

Taxing Top Incomes in the Emerging World - Fiscal and Economic Impact under the Microscope

Christopher Axelson Antonia Hohmann Jukka Pirttilä
Roxanne Raabe Nadine Riedel
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Motivation

- Many less developed countries struggle with ...
 - ... low tax-to-GDP ratio
 - ... high levels of inequality
- Optimal income tax on the rich?
- Elasticities may be very different in less developed economies
 - Less tax capacity & large informal sector
 - Higher levels of inequality: sharp equity-efficiency trade-off

Paper in a nutshell

- Testing ground: South Africa
- PIT reform in tax year 2018:
 - Top MTR \uparrow from 41 to 45%
 - Top 0.6% of income earners affected
- Aim of the reform (National Treasury 2017):
 - Raise revenue
 - Decrease after-tax income inequality
- Data: Population of PIT returns
- Methodology: Jakobsen and Sogaard (2022) with a small extension
- Key finding: High ETI around 1 - part of response reflect adjustments in real economic activity

Background: South Africa

- Upper-middle income economy (GDP per capita 7,000 US Dollar)
- Tax-to-GDP ratio 25%
- PIT share 36% of all revenues
- Close to zero GDP per capita growth since the financial crisis
- Chronic budget deficit (4-5% of GDP after 2008)
- Very high inequality (Gini 0.62, LIS)

Tax schedules

- MTR to 45% for those earning more than R1.5 million (91,000 USD)

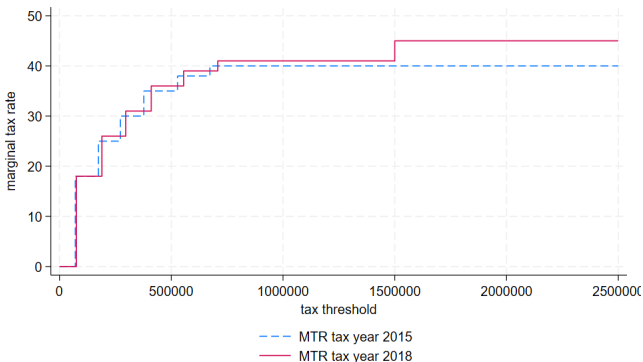
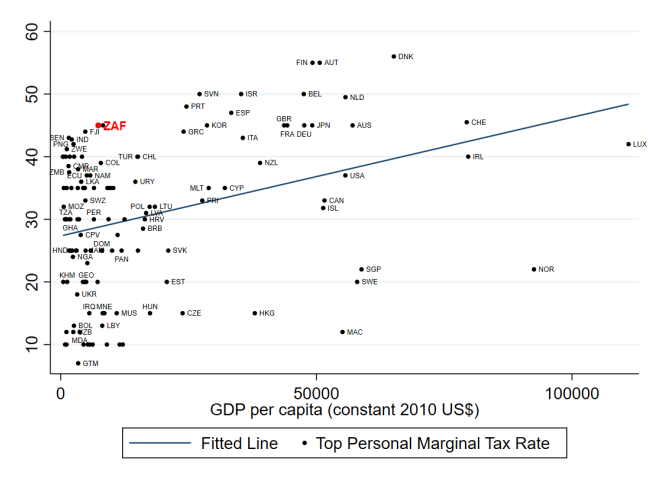


Figure: Tax schedules before and after the reform

Tax schedules

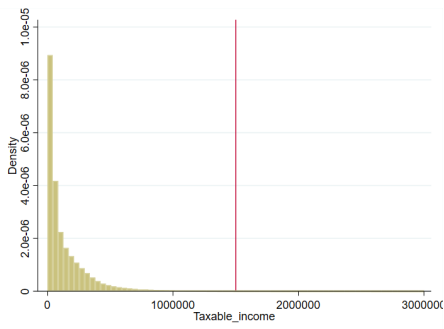
- Top MTR high by international comparison



How many taxpayers were affected?

In 2018...

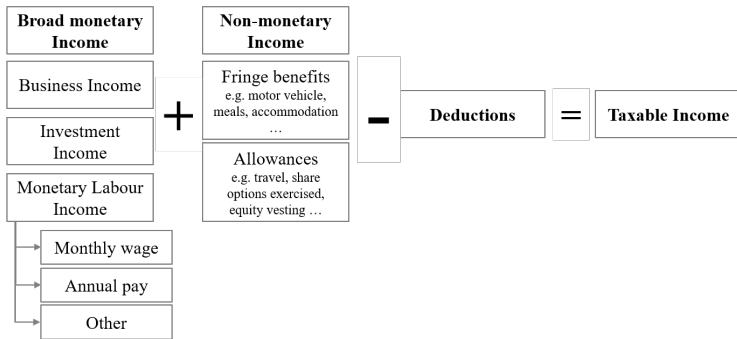
- ... **87,000 individuals** earned more than R1.5 million (0.58% of all individuals submitting a tax return)
- ... together, they paid **R78 billion in taxes** (22% of total personal income tax revenue)



Data

- Universe of Personal Income Tax Returns
- Provided by the South African Revenue Service (SARS)
- Panel for tax year 2011 until 2020
- Combines tax returns from employers and from assessments
- Detailed breakdown of the composition of taxpayers' income
- Can be linked to the universe of corporate income tax returns

Income concepts



Income composition

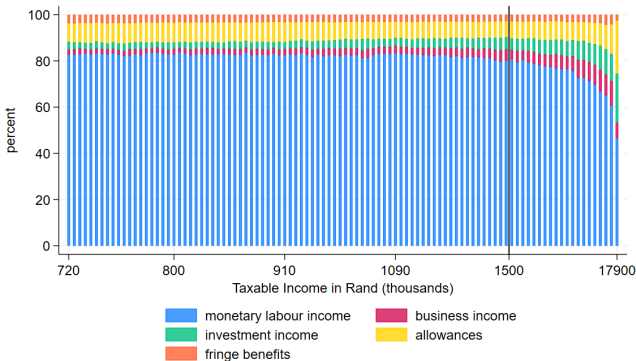


Figure: Income composition of taxpayers in our sample region for tax year 2016

Revenue developments

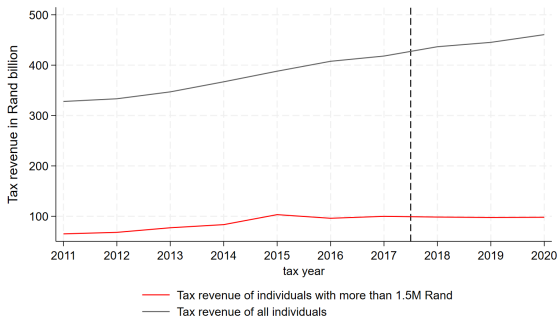


Figure: Tax Liability for all individuals and individuals with a taxable income above R1.5 million and below R10 million (adjusted for inflation to March 2017)

Standard estimation equation

- Typical ETI equation

$$\Delta \ln z_{it} = \varepsilon \Delta \ln(1 - \tau_{it}) + \Delta \ln n_{it} \quad (1)$$

- IV: predicted net-of-tax rate change which assigns treatment status based only on pre-reform information:

$$\Delta \ln(1 - \tau_{it-k}^p) = \ln(1 - T_{t'}(z_{it-k})) - \ln(1 - T_{t-1'}(z_{it-k})) \quad (2)$$

Issues and solution

- Two well-known challenges:
 1. Mean reversion: High z_{it-k} , low $\Delta \ln z_{it}$
 2. Other trends in income distribution, e.g. increase in inequality: High z_{it-k} , high $\Delta \ln z_{it}$
- The approach works if longer panel and one can establish constant trend differential in the absence of reform

$$E(\Delta \ln n_{it} | z_{it-k}) = g(z_{it-k}) + \delta_t \quad (3)$$

Graphical validation à la Jakobsen and Sørensen

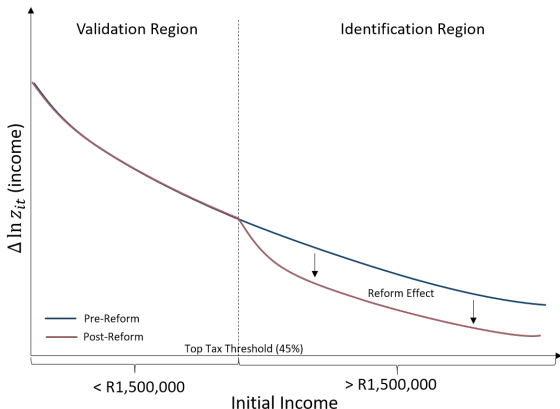


Figure: Illustration of the Identification and Validation Region Strategy, own illustration based on Jakobsen and Sørensen (2022)

Elasticity of Taxable Income

- Regress the change in the tax units' incomes on the change of their net-of-tax rates between two periods of time

$$\Delta \ln z_{it} = \beta_0 + \beta_1' D_{i,t-n}^{inc} + \beta_2 D_t^{reform} + \beta_3 \Delta \ln(1 - \tau_{it}) + v_{it} \quad (4)$$

where

- $\Delta \ln z_{it}$ is the change in income between t and $t - n$
- $D_{i,t-n}^{inc}$ models income trend differentials non-parametrically
- D_t^{reform} is a dummy variable indicating the reform period and capturing common income shocks across time
- $\Delta \ln(1 - \tau_{it})$ is the change in the net of marginal tax rate of taxpayer i between year t and tn
- IV: $\Delta \ln(1 - \tau_{it-k}^P)$ involving a deeper lag ($k \geq 1$):

$$\Delta \ln(1 - \tau_{it-k}^P) = \ln(1 - T'_t(z_{it-k})) - \ln(1 - T'_{t-1}(z_{it-k})) \quad (5)$$

Graphical validation, broad income

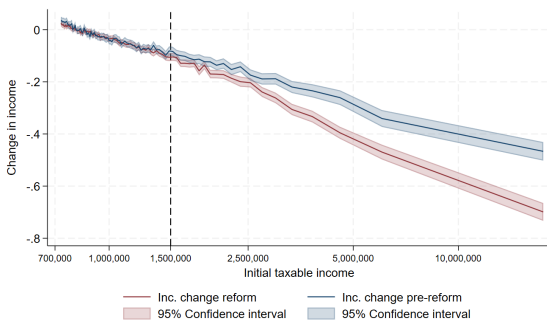


Figure: Figure shows the estimated income trend differentials for broad income

Graphical validation, broad income

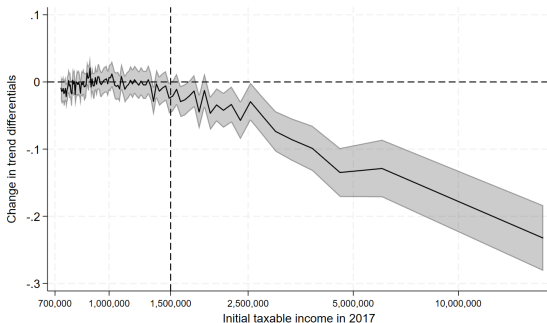


Figure: Figure shows the estimated changes in trend differentials for broad income

Graphical validation, taxable income

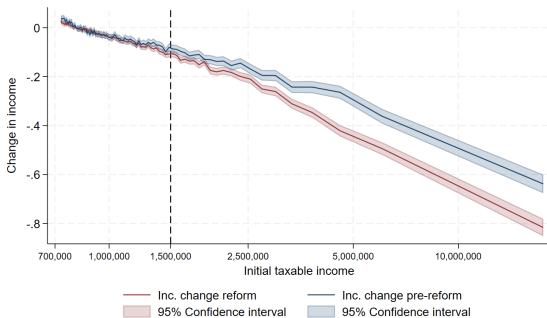


Figure: Figure shows the estimated income trend differentials for adjusted taxable income

Graphical validation, taxable income

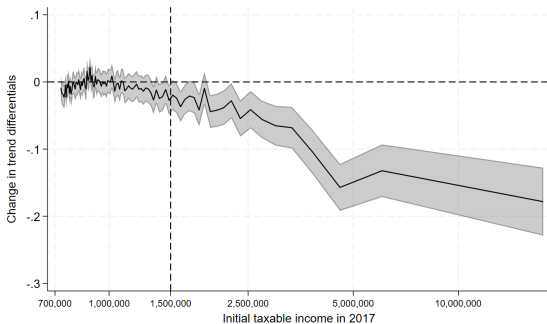


Figure: Figure shows the estimated changes in trend differentials for adjusted taxable income

Main results

	(1)	(2)
Taxable Income	.7444*** (.0439)	1.1618*** (.0697)
Observations	517,227	517,227
Broad Monetary Income	.7903*** (.0448)	1.2324*** (.0710)
Observations	516,640	516,640
Non-monetary Income	1.1023*** (.1431)	1.6102*** (.2096)
Observations	411,803	411,803
Deductions	-.7383*** (.1666)	-1.0657*** (.2403)
Observations	181,928	181,928

Note: Reduced form (1) and IV regression (2)

Validation check: Placebo 2011-2013 and 2013-2015

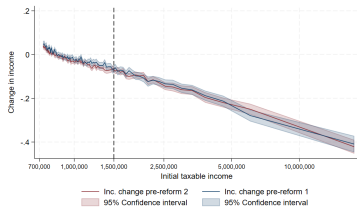


Figure: Broad Income

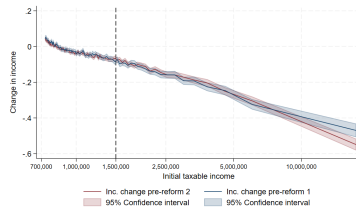


Figure: Taxable Income

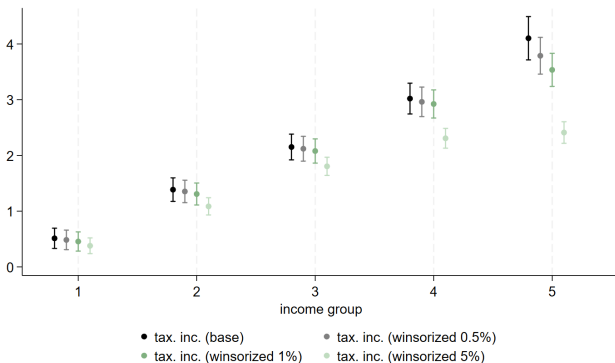
Robustness checks

We show that our results hold if we ...

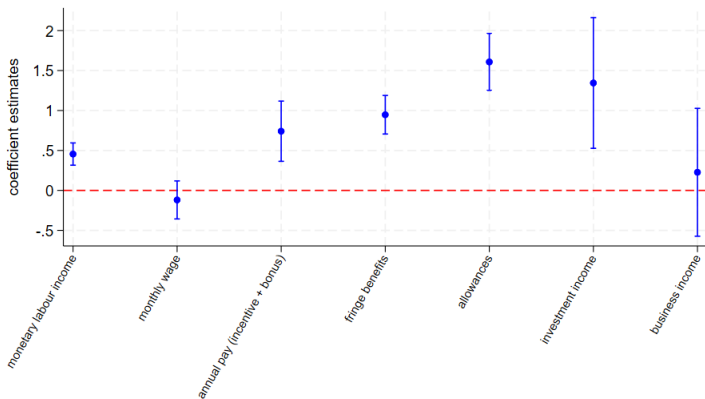
- ... use different lag length.
- ... use different time spans.
- ... shift treatment periods.
- ... exclude dividend earners.

▶ Results

Effect heterogeneity: Results by income groups



Effect heterogeneity: Results by income category



Further results

- No effect on the extensive margin (taxpayer exits).
- Moderate drop in inequality measures when simulating mechanical and overall effect of the reform
- Assess if the reform has negative real economic repercussions
 - Link PIT return data to CIT information and look at firm output
 - Account for tax years 2014-2020
 - Exclude multinational and large companies (> 100 workers)
 - Treatment status is determined based on individuals' real taxable income being larger than 1.5 million South African Rand in the tax year 2017
 - Among firms with PAYE information in 2017, 6.6% are treated by the reform in the sense that they employ at least one employee who is treated by the reform

Firm analysis

- **Difference-in Differences Model:**

$$y_{it} = \alpha_0 + \alpha_1 TREAT_i \cdot POST_t + \rho_i + \delta_t + \epsilon_{it} \quad (6)$$

where

- y_{it} : firms' sales
 - $TREAT_i$: firms' treatment status (binary and fraction of employees with taxable income > 1.5 Million Rand)
 - ρ_i : firm fixed effect
 - δ_t : time fixed effect
- Clustering of S.E. at firm level
 - Additional analyses:
 - full set of 2-digit industry-year FE;
 - full set of firm-size year FE

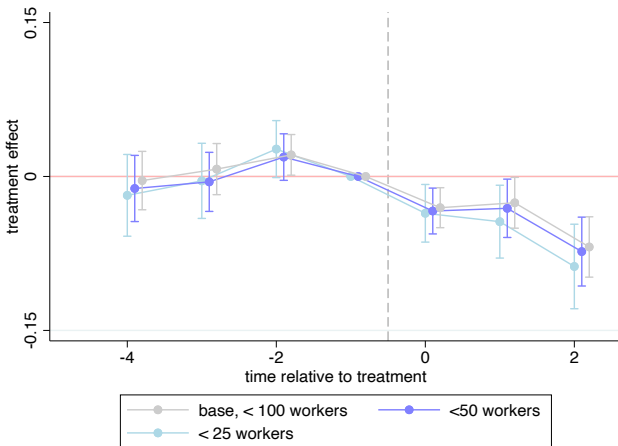
absorb differential shocks to y_{it} across industries and firms of different size

Reform Effect on Firms' Sales

	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	Binary	Fraction	Binary	Fraction	Binary	Binary
Treat	-.0361*** (.0107)	-.1126** (.0493)	-.0460*** (.0113)	-.1319*** (.0496)	-.0396*** (.0095)	-.0497*** (.0101)
Firm FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	NO	NO	YES	NO
Size-Year FE	NO	NO	YES	YES	NO	YES
Industry-Year FE	NO	NO	YES	YES	NO	YES
Treatment Def.	2017	2017	2017	2017	2015-17	2015-17
Observations	568,804	568,804	568,804	568,804	568,804	568,804

Table: Reform Effects on Firm Outcomes

Effect on Sales - Different Company Sizes



Conclusion

- **Large ETI**, close to 1, also for broad income
- Taxpayer **response increases in income** and driven by...
 - adjustments in income **not subject to third-party reporting: investment income, and**
 - **certain forms of employment income: allowances, fringe benefits & bonus and incentive pay**
- Some indication for **repercussions on real economy**: drop in sales of affected firms → but effect size and set of treated firms small
- **No increase in revenue collection**; but potentially (after evasion costs) less after-tax income inequality

	Weber k =n+3		One year difference	
	(1)	(2)	(3)	(4)
	Reduced form	IV estimates	Reduced form	IV estimates
Tax. Inc.	0.6614***	1.2257***	0.5740***	0.7674***
	(.0491)	(.0923)	(.0326)	(.0441)
Observations	352,337	352,337	586,699	586,699
	Shift control to 2012-2015		Shift treat to 2016-2019	
	(5)	(6)	(7)	(8)
	Reduced form	IV estimates	Reduced form	IV estimates
Tax. Inc.	.9931***	1.5535***	.6617***	1.0465***
	(.0462)	(.0738)	(.0418)	(.0672)
Observations	498,438	498,438	466,188	466,188
	Shift treat to 15-19, control to 11-15		Exclude dividend earners	
	(9)	(10)	(11)	(12)
	Reduced form	IV estimates	Reduced form	IV estimates
Tax. Inc.	.9953***	1.7054***	0.6171***	0.9315***
	(.0483)	(.0849)	(.0733)	(.1123)
Observations	415,930	415,930	249,882	249,882

Table: Robustness Checks