

How do Top Earners Respond to Taxation?

Own- and Cross-Tax Base Responses, Efficiency, and Inequality

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 - ① Counterfactuals are hard to find for such a special group of taxpayers:
 - ★ Comparison top 1 vs 90-99th percentiles require strong assumptions
 - ② Anatomy of responses is key to compute DWL, but extremely data-demanding:
 - ★ Sophisticated responses: labor, corporate, capital, evasion, etc.

Outline

- 1 Institutional Background
- 2 Conceptual Framework
- 3 Research Design
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Institutional Background

Background | Uruguay and the TIEs



- GDP pc 15k USD (2nd after CHI)
- Population: 3.5M || Labor Force: 1.6M
- Registered (formal) workers: 1.2M
- **TIE based on labor income: 15K**
 - ▶ Earnings 126k (10x avg. worker)
 - ▶ 81% in top 1% total income (TI)
 - ▶ 89% report labor income only [▶ More](#)
 - ▶ Avg. effective PLIT rate: 15%
 - ▶ Financial/Insurance + Health sectors

Direct Taxation to Individuals in Uruguay

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Personal income tax: dual tax system

- Personal Income Tax on Labor (PLIT)
 - ▶ Progressive tax schedule, but only top 30% actually pays [▶ Rates](#) [▶ Distribution](#)
 - ▶ Taxes wages and self-employed income [▶ Components](#)

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Direct Taxation to Individuals in Uruguay

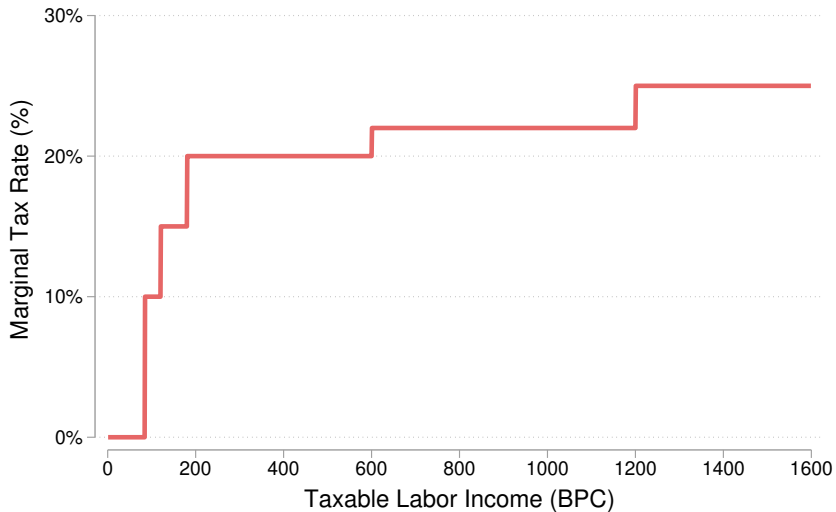
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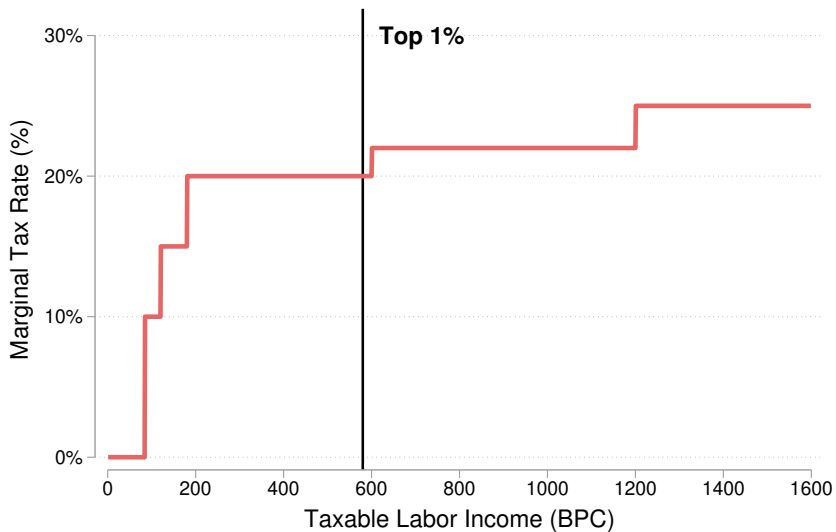
Corporate Income Tax

- Unincorporated self-employed (e.g. professionals) can opt in [▶ Descriptives](#)
- Presumptive (simplified) regime: flat 25% rate applied to 48% of revenue
- More complex regime for those who have large costs and incorporated businesses

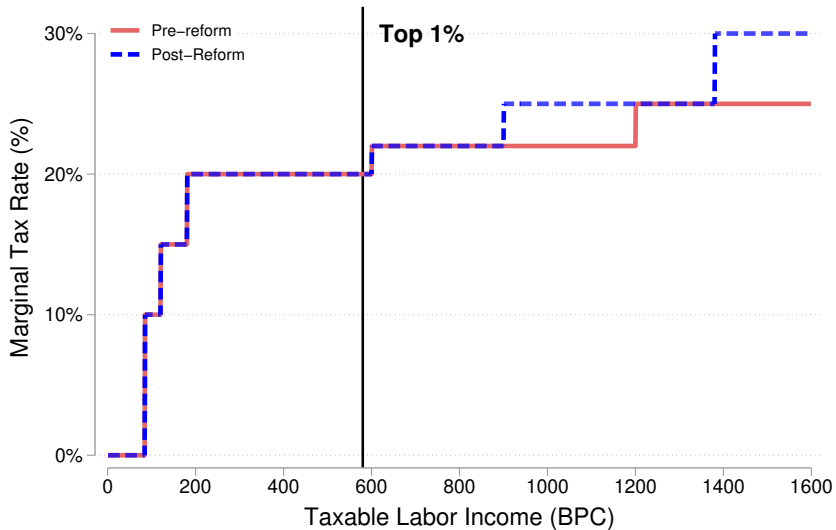
The 2011 Pre-Reform PIT Schedule



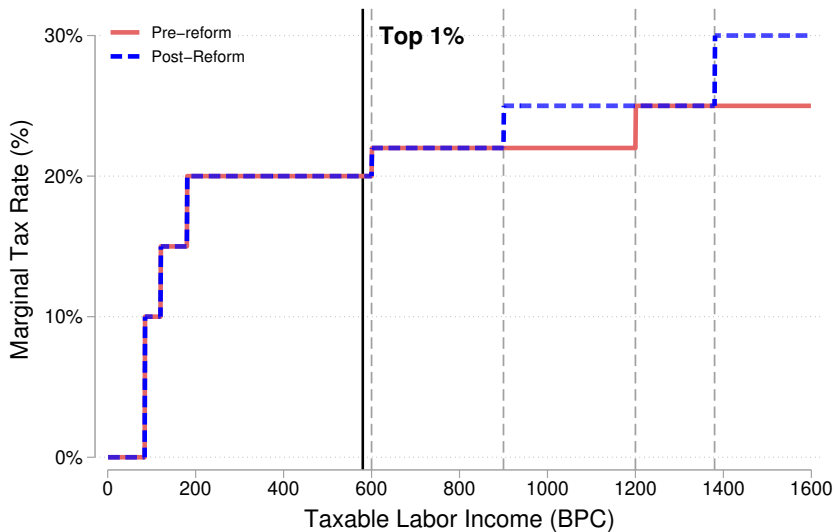
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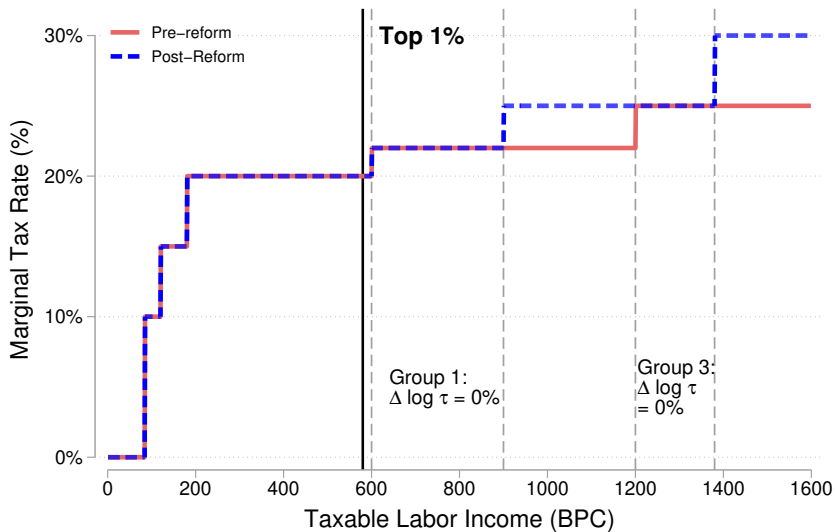
The 2012 PIT Reform...



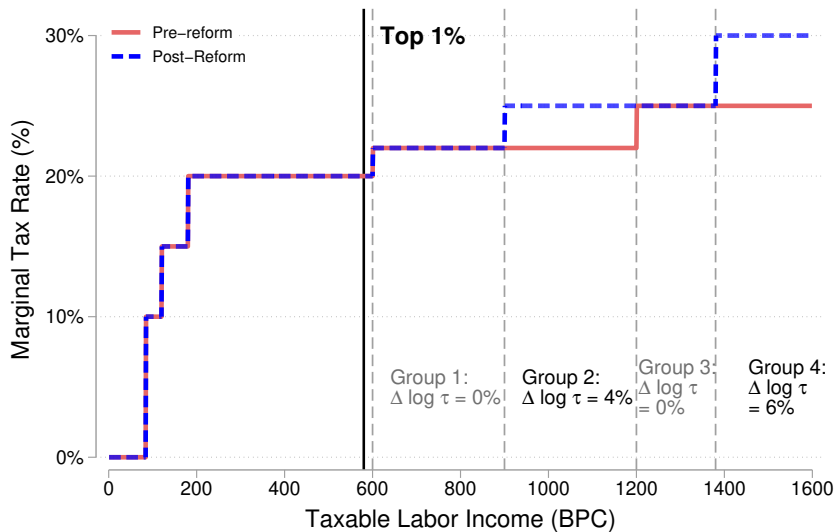
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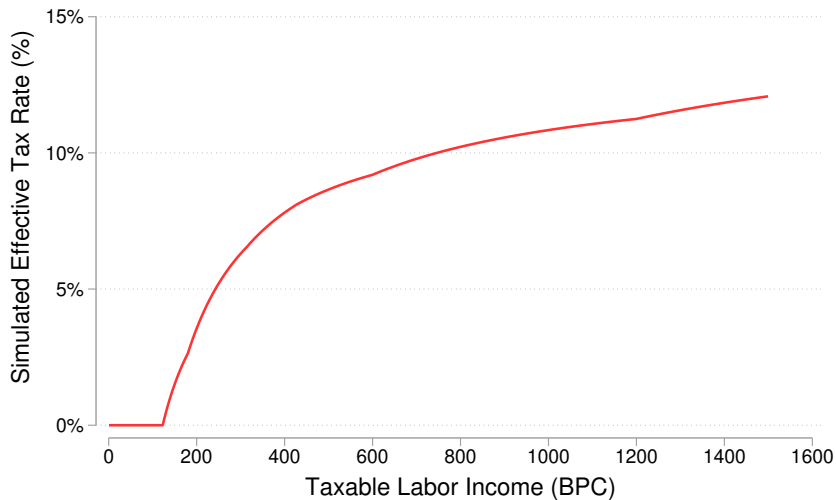
... left marginal tax rates unaffected for some TIEs



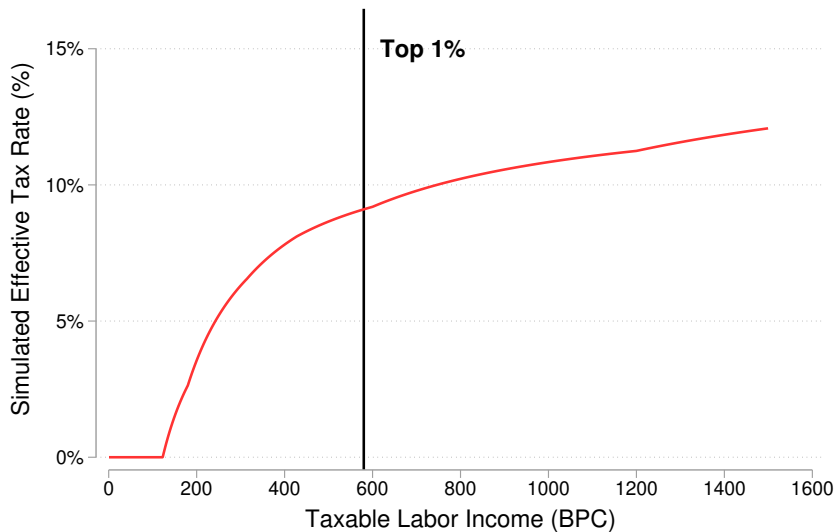
...while increased it for others



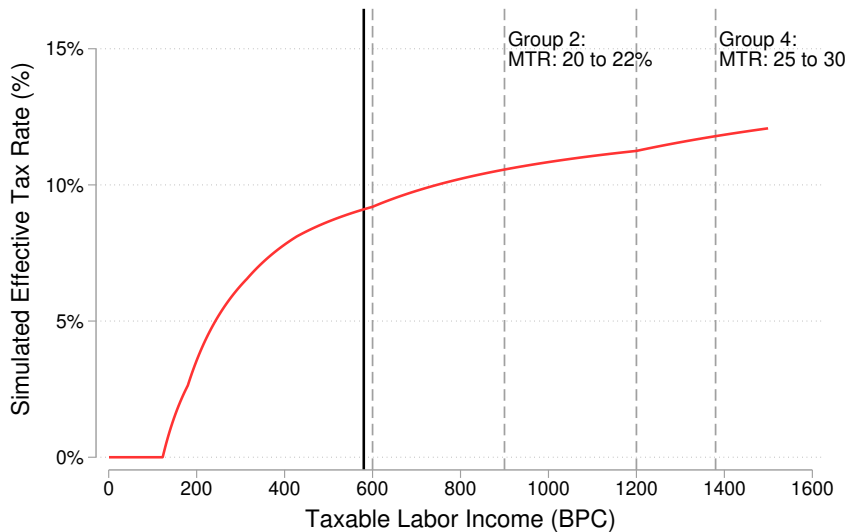
It also increased the effective tax rates for G2 through G4



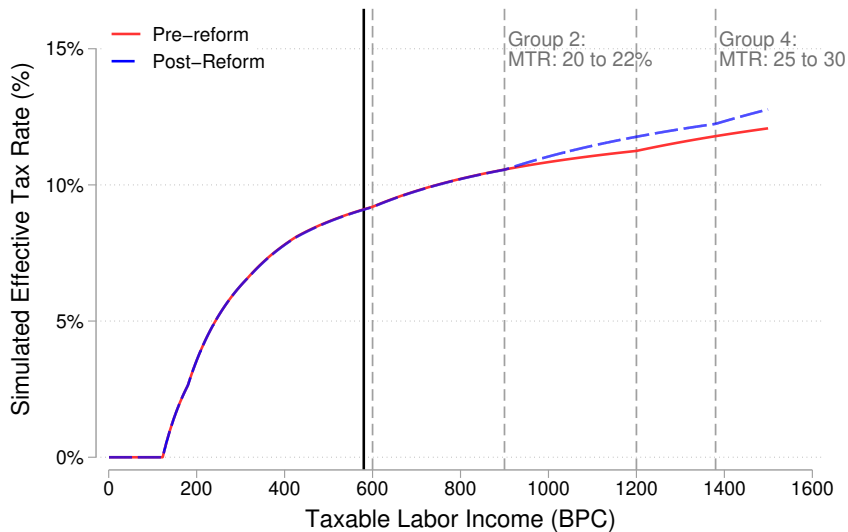
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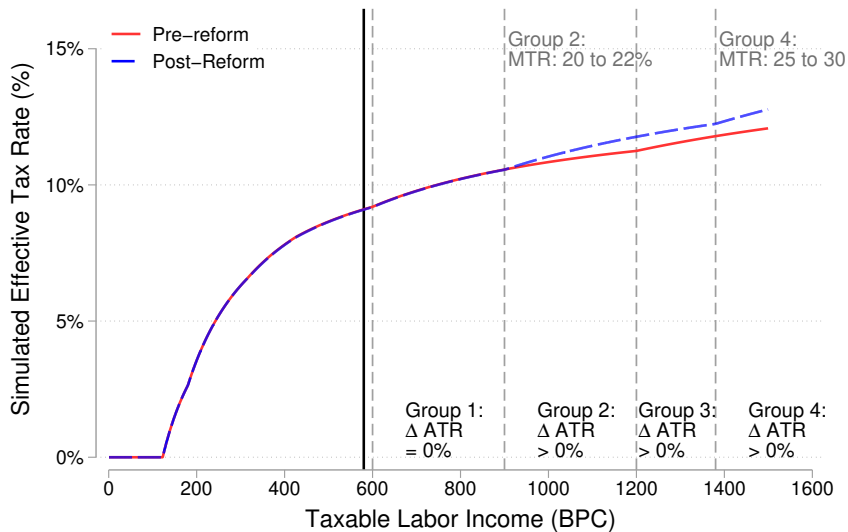
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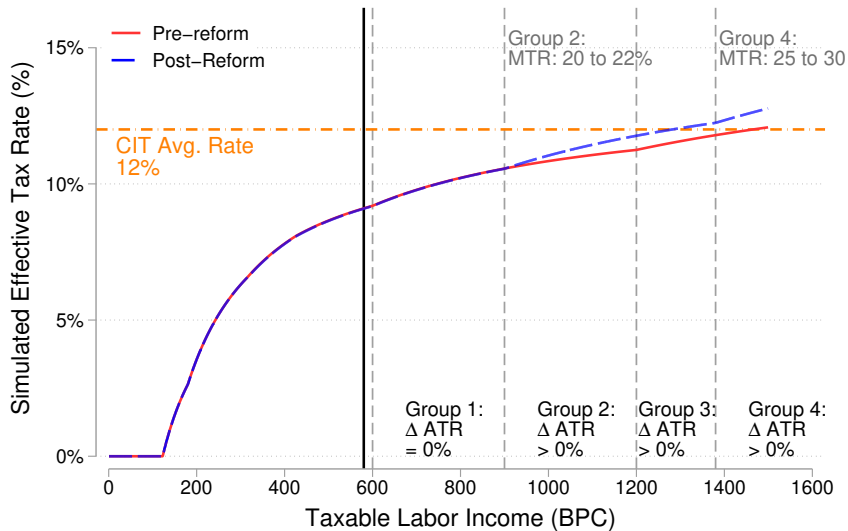
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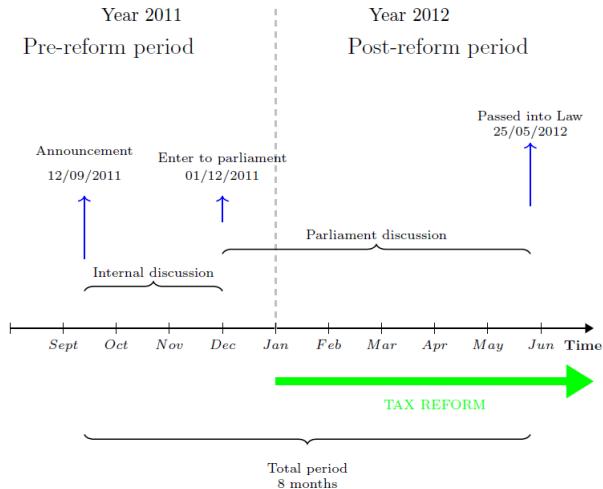
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And made CIT relatively more attractive



Timing of the Reform



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Conceptual framework

- **Setup:**

- ▶ Individuals earn labor income (tax base l), but they can shift to base k at a cost
- ▶ Paying taxes is costly (fixed and variable costs), and taxpayers are heterogeneous

- **Result:** TIEs sort into three groups: non-, partial, and full-shifting

- **Key predictions:** A small increase in τ_l will

- ▶ Reduce income reported in the l base
- ▶ Reduce the share of TIE reporting to tax base l
- ▶ Increase the share of full-shifters
- ▶ Ambiguous effect on share of partial shifters

- **Welfare:** Efficiency costs depend on weighted intensive and extensive margin elasticities across tax bases

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Data and Sample Restrictions

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 - ▶ At least one year in the top 1% of labor income in 2009-2011
 - ▶ Never dropped from the top 5% of the total income distribution [▶ Figure](#)
 - ▶ Stability: excluded if you were in three different G in 2009-2011 [▶ Figure](#)

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 - ▶ Stability: excluded if you were in three different G in 2009-2011 [▶ Figure](#)
- **Final group composition:** [G1 or G3: 9,634 (195); G2: 3,238; G4: 1,606]

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- ▶ We use MTR or ATR, depending on margin

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- **Identifying assumption:**

- ▶ Standard DiD: Treated and control outcomes are in parallel trends
- ▶ Key challenges: mean reversion, secular trends in inequality...
- ▶ Our study sample is more homogeneous and stable → transparent validation

Dynamic DiD Specifications

We use first-differenced outcomes to match elasticity estimates:

$$\Delta \log y_{it}^b = \sum_{t=2010}^{2015} \beta_t \cdot \left(\mathbb{1}\{\text{year} = t\} \cdot \text{treat}_i^{\text{MTR}} \right) + \delta_t + \varepsilon_{it}$$

$$\Delta \mathbb{1}(y_{it}^b > 0) = \sum_{t=2010}^{2015} \gamma_t \cdot \left(\mathbb{1}\{\text{year} = t\} \cdot \text{treat}_i^{\text{ATR}} \right) + \delta_t + \nu_{it}$$

$\Delta \log y_{it}^b$: log-change in income reported to tax base b from year $t - 1$ to year t

$\Delta \mathbb{1}(y_{it}^b > 0)$: change in reporting status to tax base b ($\{-1, 0, 1\}$)

$\text{treat}^{\text{MTR}} = 1$ if G2 or G4 in 2009-2011

$\text{treat}^{\text{ATR}} = 1$ if G2, G3, or G4 in 2009-2011

Outline

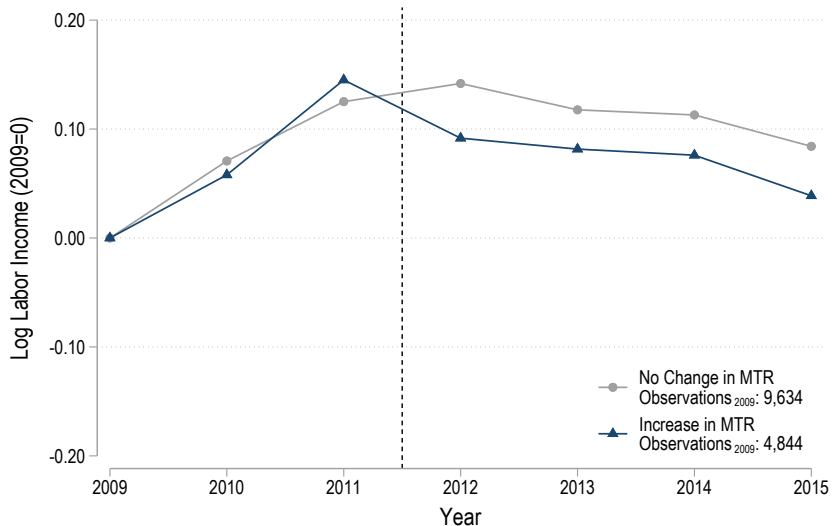
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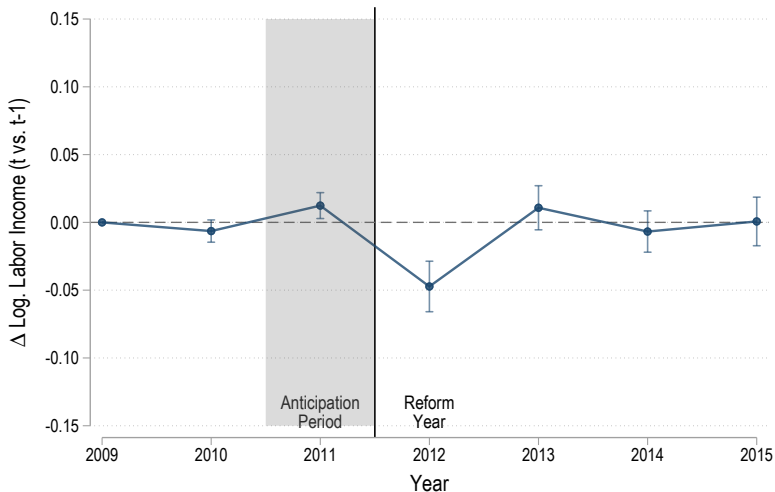
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Reduced Form Results

Own-Tax Base Responses: Intensive Margin, Raw Trends



Own-Tax Base Responses: Intensive Margin, Dynamic DiD

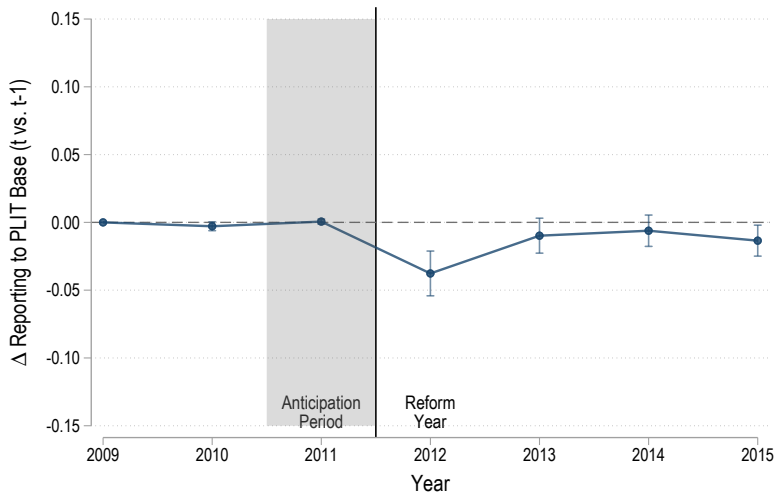


► Unweighted

► Levels

► Table

Own-Tax Base Responses: Extensive Margin



► Raw

► Unweighted

► Levels

Own-Base Elasticity Estimates

Estimating Elasticities

$$\Delta \log y_{it}^b = \alpha + \bar{\epsilon}_{l,b} \cdot \Delta \log(1 - \tau_{it}^l) + \bar{\epsilon}_{l,b}^+ \cdot \Delta \log(1 - \tau_{i,t+1}^l) + \lambda_t + v_{it}$$

$$\Delta \mathbb{1}(y_{i,t}^b > 0) = \alpha + \bar{\mu}_{l,b} \cdot \Delta \log(1 - \tau_{i,t}^{e,l}) + \bar{\mu}_{l,b}^+ \cdot \Delta \log(1 - \tau_{i,t+1}^{e,l}) + \lambda_t + v_{it}$$

Endog. Vars.: $\Delta \log(1 - \tau_{it}^l)$ and $\Delta \log(1 - \tau_{i,t+1}^l)$: *predicted* change in marginal net-of-tax rate

Endog. Vars: $\Delta \log(1 - \tau_{it}^{e,l})$ and $\Delta \log(1 - \tau_{i,t+1}^{e,l})$ *predicted* change in effective net-of-tax rate

Instruments: DiD interaction terms (e.g., $treat^{MTR} \times \mathbb{1}(\text{year} = 2012)$)

- Interpretation: intention-to-treat estimates
- Estimated using 2SLS income/revenue weighted regressions
- $\bar{\epsilon}_{l,b} + \bar{\epsilon}_{l,b}^+$ measure short-term elasticity

Intensive Margin Elasticities

	Intensive Margin	Extensive Margin
	Labor (1)	
(a): $\Delta \log (1 - \tau^l)$	1.054*** (0.161)	
(b): $\Delta^+ \log (1 - \tau^l)$	-0.283*** (0.084)	
(a) + (b)	0.770*** (0.169)	
Observations	27,128	
Unique individuals	14,419	

► Full Table

Extensive Margin Elasticities

	Intensive Margin	Extensive Margin
	Labor (1)	Labor (4)
(a): $\Delta \log (1 - \tau^l)$	1.054*** (0.161)	2.689*** (0.454)
(b): $\Delta^+ \log (1 - \tau^l)$	-0.283*** (0.084)	-0.047 (0.056)
(a) + (b)	0.770*** (0.169)	2.643*** (0.457)
Observations	27,128	28,835
Unique individuals	14,419	14,444

► Full Table

Robustness

Threats to identification and robustness tests

- Results are not driven by endogenous selection into treatment [▶ Figure](#) [▶ Int.](#) [▶ Ext.](#)
- Parallel trends hold since 2000, at least in SSA income [▶ Raw](#) [▶ Delta](#)
- Results are not driven by mean reversion
 - ▶ Jakobsen and Soogard (2021) [▶ J&S](#)
 - ▶ Stable income sample [▶ Figure](#)
 - ▶ Adding pre-reform income controls from SSA data [▶ Intensive](#) [▶ Extensive](#)
- Additional robustness tests:
 - ▶ TOT/LATE, SSA Sample, [▶ Intensive](#) [▶ Extensive](#)
 - ▶ With/Without Weights + winsoring weights [▶ Figure](#)
 - ▶ In the paper: top 5% restriction, extreme growth, winsoring outcome, G3, time $\times$ industry FE, donut radii, etc.

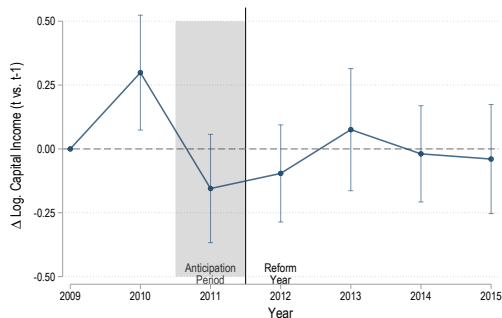
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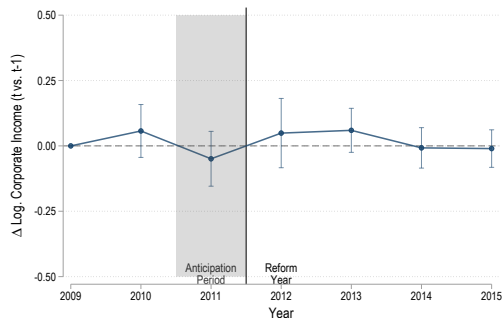
Reduced Form Results

Cross-Tax Base Responses: Intensive Margin

a. Capital Income



b. Corporate Income



► Raw - Capital

► Raw Corporate

► Table - Capital

► Table - Corporate

Intensive Margin Elasticities

	Intensive Margin			Extensive Margin
	Labor (1)	Capital (2)	Corporate (3)	Labor (4)
(a): $\Delta \log (1 - \tau^l)$	1.054*** (0.161)	2.265 (1.738)	-1.454 (1.532)	2.689*** (0.454)
(b): $\Delta^+ \log (1 - \tau^l)$	-0.283*** (0.084)	3.658* (1.946)	1.411 (1.169)	-0.047 (0.056)
(a) + (b)	0.770*** (0.169)	5.923** (2.600)	-0.043 (1.805)	2.643*** (0.457)
Observations	27,128	3,395	964	28,835
Unique individuals	14,419	1,946	533	14,444

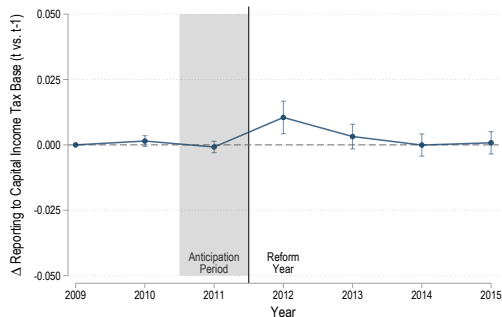
► Full Table

► Main Robustness - Capital

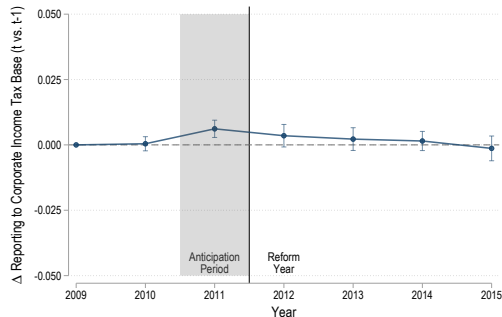
► Main Robustness - Corporate

Cross-Tax Base Responses: Extensive Margin

a. Capital Income



b. Corporate Income



► Raw - Capital

► Raw - Corporate

► Table - Capital

► Table - Corporate

Extensive Margin Elasticities

	Intensive Margin			Extensive Margin		
	Labor (1)	Capital (2)	Corporate (3)	Labor (4)	Capital (5)	Corporate (6)
(a): $\Delta \log (1 - \tau^l)$	1.054*** (0.161)	2.265 (1.738)	-1.454 (1.532)	2.689*** (0.454)	-0.814*** (0.187)	-0.271** (0.129)
(b): $\Delta^+ \log (1 - \tau^l)$	-0.283*** (0.084)	3.658* (1.946)	1.411 (1.169)	-0.047 (0.056)	0.068 (0.072)	-0.518*** (0.108)
(a) + (b)	0.770*** (0.169)	5.923** (2.600)	-0.043 (1.805)	2.643*** (0.457)	-0.746*** (0.194)	-0.788*** (0.160)
Observations	27,128	3,395	964	28,835	28,911	28,930
Unique individuals	14,419	1,946	533	14,444	14,466	14,471

[► Full Table](#)
[► Main Robustness - Capital](#)
[► Main Robustness - Corporate](#)

Summary - Main Estimates

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► Types of Taxpayers

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Heterogeneity

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- **Responses are driven by higher-intensity treatment group (G4)**

- ▶ Labor [▶ Figures](#)
- ▶ Capital [▶ Figures](#)
- ▶ Corporate [▶ Figures](#)
- ▶ However, is it higher-intensity or higher-income? Cannot separate these two.

- **More nuanced differences when comparing wage earners and self-employed workers**

- ▶ Labor [▶ Figures](#)
- ▶ Capital [▶ Figures](#)
- ▶ Corporate [▶ Figures](#)

Mechanisms

Mechanisms

- We report (poisson reg.) estimates on total income as a summary measure:
 - ▶ Total income responses are 25% smaller than labor income responses [▶ Fig.](#) [▶ Table](#)
 - ▶ No responses in total income extensive margin [▶ Figure](#) [▶ Table](#)
- We explore potential responses in labor supply:
 - ▶ Reported hours worked fall by 2% [▶ Figure](#) [▶ Table](#)
 - ▶ Number of employers falls by 1.2% [▶ Figure](#) [▶ Table](#)
 - ▶ Null effects on retirement decisions [▶ Figure](#)
- Fiscal migration, incorporation, non-nominative dividends, likely play a minor role.
- Back-of-the-envelope: reduction in labor income can be split into
 - ▶ 33% income shifting
 - ▶ At most, 36% labor supply
 - ▶ At least 31% in other margins such as tax evasion

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Welfare analysis

We show that DWL is proportional to the sum of weighted aggregate elasticities:

$$\underbrace{\frac{dW}{d\tau_I}}_{27.0\%} = - \underbrace{\frac{\tau_I}{1 - \tau_I}}_{0.333} \left[\underbrace{\bar{\epsilon}_{I,I}}_{0.770} + \underbrace{\frac{\tau_k Y_k}{\tau_I Y_I} \cdot \bar{\epsilon}_{I,k}}_0 + \underbrace{\frac{\tau_c Y_c}{\tau_I Y_I} \cdot \bar{\epsilon}_{I,c}}_0 + \underbrace{\frac{\bar{\tau}_I^e Y_I}{\tau_I Y_I} \cdot \bar{\eta}_{I,I}}_{0.249} + \underbrace{\frac{\bar{\tau}_k^e Y_k}{\tau_I Y_I} \cdot \bar{\eta}_{I,k}}_{-0.125} + \underbrace{\frac{\bar{\tau}_c^e Y_c}{\tau_I Y_I} \cdot \bar{\eta}_{I,c}}_{-.082} \right]$$

- Correct side of the Laffer curve: tax reform increased revenues
- Extreme scenario: 57.7% ; for DWL = 100%, $\epsilon_{I,I} = 2.5$ and $\mu_{I,I} = 5.5$ + no shifting
- Comprehensive analysis is key:
 - ▶ Only own-base IM: 25% lower
 - ▶ Only PLIT: 26% higher

Inequality

	Total income			
	Pre-tax Gini	Pos-tax Gini	Pre-tax top 1%	Pos-tax top 1%
Without reform	0.567	0.548	14.8%	13.5%
(d) With reform (100% labor supply)	0.565	0.546	14.4%	13.2%
(e) With reform (100% evasion)	0.567	0.549	14.8%	13.6%
(f) With reform (mixed response)	0.566	0.547	14.5%	13.4%

- If anything, limited effects on inequality.
- Most inequality improving scenario (d): ↓ 2% in top 1% share
- Least inequality improving scenario (e): ↑ 1% in top 1% share

Conclusion

- **How do TIEs respond to Taxation?**

► Contributions

- ▶ New evidence that combines compelling policy variation and rich administrative data
- ▶ Comprehensive description of responses across tax bases and margins

- **TIEs respond substantially to changes in the top marginal rates**

- ▶ Own-base responses in the intensive ($\bar{\epsilon}_{l,l} = 0.77$) and extensive margin ($\bar{\mu}_{l,l} = 2.64$)
- ▶ Cross-base responses in the extensive margin ($\bar{\mu}_{l,k} = -0.75$ and $\bar{\mu}_{l,c} = -0.79$)

- **Low efficiency costs (27%), but limited impact on inequality**

- ▶ Comprehensive analysis is key for accurate assessment
- ▶ Policy efforts should also focus on closing loopholes and avoidance opportunities.

- **Limitations and future research:**

- ▶ Real labor supply vs. evasion || long-run effects || bargaining margin

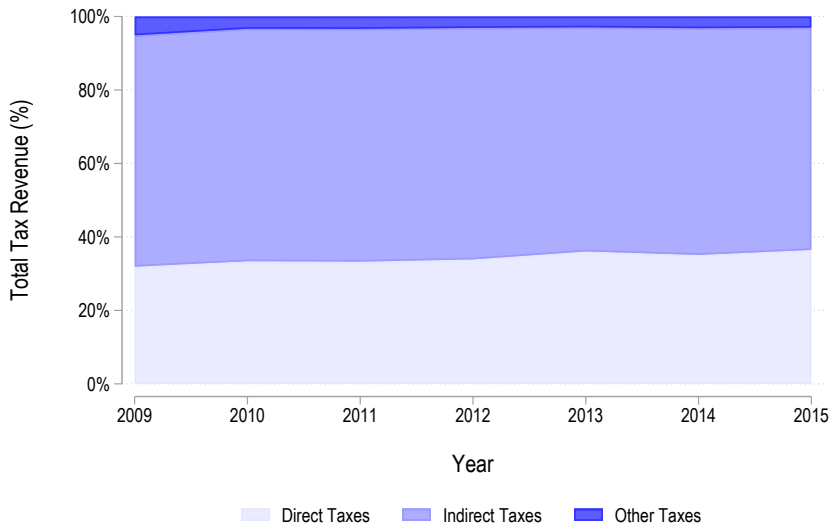
Back-up Slides

Income Structure by Top Income Type

[▶ Back](#)

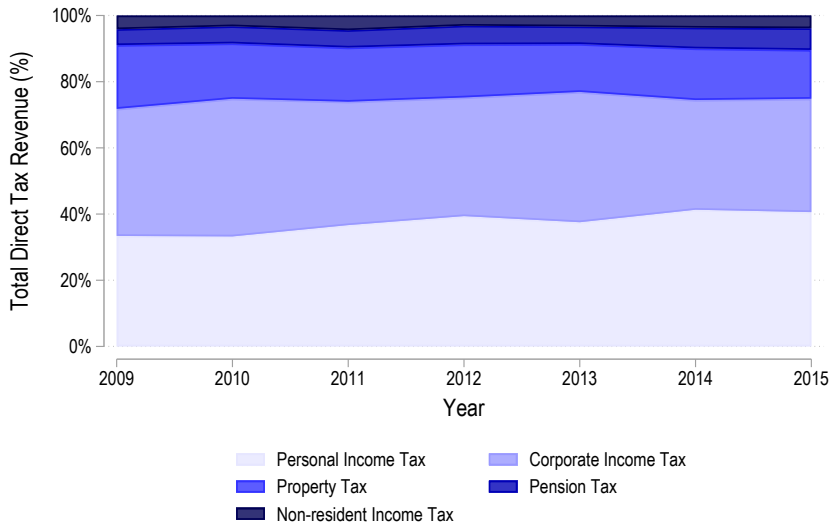
Tax Structure in Uruguay

[▶ Back](#)

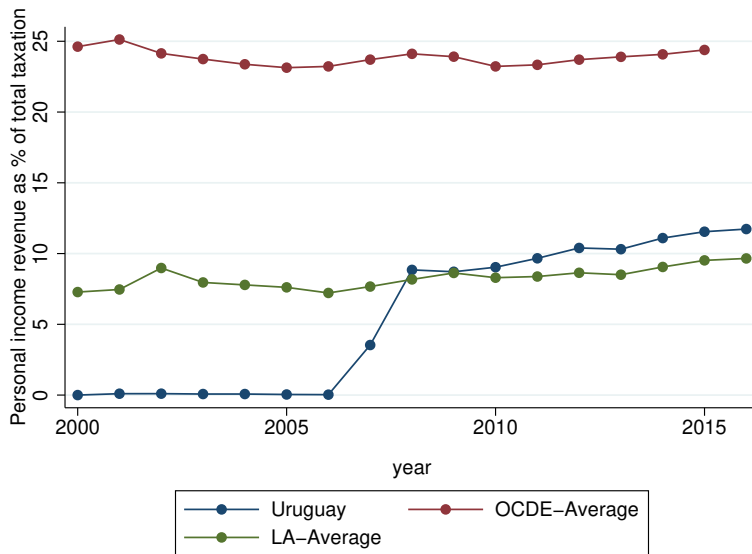


Structure of Direct Taxes in Uruguay

[▶ Back](#)



Evolution of PIT over Time [▶ Back](#)



Personal Income Tax Rates in the Pre-Reform Period (PIT)

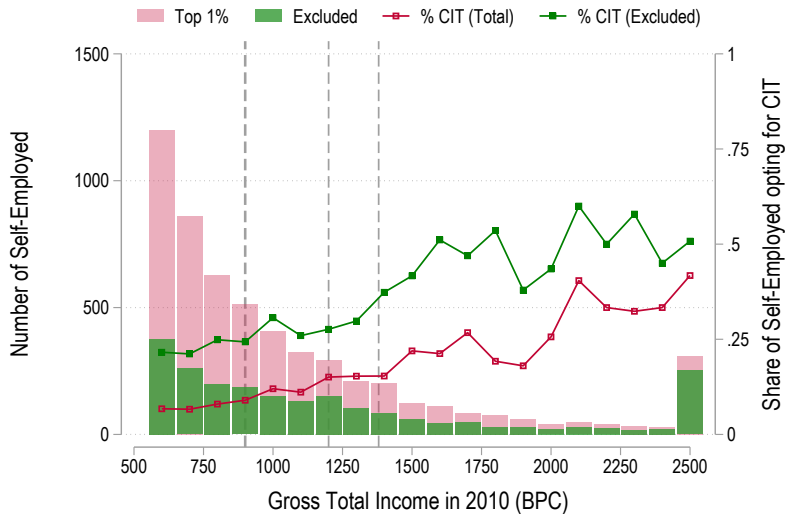
[▶ Back](#)

Tax Part		Deduction Part	
Labor Income (BPC)	Marginal Tax Rate	Deductions (BPC)	Marginal Deduction Rate
0-84	0%	0-36	10%
84-120	10%	36-96	15%
120-180	15%	96-516	20%
180-600	20%	516-1116	22%
600-1200	22%	1116-	25%
1200-	25%		

Personal Labor Income Tax Rates on Capital (PITK) [▶ Back](#)

	Statutory Rate	Effective Rate
Interest from deposits	3%	3%
Dividends and other financial income	7%	30%
Real estate rents	12%	12%

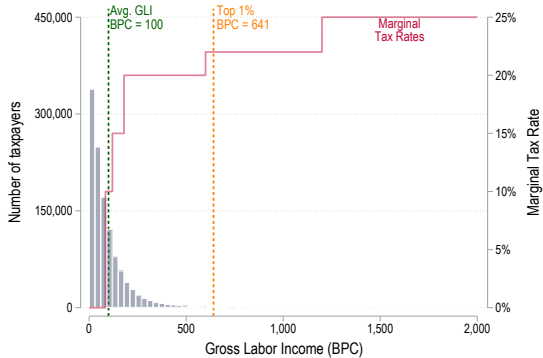
Share of Self-Employed Opting into CIT [▶ Back](#)



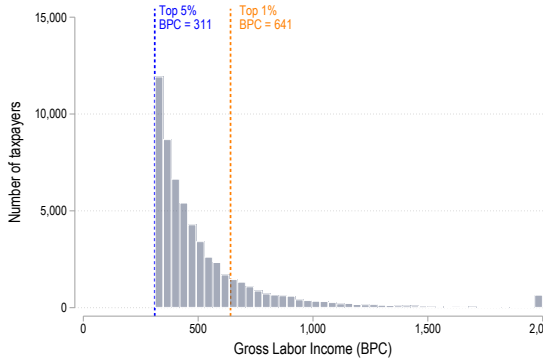
Personal Income Tax and Labor Income Distribution

[▶ Back](#)

a. Full Distribution



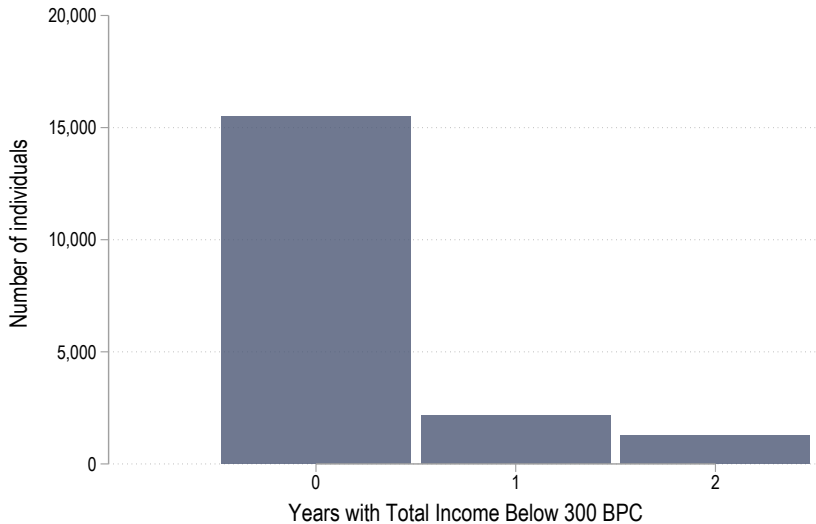
Top 5%



Income and Deduction Components [▶ Back](#)

Sources of Income	Deductions
Wages and Salaries	<i>Non - Itemized</i>
Self Employed Income (70%)	a. Payroll Taxes
Tips and Overtime	b. Health Insurance Contribution
Annual Complementary Salary and Holiday Bonus	<i>Itemized</i>
	<i>Personal Deductions</i>
	c. Other Social Security Contributions
	d. Child Care Deductions
	<i>Housing Expenses</i>
	e. Rent deductions
	f. Mortgage deductions

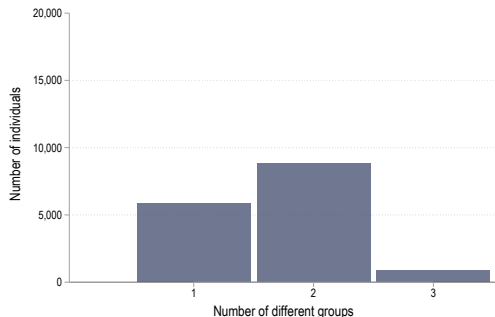
Years in Top 5% of Total Income Distribution [▶ Back](#)



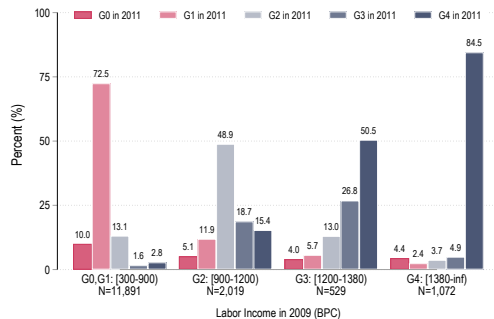
Different Groups in Pre-Reform Period

► Back

a. Distribution of Number of Groups



b. Inter-Group Transitions



► Raw Income Trends

Raw (Median) Income Trends

[▶ Back to main](#)[▶ Back to transitions](#)

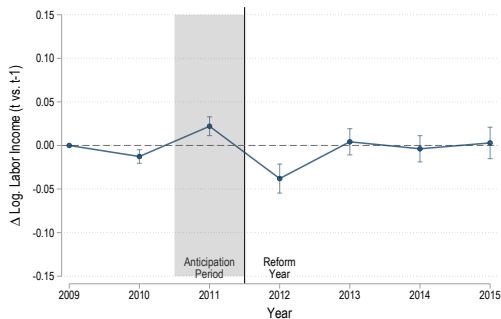
Changes in marginal rates by group [▶ Back](#)

	Change in $\Delta \ln \tau$		Total
	Decrease	No Change	
Max(G): Control Low	0	9464	9464
Max(G): Treatment Low	2305	468	2773
Max(G): Control High	110	582	692
Max(G): Treatment High	1665	262	1927
Total	4080	10776	14856

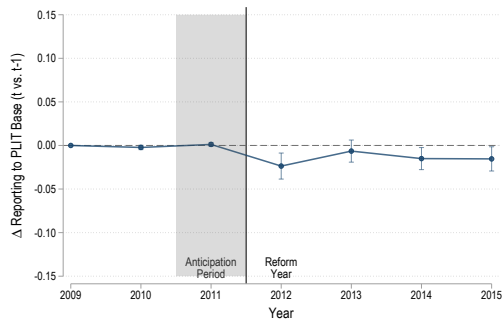
Unweighted Own-Tax Base Dynamic DiD

[▶ Back to Int.](#)[▶ Back to Ext.](#)

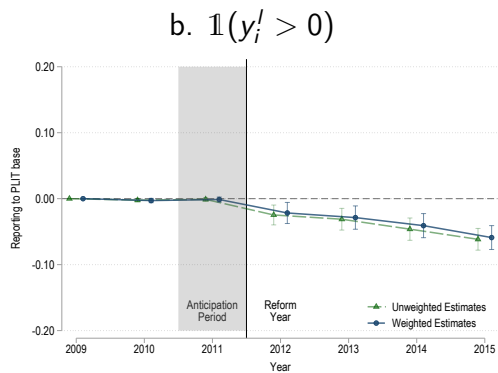
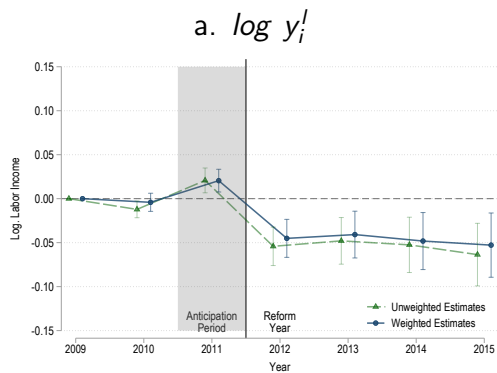
a. $\Delta \log y_i^j$



b. $\Delta \mathbb{1}(y_i^j > 0)$



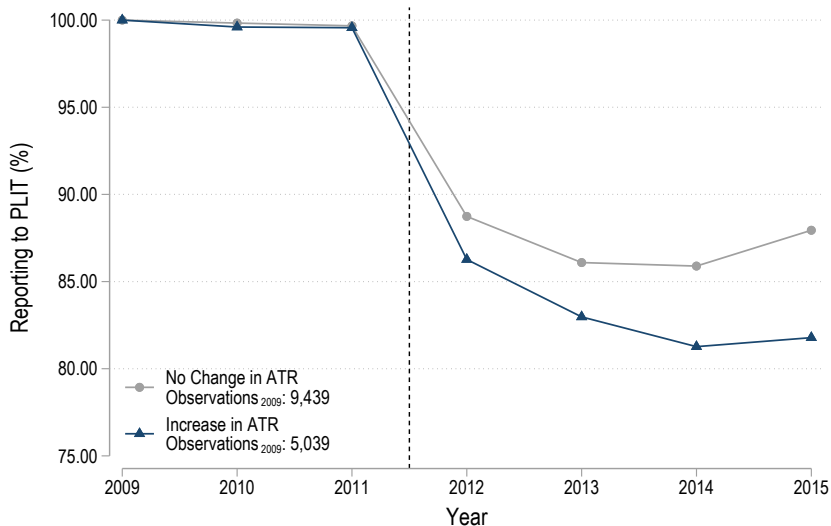
Outcomes in Levels: Own-Tax Base Dynamic DiD

[▶ Back Int.](#)[▶ Back Ext.](#)

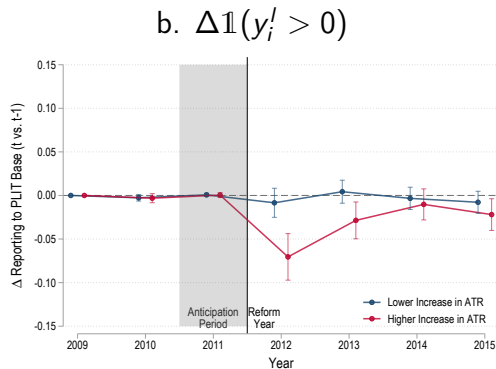
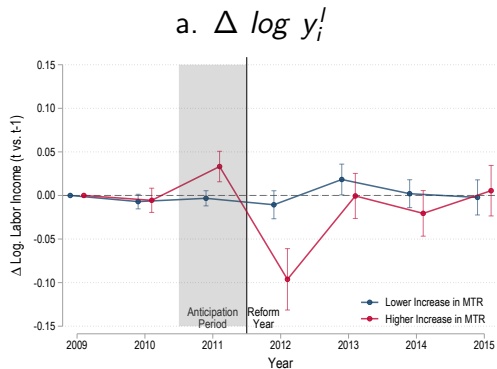
Dynamic DiD - Own-Tax Base Estimates [▶ Back](#)

	Intensive Margin				Extensive Margin			
	$\log y'_{i,t}$	$\log y'_{i,t}$	$\Delta \log y'_{i,t}$	$\Delta \log y'_{i,t}$	$\mathbb{1}(y'_{i,t} > 0)$	$\mathbb{1}(y'_{i,t} > 0)$	$\Delta \mathbb{1}(y'_{i,t} > 0)$	$\Delta \mathbb{1}(y'_{i,t} > 0)$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
a. Pre Reform Years								
Any Treat $\times$ 2010	-0.012*** (0.004)	-0.004 (0.004)	-0.013*** (0.003)	-0.006** (0.003)	-0.002** (0.001)	-0.003** (0.001)	-0.002** (0.001)	-0.003** (0.001)
Any Treat $\times$ 2011	0.021*** (0.005)	0.020*** (0.005)	0.022*** (0.004)	0.012*** (0.004)	-0.001 (0.001)	-0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
b. Post Reform Years								
Any Treat $\times$ 2012	-0.054*** (0.008)	-0.045*** (0.008)	-0.038*** (0.006)	-0.047*** (0.007)	-0.025*** (0.006)	-0.022*** (0.006)	-0.024*** (0.006)	-0.038*** (0.006)
Any Treat $\times$ 2013	-0.048*** (0.010)	-0.041*** (0.010)	0.004 (0.006)	0.011* (0.006)	-0.031*** (0.006)	-0.029*** (0.007)	-0.006 (0.005)	-0.010* (0.005)
Any Treat $\times$ 2014	-0.053*** (0.012)	-0.048*** (0.013)	-0.004 (0.006)	-0.007 (0.006)	-0.046*** (0.007)	-0.041*** (0.007)	-0.015*** (0.005)	-0.006 (0.004)
Any Treat $\times$ 2015	-0.064*** (0.014)	-0.053*** (0.014)	0.003 (0.007)	0.001 (0.007)	-0.062*** (0.006)	-0.059*** (0.007)	-0.015*** (0.005)	-0.013*** (0.004)
Observations	92,979	92,916	76,843	76,843	101,346	101,311	86,868	80,157
Unique individuals	14,458	14,442	14,451	14,451	14,478	14,473	14,478	14,478
Weights:	No	Lab. Inc.	No	Lab. Inc.	No	PIT Rev.	No	PIT Rev.

Own-Tax Base Responses: Extensive Margin, Raw Trends

[▶ Back](#)

Heterogeneity by Treatment Intensity: Labor Tax Base

[▶ Back](#)

Elasticities - Full Table

► Own. Int.

► Own. Ext.

► Cross. Int.

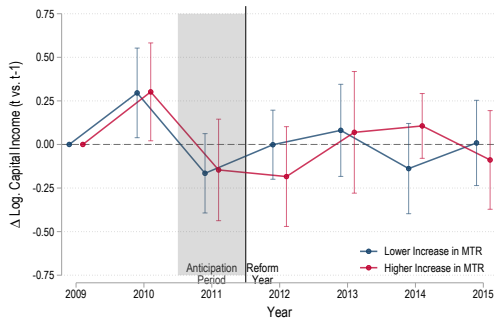
► Cross. Ext.

	Intensive Margin Elasticities			Extensive Margin Elasticities		
	Labor	Capital	Corporate	Labor	Capital	Corporate
Panel a. Reduced-Form Estimates						
$Treat \times 1(year = 2012)$	-0.047*** (0.007)	-0.096 (0.074)	0.049 (0.051)	-0.038*** (0.006)	0.011*** (0.002)	0.004** (0.002)
$Treat \times 1(year = 2011)$	0.012*** (0.004)	-0.155* (0.082)	-0.049 (0.041)	0.001 (0.001)	-0.001 (0.001)	0.006*** (0.001)
Panel b. First-Stage Estimates						
$Treat \times 1(year = 2012)$	-0.045*** (0.000)	-0.042*** (0.002)	-0.034*** (0.002)	-0.014*** (0.000)	-0.013*** (0.000)	-0.013*** (0.000)
$Treat \times 1(year = 2011)$	-0.044*** (0.000)	-0.042*** (0.002)	-0.035*** (0.002)	-0.013*** (0.000)	-0.012*** (0.000)	-0.012*** (0.000)
Panel c. 2SLS Estimates						
(a): $\Delta \log(1 - \tau^l)$	1.054*** (0.161)	2.265 (1.738)	-1.454 (1.532)	2.689*** (0.454)	-0.814*** (0.187)	-0.271** (0.129)
(b): $\Delta^+ \log(1 - \tau^l)$	-0.283*** (0.084)	3.658* (1.946)	1.411 (1.169)	-0.047 (0.056)	0.068 (0.072)	-0.518*** (0.108)
(a) + (b)	0.770*** (0.169)	5.923** (2.600)	-0.043 (1.805)	2.643*** (0.457)	-0.746*** (0.194)	-0.788*** (0.160)
Panel d. Medium-Run 2SLS Estimates						
$\Delta_{15,10} \log(1 - \tau^l)$	0.663** (0.294)	5.451 (4.113)	-1.209 (2.228)	5.083*** (0.825)	-1.096*** (0.329)	-0.993*** (0.268)
Observations	27,128	3,395	964	28,835	28,911	28,930
Unique individuals	14,419	1,946	533	14,444	14,466	14,471

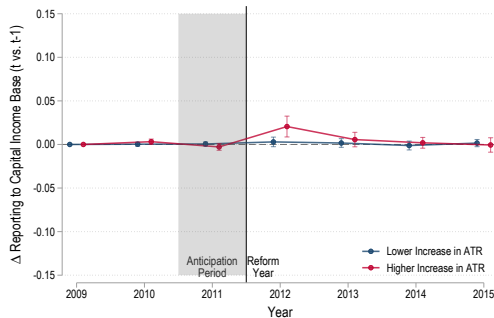
Heterogeneity by Treatment Intensity: Capital Tax Base

[Back](#)

a. $\Delta \log y_i^k$

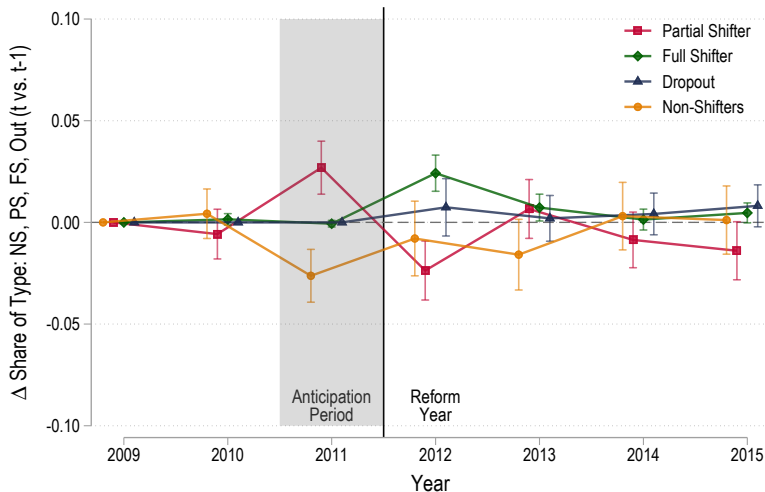


b. $\Delta \mathbb{1}(y_i^k > 0)$



Types of Taxpayers

► Back

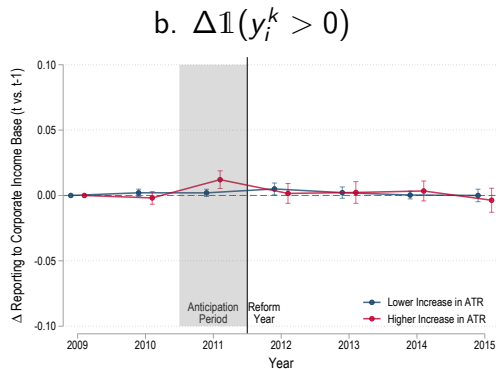
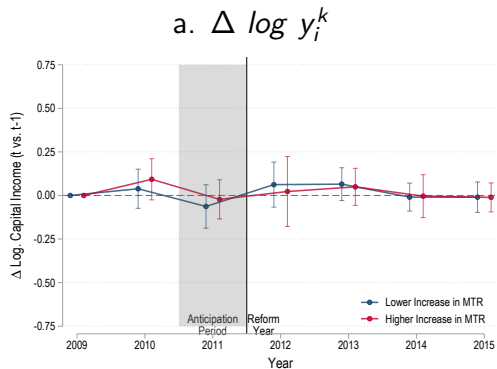


► By Tax Base

► Income Shares Full

► Income Shares: Partial Shifters

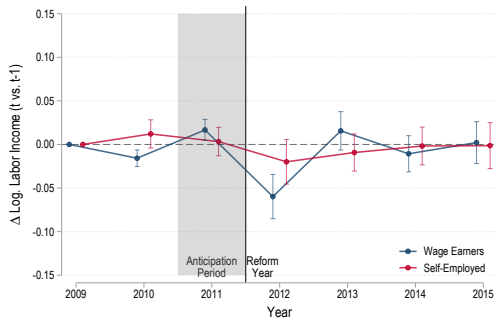
Heterogeneity by Treatment Intensity: Corporate Tax Base [▶ Back](#)



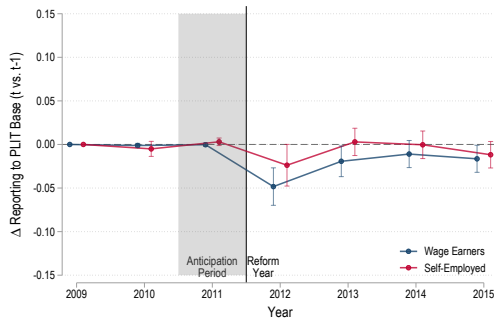
Heterogeneity by Employment: Labor Tax Base

[▶ Back](#)

a. $\Delta \log y_i^j$

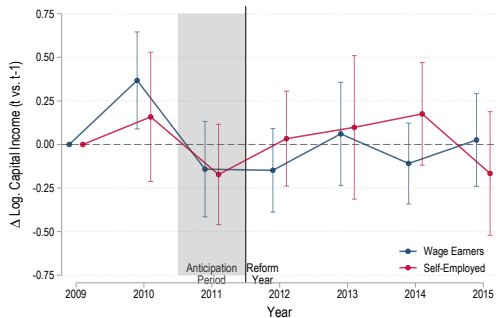


b. $\Delta \mathbb{1}(y_i^j > 0)$

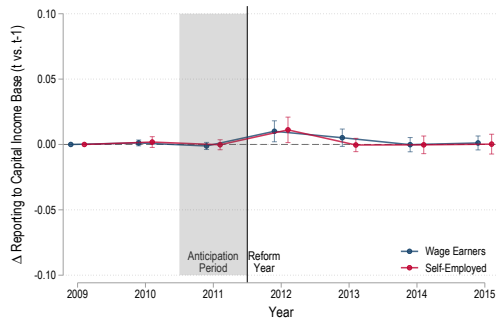


Heterogeneity by Employment: Capital Tax Base [▶ Back](#)

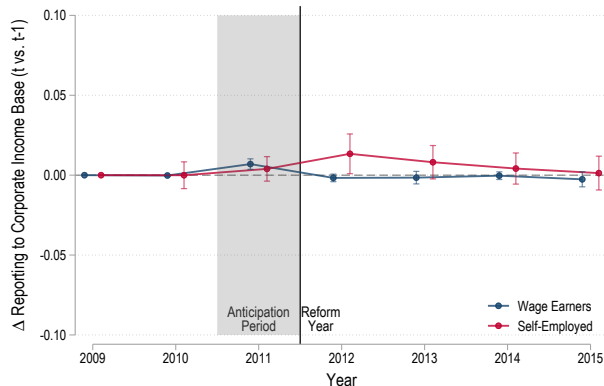
a. Raw (2009-Normalized) Trends



b. $\Delta \mathbb{1}(y_i^c > 0)$



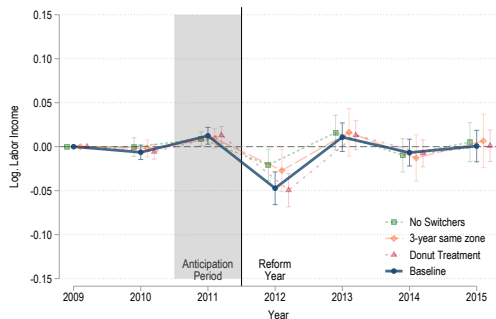
Heterogeneity by Employment: Corporate Tax Base [▶ Back](#)



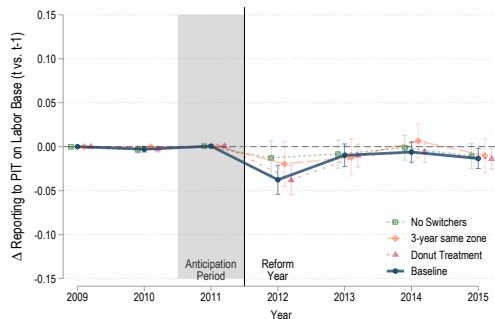
- WE vs. SE in the intensive margin does not apply since WE by definition don't report to corporate tax base

Endogenous Selection into Treatment [▶ Back](#)

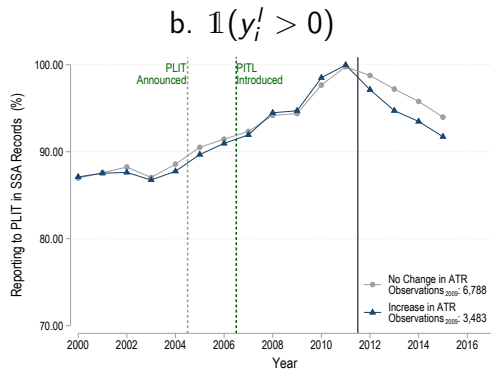
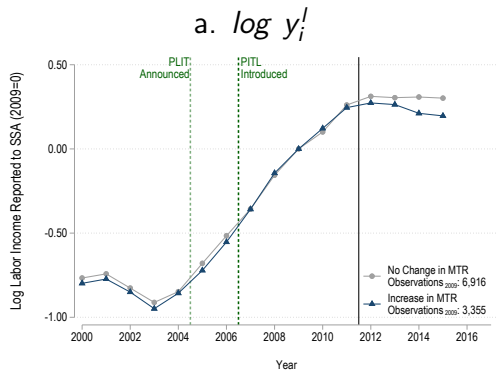
a. $\Delta \log y_i^l$



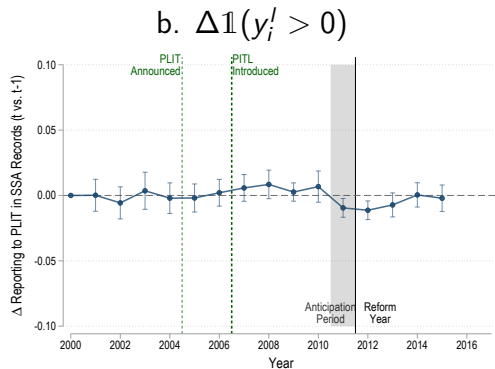
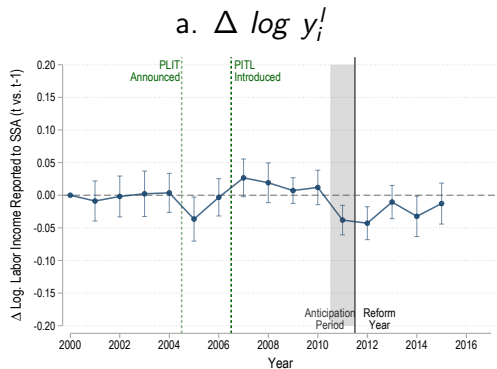
b. $\Delta \mathbb{1}(y_i^l > 0)$



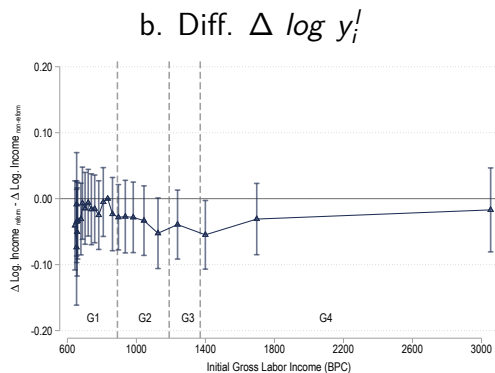
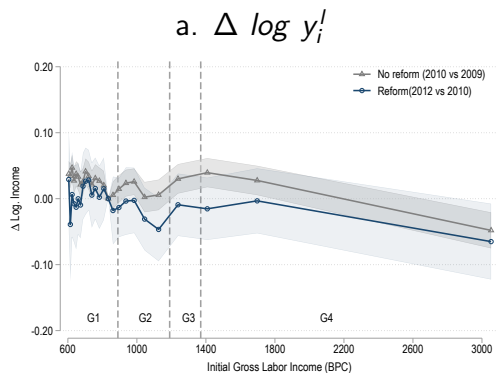
Extended Pre-Trends (SSA data) - Raw Trends [▶ Back](#)



Extended Pre-Trends (SSA data) [▶ Back](#)



No Differential Mean Reversion (J&S) [▶ Back](#)



Robustness - Own Tax Base Intensive Margin [▶ Back](#)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Dep. Var.: $\Delta \log y_i^l$							
(a): $\Delta \log (1 - \tau^l)$	1.054*** (0.161)	1.211*** (0.217)	0.405*** (0.136)	0.470*** (0.162)	1.093*** (0.162)	1.201*** (0.197)	1.007*** (0.229)	0.960*** (0.171)
(b): $\Delta^+ \log (1 - \tau^l)$	-0.283*** (0.084)	-0.471*** (0.164)	-0.175*** (0.060)	-0.163** (0.075)	-0.295*** (0.085)	-0.329*** (0.099)	0.887*** (0.205)	-0.381*** (0.092)
(a) + (b)	0.770*** (0.169)	0.739*** (0.273)	0.229 (0.143)	0.307* (0.171)	0.797*** (0.170)	0.873*** (0.202)	1.894*** (0.339)	0.579*** (0.196)
Observations	27,128	27,128	17,737	11,005	26,722	19,322	20,128	27,128
Unique individuals	14,419	14,419	9,378	5,834	14,203	10,240	10,235	14,419
Specification								
Baseline	Yes	No	No	No	No	No	No	No
Estimate	ITT	TOT	ITT	ITT	ITT	ITT	ITT	ITT
Sample	Baseline	Baseline	No Switch.	Stable G.	Donut	SSA	SSA	SSA
Data	TAX	TAX	TAX	TAX	TAX	TAX	SSA	SSA + TAX
pre-TAX controls	No	No	No	No	No	No	No	Yes

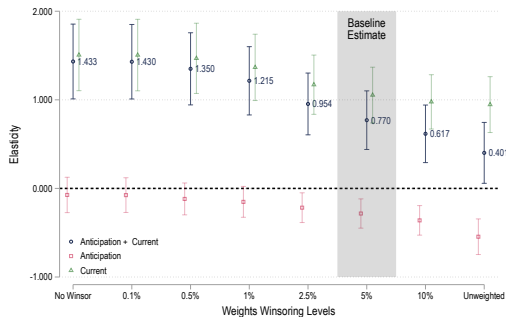
Robustness - Own Tax Base Extensive Margin [▶ Back](#)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Dep. Var.: $\Delta \mathbb{1}(y_i^l > 0)$							
(a): $\Delta \log(1 - \tau^{e,l})$	2.689*** (0.454)	2.689*** (0.454)	0.776* (0.460)	0.991** (0.499)	2.671*** (0.453)	1.950*** (0.538)	0.943*** (0.231)	2.853*** (0.493)
(b): $\Delta^+ \log(1 - \tau^{e,l})$	-0.047 (0.056)	-0.047 (0.056)	-0.015 (0.012)	0.000 (0.000)	-0.045 (0.056)	-0.118* (0.060)	0.822*** (0.241)	0.211 (0.154)
(a) + (b)	2.643*** (0.457)	2.643*** (0.457)	0.761* (0.460)	0.991** (0.499)	2.626*** (0.456)	1.832*** (0.542)	1.765*** (0.334)	3.064*** (0.573)
Observations	28,835	28,835	18,748	11,666	28,403	20,473	19,576	28,835
Unique individuals	14,444	14,444	9,382	5,833	14,228	10,256	10,266	14,444
Specification								
Baseline	Yes	No	No	No	No	No	No	No
Estimate	ITT	TOT	ITT	ITT	ITT	ITT	ITT	ITT
Sample	Baseline	Baseline	No Switch.	Stable G.	Donut	SSA	SSA	SSA
Data	TAX	TAX	TAX	TAX	TAX	TAX	SSA	SSA + TAX
pre-TAX controls	No	No	No	No	No	No	No	Yes

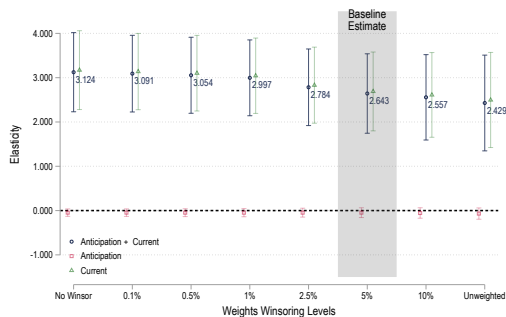
Sensitivity to Weights Definition

[▶ Back](#)

a. $\Delta \log y_i^j$

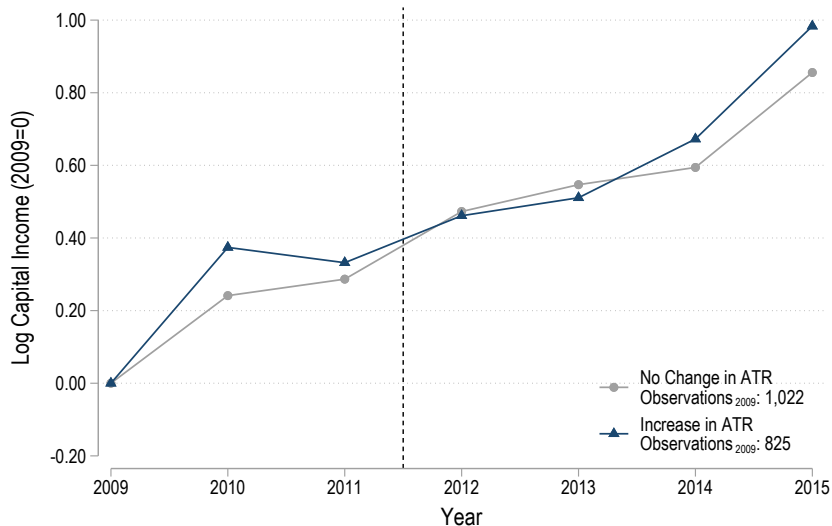


b. Diff. $\Delta \log y_i^j$



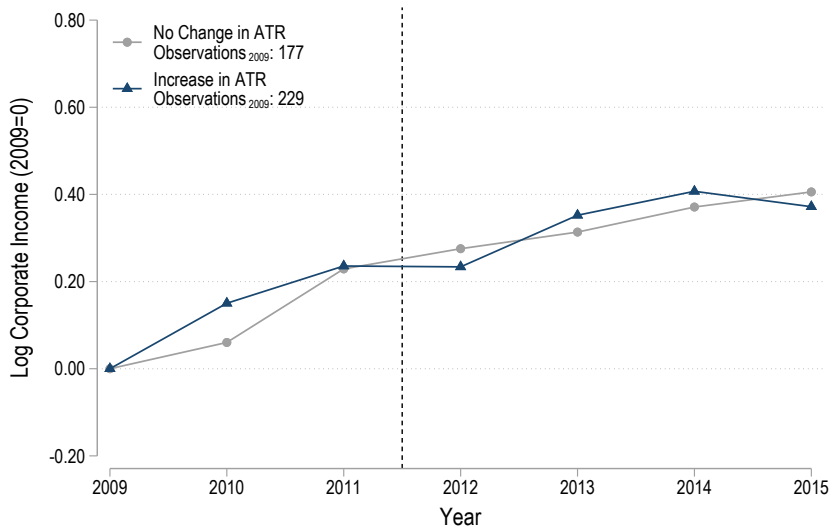
Capital Income - Intensive Margin, Raw Trends

► Cross Base - Intensive



Corporate Income - Intensive Margin, Raw Trends

► Cross Base - Intensive



Dynamic DiD - Capital Tax Base Estimates

	Intensive Margin				Extensive Margin			
	$\log y_{i,t}^k$	$\log y_{i,t}^k$	$\Delta \log y_{i,t}^k$	$\Delta \log y_{i,t}^k$	$\mathbb{1}(y_{i,t}^k > 0)$	$\mathbb{1}(y_{i,t}^k > 0)$	$\Delta \mathbb{1}(y_{i,t}^k > 0)$	$\Delta \mathbb{1}(y_{i,t}^k > 0)$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
a. Pre Reform Years								
Any Treat $\times$ 2010	0.111** (0.054)	0.119 (0.083)	0.045 (0.044)	0.299*** (0.087)	0.001 (0.003)	0.001* (0.001)	0.001 (0.003)	0.001* (0.001)
Any Treat $\times$ 2011	0.032 (0.060)	0.088 (0.073)	-0.073* (0.038)	-0.155* (0.082)	0.001 (0.004)	0.009*** (0.003)	-0.000 (0.004)	-0.001 (0.001)
b. Post Reform Years								
Any Treat $\times$ 2012	0.115 (0.070)	-0.172 (0.124)	0.047 (0.039)	-0.096 (0.074)	0.009** (0.005)	0.020*** (0.004)	0.009** (0.004)	0.011*** (0.002)
Any Treat $\times$ 2013	0.045 (0.072)	-0.245* (0.133)	-0.050 (0.037)	0.076 (0.093)	0.012** (0.005)	0.024*** (0.005)	0.003 (0.004)	0.003* (0.002)
Any Treat $\times$ 2014	-0.034 (0.078)	-0.339* (0.179)	-0.067* (0.040)	-0.019 (0.073)	0.011* (0.006)	0.024*** (0.005)	-0.001 (0.004)	-0.000 (0.002)
Any Treat $\times$ 2015	0.008 (0.078)	-0.154 (0.119)	0.039 (0.042)	-0.040 (0.083)	0.011* (0.006)	0.026*** (0.006)	0.000 (0.004)	0.001 (0.002)
Observations	14,389	9,152	10,791	10,791	101,346	101,346	86,868	81,581
Unique individuals	3,068	1,530	2,931	2,931	14,478	14,478	14,478	14,478
Weights:	No	Cap. Inc.	No	Cap. Inc.	No	KIT Rev.	No	KIT Rev.

► Cross - Intensive

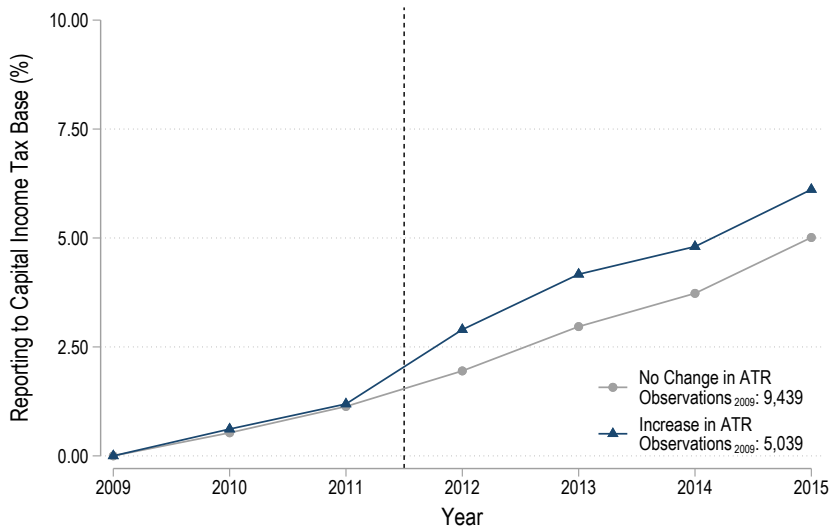
► Cross - Extensive

Dynamic DiD - Corporate Tax Base Estimates

	Intensive Margin				Extensive Margin			
	$\log y_{i,t}^c$ (1)	$\log y_{i,t}^c$ (2)	$\Delta \log y_{i,t}^c$ (3)	$\Delta \log y_{i,t}^c$ (4)	$\mathbb{1}(y_{i,t}^c > 0)$ (5)	$\mathbb{1}(y_{i,t}^c > 0)$ (6)	$\Delta \mathbb{1}(y_{i,t}^c > 0)$ (7)	$\Delta \mathbb{1}(y_{i,t}^c > 0)$ (8)
a. Pre Reform Years								
Any Treat $\times$ 2010	0.106** (0.052)	0.046 (0.029)	0.066* (0.038)	0.057 (0.039)	0.002 (0.002)	0.000 (0.001)	0.002 (0.002)	0.000 (0.001)
Any Treat $\times$ 2011	-0.073 (0.070)	-0.040 (0.074)	-0.040 (0.039)	-0.052 (0.041)	0.014*** (0.003)	0.016*** (0.003)	0.012*** (0.002)	0.006*** (0.001)
b. Post Reform Years								
Any Treat $\times$ 2012	0.053 (0.074)	0.010 (0.071)	0.140*** (0.052)	0.144*** (0.054)	0.020*** (0.003)	0.024*** (0.003)	0.006*** (0.002)	0.004** (0.002)
Any Treat $\times$ 2013	0.052 (0.073)	0.010 (0.078)	0.052 (0.031)	0.063* (0.033)	0.026*** (0.004)	0.029*** (0.004)	0.005*** (0.002)	0.002 (0.002)
Any Treat $\times$ 2014	0.064 (0.073)	-0.039 (0.073)	0.023 (0.027)	0.009 (0.033)	0.027*** (0.004)	0.032*** (0.004)	0.001 (0.002)	0.001 (0.001)
Any Treat $\times$ 2015	0.013 (0.077)	-0.113 (0.078)	-0.023 (0.026)	0.008 (0.028)	0.025*** (0.004)	0.030*** (0.004)	-0.002 (0.002)	-0.001 (0.002)
Observations	4,257	2,379	3,361	3,361	101,346	101,346	86,868	81,571
Unique individuals	866	387	862	862	14,478	14,478	14,478	14,478
Weights:	No	Corp. Inc.	No	Corp. Inc.	No	CIT Rev.	No	CIT Rev.

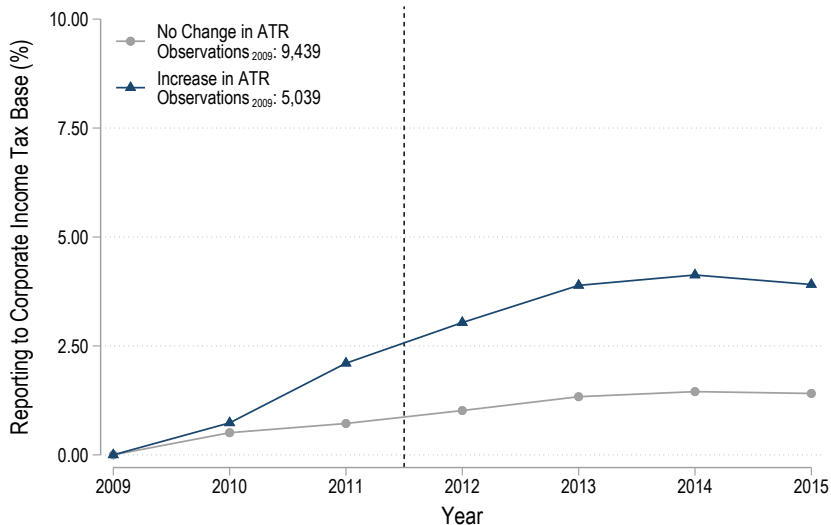
Capital Income - Extensive Margin, Raw Trends

► Cross Base - Extensive



Corporate Income - Extensive Margin, Raw Trends

► Cross Base - Extensive



Main Robustness - Capital Income Tax Base

► Cross. Int.

► Cross. Ext.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel a. Intensive Margin Elasticities							
	Dep. Var.: $\Delta \log y_i^k$						
(a): $\Delta \log (1 - \tau^l)$	2.265 (1.738)	-0.858 (6.396)	2.635 (1.803)	3.796* (2.146)	2.427 (1.751)	-0.311 (1.495)	1.940 (1.829)
(b): $\Delta^+ \log (1 - \tau^l)$	3.658* (1.946)	7.949 (7.625)	0.034 (2.185)	-0.648 (2.304)	3.615* (1.960)	5.983** (2.389)	3.300* (1.981)
(a) + (b)	5.923** (2.600)	7.091 (4.637)	2.669 (2.885)	3.148 (3.194)	6.042** (2.639)	5.672** (2.787)	5.240* (2.792)
Observations	3,395	3,395	2,316	1,480	3,349	2,241	3,395
Unique individuals	1,946	1,946	1,313	840	1,920	1,283	1,946
Panel b. Extensive Margin Elasticities							
	Dep. Var.: $\Delta \mathbb{1}(y_i^k > 0)$						
$\Delta \log (1 - \tau^{e,l})$	-0.814*** (0.187)		-0.700*** (0.197)	-0.731*** (0.226)	-0.806*** (0.186)	-0.854*** (0.210)	-0.840*** (0.198)
$\Delta^+ \log (1 - \tau^{e,l})$	0.068 (0.072)		0.076 (0.072)	0.030 (0.072)	0.067 (0.072)	0.110 (0.077)	0.037 (0.092)
(a) + (b)	-0.746*** (0.194)		-0.625*** (0.205)	-0.701*** (0.234)	-0.739*** (0.194)	-0.744*** (0.215)	-0.803*** (0.231)
Observations	28,911		18,798	11,668	28,479	20,524	28,911
Unique individuals	14,466		9,404	5,834	14,250	10,270	14,466
Specification							
Baseline	Yes	No	No	No	No	No	No
Estimate	ITT	TOT	ITT	ITT	ITT	ITT	ITT
Sample	Baseline	Baseline	No Switch.	Stable G.	Donut	SSA	SSA
Data	TAX	TAX	TAX	TAX	TAX	TAX	SSA + TAX
pre-TAX controls	No	No	No	No	No	No	Yes

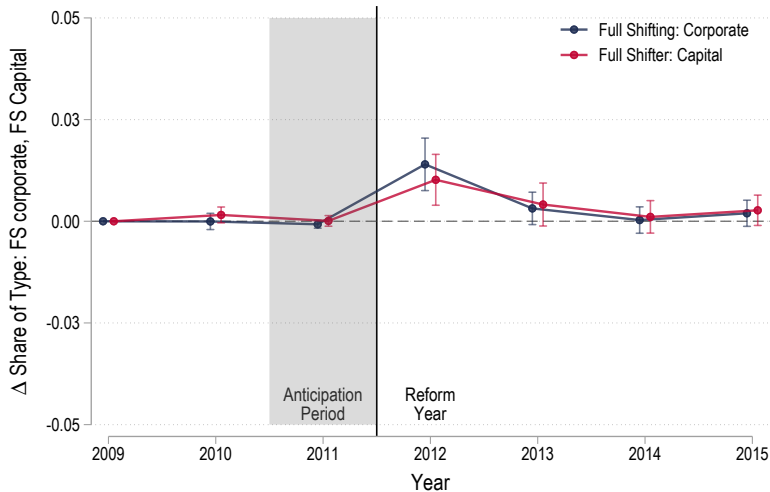
Main Robustness - Corporate Income Tax Base

► Cross. Int.

► Cross. Ext.

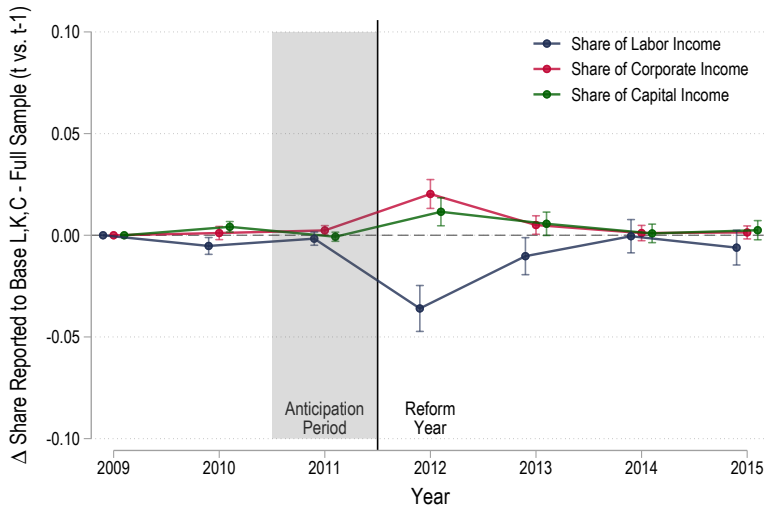
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel a. Intensive Margin Elasticities							
	Dep. Var.: $\Delta \log y_i^c$						
(a): $\Delta \log (1 - \tau^l)$	-1.454 (1.532)	-1.392 (1.592)	-2.379 (1.905)	-2.185 (2.323)	-1.385 (1.530)	0.503 (1.835)	-1.739 (1.610)
(b): $\Delta^+ \log (1 - \tau^l)$	1.411 (1.169)	1.262 (1.154)	0.798 (1.353)	-0.714 (1.165)	1.405 (1.167)	1.229 (1.637)	1.135 (1.170)
(a) + (b)	-0.043 (1.805)	-0.130 (1.733)	-1.580 (2.177)	-2.899 (2.372)	0.020 (1.804)	1.732 (2.353)	-0.604 (1.921)
Observations	964	964	672	345	955	639	964
Unique individuals	533	533	359	186	528	350	533
Panel b. Extensive Margin Elasticities							
	Dep. Var.: $\Delta \mathbb{1}(y_i^c > 0)$						
$\Delta \log (1 - \tau^{e,l})$	-0.271** (0.129)		-0.284** (0.137)	-0.188 (0.130)	-0.251* (0.129)	-0.228 (0.159)	-0.338** (0.144)
$\Delta^+ \log (1 - \tau^{e,l})$	-0.518*** (0.108)		-0.545*** (0.106)	-0.653*** (0.128)	-0.519*** (0.109)	-0.361*** (0.116)	-0.590*** (0.114)
(a) + (b)	-0.788*** (0.160)		-0.829*** (0.165)	-0.841*** (0.172)	-0.770*** (0.160)	-0.589*** (0.186)	-0.927*** (0.191)
Observations	28,930		18,817	11,668	28,498	20,540	28,930
Unique individuals	14,471		9,409	5,834	14,255	10,274	14,471
Specification							
Baseline	Yes	No	No	No	No	No	No
Estimate	ITT	TOT	ITT	ITT	ITT	ITT	ITT
Sample	Baseline	Baseline	No Switch.	Stable G.	Donut	SSA	SSA
Data	TAX	TAX	TAX	TAX	TAX	TAX	SSA + TAX
pre-TAX controls	No	No	No	No	No	No	Yes

Full Shifters Detailed

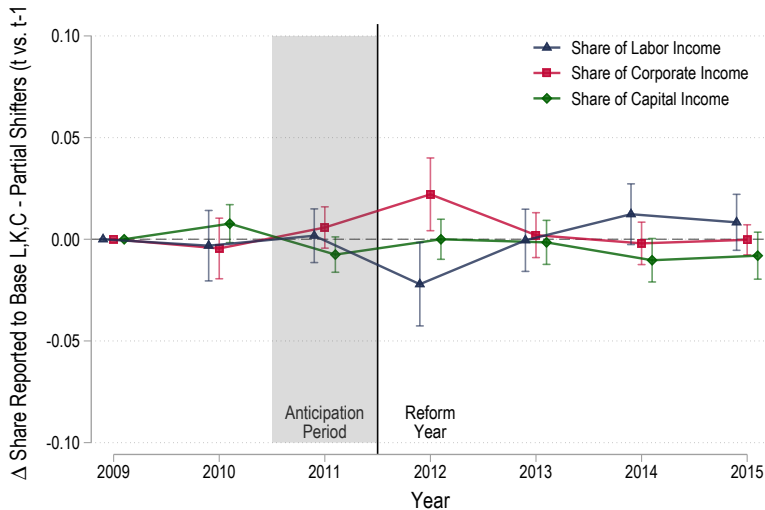
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Income Shares Full

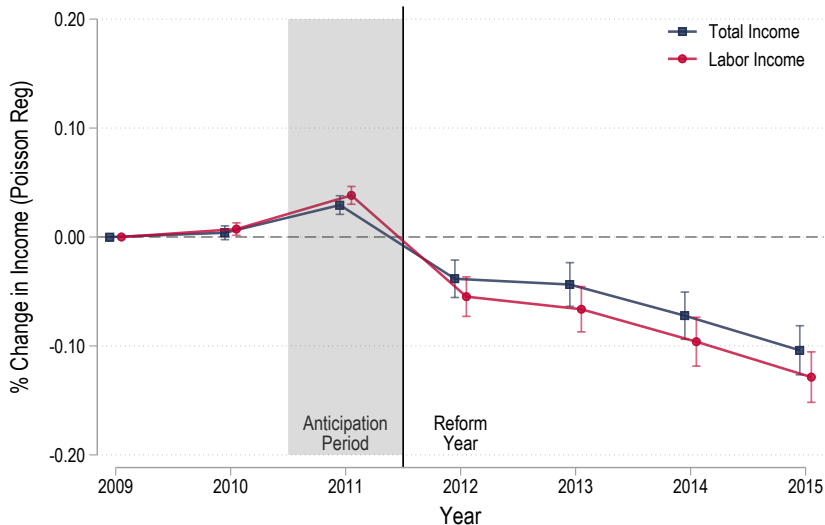
► Back



Income Shares - Partial Shifters

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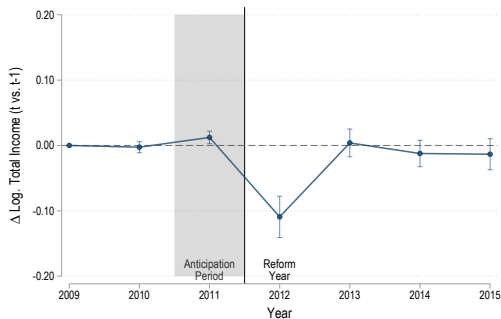
Total Income vs Labor Income - Dynamic DiD

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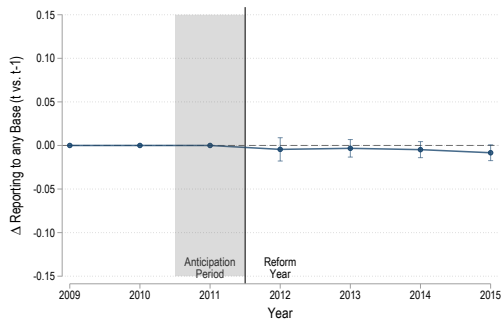
Total Income: Intensive and Extensive Margins

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a. Intensive Margin



b. Extensive Margin

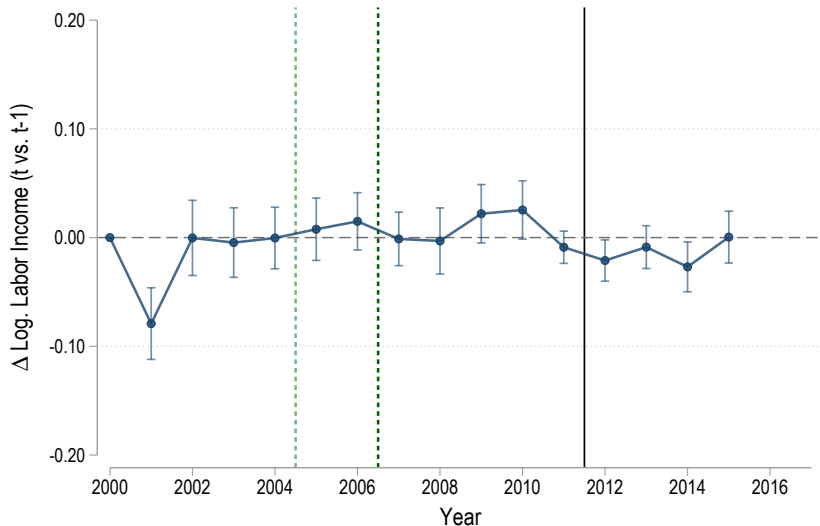


Total Income vs Labor Income - Dynamic DiD Estimates

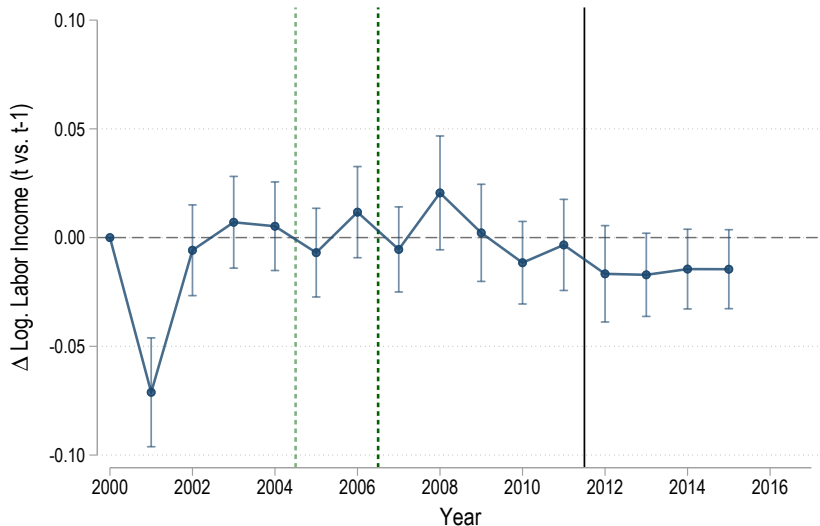
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	Total Income				Real Labor Supply		
	$y_{i,t}^I$	$y_{i,t}^T$	$\Delta \log y_{i,t}^T$	$\Delta \mathbb{1}(y_{i,t}^T > 0)$	$\Delta \log hs_{i,t}^T$	$\Delta \#emp_{i,t}$	$\Delta \mathbb{1}(y_{i,t}^P > 0)$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
a. Pre Reform Years							
Any Treat $\times$ 2010	0.006* (0.003)	0.004 (0.003)	-0.003 (0.003)	0.000 (0.000)	0.025** (0.010)	-0.012 (0.007)	0.004* (0.002)
Any Treat $\times$ 2011	0.037*** (0.005)	0.029*** (0.004)	0.012*** (0.004)	0.000 (0.000)	-0.009 (0.006)	-0.003 (0.008)	0.005* (0.003)
b. Post Reform Years							
Any Treat $\times$ 2012	-0.057*** (0.010)	-0.038*** (0.009)	-0.080*** (0.011)	0.007 (0.005)	-0.021*** (0.007)	-0.017* (0.009)	0.004 (0.003)
Any Treat $\times$ 2013	-0.066*** (0.011)	-0.044*** (0.010)	-0.001 (0.008)	-0.003 (0.005)	-0.009 (0.008)	-0.017** (0.007)	-0.001 (0.003)
Any Treat $\times$ 2014	-0.096*** (0.012)	-0.072*** (0.011)	-0.011 (0.009)	-0.012** (0.005)	-0.027*** (0.009)	-0.014** (0.007)	0.004 (0.004)
Any Treat $\times$ 2015	-0.128*** (0.012)	-0.104*** (0.011)	0.008 (0.011)	-0.020*** (0.005)	0.000 (0.009)	-0.015** (0.007)	0.007* (0.004)
Observations	101,346	101,346	79,416	86,868	117,719	128,712	80,157
Unique individuals	14,478	14,478	14,478	14,478	10,138	10,206	14,478
Weights:	Lab. Inc.	Tot. Inc.	Tot. Inc.	Tot. Inc.	Lab. Inc.	Lab. Inc.	PIT Rev.

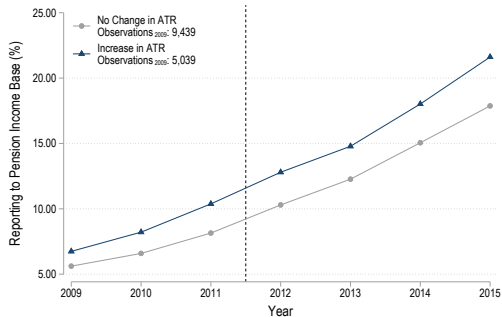
Reported Hours Worked [▶ Back](#)



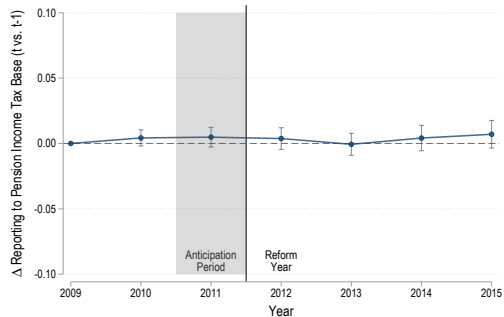
Number of Employers [▶ Back](#)



a. Capital Income



b. Corporate Income



- ❶ How do taxpayers respond to taxation? With emphasis in TIEs (Miller et al, 2024; Miao et al, 2024; Jakobsen and Søgaaard, 2022; Nesser, 2021; Alstadsæter and Jacob 2016; Harju and Matikka 2016; Weber, 2014; Kleven and Schultz, 2014; Saez et al, 2012; Pirttilä and Selin, 2011; Gruber & Saez, 2002)
 - ▶ **Unified approach + three major tax bases, int./ext., timing + mechanisms**
 - ▶ **Transparent visual approach, rare in related PF literature.**
- ❷ Behavioral responses of TIEs in dev./non-high income countries (Jouste et al. 2024; Axelson et al. 2024; Tortarolo et al. 2020; Foremny et al., 2018)
 - ▶ **Thin, but important literature.**
- ❸ The Uruguayan case and its external validity (e.g., Selin and Simula, 2020; Kopczuk and Zwick, 2020; Goolsbee 2004; Gruber and Saez 2002; Feldstein 1995)
 - ▶ **Fairly representative tax structure + granular data → middle-ground case of study**