Relocation of the Rich: Migration in Response to Top Tax Rate Changes from Spanish Reforms

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Skilled workers play a vital role in the fiscal systems of advanced economies, and may easily be "worth their weight in gold", bringing fiscal dividends of substantial size to the societies in which they reside.
– David Wildasin (2009)

Research Agenda

- How sensitive are the "rich" to interstate tax differentials?
- Are individuals in certain industries and occupations more sensitive?
- How large are the revenue implications of tax-induced migration?
- Ideal context to study migration:
  - A reform implemented in 2011 granted Spanish regions the ability to set their own income tax rates and brackets.
  - Tax rates diverged substantially across regions.

Motivation to Study Migration

- High-income individuals are potentially very responsive to tax differentials, especially within a country when mobility barriers are low.
- Mobility is a form of behavioral response.
  - Moving increases the efficiency cost of taxation and limits redistribution policy (Mirrlees 1982: optimal degree of redistribution will decline as the mobility elasticity increases).
  - Mobile labor may induce inefficient tax competition (Wildasin 2006; Wilson 2009).
- Substantially discussed in the media and policy world: e.g., "Actor Depardieu bids 'adieu' to France to avoid taxes."

Tax-Induced Migration: An Example

Actor Depardieu bids 'adieu' to France to avoid taxes

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French cinema's leading man Gérard Depardieu has set up his home in a Belgian town straddling the French border to avoid paying taxes in his home country, a local mayor has confirmed.

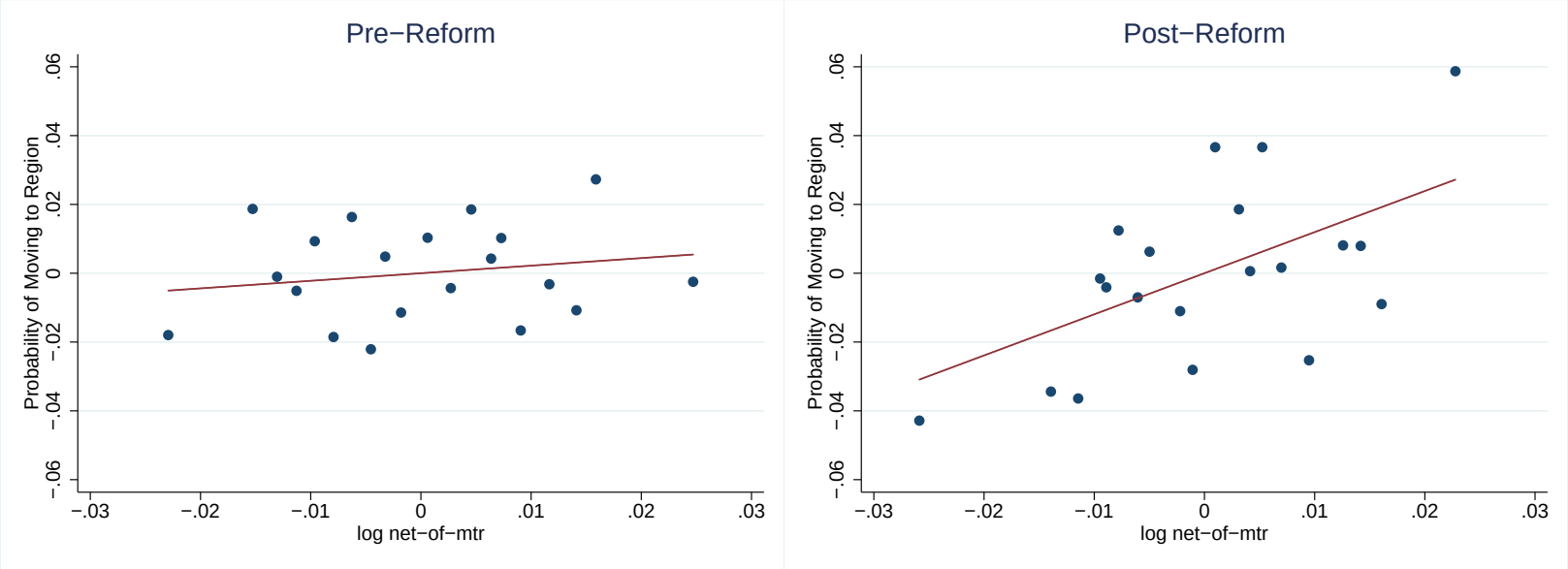
Academic Evidence

- Limited in scope and in conflict:
  - Large effects found in select groups of the sub-population: star scientists (Moretti and Wilson 2017 AER; Ackigit, Baslandze, and Stantcheva 2016 AER), athletes (Kleven, Landais and Saez 2013 AER), or foreigners subject to preferential taxation (Kleven, Landais, Saez, and Schultz 2014 QJE)
  - Smaller effects across localities in Switzerland (Brülhart and Parchet 2014 JPubEc) and states in the USA (Coomes and Hoyt 2008 JUE; Young and Varner 2011 NTJ; Young, Varner, Lurie and Prisinzano 2016 ASR)
  - Agrawal and Hoyt (2018, EJ) show U.S. tax rules are often not purely residence based $\Rightarrow$mobility may be in jobs, not people.
- We study an alternative scenario: population representative administrative data – containing occupation and industry information – but in a country with relatively low mobility (less than 1% for the rich). Then we use occupation and industry data to assess the external validity of the prior literature.

Main Contributions and Findings

- Graphical evidence on aggregate effects using stocks.
  - Clear effect after accounting for origin and destination fixed effects.
  - But, the elasticity of the stock has relatively small revenue implications.
- Choice model: movers are more likely to select low-tax states.
  - The Madrid - Catalunya tax differential increases probability of moving to Madrid by 2.25 points.
  - Heterogeneity by various occupations/industries.
- Interpretation of the elasticities using a simple theoretical model.
  - Tax decreases result in revenue losses suggesting the mechanical effect of the tax change outweighs the behavioral response.

Preview of Results



pre-reform: no effect

post-reform: "large" effect

Institutional Details

Institutional Details: Reform

- Spain consists of 17 autonomous communities (in Spanish: *comunidades autónomas*).
- Since the 90s regions are entitled to receive a share of the Personal Income Tax (*Impuesto sobre la Renta de las Personas Físicas*), where we study the labor income tax bases.
  - Capital income is taxed under a single federal tax system.
- A major wave of decentralization in 2011 had substantial changes:
  - The share of revenue that regions could keep.
  - The authority to change the tax rates / tax brackets were given to the regions.
- Immediately following the new law, the regions began changing tax rates substantially, but mainly at the top portion of the income distribution.

Spanish Popular Press: “Fiscal Paradise”

Susana Díaz acusa a Madrid de querer convertirse en un paraíso fiscal

La presidenta de la Junta critica la rebaja del IRPF acometida por Ignacio González

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MANUEL PLANELLES

Sevilla - 8 ENE 2014 - 21:26 CET

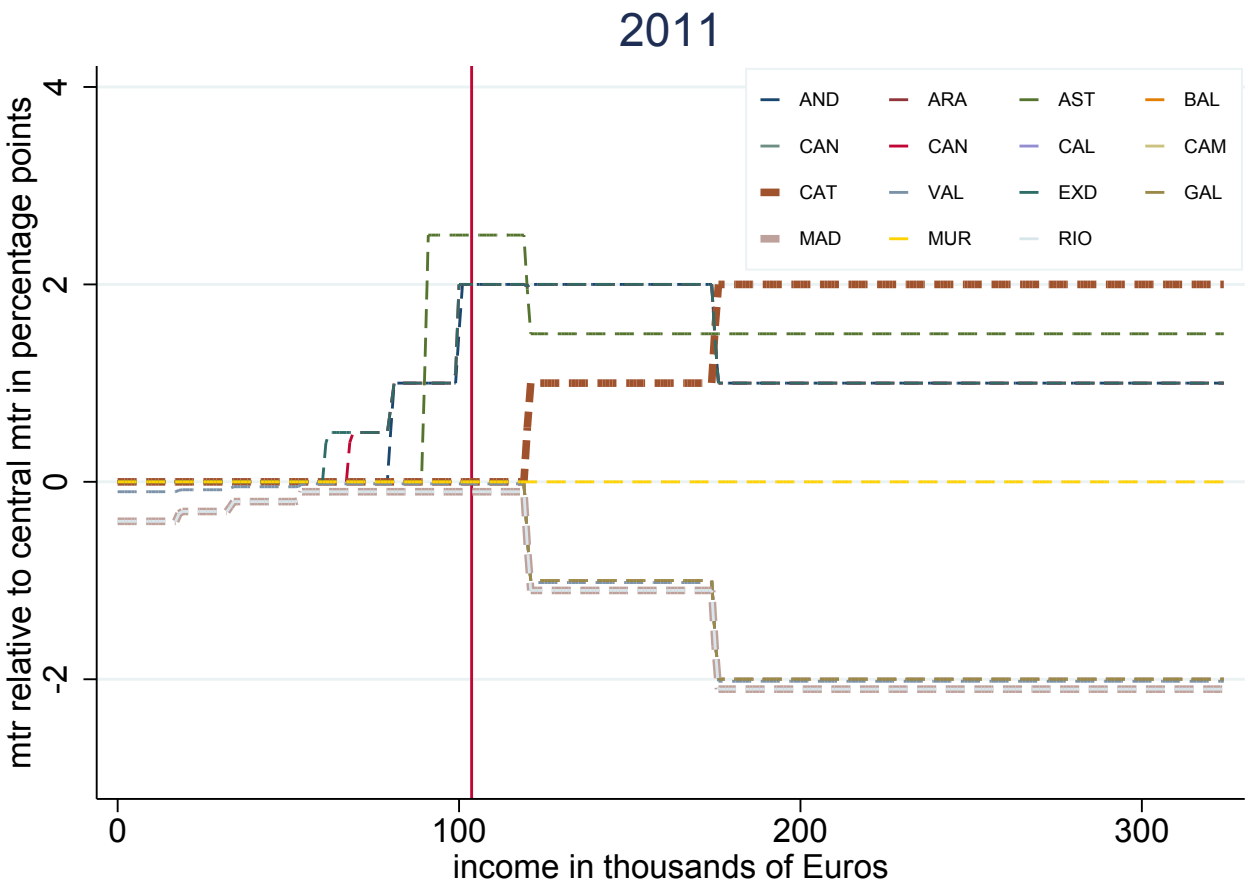
La presidenta de la Junta de Andalucía, la socialista Susana Díaz, ha criticado este miércoles la rebaja que ha acometido Madrid del tramo autonómico del Impuesto de la Renta de las Personas Físicas (IRPF), que supondrá que las arcas de la comunidad gobernada por Ignacio González (PP) dejen de ingresar 216 millones este año. Díaz ha interpretado que los responsables de esa comunidad buscan con esta medida convertir a Madrid en un "paraíso fiscal".

En su opinión, el objetivo de la rebaja es que haya "fugas" de contribuyentes entre autonomías, "a costa del esfuerzo" que están haciendo "el resto de comunidades" para controlar sus cuentas y el déficit. Por ello, Díaz ha instado al Estado a que se ocupe de este asunto. "El Gobierno no se preocupa de que no se produzcan agravios como el que pretende la Comunidad de Madrid y de actuar en defensa del proyecto común que se llama España, en el que todos debemos

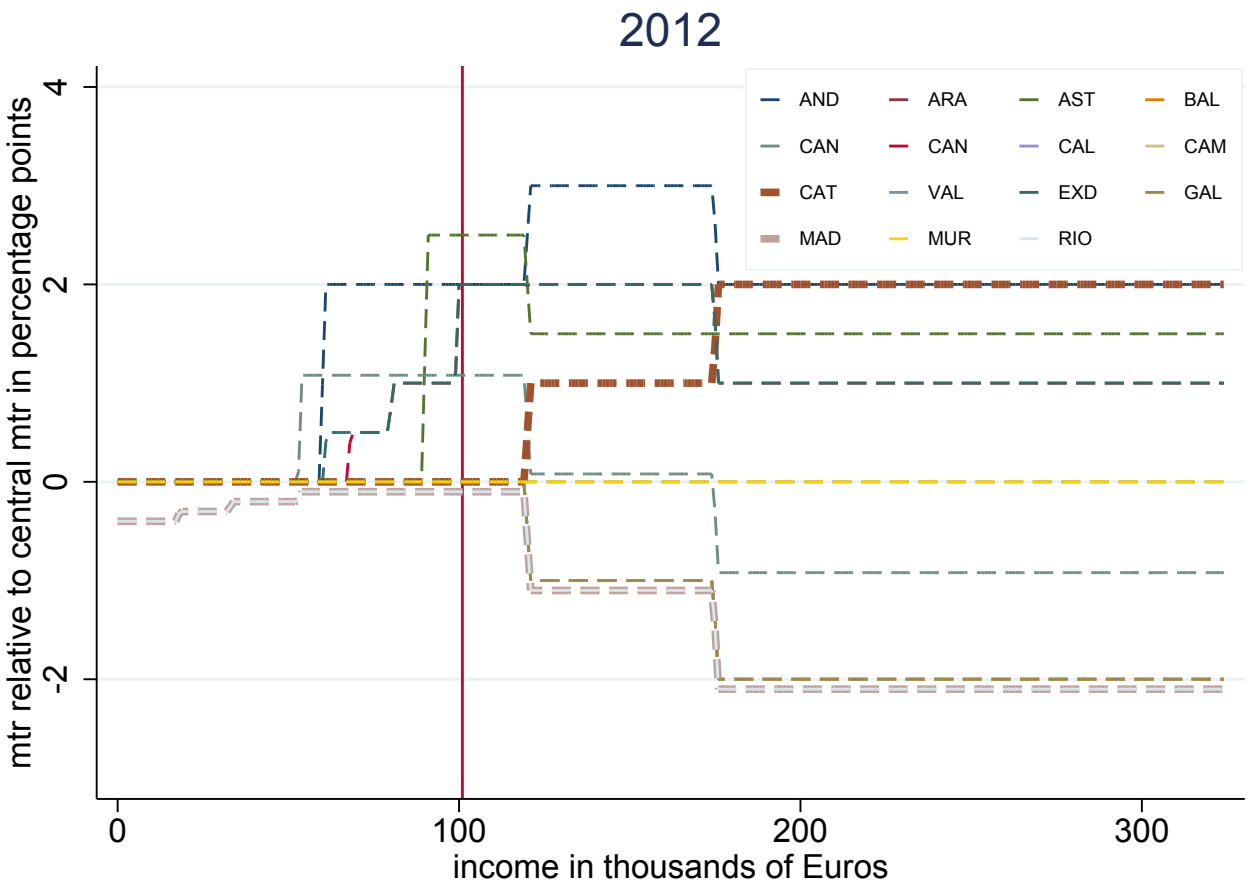
VÍDEOS NEWSLETTERS

TE PUEDE INTERESAR

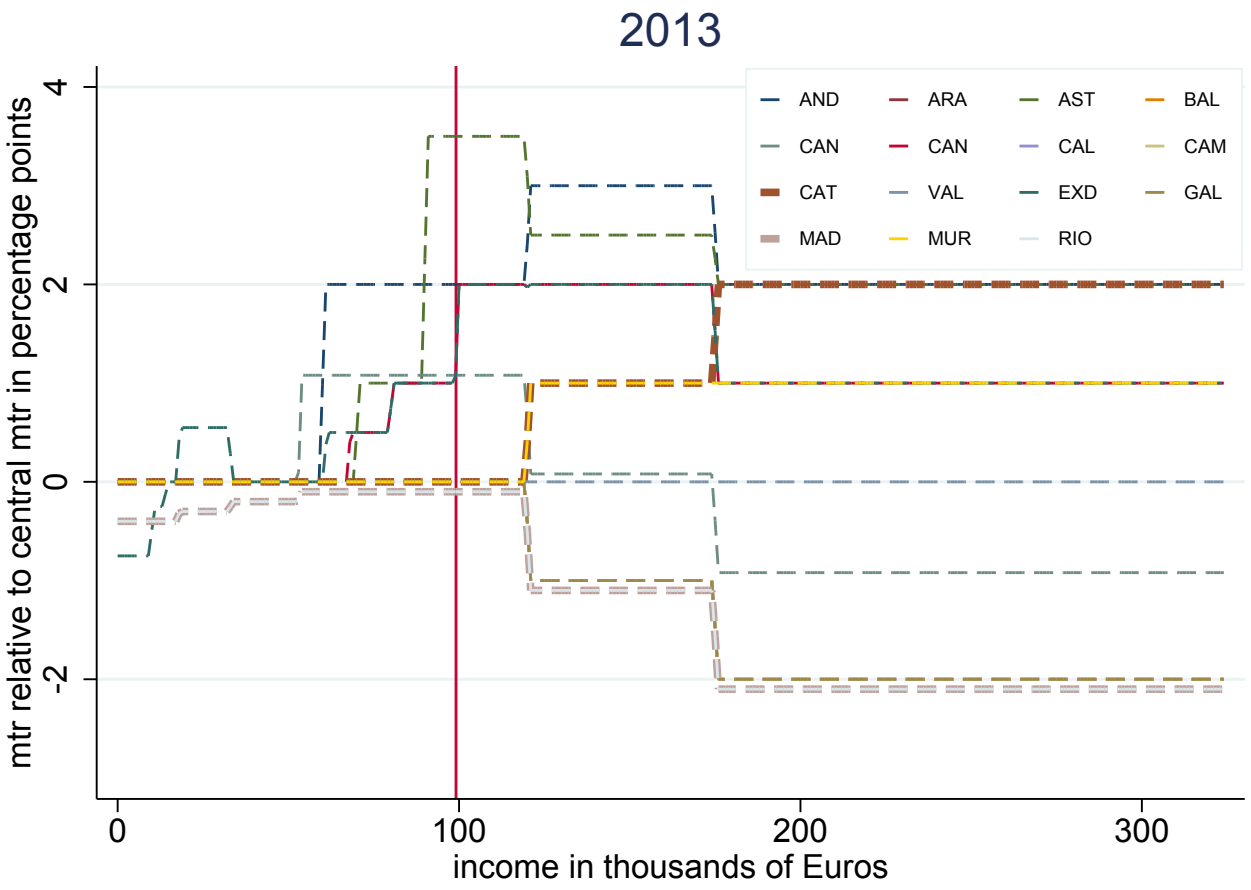
Tax Changes (2011)



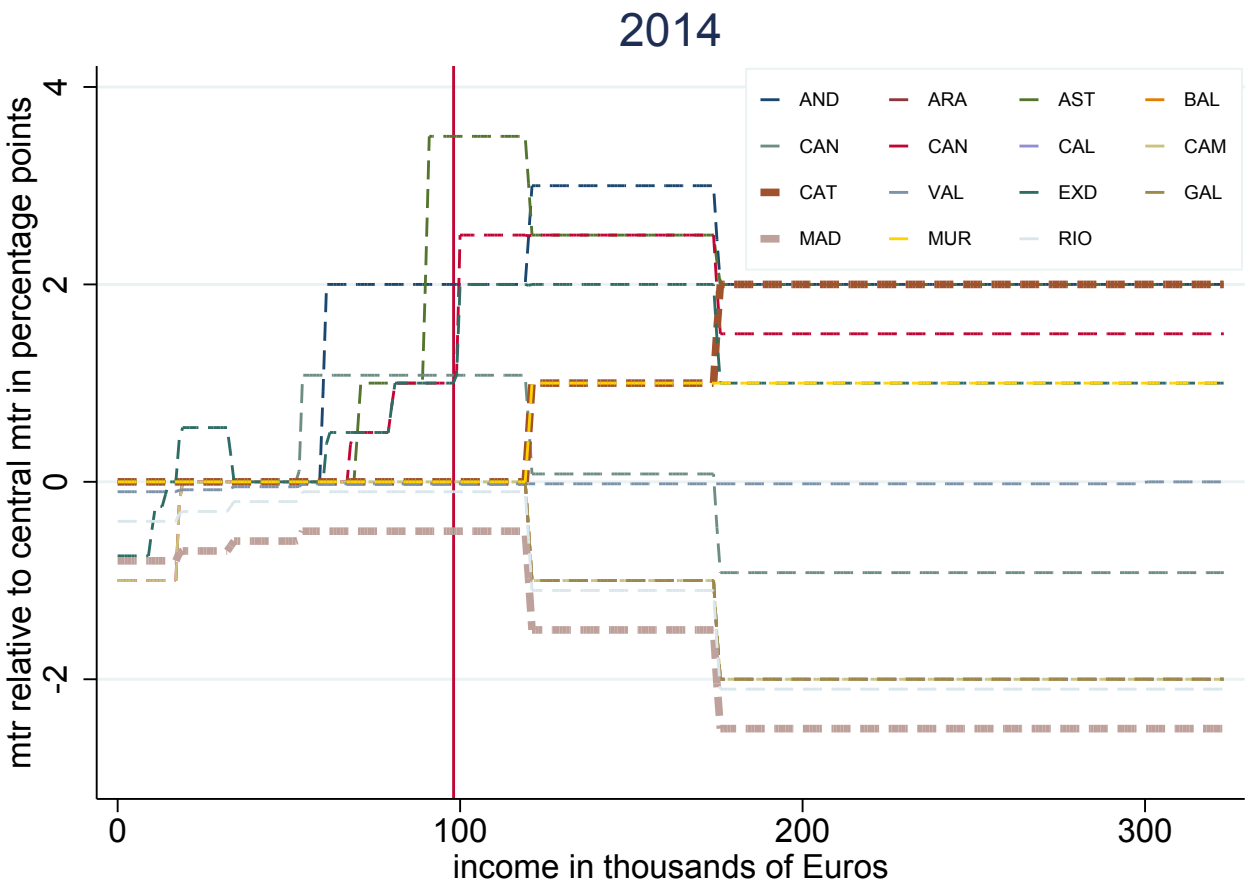
Tax Changes (2012)



Tax Changes (2013)



Tax Changes (2014)

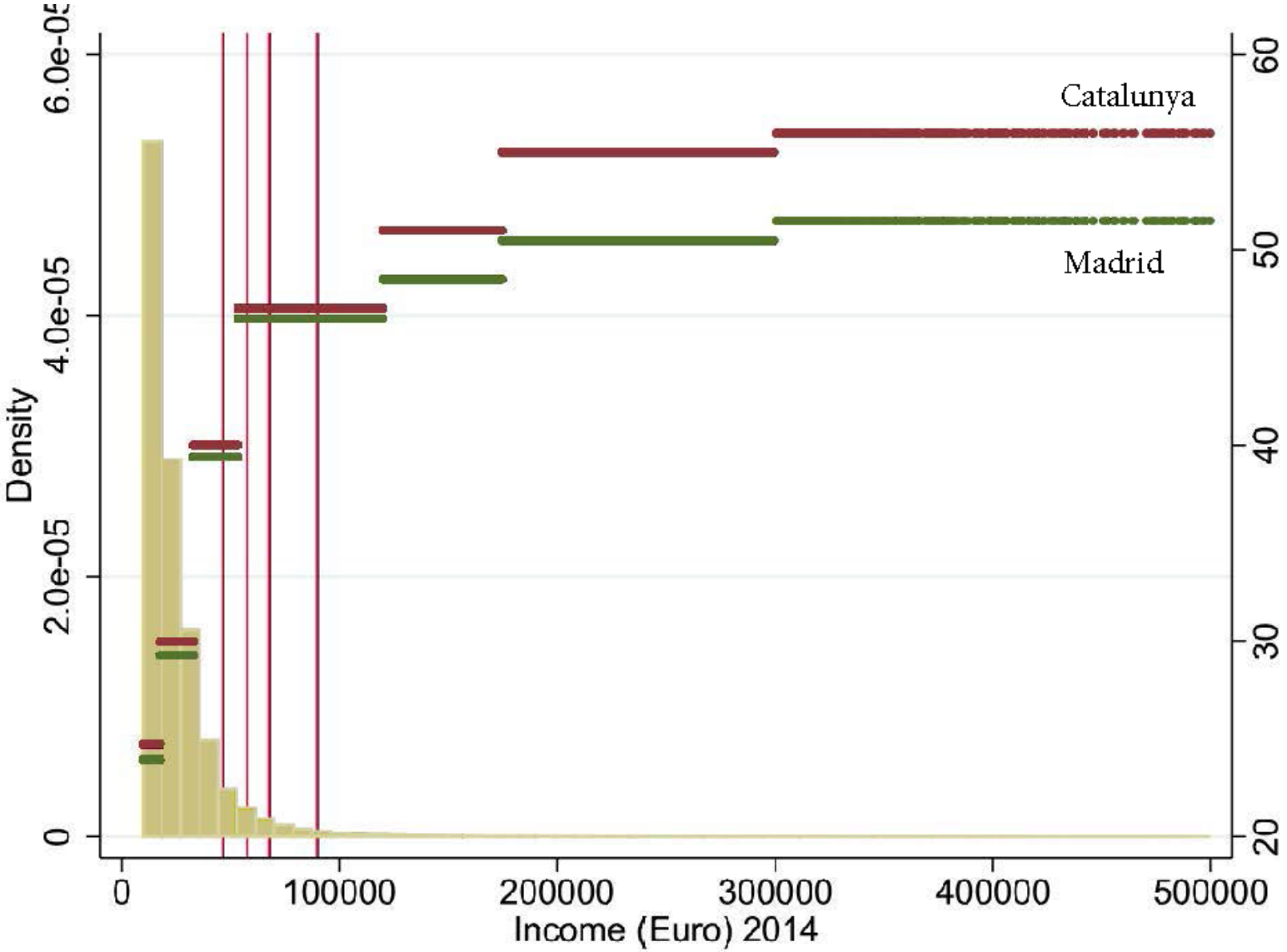


Tax Declaration

Cálculos del impuesto y resultado de la declaración

Cuota estatal correspondiente a la base liquidable general sometida a gravamen	524	
Cuota autonómica correspondiente a la base liquidable general sometida a gravamen	525	
Cuota estatal complementaria correspondiente a la base liquidable general sometida a gravamen	526	
Cuota estatal correspondiente al mínimo personal y familiar de B.L. general	527	
Cuota estatal complementaria correspondiente al mínimo personal y familiar de B.L. general	528	
Cuota derivada de la escala de gravamen general estatal	529	
Cuota derivada de la escala de gravamen complementaria	530	
Cuota autonómica correspondiente al mínimo personal y familiar de la B.L. general	531	
Cuota estatal correspondiente a la base liquidable general	532	
Cuota autonómica correspondiente a la base liquidable general	533	
Tipo medio estatal	TME	
Tipo medio autonómico	TMA	
Cuota íntegra estatal [(532)+(541)]	545	
Cuota íntegra autonómica [(533)+(542)]	546	

Tax Rates and Income Distribution: 2014



[Calculator]

Data

- Spain's Continuous Sample of Employment Histories (*Muestra Continua de Vidas Laborales*, MCVL)
  - Data matches individual microdata from from social security records with data from the tax administration (*Agencia Tributaria, AEAT*), and official population register data (*Padrón Continuo)* from the Spanish National Statistical Office (*INE*).
  - A 4% non-stratified random sample (over 1 million observations each year) of the population of individuals which had any relationship with Spain's Social Security system in a given year.
- Income tax data <u>not</u> top coded: ideal for high-income.
  - We create an income variable which is the sum of all reported income by different employers within each year which is subject to the personal income tax (labor income, self employed income, etc.).
- We define a change of location if an individual changed his or her residence using official population registers.
  - Information is taken from the official register of the municipality where people registered (for local services).

Tax Rates

- The data only includes income reported by employers or self-employed, not full tax declarations.
- NBER's TAXSIM does not exist for Spain – we digitize Spain's tax code.
- We write a tax calculator where we simulate average and marginal tax rates for each individual in each year for each region and reconstruct the taxes of all individuals included in the data.
  - This simulation takes into account the variation of marginal tax rates, their brackets, and basic deductions and tax credits for children, elderly, and disabilities.

Method I: Aggregate Analysis
Estimation of Location Equilibrium Condition

Theoretical Motivation

- Let the utility of a top income individual living in region r in period t be given by:

$$V_{r,t} = \alpha ln(c_{r,t}) + \pi ln(g_{r,t}) + \mu_r - \gamma ln(N_{r,t}) \tag{1}$$

  - where $c_{r,t} = (1 - \tau_{r,t})w_{r,t}$ and $ln(N_{r,t})$ is a disutility (congestion) function.

- If production is given by $A_r N_{r,t}^{\theta} \bar{K}_r^{\vartheta}$ we must have $w_{r,t} = \frac{A_r \bar{K}_r^{\vartheta}}{N_{r,t}^{\theta}}$.
- Then, the equilibrium between regions $r = \{d, o\}$ is characterized by

$$ln(\frac{N_{d,t}}{N_{o,t}}) = \frac{1}{\theta + \frac{\gamma}{\alpha}} ln\left(\frac{1 - \tau_{d,t}}{1 - \tau_{o,t}}\right) + \frac{\pi}{\alpha(\theta + \frac{\gamma}{\alpha})} ln\left(\frac{g_{d,t}}{g_{o,t}}\right) + \zeta_d - \zeta_o \tag{2}$$

  - where ζ_r depends on time-invariant parameters μ_r, A_r and $\bar{K}_r$.
  - Adjustment of wages: $\frac{dln(w_{r,t})}{dln(1-\tau_{r,t})} = \frac{dln(N_{r,t})}{dln(1-\tau_{r,t})} \times \frac{dln(w_{r,t})}{dln(N_{r,t})} = -\theta \frac{1}{\theta + \frac{\gamma}{\alpha}}$

Aggregate Analysis: Stocks

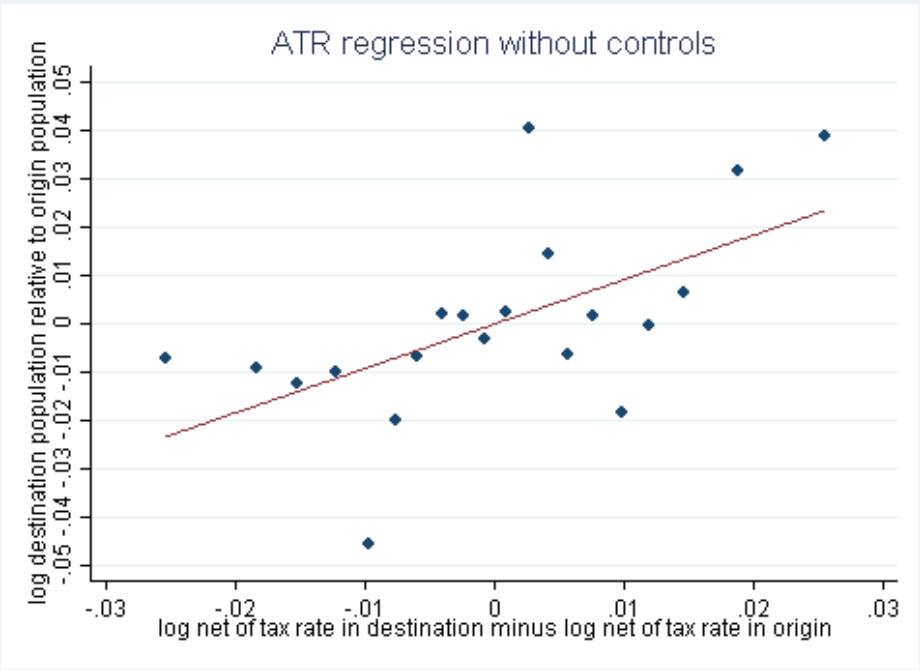
$$\underbrace{ln(N_{dt}/N_{ot})}_{\text{stock ratio}} = \underbrace{\beta[ln(1-atr_{dt}) - ln(1-atr_{ot})]}_{\text{tax differentials}} + \underbrace{\zeta_d}_{\text{'d' amenities}} + \underbrace{\zeta_o}_{\text{'o' amenitiess}} + \zeta_t + \delta ln\left(\frac{g_{d,t}}{g_{o,t}}\right) + X_{odt}\phi + \nu_{odt} \tag{3}$$

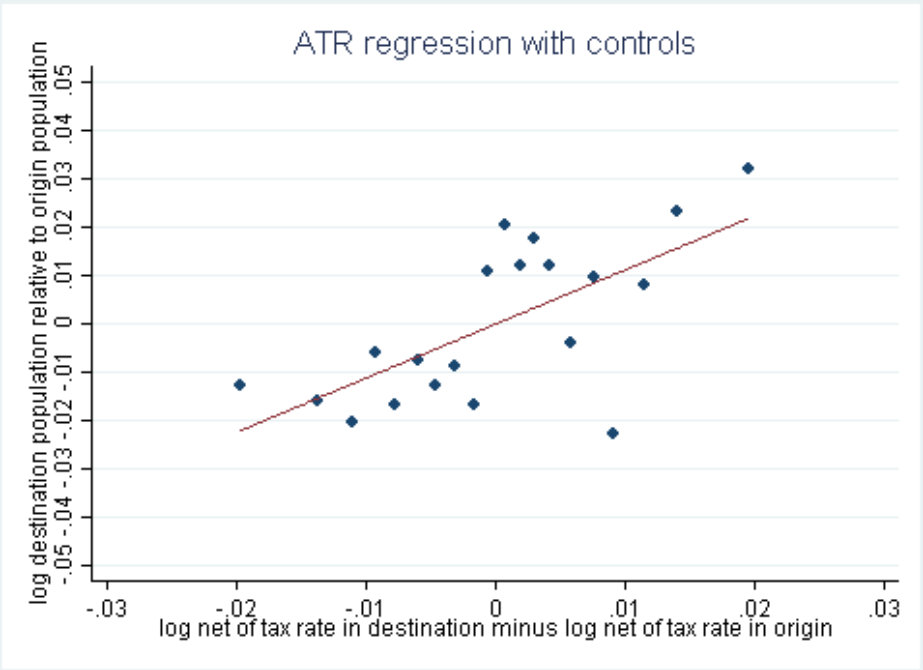
- The left hand side variable $ln(N_{dt}/N_{ot})$ is the log of the stock of individuals in the top 1% of the income distribution in region d relative to region o.
- Need to address potential taxable income responses. Do so by focusing on individuals that repeat being in the top 1%.
- The stock elasticity with respect to the net of tax top rate is approximately equal to $\beta = \frac{dln(N_{d,t})}{dln(1-atr_{d,t})} - \frac{dln(N_{o,t})}{dln(1-atr_{d,t})}$.

Model Motivation

- Model leads to a structural interpretation of estimated coefficient:
  - β is the effect of tax changes including through their indirect effect on regional wages, i.e. the effect taking all fixed regional characteristics (amenities) and public services as given except for taxes <u>and</u> wages.

Visual Results: Stock Elasticity





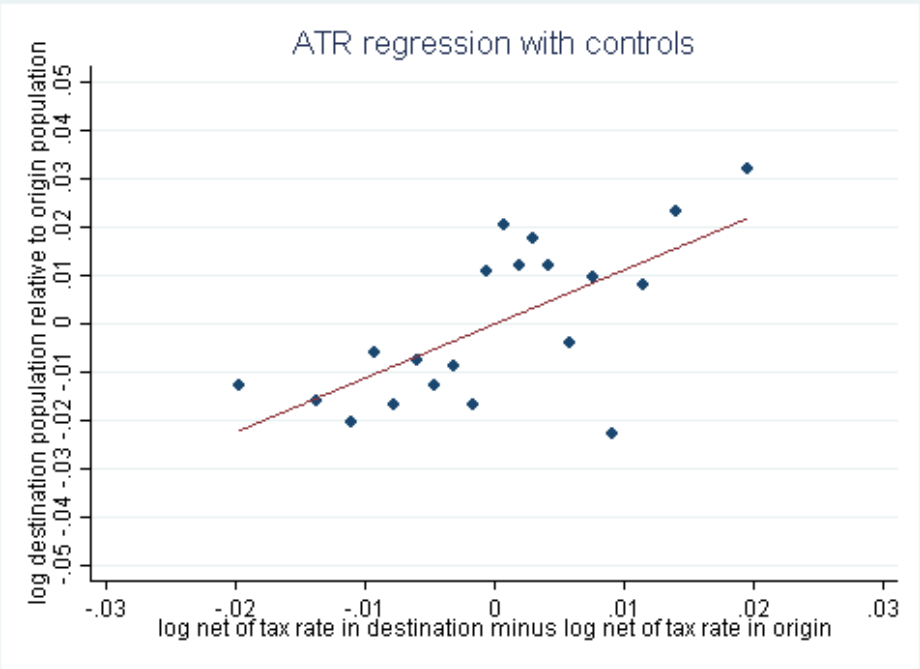
theory: $\downarrow$tax differential $\Longrightarrow$ $\uparrow$ net of tax differential $\Longrightarrow$ $\uparrow$ stock of rich

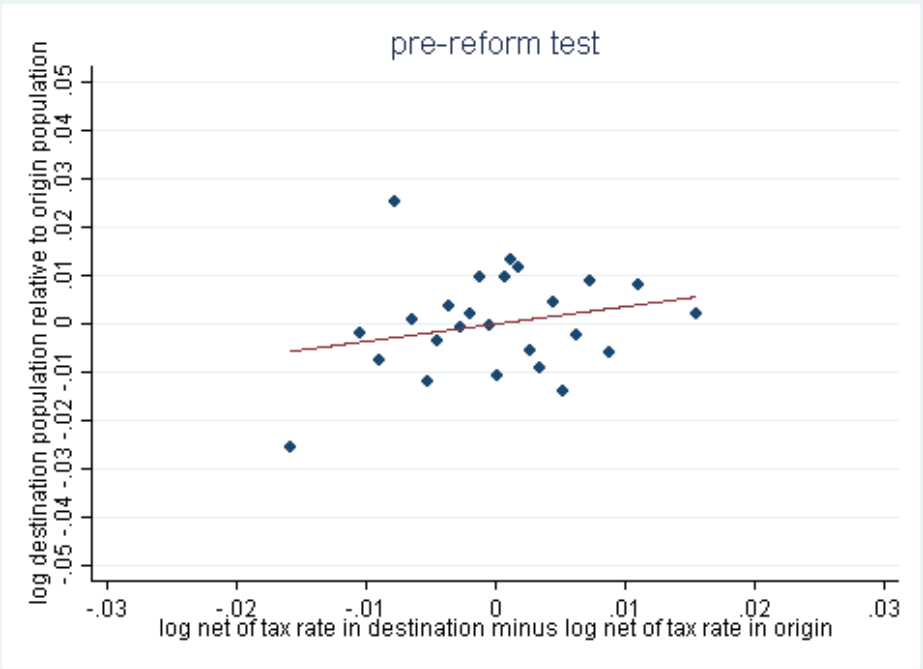
Results : Stock Elasticity

	Baseline Specifications			Addressing Taxable Income	
	ATR (1)	ATR (2)	MTR (3)	ATR (4)	MTR (5)
$ln[(1-atr_d)/(1-atr_o)]$	0.917*	1.116**	0.656**	0.878*	0.556**
	(0.537)	(0.545)	(0.300)	(0.500)	(0.267)
Government Spending?	Y	Y	Y	Y	Y
FE?	Y	Y	Y	Y	Y
Controls?	N	Y	Y	Y	Y
Number of Observations	1050	1050	1050	1050	1050

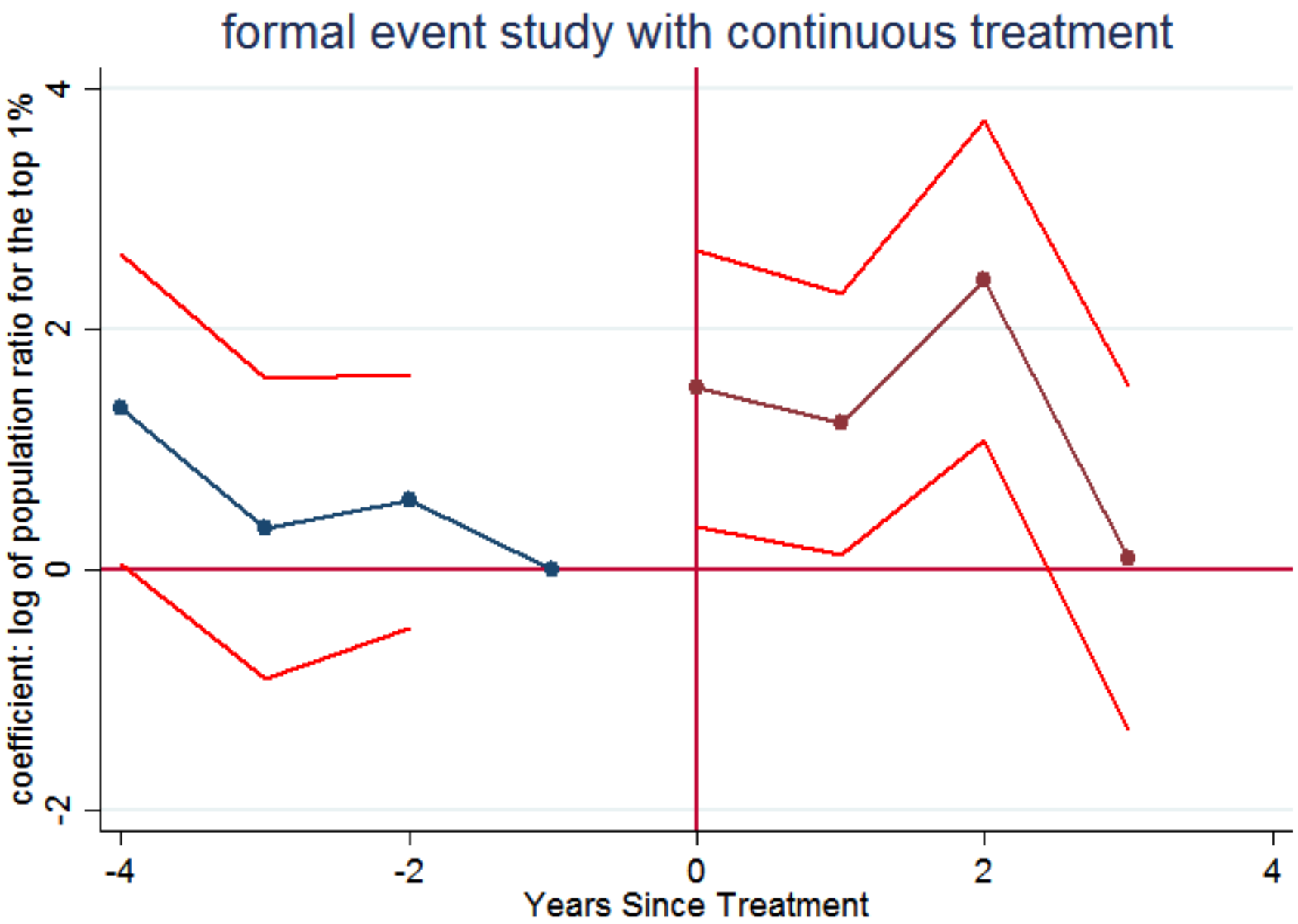
Visual Results : Lower Parts of Distribution

Visual Results : Pre-reform Stock & Post-reform Taxes





Event Study


formal event study with continuous treatment
coefficient: log of population ratio for the top 1%
4
2
0
-2
-4
-2
0
2
4
Years Since Treatment

Method II: Individual Analysis

Where to Move?

Individual Choice Model [Estimation]

- Letting j index location and (i,t) index a particular move, we estimate using movers pre-reform (2005-2010) and post-reform (2011-2014):

$$d_{i,t,j} = \underbrace{\beta\, ln(1-\tau_{i,t,j})}_{\text{tax differentials}} + \underbrace{\zeta_j \mathbf{x}_{i,t}}_{\text{wage differentials}} + \underbrace{\gamma \mathbf{z}_{i,t,j}}_{\text{moving costs}} + \overbrace{\iota_{t,j}}^{\text{region-year effects}} + \underbrace{\alpha_{i,t}}_{\text{case FE}} + \varepsilon_{i,t,j} \tag{4}$$

- with $d_{i,t,j} = 1$ if selected region and 0 otherwise.

Identification: Taxes

- Approach A:
  - Because counterfactual wages are not observed, calculation of the counterfactual average tax rate presents challenges if wages are not similar across regions.
  - Initially use the marginal tax rate of individual i. Independent of earnings if income changes across regions do not induce tax bracket changes across regions.
- Approach B:
  - Also calculate the average tax rate assuming that wages are constant across regions.
  - Individuals are more likely to select states with high wages $\Longrightarrow$ overestimate counterfactual wages $\Longrightarrow$ overestimate counterfactual average tax rates (progressive).
  - Resolved using an IV approach.

Identification: Wage Differentials

- But, we also need to control for wages across other regions. To do this, we construct measures of "ability" using education, male, age, and age squared.
  - We then interact these variables with state dummy variables to allow for different effects across states.
  - This allows the returns to education and the skill premium of age to vary by region.

Identification: Other Policies / Amenities

- We control for other policy changes and amenities across regions.
  - We do this by including region by year fixed effects to capture any alternative specific policies that may vary over time.
  - Implicitly assumes all policies are constant across individuals within a region.
  - Public services consumption likely similar in the top 1%.

Identification: Moving Costs

- We control for moving costs.
  - Calculate the distance between all alternatives and the region of origin (gravity model of migration).
  - Dummy variable for region of birth.
  - Dummy variable for region of first job.
  - Dummy variable for region moving from.
  - Dummy variable for region of firm headquarters.

Sample Selection

- We focus on movers.
- Because movers are a very small share of the population, it is likely that the equilibrium tax rates selected following the fiscal decentralization are driven by the large share of the stayers – reducing endogeneity concerns (Brulhart, Bucovetsky and Schmidheiny 2015).
- Schmidheiny (2006): *"Households do not daily decide upon their place of residence. There are specific moments in any individual's life [first job, family changes, career opportunities] when the decision about where to live becomes urgent.... Limiting the analysis to moving households therefore eliminates the bias when including households that stay in a per se sub-optimal location because of high monetary and psychological costs of moving. However, the limitation to moving households introduces a potential selection bias when the unobserved individual factors that trigger the decision to move are correlated with the unobserved individual taste for certain locations."*

Sample Selection

- Address these concerns by:
  - Testing for differences in covariates between movers and stayers.
  - Estimate the model for the full sample of stayers and movers (smaller, but same sign).

Results: MTR

	(1)	(2)	(3)
$ln(1 - mtr_{i,j,t})$	0.569	0.604**	0.677**
	(0.367)	(0.305)	(0.308)
place of origin		-0.797***	-0.766***
		(0.061)	(0.060)
place of birth		0.207***	0.206***
		(0.022)	(0.021)
place of first work		0.186***	0.177***
		(0.020)	(0.020)
work place		0.288***	0.261***
		(0.018)	(0.021)
$ln(distance)$		-0.075***	-0.072***
		(0.009)	(0.009)
individual fixed effects	Y	Y	Y
j by year fixed effects	Y	Y	Y
j by education	N	N	Y
j by age	N	N	Y
j by age squared	N	N	Y
j by male	N	N	Y
observations	13,395	13,395	13,395

Results: ATR

	(1)	(2)	(3)
$ln(1 - atr_{i,j,t})$	0.588	0.714**	0.904***
	(0.420)	(0.343)	(0.332)
place of origin		-0.797***	-0.766***
		(0.061)	(0.060)
place of birth		0.207***	0.206***
		(0.022)	(0.021)
place of first work		0.185***	0.177***
		(0.020)	(0.020)
work place		0.288***	0.261***
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		(0.009)	(0.009)
individual fixed effects	Y	Y	Y
j by year fixed effects	Y	Y	Y
j by education	N	N	Y
j by age	N	N	Y
j by age squared	N	N	Y
j by male	N	N	Y
observations	13,395	13,395	13,395

Results: ATR with IV

	(1)	(2)	(3)
$ln(1 - atr_{i,j,t})$	1.452	1.542*	1.731**
	(0.948)	(0.788)	(0.797)
place of origin		-0.797***	-0.766***
		(0.061)	(0.060)
place of birth		0.207***	0.206***
		(0.022)	(0.021)
place of first work		0.185***	0.177***
		(0.020)	(0.020)
work place		0.288***	0.261***
		(0.018)	(0.021)
$ln(distance)$		-0.075***	-0.072***
		(0.009)	(0.009)
individual fixed effects	Y	Y	Y
j by year fixed effects	Y	Y	Y
j by education	N	N	Y
j by age	N	N	Y
j by age squared	N	N	Y
j by male	N	N	Y
observations	13,395	13,395	13,395
First Stage Coefficient	0.392***	0.392***	0.391***
	(0.015)	(0.014)	(0.014)
F-statistic	735.1	740.2	792.9

Magnitudes

- Effect of Madrid-Catalunya average tax differential (0.75 points in 2013)
  - increases probability of moving to Madrid by 2.25 percentage points.
- Effect of Madrid's tax cut in 2014 (0.4 points)
  - Further increases probability of moving to Madrid by another 1.15 points.

Results: IV Fixed Bracket

- Exclude observations 1, 2.5 and 5% above/below cut-offs.
- Idea: reduces the possibility that the instrument is influenced by counterfactual income.

	(1) 1% above/below	(2) 2.5% above/ below	(3) 5% above/below
$ln(1 - atr_{i,j,t})$	1.782**	1.864**	3.734***
	(0.896)	(0.871)	(1.277)
observations	12,255	10,620	8,040

Placebo Test: Do Post-reform Rates Predict Pre-reform Migration?

	(1)	(2)	(3)	(4)
	MTR	ATR	MTR	ATR
	Pre-Reform		Post-Reform	
$ln(1-\tau)$	0.038	0.093	0.866***	2.051***
	(0.194)	(0.469)	(0.281)	(0.687)
observations	6,180	6,180	4,965	4,965

Discussion

- Real response vs. tax evasion
  - The top 1% may have the ability to change residence to a second home without spending the majority of the year there.
  - From a tax revenue perspective real response and tax evasion are both important.
- A tax professional we spoke to: recommends his clients to 'move' when income is above 80,000 euros.
- We conduct heterogeneity analysis to try to determine the mechanism.

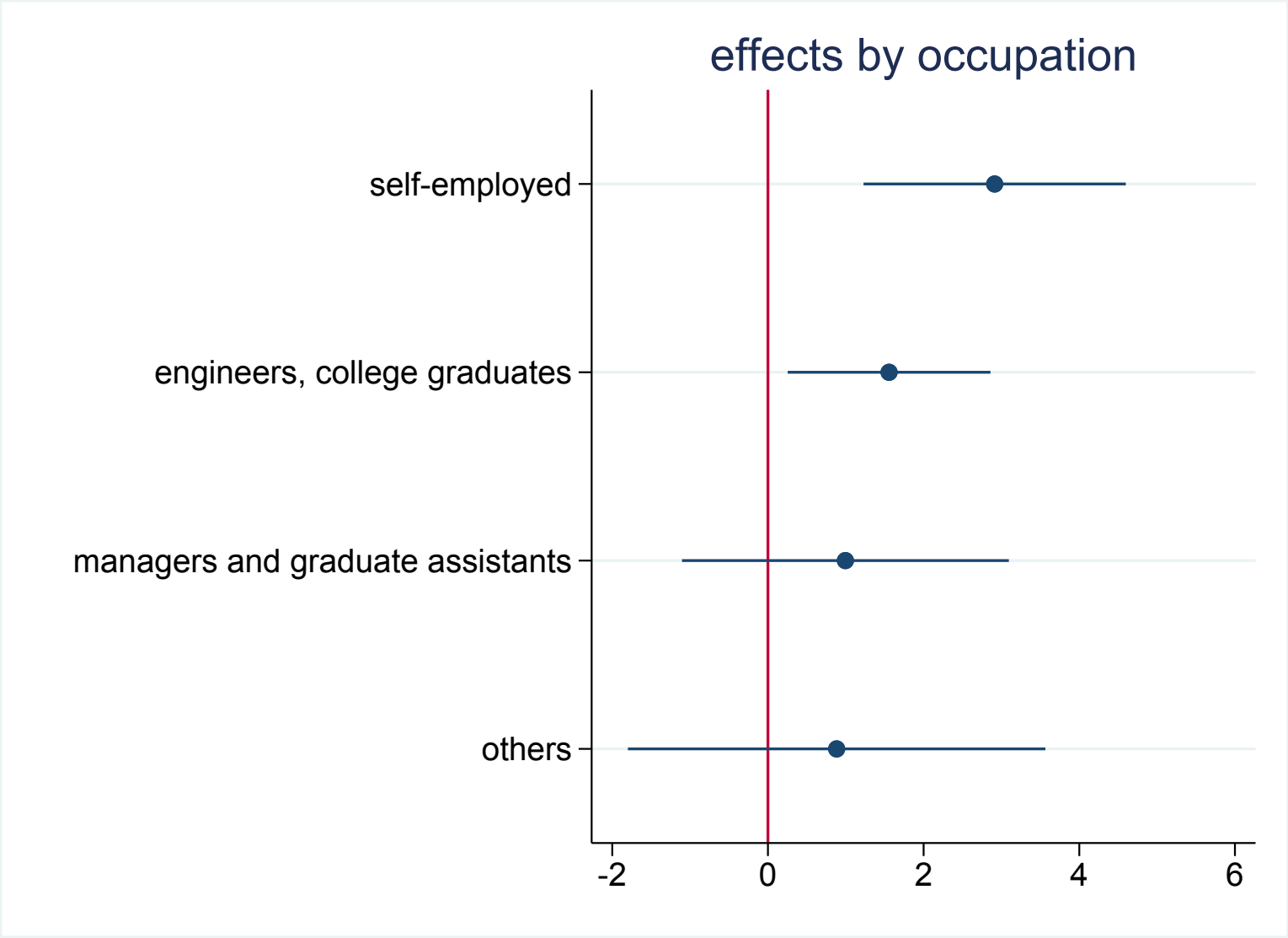
Heterogeneity of Effect

- Individual characteristics:
  - Younger than 40 (1.680*) vs. older than 40 (1.759**)
  - Kids (1.767*) vs. no kids (1.709**).
  - University degree (2.185**) vs. no degree (1.008).
  - Men (1.483) vs. women (3.012***).
- Job characteristics:
  - Not fired (2.015**) vs. fired (0.847).
  - No contract change (1.660**) vs. contract change (2.429**).

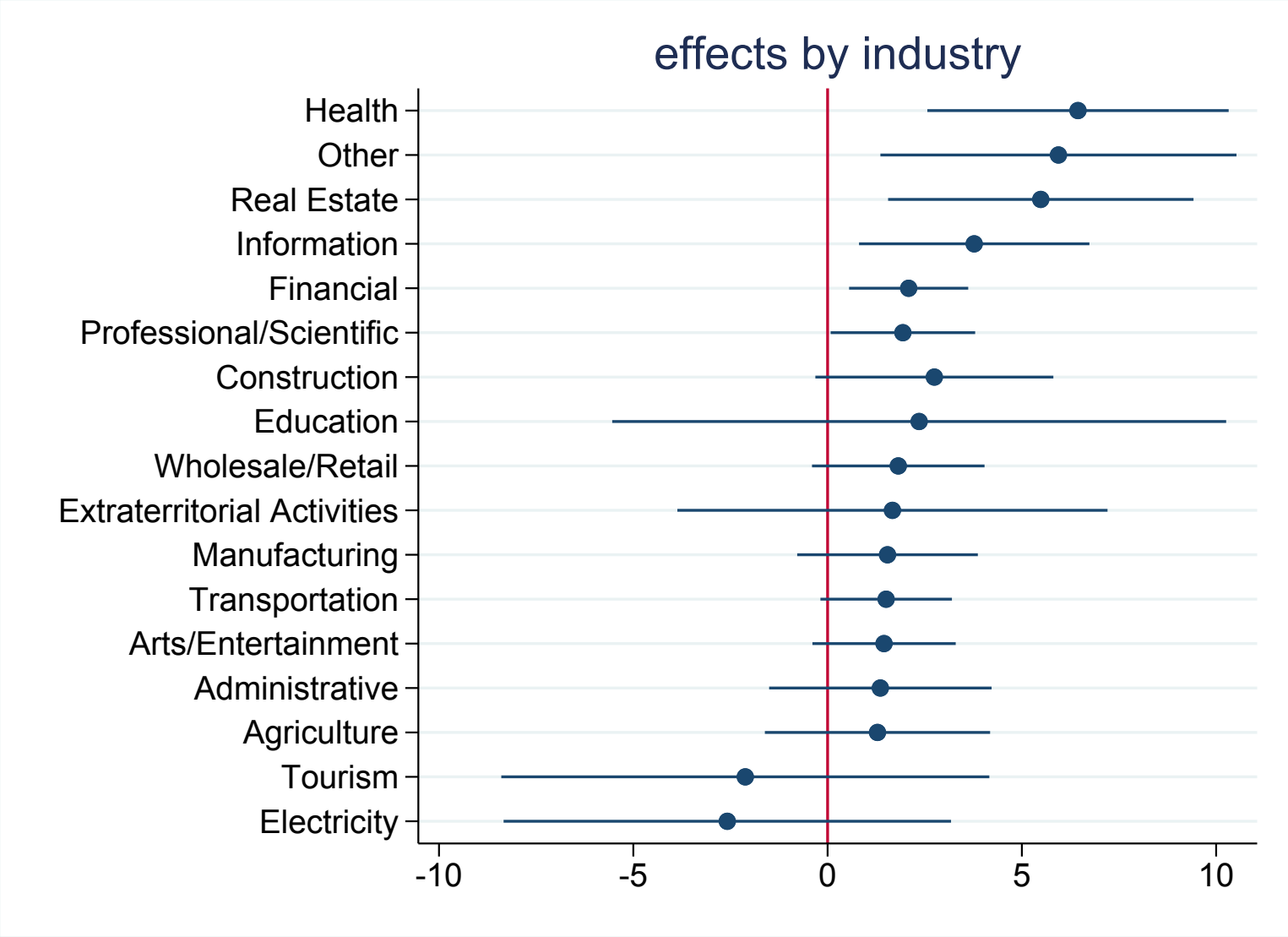
Occupation/Industry

- The prior literature has been unable to answer the question whether policymakers can take the estimates derived for star scientists and athletes and apply these elasticities to the top of the income distribution more generally.
- The Spanish data we have access to has occupation and industry reported in the data.
- This section also helps to inform the recent policy debate on the efficiency of tax schemes for top earners in specific occupations. Several OECD countries have preferential tax schemes for foreigners in certain high-income occupations.
- Major contribution: prior literature focusing on star scientists and athletes masks substantial heterogeneity by other occupations/industries.

Occupation


effects by occupation
self-employed
engineers, college graduates
managers and graduate assistants
others
-2
0
2
4
6

Industry


effects by industry
Health
Other
Real Estate
Information
Financial
Professional/Scientific
Construction
Education
Wholesale/Retail
Extraterritorial Activities
Manufacturing
Transportation
Arts/Entertainment
Administrative
Agriculture
Tourism
Electricity
-10
-5
0
5
10

Interpretation of Magnitudes

Magnitudes

- To interpret, we construct a simple model of tax revenue maximization from the rich.
- Then a top tax rate change above income $\overline{y}$ will have mechanical and behavioral effects:

$$dR = \underbrace{[N(y-\bar{y})]\,d\overline{\tau}}_{\text{mechanical}} \underbrace{-\varepsilon a\left[N(y-\bar{y})\frac{\overline{\tau}}{1-\overline{\tau}}\right]d\overline{\tau}}_{\text{taxable income}} \underbrace{-\eta N(y-\bar{y})\left[\frac{T(y)}{y-T(y)}\right]d\overline{\tau}}_{\text{mobility}}$$

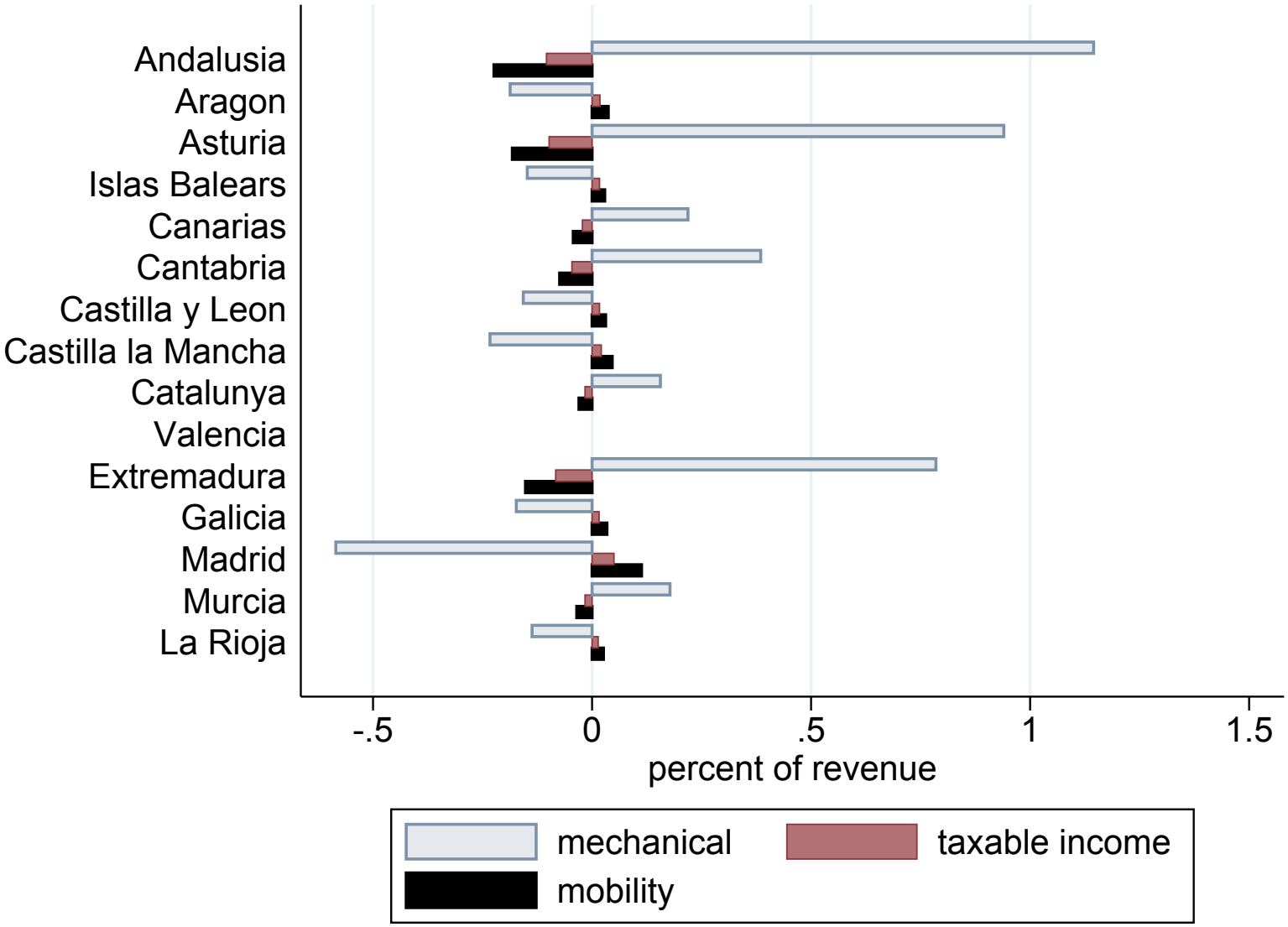
- ETI for governments that hits the Laffer Curve Peak:

$$\widetilde{\varepsilon} = \frac{1-\eta\left(\frac{T(y)}{y-T(y)}\right)}{a\left(\frac{\overline{\tau}}{1-\overline{\tau}}\right)}.$$

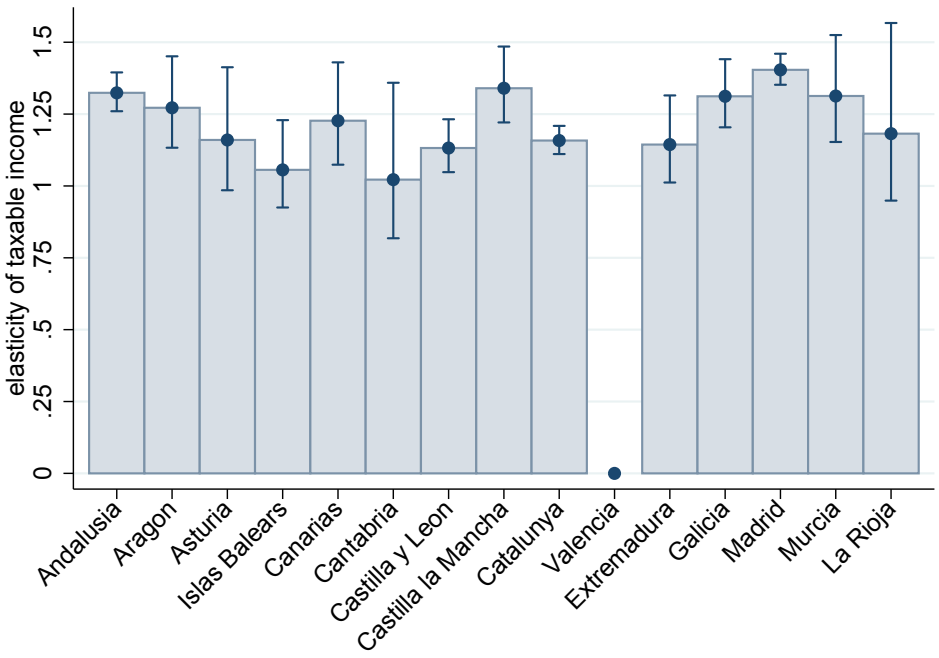
Revenue Changes / Laffer Tax Rates

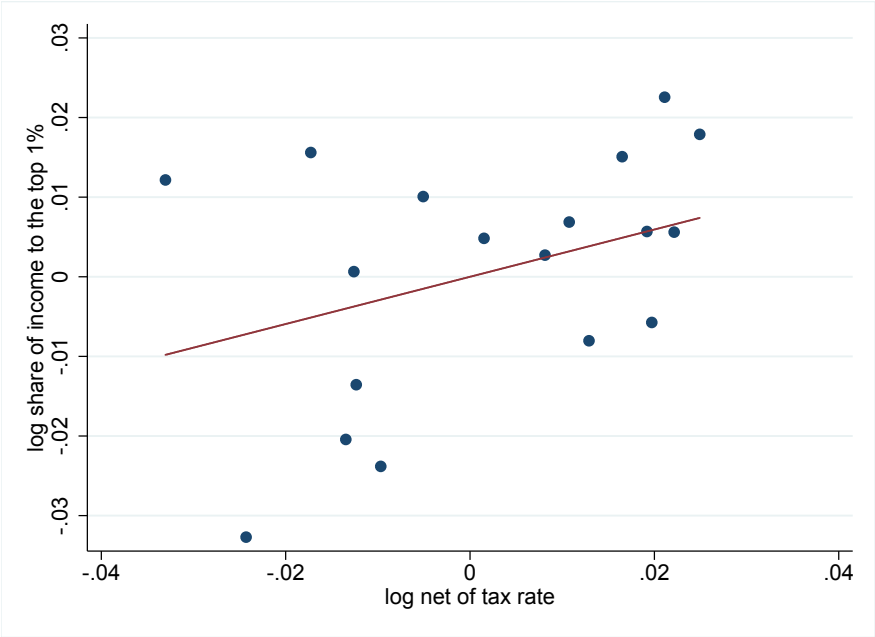
- We calculate the change in revenue relative to what would have been obtained if the region had simply mimicked the federal government tax rate.
  - Focus on a $\overline{\tau}$ applied to income above 94,000 euros (top 1%).
  - We estimate the Pareto parameter (we estimate this for each region).
  - Elasticity of taxable income is taken from Saez, Slemrod and Giertz (2012, JEL). We take the midpoint of the literature (0.25) and adjust it downward slightly because of the smaller number of deductions in Spain (consistent with our estimates).
- Use the parametric bootstrap to construct confidence bands.

Revenue Effects



What Does the ETI Need to Be to Break Even?



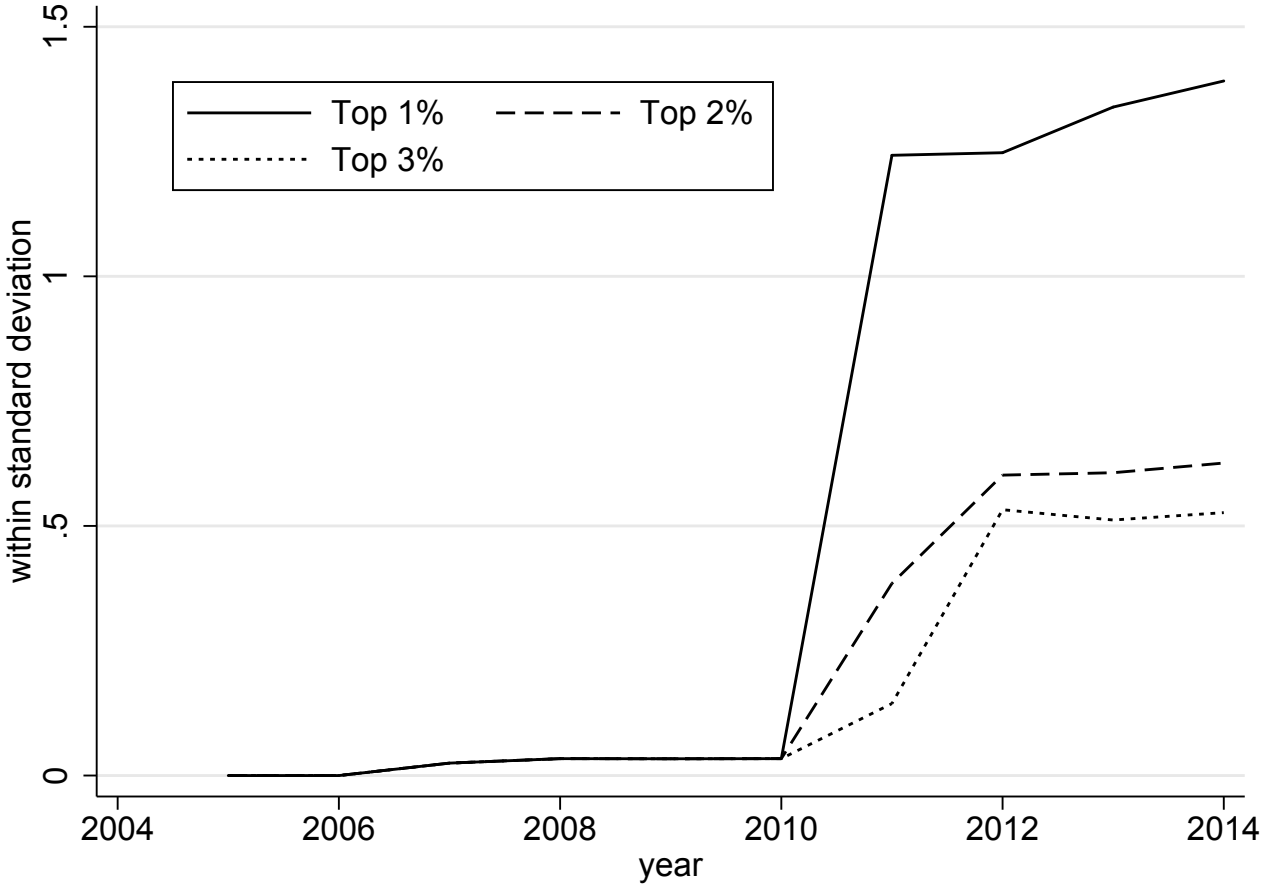


Conclusion

- State taxes have a significant and stable effect on the location decisions of the rich, but the revenue implications appear to be small.
- Thus, we find short-run evidence consistent with Epple and Romer (1991) that shows local redistribution is feasible even with migration.
- In the long-run, this may create substantial sorting effects as migration flows persist, in particular when avoidance is easy.
  - Mobility is likely to rise over time given demographic shifts and technological innovations, which may in turn impose added constraints on the ability to engage in redistributive fiscal policy (Wildasin 2015).

Within Variation

[Back]

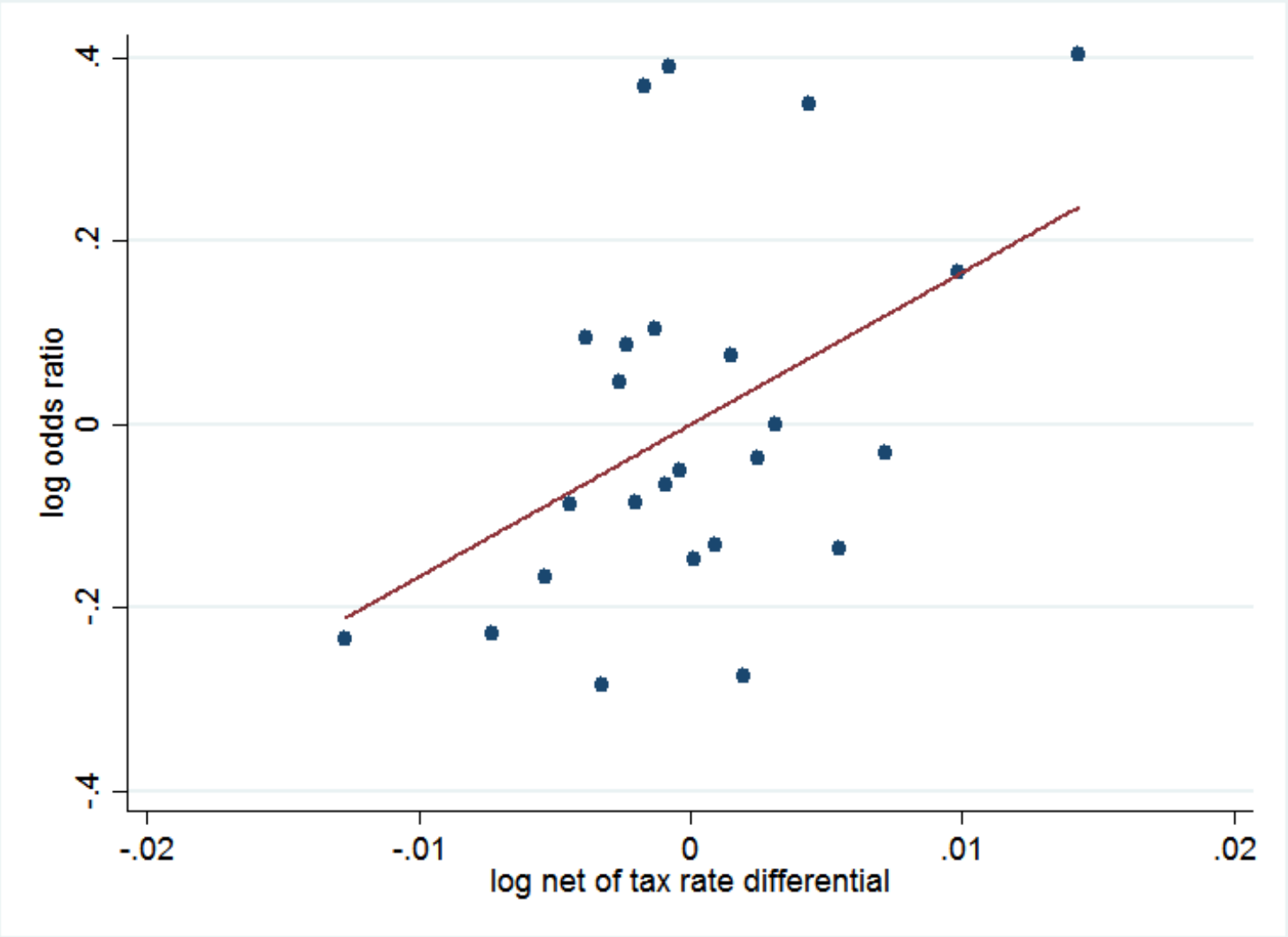


Aggregate Analysis: Flows [Back]

$$ln(P_{odt}/P_{oot}) = e[ln(1 - mtr_{dt}) - ln(1 - mtr_{ot})] + \zeta_o + \zeta_d + \zeta_t + X_{odt}\beta + \nu_{odt} \tag{5}$$

- The left hand side variable $ln(P_{odt}/P_{oot})$ is the log odds ratio where P_{odt} is the the share of the population that moves from state o to state d in year t and P_{oot} is the fraction of the population that stays in state o in the same year.
- ε is the approximate flow elasticity with respect to the net of tax rate.

Visual Results: Flow Model



theory: $\downarrow$tax differential $\Longrightarrow$ $\uparrow$ net of tax differential $\Longrightarrow$ $\uparrow$ odds of moving

Estimation [Back]

- For ease of notation, we prove this for an equation with a single covariate denoted by $x_{i,t,j}$, the sum of the predicted probabilities for a given move (i,t) from our regression is given by

$$\sum_j(\widehat{\beta}x_{i,t,j}+\widehat{\alpha_{i,t}}) \quad = \quad \sum_j \widehat{\beta}x_{i,t,j}+\sum_j \widehat{\alpha_{i,t}} \quad = \quad \widehat{\beta}\cdot J\cdot\overline{x_{i,t}}+J\cdot\widehat{\alpha_{i,t}} \quad = \quad J\cdot[\widehat{\beta}\overline{x_{i,t}}+\widehat{\alpha_{i,t}}] \tag{6}$$

- where the upper-bar denotes an average over the j's. Given we have J alternative regions and, for a given move, only one region can be chosen:

$$\overline{d}_{i,t}=\frac{1}{J}. \tag{7}$$

- As shown in Greene (2003), the linear model implies that the estimated fixed effects, $\widehat{\alpha_{i,t}}$, are given by

$$\widehat{\alpha_{i,t}}=\overline{d}_{i,t}-\widehat{\beta}\overline{x}_{i,t}\Rightarrow\overline{d}_{i,t}=\widehat{\beta}\overline{x}_{i,t}+\widehat{\alpha_{i,t}}. \tag{8}$$

- Algebra proves that $\sum_j(\widehat{\beta}x_{i,t,j}+\widehat{\alpha}_i)=J\cdot\overline{d}_{i,t}=J\cdot\frac{1}{J}=1$. This, then, necessarily implies that an increase in the probability of selecting one region must lower the probability of the alternative regions.