

The Response of Salaried Workers to the Personal Income Tax: Evidence from a Regression Discontinuity Design in Argentina

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Introduction

HOW DO TAXES (TAX REFORMS) AFFECT THE LABOR SUPPLY OF SALARIED WORKERS?

- The response of wage earners to the personal income tax has long been of interest to economists and policymakers
- The magnitude of this response is of critical importance for tax and transfer policies, and welfare analysis
- However, the empirical literature has not yet reached a consensus on the magnitude of the elasticity of earnings with respect to tax rates
- Empirical estimates range from no effect to very sizeable responses (Saez et al. 2012 for a recent survey).
- Moreover, most of the literature is based on developed countries

This project

- We exploit a unique natural experiment in Argentina in 2013-2016 that introduced a **discontinuity in the income tax**
- Reform: In August 2013, the president passed a Decree that exempted a group of salaried workers (1.4m) below an **earnings threshold** from the Personal Income Tax (PIT) for 2.5 years
- Key: **tax cut based on earnings accrued prior the reform**; unexpected; affected differentially what would otherwise be comparable workers
- We use this exogenous variation to estimate earnings responses of (upper) salaried workers with **admin data from SSA**
- We use a **RD design**, which overcomes identification difficulties that have plagued previous work

Preview of the findings

- The tax cut created a large and salient discontinuity in tax liabilities
 - * MTR went from 27% to 0%
 - * Annual tax savings of about 10% for single workers
- Evidence suggests that salaried workers didn't react to the tax cut...
 - * No discontinuity in earnings around the threshold after 2.5 years

Institutional context: the income tax

- Argentina has a progressive personal income tax (PIT) schedule with 7 brackets and marginal tax rates ranging from 9 to 35 percent
- In practice, employers must withhold the income tax from employees' monthly paychecks
- The amount to withhold depends on employee's *taxable income*
- Can deduct Social Security contributions, Personal exemptions (spouse and dependents), and other minor General deductions (mortgage, etc)
- In Argentina the PIT is borne by relatively high-earning individuals

Table: Personal Income Tax Schedule in Argentina

Annual Taxable Income		Annual Payment		
From AR\$	To AR\$	AR\$	+ $x\%$	over AR\$
0	10,000	-	9	0
10,000	20,000	900	14	10,000
20,000	30,000	2,300	19	20,000
30,000	60,000	4,200	23	30,000
60,000	90,000	11,100	27	60,000
90,000	120,000	19,200	31	90,000
120,000		28,500	35	120,000

Key facts

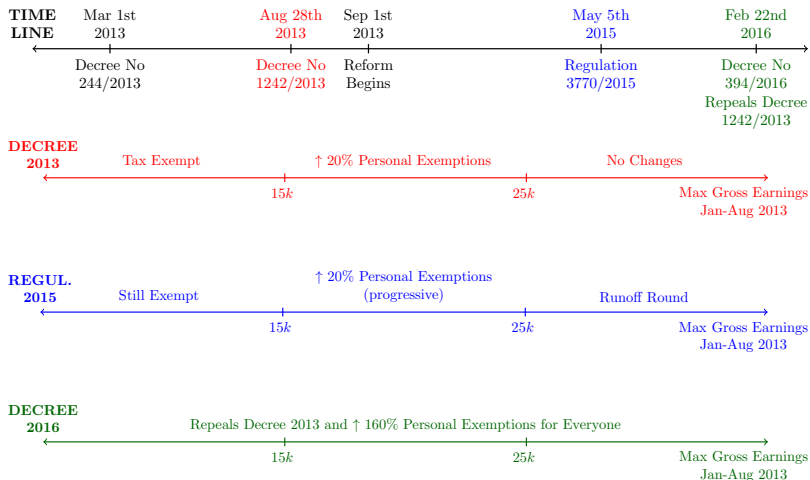
4 key facts have characterized the **evolution of the PIT** in the last years

1. PIT schedule fixed in nominal terms since 2000
2. Huge inflation during the 2000s [LINK](#)
3. Nominal earnings adjusted every year
4. Exemptions adjusted irregularly, behind average increase in wages [LINK](#)

The PIT **lost progressivity** in the last 15 years

⇒ in 2013 the gov implemented a **large and salient tax cut**

Timeline and Reforms



The variation we exploit...

Decree 1242/2013 (August 28th 2013, starting on September 1st 2013)

$$\overline{W} \equiv \max\{\text{gross earnings} | \text{Jan to Aug 2013}\}$$

Regardless of subsequent income, salaried workers with...

- $\overline{W} \leq 15\text{k}$: fully exempt from the income tax
- $15\text{k} < \overline{W} \leq 25\text{k}$: 20% increase in personal exemptions
- $\overline{W} > 25\text{k}$: continued paying the tax normally

The reform introduced a discontinuity at 15k and 25k

KEY: affected differentially what would otherwise be comparable workers

Example: Earned $< 15\text{k}$ before August, get a promotion to 20k, no taxes!

Empirical Strategy: regression discontinuity design

- The regression of interest is

$$\ln(Y_{it}) = e \ln(1 - \tau_{it}) + error_{it}$$

- Standard OLS leads to a biased estimate of the elasticity e
- Hence, literature uses (imperfect) instruments + tax reforms to identify e
- We use a **RD design**, which overcomes identification difficulties

Basic idea is to plot average outcomes for bins of running variable

First stage: Does tax burden change sharply around the threshold?

Second stage: Does the discontinuity in tax liability translate into a discontinuity in labor outcomes later on?

Data

- Admin data from the Social Security (SIPA) 2012-2016 (third-party reporting by employers, Form # 931)
- Panel of social security records of all employer-employee links
- Source: Observatorio de Empleo y Dinamica Empresarial - MTEySS
- Can follow the full working history of salaried workers, month by month
- Data are anonymized to preserve confidentiality
- Some variables:
 - Earnings: gross monthly labor income
 - Demographics: age, gender, geographic location
 - Labor: private worker, tenure, 4-digit sector, unionized, type of contract
- In March 2013, the year of the reform, the data included around 400k private firms and more than 6m private salaried workers (9m total)

Summary statistics

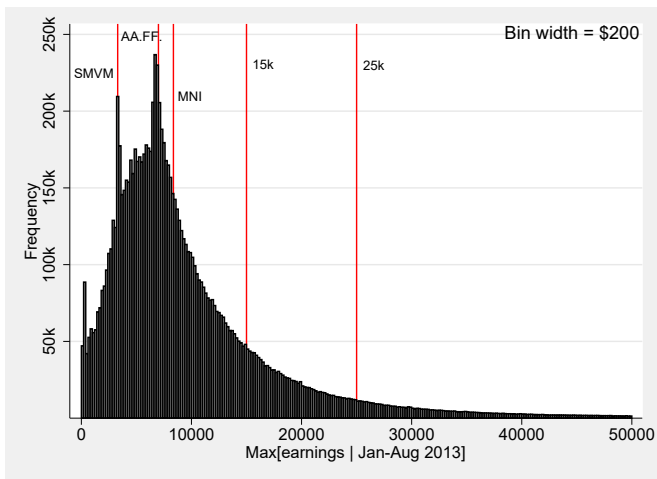
Table: Summary Statistics of Registered Wage Earners in Argentina, 2013

	Group 1: 8.3k-15k (1)	Group 2: 15k-25k (2)	Group 3: 25k-40k (3)	Group 4: 14k-16k (4)	All (5)
Salaried workers (%)	0.262	0.114	0.041	0.044	1
Decile of max earnings Jan-Aug 2013	7-8	9	10	8-9	1-10
Average age	41.4	43.7	44.6	43	40.4
Public worker (%)	0.332	0.359	0.315	0.345	0.287
Collective Barg. Agreement (%)	0.490	0.499	0.542	0.497	0.497
Female (%)	0.389	0.333	0.279	0.355	0.395
Average gross earnings Aug 2012	7,576	11,769	16,772	9,768	7,379
Average gross earnings Aug 2013	9,540	15,124	22,229	12,432	9,108
Average gross earnings Aug 2014	13,228	20,489	29,914	16,949	12,749
Average gross earnings Aug 2015	17,973	27,626	39,949	22,977	17,414
Number of jobs	1.02	1.08	1.09	1.06	0.95
Multiple jobs (%)	0.066	0.109	0.131	0.091	0.052
Number of workers	2,763,269	1,205,096	431,908	462,911	10,543,800

Note: This table displays summary statistics for private and public registered wage earners. Groups 1-4 are defined based on the highest gross monthly salary between January and August 2013. ER for October 2013 was 5.8.

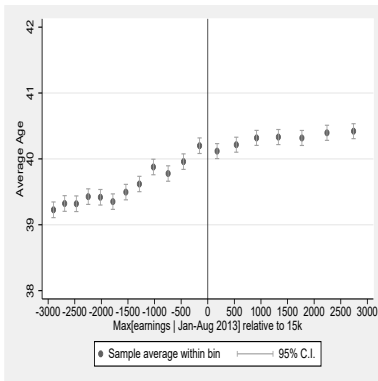
Identification check #1 - incumbents

Figure: Density of $\max\{\text{earnings}|\text{Jan to Aug 2013}\}$ around 15k and 25k

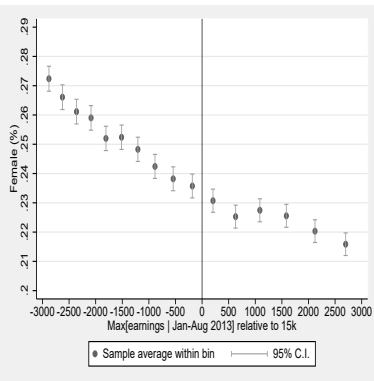


Identification check #2 - covariate balance

Figure: RD for age and gender around the 15k cutoff



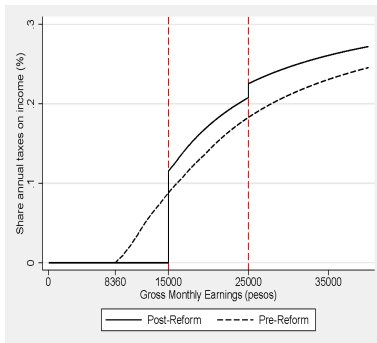
(a) Average Age



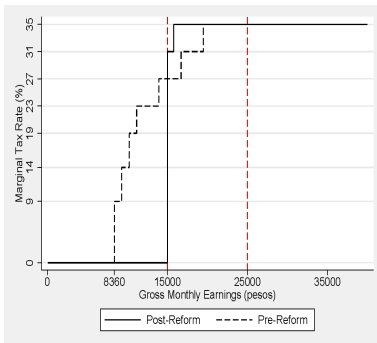
(b) Female (%)

First stage (simulation)

Figure: single workers without children



(a) Share of tax liability on annual earnings

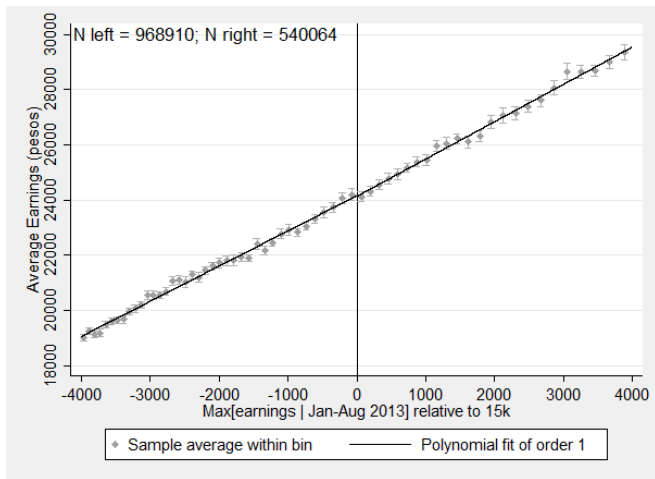


(b) Marginal tax rate

Note: to get the taxable income, I subtract from gross monthly earnings 17% of Social Security contributions and personal exemptions using the values reported in the law. Then I multiply by 13 to annualize taxable earnings. Finally, I compute tax liability and MTR from PIT schedule. Post reform considers an inflation of 34%.

Main result in one slide: no response!!

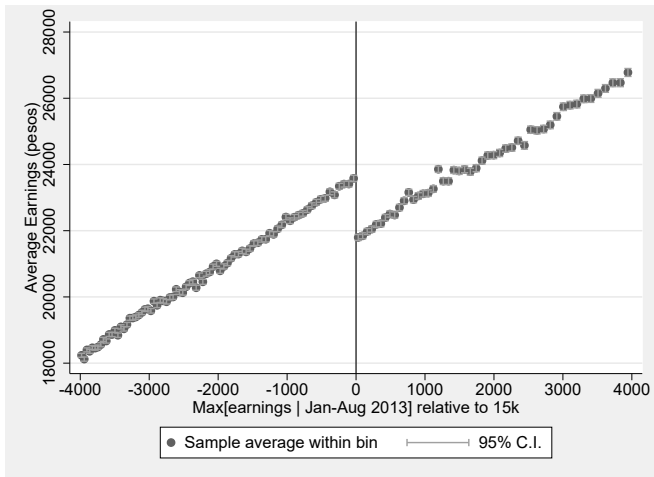
Figure: Average gross earnings around 15k, October 2015



Note: this figure is done for the pool of wage earners around the 15k cutoff.
The vertical spikes denote 95% confidence intervals.

Thought experiment

what we should've seen with $e = 0.2$



Note: this is the simulated response of workers in a frictionless world with $e = 0.2$ and an inflation rate of 34% and 31% between 2013, 2014, 2015. Earnings to the left of 15k are shifted by $0.2 \times \Delta \log(1 - \tau_t)$, where $\tau_1 = 0\%$ and $\tau_0 = 27\%$.

Some numbers, for completeness...

Table: RD estimates using local polynomial regression

	Earnings 10/2012	Earnings 10/2013	Earnings 10/2014	Earnings 10/2015
	(1)	(2)	(3)	(4)
Panel A: RD around 15k				
RD estimate	4.9 (36.1)	-114.6 (85.2)	-29.3 (132.1)	-159.9 (214.9)
Obs	367,538	380,115	366,912	357,016
Obs to the left of c	195,154	202,026	194,934	189,844
Obs to the right of c	172,384	178,089	171,978	167,172
BW est. (h)	311.9	207.5	199.1	210.6
Panel B: RD around 25k				
RD estimate	-32.4 (127.2)	-271.8 (275.1)	-238.1 (470.1)	-299.7 (699.1)
Obs	149,002	149,211	144,331	140,050
Obs to the left of c	80,963	81,319	78,607	76,244
Obs to the right of c	68,039	67,892	65,724	63,806
BW est. (h)	344.1	260.7	353.2	423.6

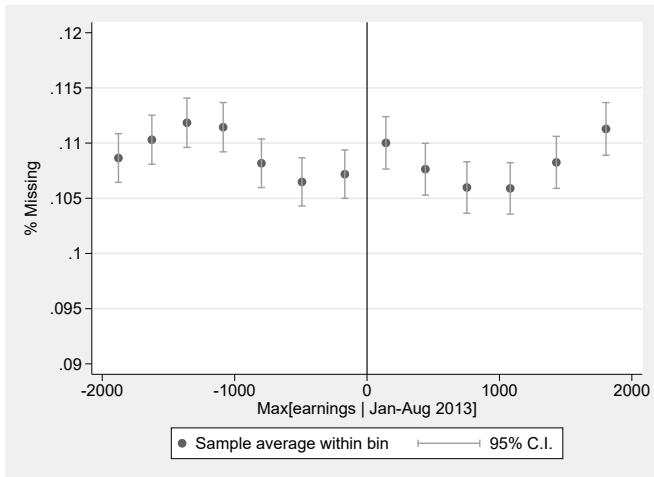
Note: standard errors reported between parentheses. Point estimates computed with `rdrobust` routine using local linear regressions and a uniform kernel.

So, no response after 2.5 years...

- What about other margins? **Switchers (to “.” and 0)**
- Did any subgroup respond? **Heterogeneities**
- Maybe salaried workers were unaware... **Saliency**

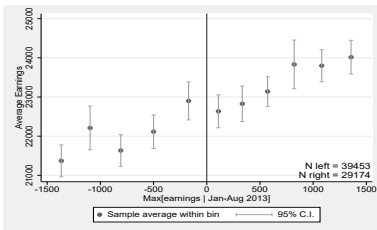
Fraction missing

Figure: Fraction missing around 15k, October 2015

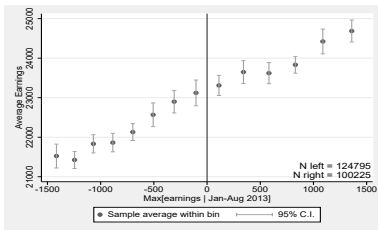


Note: missing as a proxy for formal workers dropping out

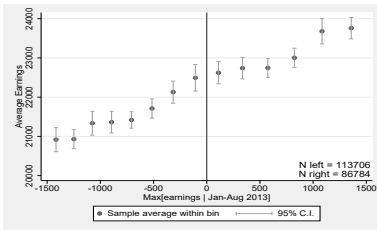
Results: heterogeneities ($c = 15k$)



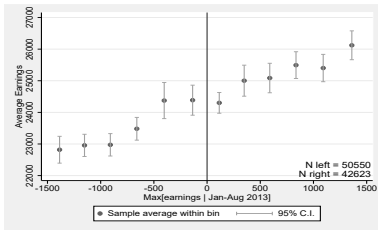
(a) Female, private



(b) Male, private



(c) Unionized, private



(d) Non-Unionized, private

Results: robustness ($c = 15k$)

Other things I've tried...

1. **Firm size:** small [10-] vs large [200+] [LINK](#)
2. **Age groups:** young [18-35] vs prime-age [36-55] [LINK](#)
3. **Sectors:** manufacturing, transport, professionals, retail, financial [LINK](#)
4. **Labor unions:** commerce, banks, public transport, truck drivers, metalworkers, oil workers [LINK](#)
5. **Other checks:** % Change 2015-2013 [LINK](#); Percentiles 10, 50, 90, 99 within each bin [LINK](#); $Prob[\Delta earnings > inflation]$
6. **Closest case of an “effect”:** (i) Private, manufacturing, prime-age [LINK](#); (ii) Private, professionals, prime-age [LINK](#)

Saliency

Were workers unaware of the reform?

- The income tax is indeed very salient in Argentina
- People can see in their paycheck if they cross the threshold
- Some anecdotal evidence from newspapers
- Google trends

Figure: Main Newspapers in Argentina (La Nacion and Clarin)



(a) August 28th, 2013

Ganancias: el decreto 1242 provocó un trato desigual entre asalariados

Hace casi un año, la norma liberó del pago de Ganancias a los asalariados y jubilados que entre enero y agosto de 2013 habían percibido salarios o haberes brutos no mayores a \$ 15.000.

SEGUIR *Silvia Stano* LA NACION MARTES 22 DE JULIO DE 2014 • 12:24

Hace casi un año, el decreto 1242 liberó del pago de Ganancias a los asalariados y jubilados que, entre enero y agosto de 2013, habían percibido salarios o haberes brutos no mayores a \$ 15.000. Tal como se había advertido en su momento, esa medida provocó un trato

(c) July 22nd, 2014



(b) August 28th, 2013

El reino del revés: los que prefieren no tener aumentos, para ganar más

OPINIÓN
Paula Urien
LA NACION

Parece increíble, pero es real. Quienes trabajan en empresas y están registrados les dicen que no a ascensos y también a

crecimiento profesional cuando la inflación, que en 2006 había sido del 7%, superó el 20%. Empezaron entonces las distorsiones y las políticas salariales que dejaron atrás el reconocimiento a los talentos para concentrarse en evitar, dentro de lo posible, la merma del poder adquisitivo de su gente.

este mínimo a \$ 25.000. Un avance ¿o un retroceso? Según Mercer, hoy paga Ganancias casi la misma cantidad de personas que antes de la modificación. Desde el Gobierno se dijo que ya no pagarían el tributo 180.000 personas, pero desde la CTA afirman que 220.000 empezaron a pagar ya que cayó el decreto 142/2013 que dejaba

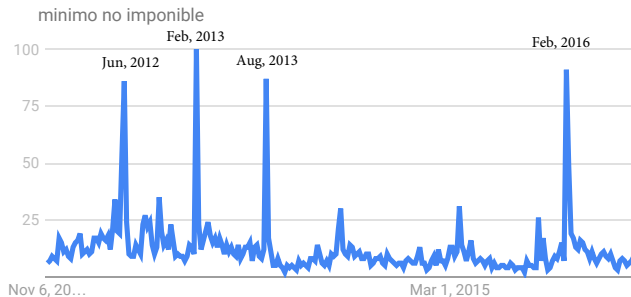
(d) July 2nd, 2016

Figure: Saliency, example from Google Trends

Interest over time

Google Trends

Worldwide. Past 5 years.



Someone's paycheck (Sept 2015)

TTTTTTTTT Y ASOCIADOS SA		CUIT N° 30-XXXXXXX-3	
AV.PASEO COLON 275 10 CABA - Capital Federal			
APELLIDO Y NOMBRE		CUIL	LEGAJO
ZZZZZZZZ YYYYYY		20-XX.XXX.XX-8	285
SECCION OF.CENTRAL CATEGORIA Empleado CALIFICACION PROFESIONAL Empleado	FECHA DE INGRESO	REMUNERACION ASIGNADA	RECIBO N°
	01/12/2014	13.719,60	6346
	PERIODO DE PAGO: SEPTIEMBRE 2015		
	CONTRATACION: A tiempo completo indeterminado		
CONCEPTO	UNIDADES	REMUNERACIONES SUJETAS A RETENCION	REMUNERACIONES EXENTAS
0100 SUELDO BASICO		13.719,60	
0120 Almuerzos.Art9	22,00	1.980,00	
0401 JUBILACION 11%			1.726,96
0402 LEY 19032			470,99
0405 OBRA SOCIAL			470,99
6980 RETENCION GANANCIAS			4.487,40
6999 Beneficio Decreto PEN 1242/13			-4.487,40
9999 REDONDEO			0,34
		15.699,60	0,34
			2.668,94
LUGAR Y FECHA DE PAGO:	FORMA DE PAGO:	TOTAL NETO →	
CAPITAL FEDERAL, 05/10/2015	Cuenta Bancaria	13.031,00	
O.S.: O.S. Comisarios Navales			

Income tax
concepts

Gross monthly
earnings

Potential explanations

- (1) Substitution effect and Income effect offset each other
- (2) Low intensive elasticity of earnings w.r.t. marginal tax rates (Zidar, 2017)
- (3) Large adjustment costs, slow dynamic response to the tax cut
- (4) Firms mediate tax responses of employees. Hard to coordinate

Final Remarks

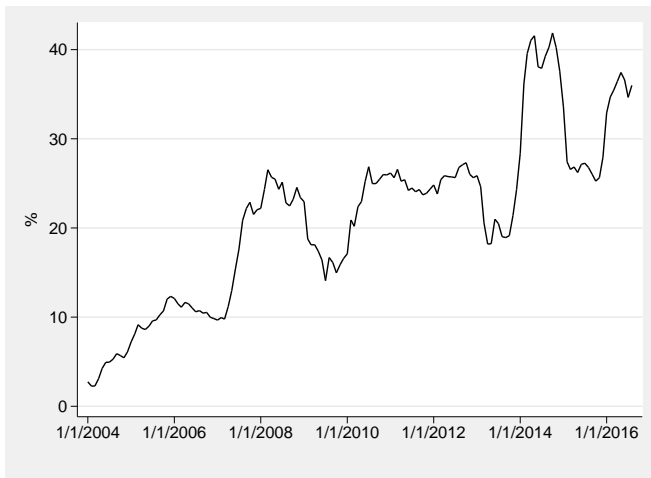
- First stage: shows a discontinuous change in tax liabilities
- Second stage: precisely measured zero effect of the tax cut
- Labor supply of upper wage earners (\sim decile 8) is not responsive.
Striking given the size and saliency of the cut
- This zero result is consistent with the paper by Saez (2010, AEJ), Saez et al. (2012, QJE), Bastani and Selin (2014, JPubE)
- Could imply that the costs of raising PIT in Argentina are not large...
... at least for the intensive margin and upper income earners
- Similarity of income tax in other developing countries and lack of evidence make the topic of this paper a very important venue for future research

Many thanks!

Comments? Questions?

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Figure: Inflation rate (%), 2004-2016



Source: Argentina's Inflation Series from The Billion Prices Project at MIT.

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Facts

Figure: Evolution of exemptions (married with 2 kids), average wages of formal workers (left axis), and ratio of exemptions to average wages (right axis)

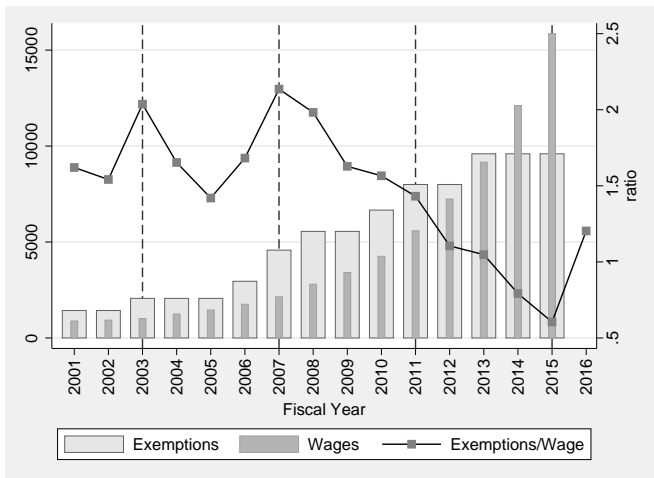
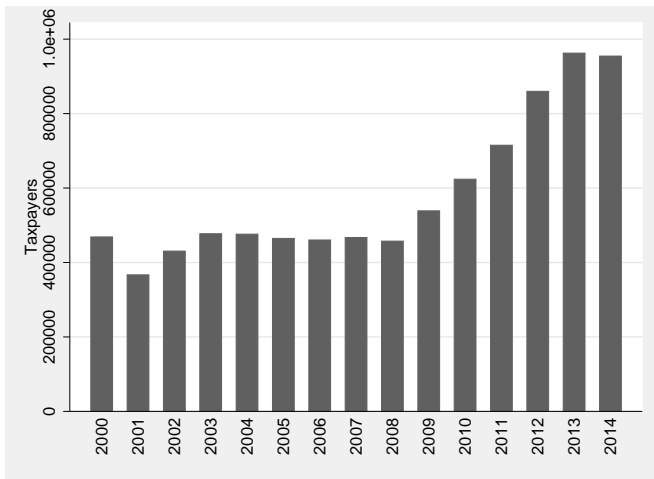


Figure: Number of taxpayers filing tax returns (DDJJ), 2000-2014

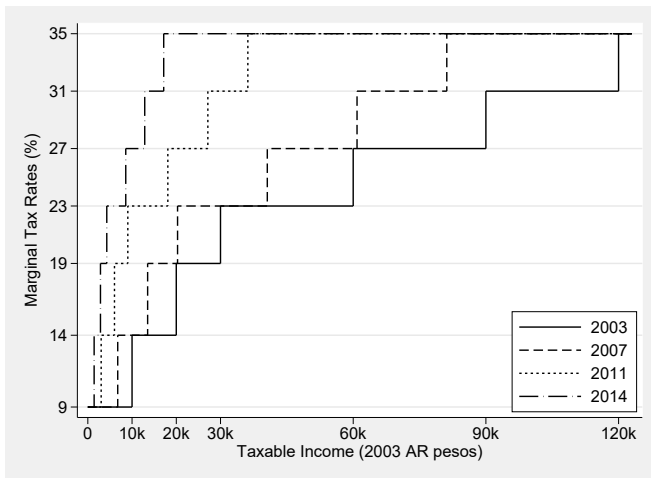


Source: Own elaboration based on statistical yearbooks of the national tax authority (AFIP).

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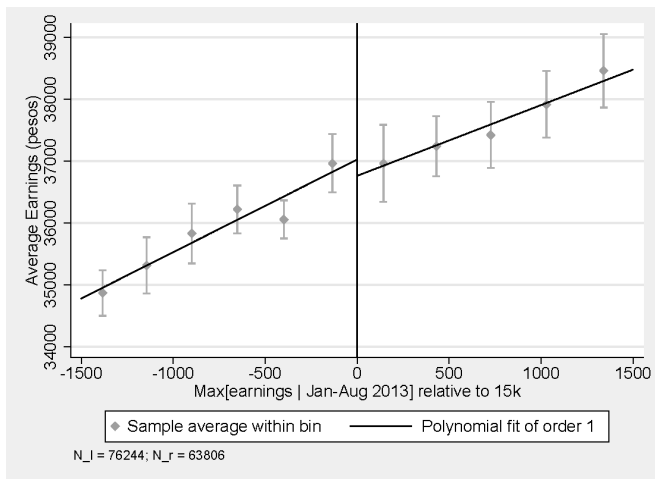
Progressivity

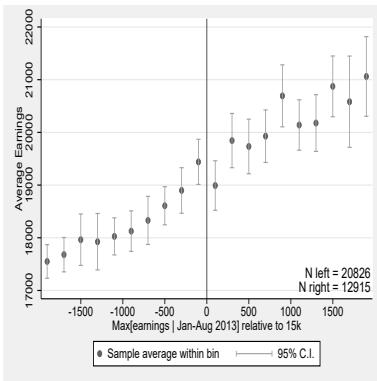
Figure: Inflation reduced the significance of the taxable threshold



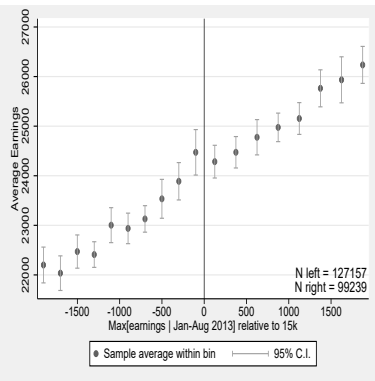
Results: second stage at $c = 25k$ (pool & zoom)

Figure: Average gross earnings around 25k, October 2015





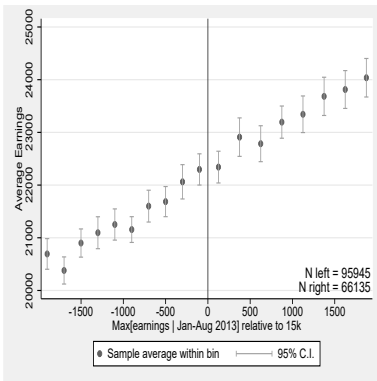
(a) Small firms



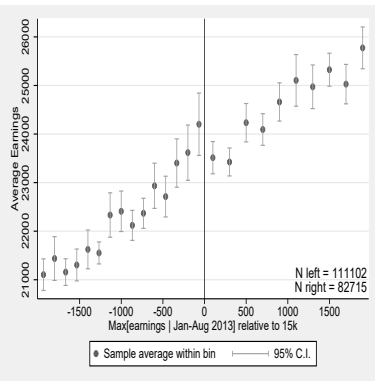
(b) Large firms

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Robustness



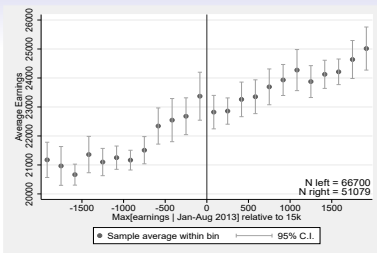
(c) Young



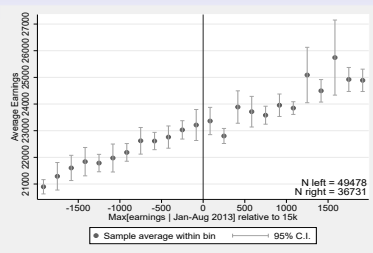
(d) Prime age

Back to

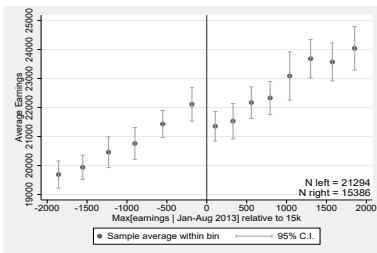
Robustness



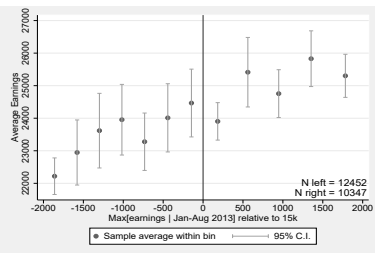
(e) Manufacturing



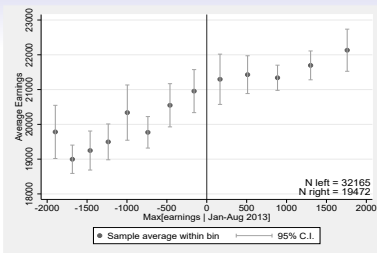
(f) Transport



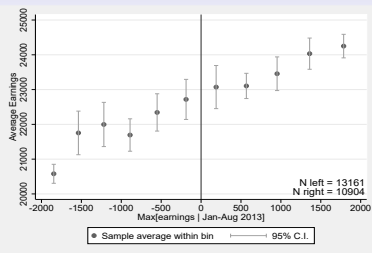
(g) Professionals



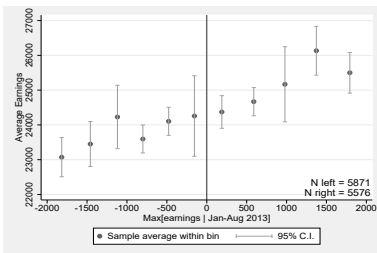
(h) Financial



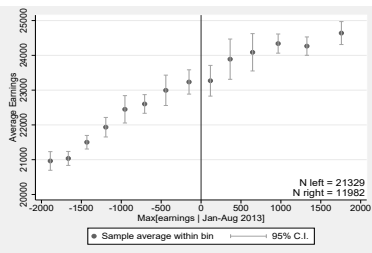
(i) Commerce



(j) Truck drivers

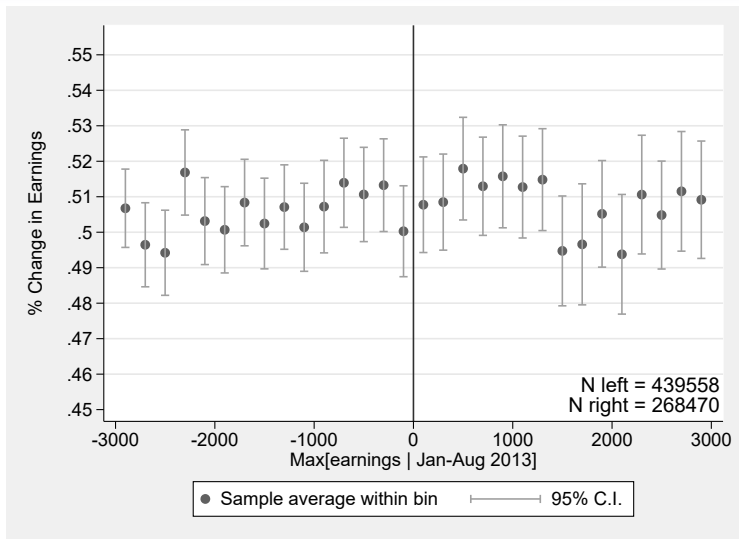


(k) Banks

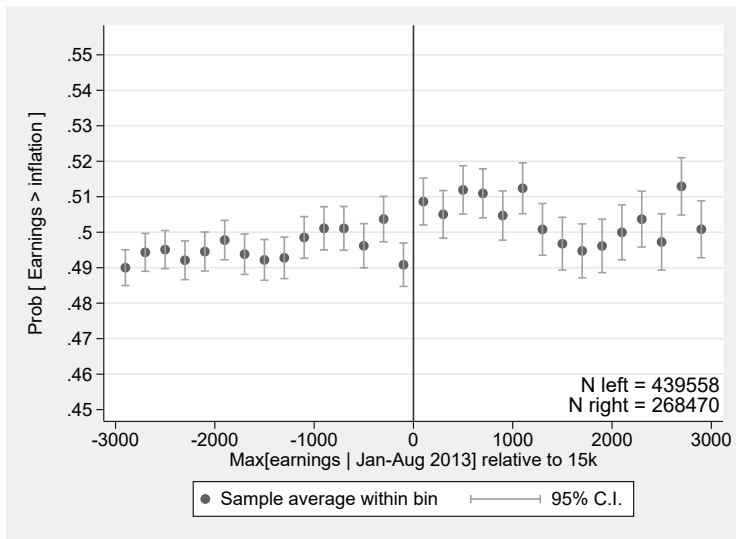


(l) Public transport

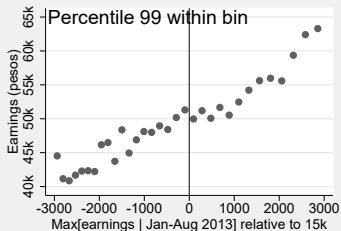
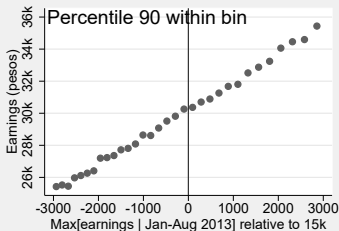
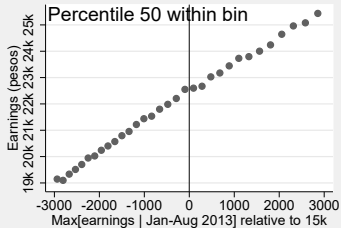
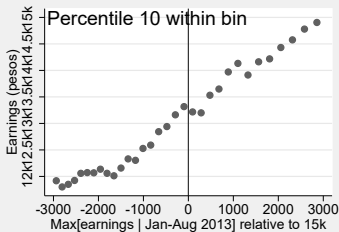
Percentage change in gross earnings August 2015-2013



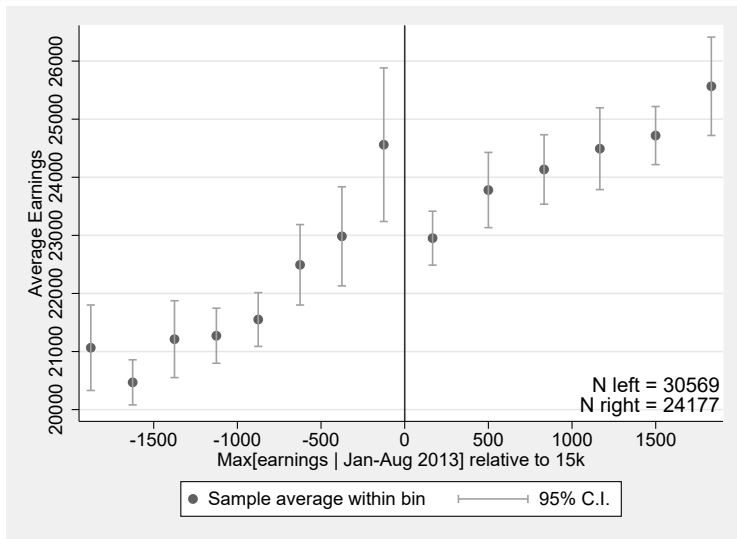
Probability that increase in earnings 2015-2013 is greater than inflation



Percentiles 10, 50, 90, 99 within each bin, October 2015



Private, manufacturing, prime-age workers



Private, professional, prime-age workers

