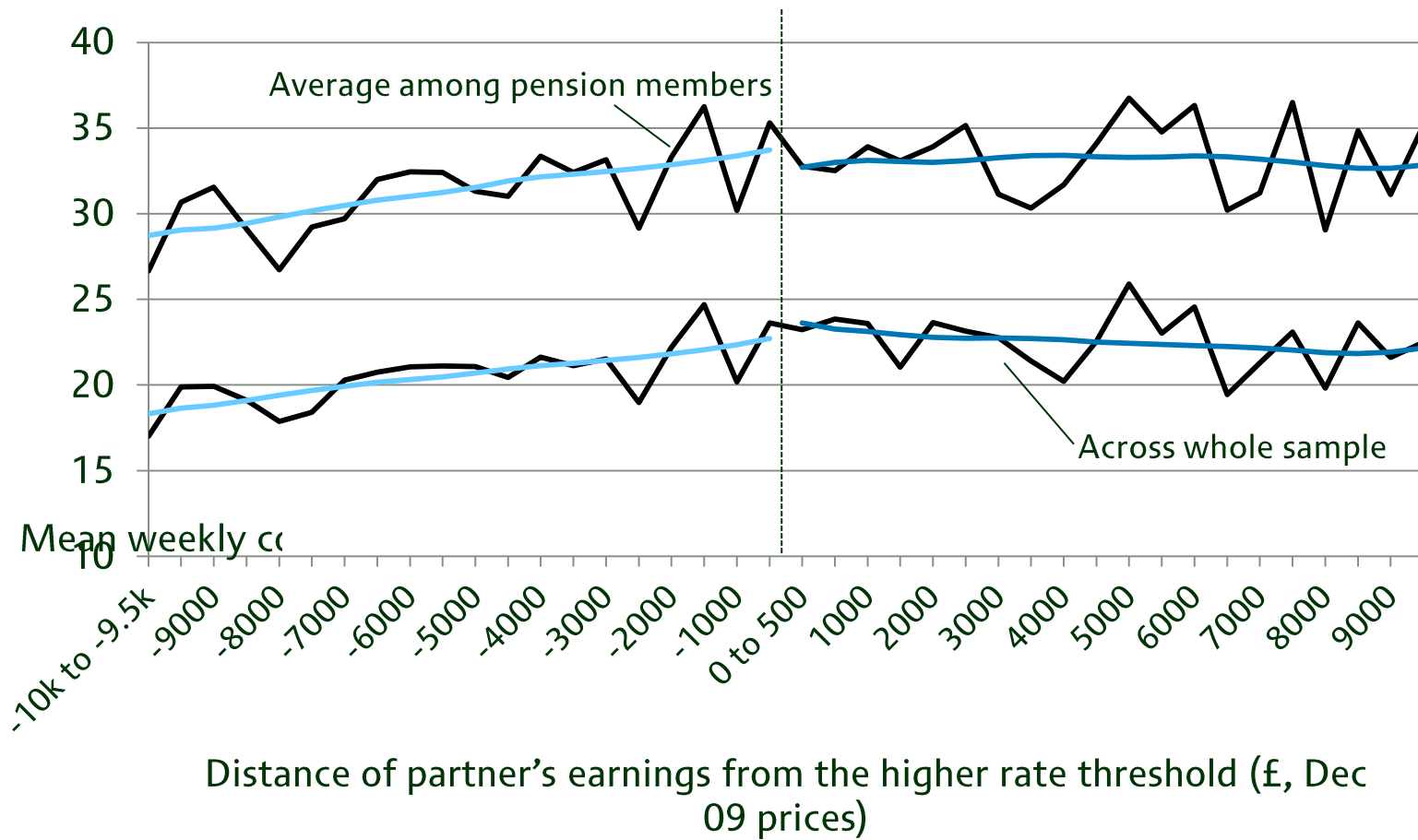
- Individual characteristics include: age, age², sex, marital status, education, hours, partner's age difference, (age difference)², education, hours, other household income, (other household income)²
- Standard errors in parenthesis. ***, ** and * indicate statistical significance at the 1%, 5% and 10% levels respectively.

2: Couples analysis – contributions

- Potentially easier than in the individual analysis since individual pension saving may not be closely related to partner's income
- Again two potential effects of partner being above the HRT:
 - Those whose membership decision is affected may have different levels of saving from those membership decision is not affected
 - Those whose membership decision is not affected by the HRT may change their level of saving
- Again cannot distinguish these effects
- Unclear expectation for the discontinuity:
 - Negative (since expect individuals to reduce own contributions if partner is above the HRT)
 - Negative/Positive (from selection due to individuals whose membership decision is affected)

2: Couples analysis – contributions

Non parametric method



2: Couples analysis – contributions

Parametric method (using earnings)

	Those in a pension		
τ	0.720	0.838	-0.546
	(0.788)	(1.104)	(1.694)
Y_1	-0.147	-0.558	3.051**
	(0.148)	(0.381)	(1.500)
Characteristics	✓	✓	✓
Model	C	C	C
Sample bandwidth	£20,000	£10,000	£4,000
N	9,421	4,465	1,745

2: Couples analysis – contributions

Parametric method (using earnings)

	Those in a pension			All individuals		
τ	0.720 (0.788)	0.838 (1.104)	-0.546 (1.694)	1.214* (0.635)	1.478* (0.891)	-0.637 (1.395)
γ_1	-0.147 (0.148)	-0.558 (0.381)	3.051** (1.500)	-0.189 (0.117)	-0.368 (0.303)	2.122* (1.227)
Characteristics	✓	✓	✓	✓	✓	✓
Model	C	C	C	C	C	C
Sample bandwidth	£20,000	£10,000	£4,000	£20,000	£10,000	£4,000
N	9,421	4,465	1,745	14,585	6,838	2,360

Conclusions so far

- The higher rate threshold is associated with around a 3ppt increase in the probability of contributing to a pension
 - Effect clearer when compare earnings to the HRT rather than income
 - Significant positive effect for women, those aged 22-39, and those with higher levels of education (left school after age 19)
- Partner hitting the higher rate threshold is associated with around a 4-5ppt increase in the probability of contributing to a pension
- No effect in either case on contribution rates
- Effect on partners suggests the effect of the HRT is a signalling one
 - Can't reject that the effect is of signalling the need to save in a pension for retirement (rather than a need to save in a tax-efficient way more generally)

What's next...

- 3. Compare the pensions saving behaviour of those just above the end of the WTC taper with those just below
 - Those on the taper have higher upfront incentive to save than those just off the taper (tax relief 59% vs. 22%(20%))
 - BUT: those just off the taper have an incentive to contribute in order to put themselves on the taper and get greater relief
 - Exploit the introduction of the WTC (2003) and use more of a diff-in-diff approach
- Sister project: a laboratory experiment to investigate individual saving decisions in the presence of different types of incentives



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