Distributional National Accounts for Uruguay 2009-2014
Falling inequality through the lens of DINA

M. De Rosa, J. Vilá

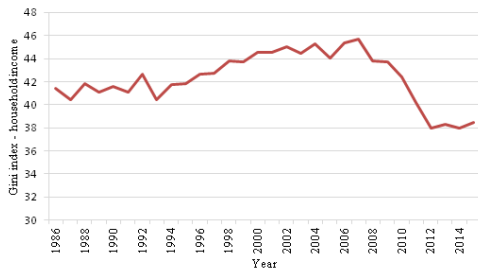Instituto de Economía - Universidad de la República

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A snapshot of the paper

- Short period of falling inequality based on DINA framework.
- Differences with other DINA studies: very good micro-data but extremely poor macro-data.
- Estimation of factor, pre-tax and post-tax (disposable) income inequality series.
- Three different estimation stages to track distributive impact of imputations.
- Inequality fell during the period, but growth was unequally distributed.

Falling inequality

Figure: Gini index 1986-2016 - Household survey

Inequality fell around seven pp of Gini index in 2008-2013. Annual national income growth of 5.5 % over this period.

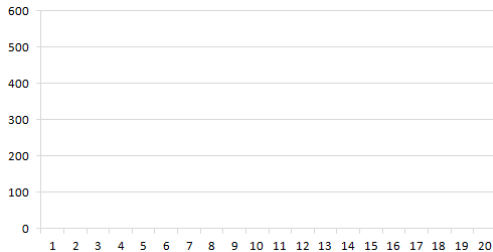Figure: Source: Household surveys 1986-2016

Policies: major raise in the minimum wage; restoration of centralized, collective wage bargaining; expansion of the child allownaces; implementation of tax reform that introduced progressive income taxation.

Overview of the methodology

- High quality tax and survey micro-data; a wide range of official data on total revenues, deficits, firms' balance sheets, among others.
- Absence of complete National Accounts over this period: only reference point is national income.
- Estimation in three stages, which take us closer to national income but with decreasing accuracy in distributional terms
    1. Tax-survey database, accounts for 60-65 % of national income
    2. Imputation of remaining taxes and undistributed profits: 70 % of national income
    3. Scaling up to national income: 100 % national income (exept pos-tax), but distribution of 2nd stage. DINA series.
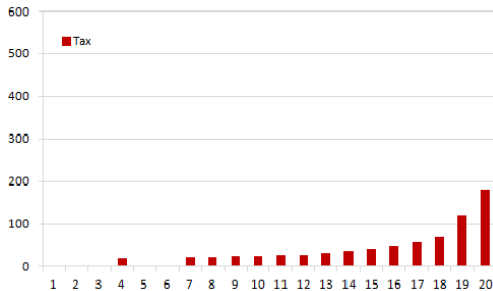
DINA estimation

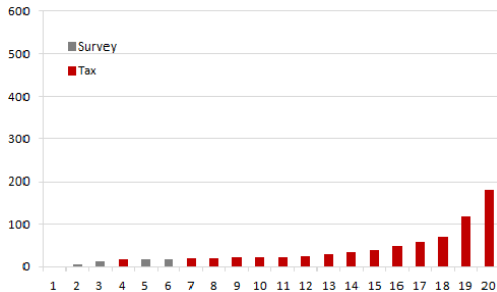Figure: Construction of DINA database

DINA estimation

Figure: Construction of DINA database - tax records

- We depart from tax data 2009-2014.
- Accounts for around 77 % adult population.
- Labour incomes, capital incomes and pensions (and matched child allowances when possible).
- 49.6 % of National Income (2014).
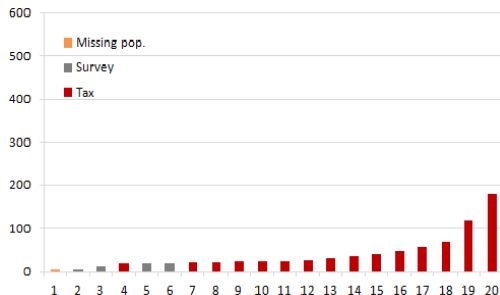
DINA estimation

Figure: Construction of DINA database - Household survey

- We add individuals with (exclusively) informal or untaxed incomes, or no incomes at all.
- Accounts for around 20 % adult population.
- Informal labour and capital incomes, remaining transfers, owner occupied housing rent.
- 4.6 % of national income.
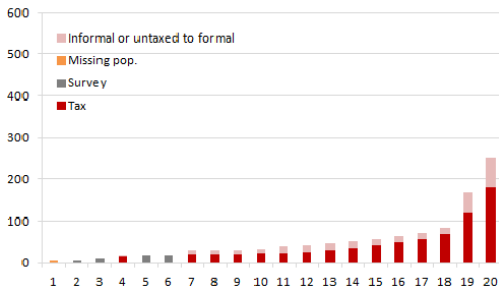
DINA estimation

Figure: Construction of DINA database - Missing population

- Reweight survey population in order to match official total population (census).
- Accounts for around 3 % adult population.
- Barely no incomes.
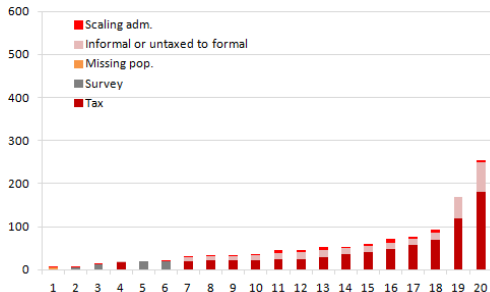
DINA estimation

Figure: Construction of DINA database - Income imputation

- We match informal and untaxed incomes from household surveys to tax database (including interests from deposits)
- Imputation based on very similar individuals in terms of age, sex, income sources and total formal earnings.
- Computation of social security and health contributions.
- 9.9 % of national income.
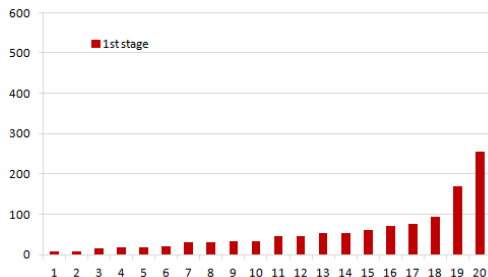
DINA estimation

Figure: Construction of DINA database - Scaling administrative data

- Incomes are scaled up or down with administrative data when possible.
- No major implications, but assures full consistency with official data.
- Pensions, cash transfers, social security contributions, interests.

DINA estimation

Figure: Construction of DINA database - 1st Threshold

- First estimagion stage.
- Combines the two most important datasets we have in a consistent way (in aggregate and distributive terms)
- 64.2 % of national income (pre-tax).

DINA estimation

Figure: Construction of DINA database - Undistributed profits

- Imputation of remaining taxes (inc. deficits)
- In pre-tax, most important is imput. of undistributed profits (5 % of national income)
- Estimated based on firms' tax records (micro-data).

DINA estimation

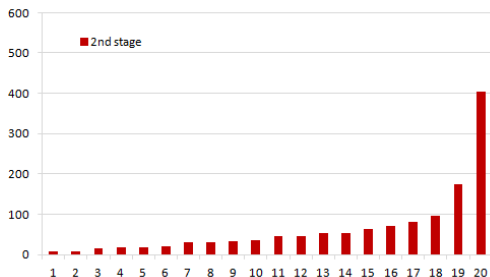Figure: Construction of DINA database - Undistributed profits

- Problem to find proxy of firms' ownership.
- Few firms distribute profits, to few individuals (2500 and 800).

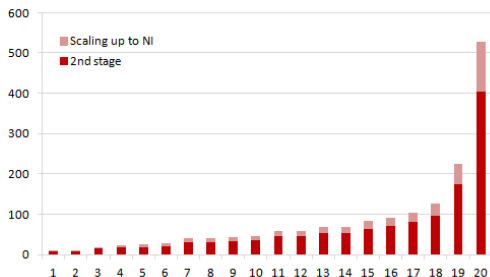|	Total taxable capital income	Dividends and utilities
Bottom 90%	16.2%	1.9%
Top 10%	83.8%	98.1%
Top 1%	56.9%	87.5%
Top 0,1%	33.7%	60.3%

DINA estimation

Figure: Construction of DINA database - 2nd
Threshold

- Second estimation stage.
- It includes all income sources.
- It accounts for 70 % of national income.
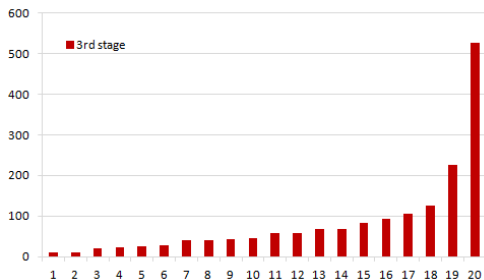
DINA estimation

Figure: Construction of DINA database - Scaling up to NI

- Incomes are proportionally scaled up to national income.
- We distinguish labour, capital and mixed incomes in order to be consistent with previous unofficial estimations of functional distribution.
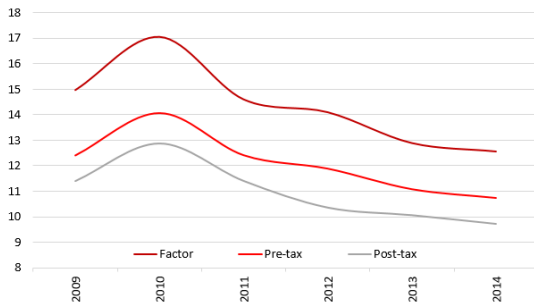
DINA estimation

Figure: Construction of DINA database - 3rd Threshold

- Third estimation stage.
- It keeps 2nd stage distribution.
- It accounts for 100 % of national income and matches estimations of labour, capital and mixed incomes.
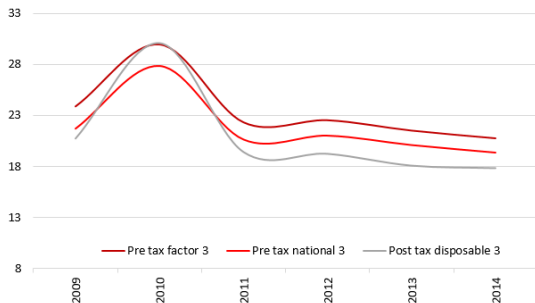
Results: income shares

Figure: Top 1 % share - 1st stage

Factor income is much larger (25 % pop. 65 or older). Tax-transfers system reduces 1 p.p. top 1 % share.
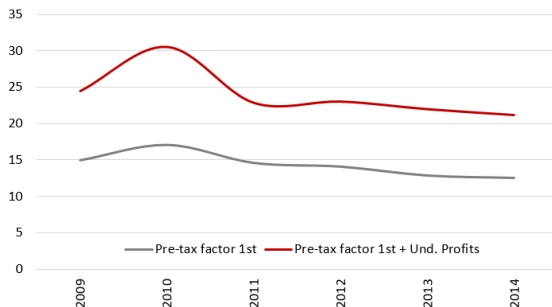
Results: income shares

Figure: Top 1 % share - 3rd stage (DINA)

Similar trend but larger top incomes share (8 pp). Top income shares fell around 3pp in the period.

Results: income shares

Figure: Sensitivity to imputation of undist. profits

Although they were imputed "generously", undist. profits explain the difference in estimations.

Results: income shares
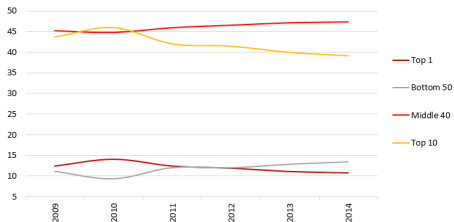
Figure: Income shares: 1st stage

Figure: Income shares: 3rd stage (DINA)

Middle 40 - top 10 % and bottom 50 - top 1 %: similar orders of magnitud.

Results: growth distribution

Figure: Growth incidence curves

In a strong income growth process, incomes increased much faster for poorer individuals and hence inequality fell.

Results: growth distribution

Figure: Growth appropiation curves

Despite income inequality downturn, the new income was unevenly distributed. Appropriation of growth increases with base line income.

International comparison

Figure: Top 1 % pre-tax national income

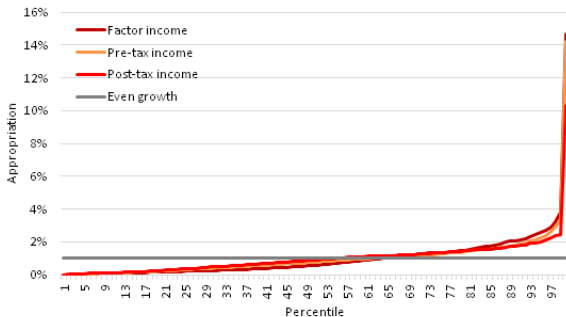| Income shares	United States	France	China	Russia	Middle East	India*	Brazil	Uruguay
Bottom 50	12.6	22.5	14.9	16.8	9.7	14.9	12.5	**12.0**
Middle 40	40.4	44.9	43.8	37.5	29.9	29.6	32.6	**42.0**
Top 10	47	32.6	41.3	45.7	60.4	55.5	54.9	**46.0**
Top 1	20.2	10.8	13.7	20.4	25.1	21.7	27.6	**19.3**

Source: WID.World. *Estimations for India refer to 2013.

Income distribution very similar to US, much lower than Brazil.

Concluding remarks and further steps

- Falling inequality is robust to data sources.
- Inequality downturn does not entail an equal distribution of growth.
- Once all incomes are considered, there is still 30 % income missing. The problem may be in National Income (Deaton, 2005).
- It is important (in our view) to analyze both proper DINA series and tax-survey based series, as results vary dramatically.
- Need to fully understand firms-individuals income dynamics and mechanisms to better impute undist. profits.
- Improve present estimations and move forward to post-tax national income and wealth distribution.
- Need to extend time coverage of the estimations to 1986 (survey data).

Appendix

Figure: Growth distribution

	Average income growth (1)	Growth appropriation (2)	Growth appropriation in terms of "even growth" (3)
Top 10	36.1%	35.7%	356.9%
Middle 40	64.7%	47.8%	119.5%
Bottom 50	90.6%	16.5%	33.0%
Average	52.4%	100.0%	100.0%
Top 01	39.2%	8.1%	8088.2%
Top 09_01	27.6%	6.1%	680.3%
Top 1	33.2%	14.2%	1421.1%

Inequality fell during the period, led by a moderate increase in the national income share of the bottom 90 %, in contrast with the decline in the shares of the top 10 % and especially the top 1 %. But growth was still very inequally distributed.

Appendix

Figure: Overview of the method

	Factor Income	Pre-tax income	Pos-tax disposable income
Individuals in tax records (formal and taxed incomes)	45.9%	49.6%	46.6%
Individuals in survey (no formal-taxed incomes)	3.7%	4.6%	5.1%
Informal or untaxed incomes accrued by individuals in tax records	9.3%	9.9%	10.3%
First threshold	58.9%	64.2%	62.0%
Other taxes (and transfers) not present neither in tax records nor in the household surveys, but available on official aggregates, are imputed	6.4%	1.1%	-23.0%
Net undistributed profits are imputed based on Firms'balance sheets	5.0%	5.0%	5.0%
Second threshold	11.4%	6.1%	-18.0%
$1^{st} + 2^{nd}$ threshold	70.3%	70.3%	44.0%
Labour income is scaled up to match aggregate estimation	3.0%	2.3%	2.2%
Capital income is scaled up to match aggregate estimation	12.6%	12.5%	9.8%
Mixed income is scaled up to match aggregate estimation	12.4%	11.0%	10.5%
Others income is scaled up to match aggregate estimation	1.7%	3.8%	7.1%
Third threshold	29.7%	29.7%	29.7%
Total % of national income	100.0%	100.0%	73.7%

Appendix

Figure: Income composition - 1st stage

Appendix
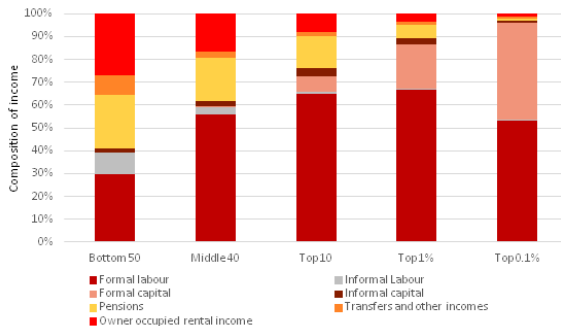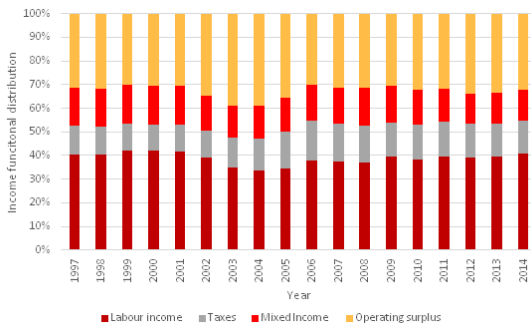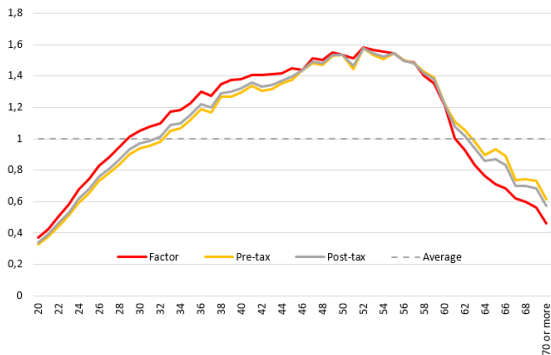
Figure: Estimated functional distribution

Figure: Income series by age

Appendix
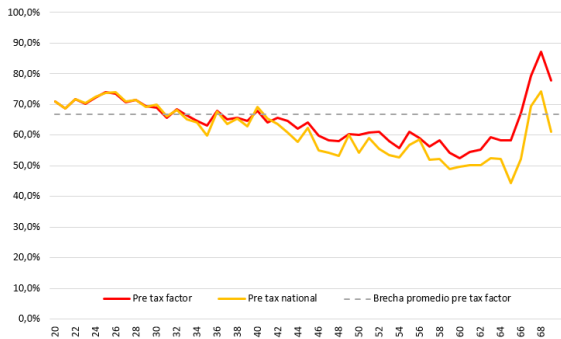
Figure: Income series by gender

Figure: Top 1 % share results comparison

Year	Household survey (1)	Previous fiscal income study (2)	First threshold estimations (3)	DINA estimations (4)
2009	11.60	14.60	12.39	21.69
2010	10.20	15.00	14.05	27.86
2011	9.40	14.80	12.40	20.62
2012	7.30	14.80	11.88	21.00
2013	8.30	14.80	11.07	20.08
2014	8.00	14.40	10.73	19.34