

DO MARGINAL TAX RATES MATTER?

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- Section 1 Background, Estimation and Data
- Section 2 Results



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Background

- Governments want to raise revenue efficiently
- Responsiveness governed by Elasticity of Taxable Income (ETI)

$$ETI = [\Delta z/z] / [\Delta(1-t)/(1-t)]$$

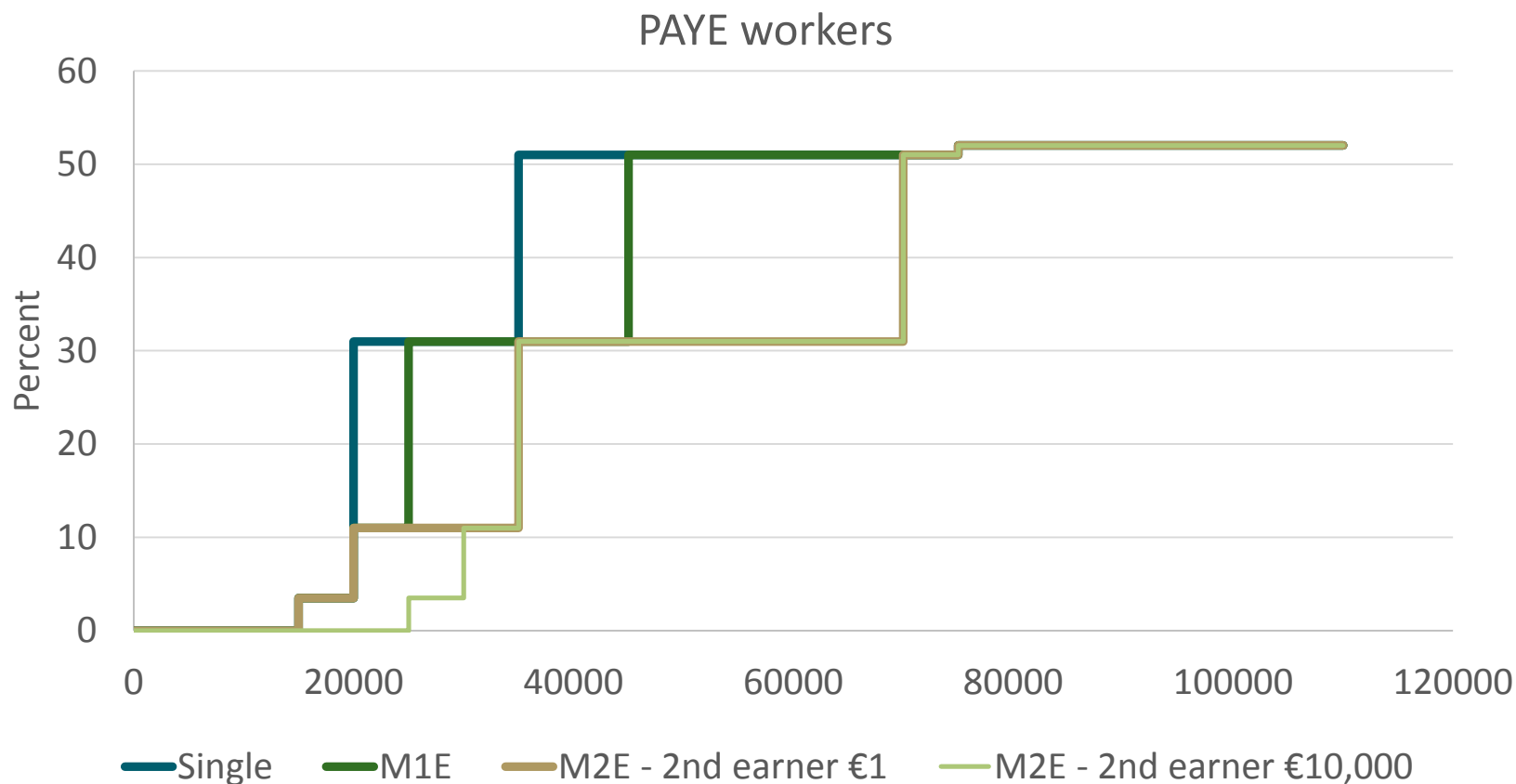
where z is taxable income and $(1-t)$ is net-of-tax rate

- ETI is a function of tax system (e.g. availability of deductions) and real economic responses (e.g. labour supply)
- Results vary internationally: typically 0 - 1 with 0.4 the average



Irish personal tax system (1)

Figure 1: Headline marginal tax rates in Budget 2015



- Three marginal tax rates: zero, standard and higher

Irish personal tax system (2)

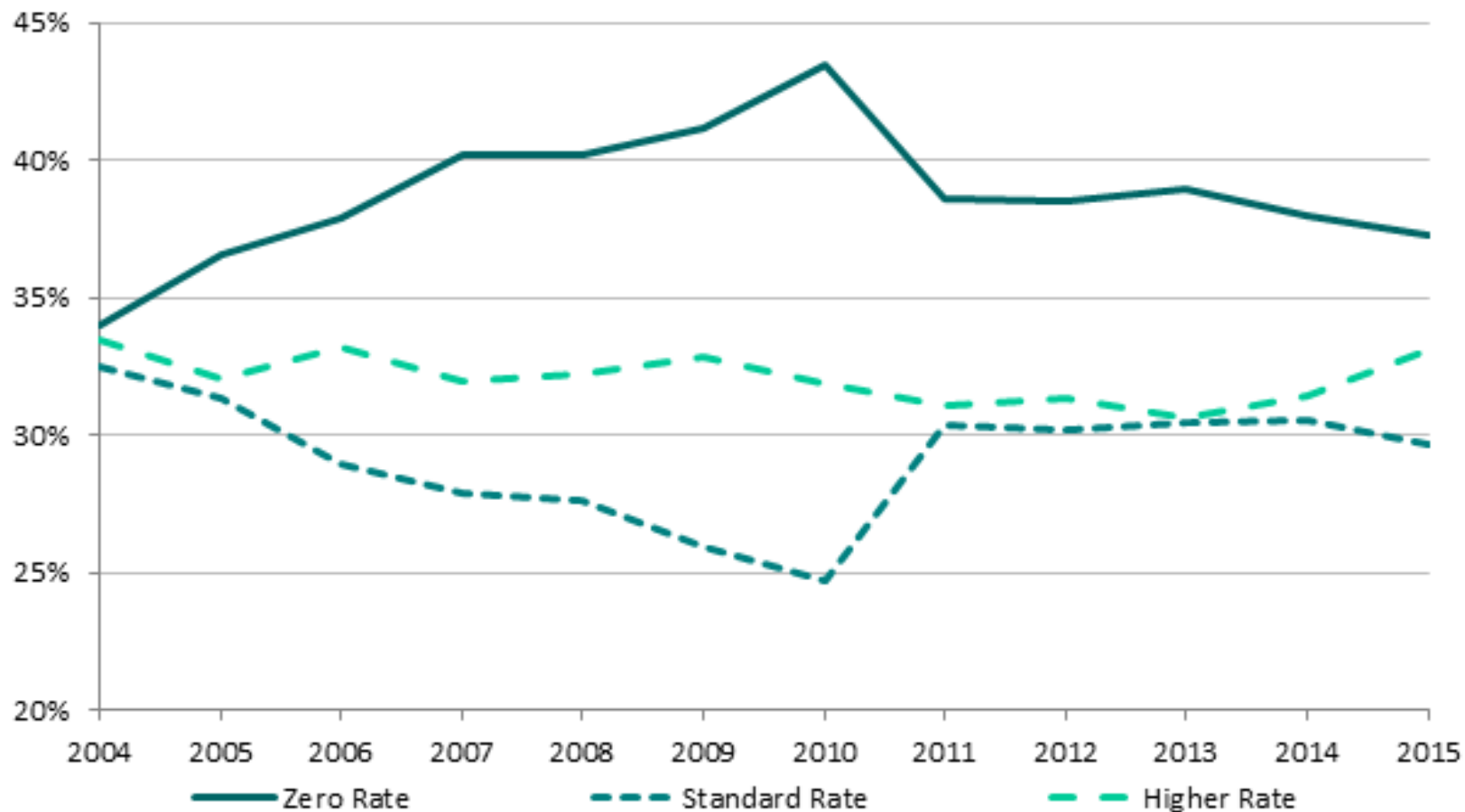
Table 1: Marginal income tax rate cut-off points (€)

	Minimum Zero Marginal Rate Cut-Off				Standard Rate Cut-Off Point		
	Single		M1E and M2E		Single	M1E	M2E
	PAYE	Self-Assessed	PAYE	Self-Assessed	Both	Both	Both
2004	12,800	7,600	30,400	15,200	28,000	37,000	56,000
2005	14,250	7,900	31,600	15,800	29,400	38,400	58,800
2006	15,600	8,150	32,600	16,300	32,000	41,000	64,000
2007	17,600	8,800	35,200	17,600	34,000	43,000	68,000
2008	18,300	9,150	36,600	18,300	35,400	44,400	70,800
2009	18,300	9,150	36,600	18,300	36,400	45,400	72,800
2010	18,300	9,150	36,600	18,300	36,400	45,400	72,800
2011	16,500	8,250	33,000	16,500	32,800	41,800	65,600
2012	16,500	8,250	33,000	16,500	32,800	41,800	65,600
2013	16,500	8,250	33,000	16,500	32,800	41,800	65,600
2014	16,500	8,250	33,000	16,500	32,800	41,800	65,600
2015	16,500	8,250	33,000	16,500	32,800	41,800	65,600

- Cut-off points for the zero, standard and higher marginal tax rates
- The zero rate cut-off point is calculated using each taxpayer's total tax credits

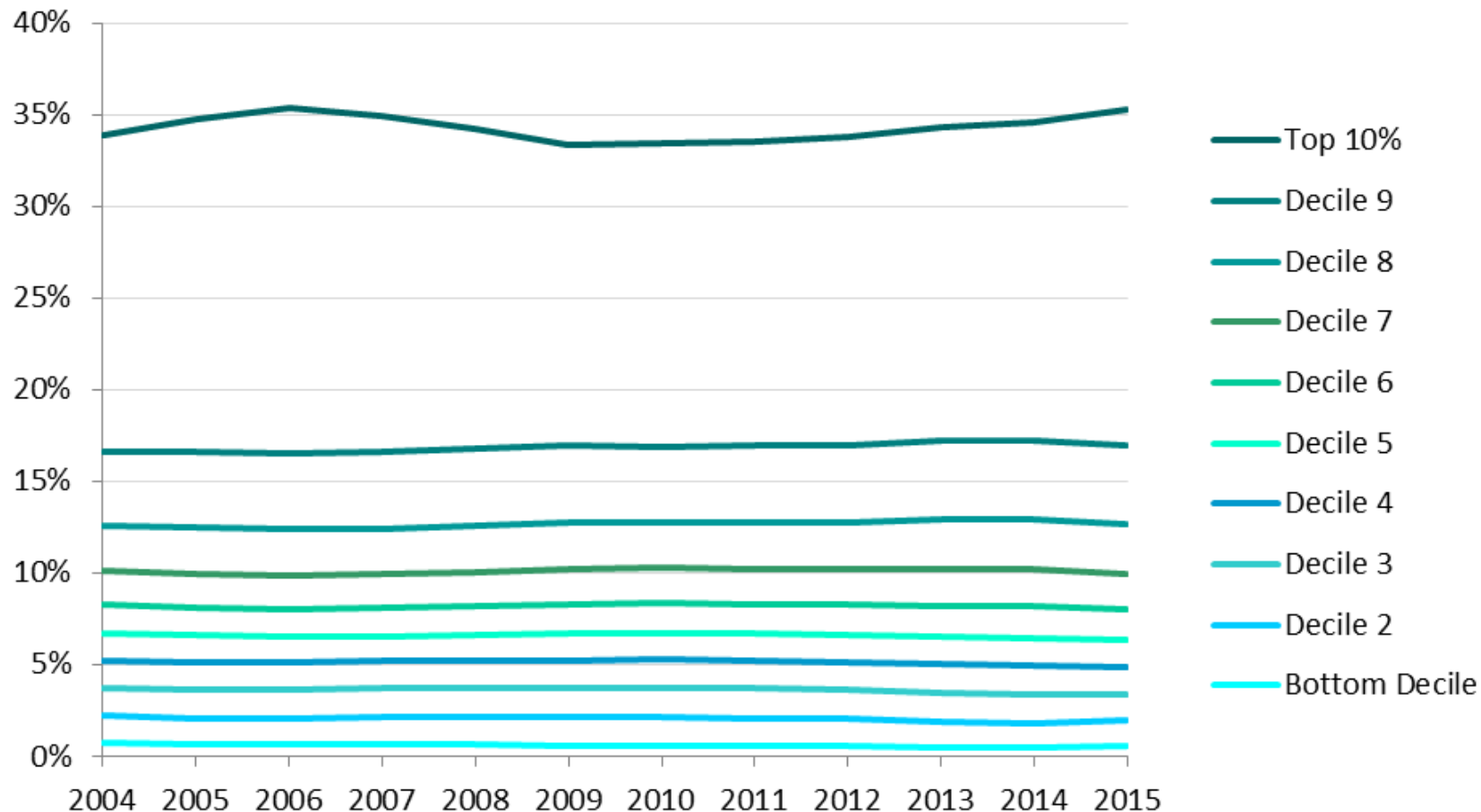
Irish personal tax system (3)

Figure 2: Share of taxpayers by marginal tax rate



Irish income distribution

Figure 3: Share of taxpayer income by deciles



Estimation method

- For each taxpayer, relate 3 year changes in taxable income to 3 year changes in marginal net-of-tax rates

- Estimation challenges:
 1. Income and marginal tax rate jointly determined in a progressive tax system

 2. Non tax-related changes in income:
 - a) Heterogeneous income trends
 - b) Mean reversion



Estimation method

Challenge	Solution / Judgement?
1. Joint determination	Use an instrument for the net-of-tax rate <ul style="list-style-type: none">• Exploit changes in the tax system over time• “mechanical” net-of-tax rate – a tax rate free of any behavioural response by applying the current year’s tax rules to the base year’s income• Estimate an IV 2SLS regression in first differences
2.a. Heterogeneous income trends	Stable income distribution (Figure 3)
2.b. Mean reversion	Control for base year income

- In addition, sample restrictions:
 - ✓ Age cut-off (15 - 64 years)
 - ✓ Income cut-off (> €5,000 annual taxable income)



Data

- Revenue's Income Distribution Statistics (IDS)
 - follows 2 million taxpayers over a 12 year period from 2004 to 2015
 - Includes P35 (PAYE) and Form 11 (Self-Assessed) tax returns
- Additional demographic information:
 - personal tax status (single male, single female, married one-earner and married two earner)
 - schedule (PAYE or Self-Assessed)
 - industry sector
 - region (taxpayer's residence)
 - age



Section 1 Background, Estimation and Data

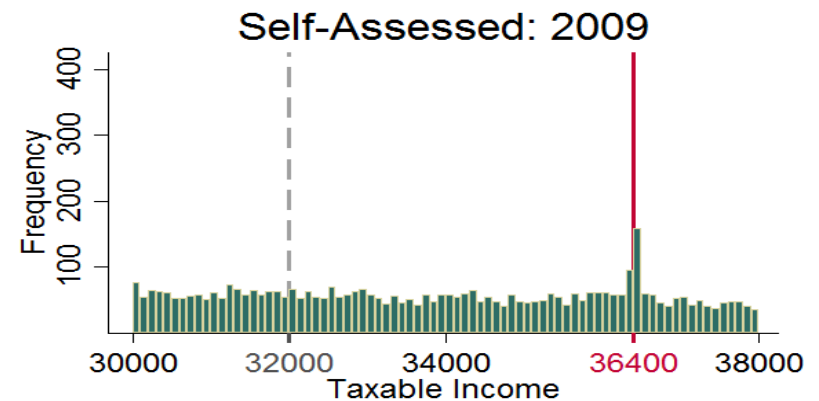
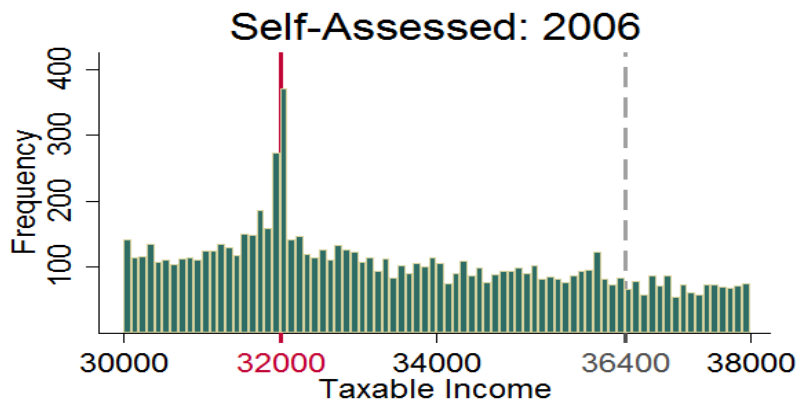
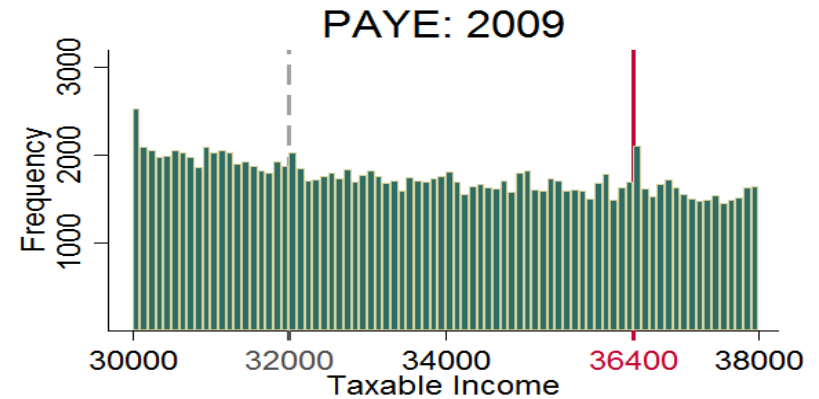
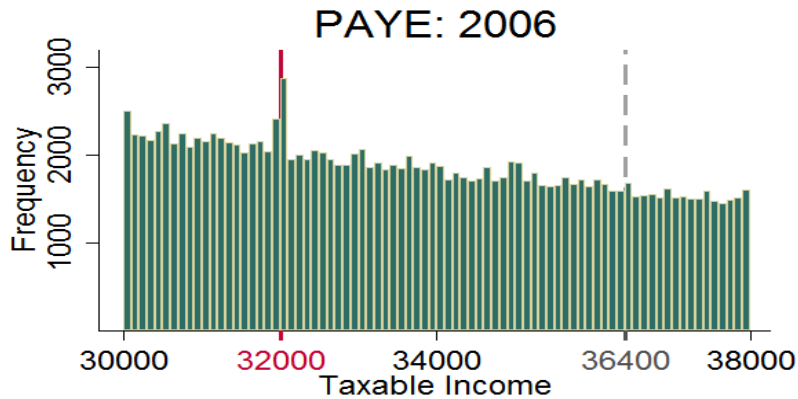
■ Section 2 Results



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Results (1): expect a positive behavioural response

A: Single Taxpayers



Results (2): sample choice matters

	ETI for all taxpayers	ETI for PAYE	ETI for Self-assessed
Sample: annual real taxable income > €500	0.320***	0.315***	0.422***
	(0.005)	(0.005)	(0.023)
<i>Observations</i>	11,777,605	10,910,184	867,421
Sample: annual real taxable income > €5000	0.094***	0.089***	0.168***
	(0.003)	(0.003)	(0.018)
<i>Observations</i>	10,614,250	9,825,828	788,422

Note: standard errors in parentheses; *, ** and *** denotes significance at the 5%, 1% and 0.1% level respectively. All regressions employ an age cut-off range (15-64 years inclusive) and an income cut-off (€5,000) unless otherwise specified. Coefficients on control variables (logged base-year income, industry, age, location, marital status, unemployment rate, status switches) are omitted here for simplicity.

Results (3): marital status matters... but so does income level and tax system design?

	ETI for Single		ETI for Married One Earning		ETI for Married Two Earning	
	PAYE	Self-Assessed	PAYE	Self-Assessed	PAYE	Self-Assessed
	0.008	-0.063*	0.128***	0.271***	0.242***	0.345***
	(0.005)	(0.031)	(0.009)	(0.049)	(0.006)	(0.025)
<i>Obs:</i>	5,663,589	292,743	1,579,815	193,435	2,451,593	288,868

Note: standard errors in parentheses; *, ** and *** denotes significance at the 5%, 1% and 0.1% level respectively. All regressions employ an age cut-off range (15-64 years inclusive) and an income cut-off (€5,000) unless otherwise specified. Coefficients on control variables (logged base-year income, industry, age, location, unemployment rate, status switches) are omitted here for simplicity.

Results (4): no differential gender response for Single taxpayers

	ETI for Single		ETI for Single Male		ETI for Single Female	
	PAYE	Self-Assessed	PAYE	Self-Assessed	PAYE	Self-Assessed
	0.008	-0.063*	0.017*	-0.075*	0.01	0.026
	(0.005)	(0.031)	(0.007)	(0.035)	(0.006)	(0.064)
<i>Obs:</i>	5,663,589	292,743	2,741,615	219,009	2,921,974	73,734

Note: standard errors in parentheses; *, ** and *** denotes significance at the 5%, 1% and 0.1% level respectively. All regressions employ an age cut-off range (15-64 years inclusive) and an income cut-off (€5,000) unless otherwise specified. Coefficients on control variables (logged base-year income, industry, age, location, unemployment rate, status switches) are omitted here for simplicity.

Results (5): age matters

	Single		Married One Earning		Married Two Earning	
	PAYE	Self-Assessed	PAYE	Self-Assessed	PAYE	Self-Assessed
	0.105***	0.056	0.177***	0.236***	0.259***	0.290***
	(0.005)	(0.037)	(0.01)	(0.059)	(0.007)	(0.029)
<i>Obs:</i>	3,751,207	214,926	1,188,924	128,563	1,888,268	197,976
Note: standard errors in parentheses; *, ** and *** denotes significance at the 5%, 1% and 0.1% level respectively. All regressions employ an age cut-off range (25-55 years inclusive) and an income cut-off (€5,000) unless otherwise specified. Coefficients on control variables (logged base-year income, industry, age, location, unemployment rate, status switches) are omitted here for simplicity.						

- Sample here: 25-55 years old inclusive

Results (6): income really matters

	ETI for Single Taxpayers	
	PAYE	Self-Assessed
Low income sample: €5k – 25k	-0.513***	-0.997***
	(0.024)	(0.044)
<i>Observations</i>	2,987,826	174,328
Middle income sample: €25k – 75k	0.026***	0.590***
	(0.005)	(0.047)
<i>Observations</i>	3,118,662	117,483
High income sample: €75k +	3.835***	4.683***
	(0.223)	(0.898)
<i>Observations</i>	156,164	19,814
All	0.008	-0.063*
	(0.005)	(0.031)
<i>Observations</i>	5,663,589	292,743

Note: standard errors in parentheses; *, ** and *** denotes significance at the 5%, 1% and 0.1% level respectively. All regressions employ an age cut-off range (15-64 years inclusive) and an income cut-off (€5,000) unless otherwise specified. Coefficients on control variables (logged base-year income, industry, age, location, unemployment rate, status switches) are omitted here for simplicity.



Interpretation and Application

- Marginal tax rates matter...
- ... but the extent to which they do so is governed by which taxpayers and socio-economic characteristics you are interested in
- Results are extremely sensitive to specification, meaning there is no one ETI that can answer all questions on the efficiency of income tax policy and the most appropriate marginal tax rate
- Having said that... taking the ETI results by marital status, weighting them by income, we obtain an ETI of 0.12. This leads to an estimate of the shadow price of public funds of €1.24 per euro of income tax revenue raised (slightly lower than current estimate in the Public Spending Code of €1.30)



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