What Happens When You Tax the Rich? - Evidence from South Africa

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Table of Contents

Motivation

- Vast literature on measuring elasticity of taxable income

- Meta analysis by Neisser (2021):
  Relatively few studies on MTR changes at top of distribution
  Only two studies based on data from outside of the OECD

- Elasticities may be very different in less developed economies
  - Less tax capacity & large informal sector
  - Higher levels of inequality: sharp equity-efficiency trade-off

This paper

- Testing ground: South Africa
- PIT reform in 2017:
  - Top MTR $\uparrow$ from 41 to 45%
  - Top 0.5% 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 Søgaard (2022) with a small extension
- Key finding: High ETI around 1

Overview

Table of Contents

Background: South Africa

- Close to zero GDP per capita growth since the financial crisis
- Chronic budget deficit (4-5% of GDP after 2008)
- Tax take 25% of GDP, PIT share 26% of all revenues
- Very high inequality (Gini 0.62, LIS)
- Close to 99% of top1 income earners formal
  (own calculations based on survey data)

Inequality - GINI Coefficient
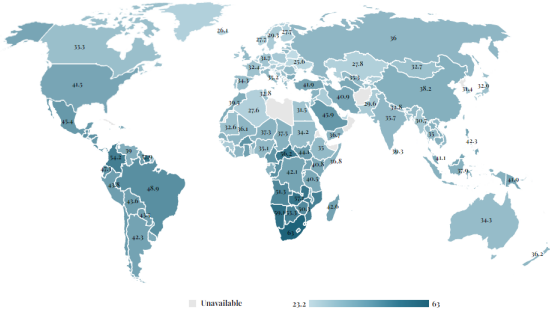
Figure: World Map - Gini Coefficient

Tax schedules

- MTR to 45% for those earning more than R1.5 million (73,000 €)
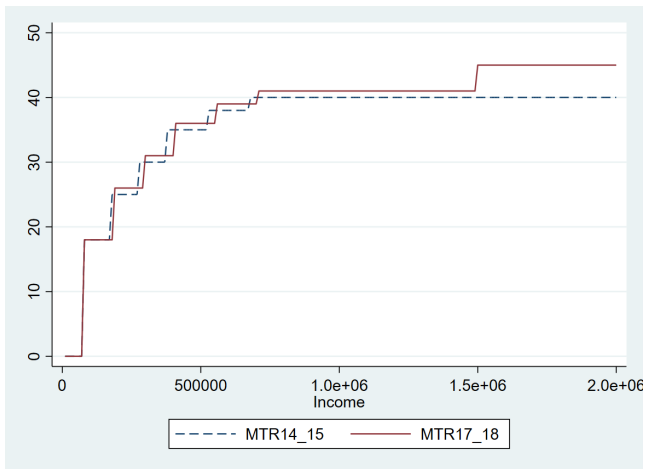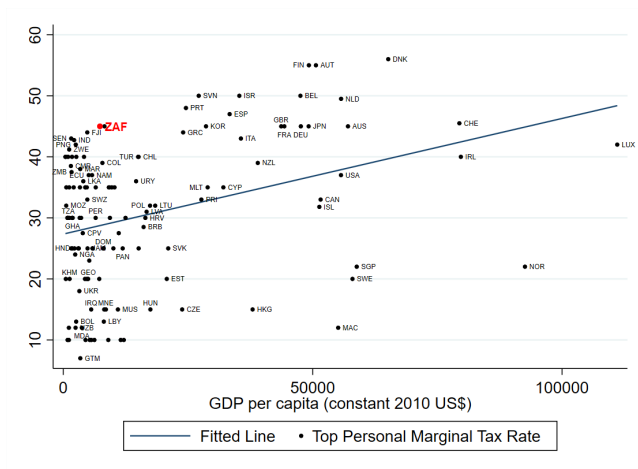

Figure: Tax schedules before and after the reform

Tax schedules

- Top MTR high by international comparison

Personal Income Tax Base

- **Income**: normal income, business income, investment income (interest income and capital gains)
- Hardly any **deductions** apart from pension contributions
- Dividend income: proportional tax withheld by dividend paying firm

Other Tax Changes

- **'Global' MRT increase by 1 pp** in tax year 2015/2016
- **Reform pension contribution deductions** in tax year 2016/17
  - Aligned the treatment of different savings vehicles
  - A cap was introduced
    - ⇒ Use dependent variables unaffected by change in tax base:
      - Broad income
      - Taxable income base adjusted
- **Dividend tax rate increased** from 15 to 20% in 2017/8
  (counteract incentive to shift across tax bases)

How many taxpayers were affected?

In 2018...

- ... **81,300 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)

Table of Contents

Standard estimation equation

- Typical ETI equation

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

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

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

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

$$E(\Delta \ln n_{it} | z_{it-k}) = g(z_{it-k}) + \delta_t \tag{3}$$
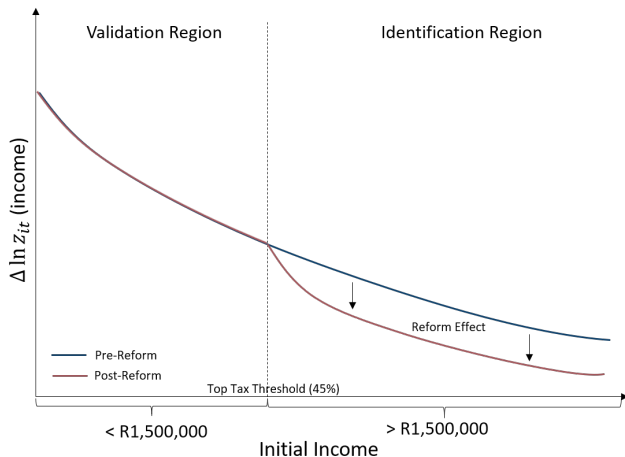
Graphical validation à la Jakobsen and Søgaard

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

Standard Tax Reform Approach

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

$$\Delta \ln z_{it} = \gamma_0 + f\left(z_{it-k}\right) + \gamma_2 D_{it}^{reform} + \gamma_3 \Delta \ln(1 - \tau_{it}) + v_{it} \qquad (4)$$

where

- $f\left(z_{it-k}\right)$ controls for initial income
- D_{it}^{reform} is a dummy for the reform period
- IV: $\ln(1 - \tau_{it-k}^{p})$ involving a deeper lag $(k > 1)$:

$$\Delta \ln(1 - \tau_{it-k}^{p}) = \ln\left(1 - T_t'\left(z_{it-k}\right)\right) - \ln\left(1 - T_{t-1}'\left(z_{it-k}\right)\right) \qquad (5)$$

Table of Contents

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
- Use two dependent variables
  - Broad income
    = normal income + business income + investment income
  - Taxable income, after deductions

Revenue developments

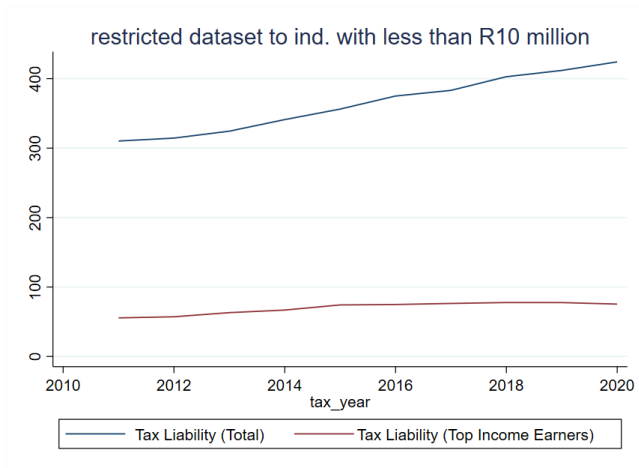restricted dataset to ind. with less than R10 million

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)
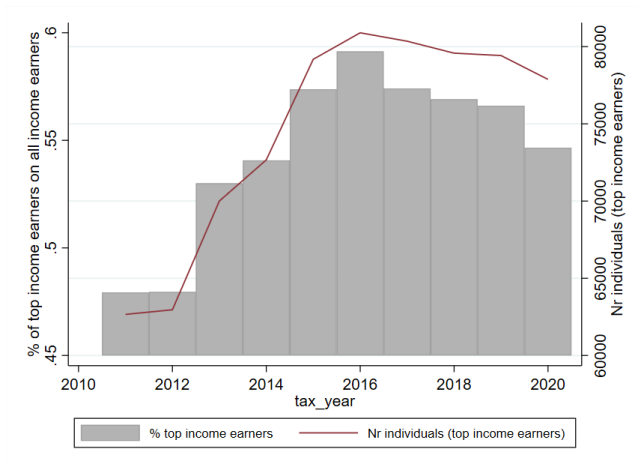
Number of top income earners

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

Aggregate Taxpayers/Income/Tax Revenue above Threshold

	2011	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Number of individuals	62,660	62,960	70,000	72,668	79,180	80,897	80,352	79,578	79,424
Taxable Income (R billion)	160.84	159.86	178.02	186.67	206.64	207.95	210.51	205.11	203.83
Tax Liability (R billion)	55.53	57.17	63.13	66.83	74.24	74.83	76.38	77.68	77.62

Bunching
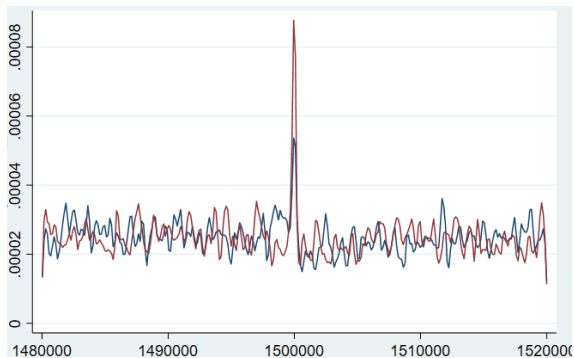
Figure: Density of taxable income around the threshold in pre-reform tax year 2017 and reform tax year 2018

Table of Contents

Graphical validation à la Jakobsen and Søgaard
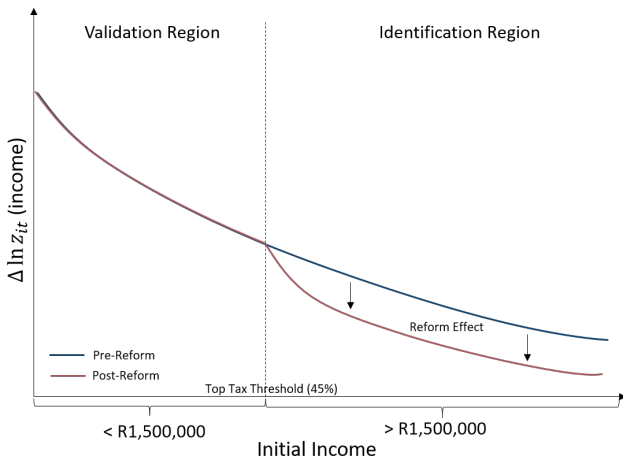
Figure: Illustration of the Identification and Validation Region Strategy, own illustration based on Jakobsen and Søgaard (2022)

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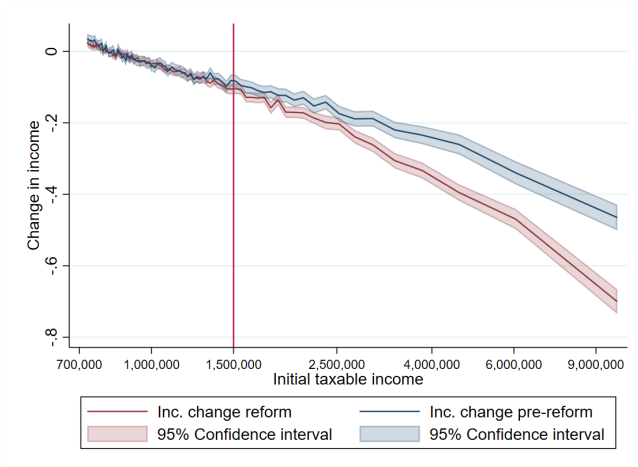
Figure: Figure shows the estimated changes in trend differentials for broad income

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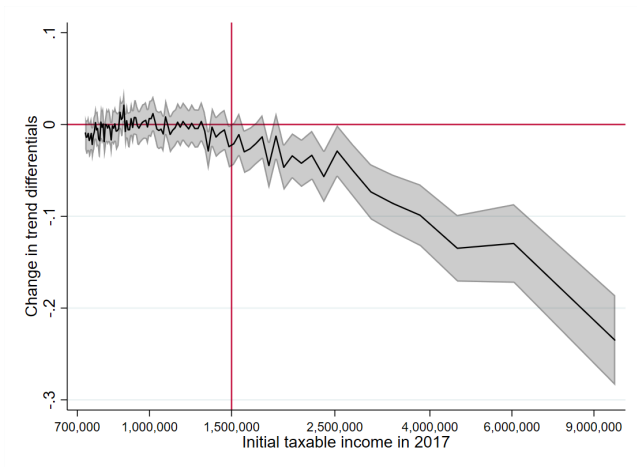
Figure: Figure shows the estimated changes in trend differentials for broad income

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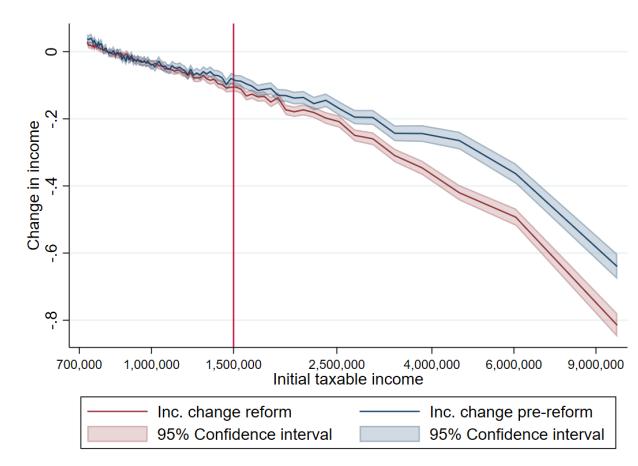
Figure: Figure shows the estimated changes in trend differentials for adjusted taxable income

Graphical validation, taxable income

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

Main results

Table: Elasticity of Taxable/Broad Income South Africa

|	(1)	(2)
Broad Income	0.7923***	1.2356***
	(0.0449)	(0.0712)
Observations	516,640	516,640
Taxable Income adj.	0.7247***	1.1311***
	(0.0440)	(0.0699)
Observations	517,227	517,227

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

Shifts in (Pre-)treatment period

Table: Robustness: Shifts in Control and Treatment Period

	Control: 2012-15		Treatment: 2016-2019		Treatment: 2015-2019	
	Reduced	IV	Reduced	IV	Reduced	IV
	(1)	(2)	(3)	(4)	(5)	(6)
Broad Income	0.7403***	1.1316***	0.4868***	0.8641***	0.7592***	1.1972***
	(0.0489)	(0.0757)	(0.0500)	(0.0787)	(0.0596)	(0.1030)
Observations	468,321	468,321	440,260	440,260	415,463	415,463

Dynamics

Table: Robustness - Effect dynamics

	Three-Year Difference	
	(1)	(2)
Broad Income	0.7049***	1.0706***
	(0.047)	(0.0726)

	Two-Year Difference	
	(1)	(2)
Broad Income	0.595***	0.845***
	(0.0489)	(0.0571)

	One-Year Difference	
	(1)	(2)
Broad Income	0.3458***	0.4580***
	(0.0332)	(0.0442)

Validation Check

- Underlying assumption: constant relative trend differentials
- Tests of this assumption:
    - Assess trend differentials in validation region
    - Placebos in the pre-period

Placebo: Broad Income

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

Placebo: Taxable Income

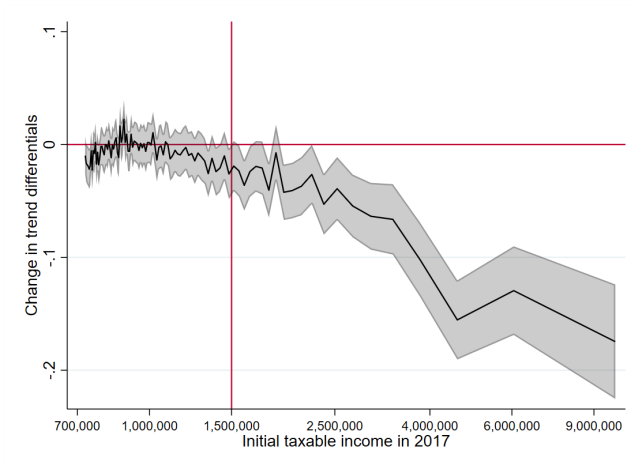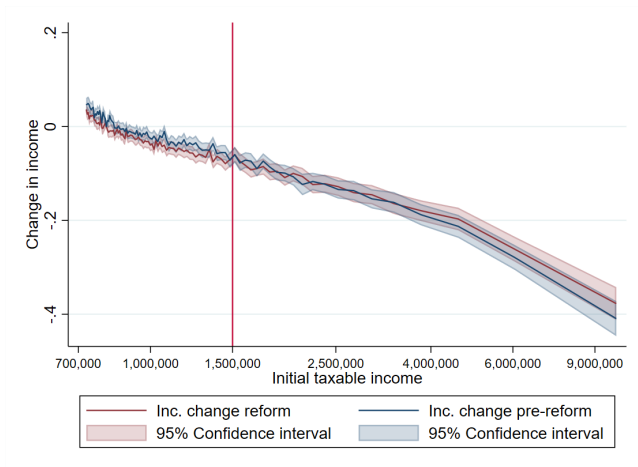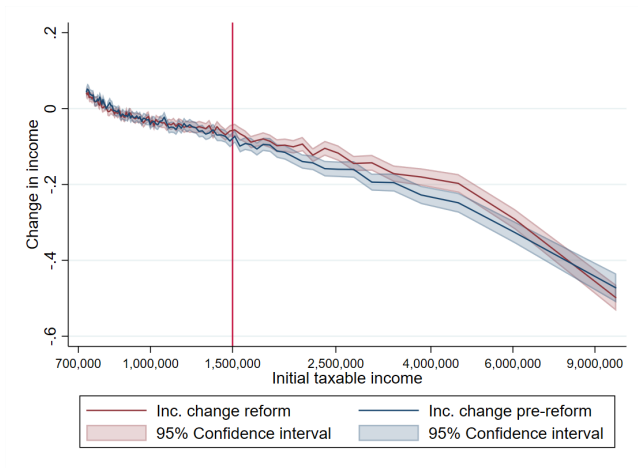**Figure:** Figure shows the estimated changes in trend differentials for adjusted taxable income

Relax Identification Assumption

- In earlier periods:
  violation of constant trend differentials for taxable income
- Relative income growth:
  Becomes stronger at the upper end of income distribution
- Estimates biased against us:
  Estimated ETI a lower bound to true effect

Relax Identification Assumption

- Use three periods of time:
  - Two pre-treatment periods: 2011-2013, 2013-2015
  - Treatment period: 2017-2019
- Model changes in trend differentials in the pre-period: assume that this change is constant over time
- Empirical model

$$\Delta ln z_{it} = \delta_0 + \delta_1 D_i^{inc} + \delta_2 D_i^{inc} \cdot TIME_t + \delta_3 \mu_t + \rho \Delta(1 - \tau_{it}) + \epsilon_{it} \quad (6)$$

- D_i^{inc}: full set of percentile dummies
- $TIME_t$: linear time trend

Relax Identification Assumption

|	(1) Without time trend	(2) With time trend
Broad Income	.748684***	.6717096***
	(.0291813)	(.0655548)
Observations	757,177	757,177
Taxable income	.7584071***	.618669***
	(.0293589)	(.0650931)
Observations	757,961	757,961

Table of Contents

Additional analyses

- Results by income groups
- Role of self-employment income
- Role of investment income

Investment Income and Self-Employment Income
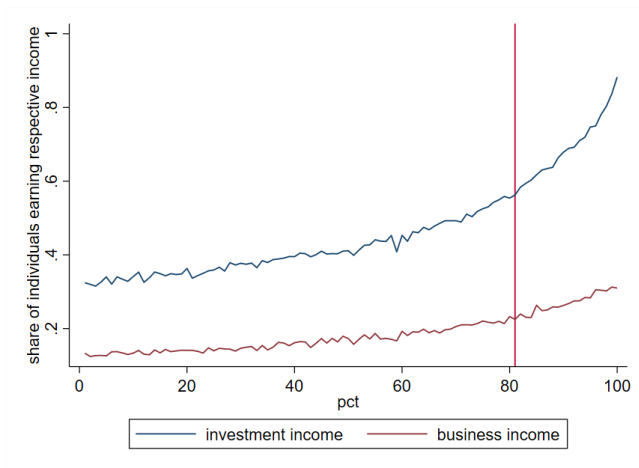
Elasticities by income
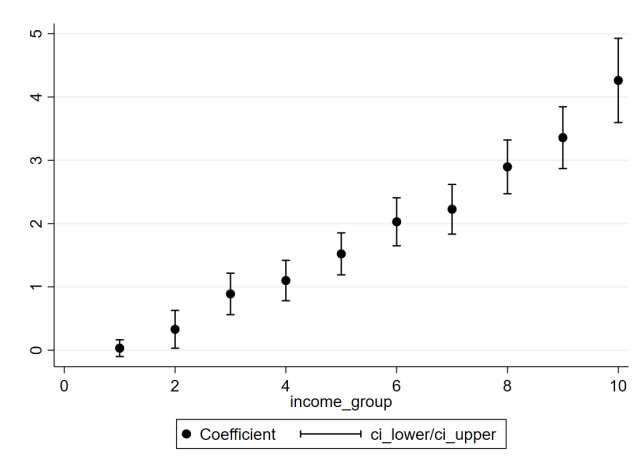
Role of self-employment & investment income

Table: Response Heterogeneity

Dep. Var.	Broad Income	Broad Income	Broad Income
Δ (1-MTR)	0.6142***	0.3557***	0.2835***
	(0.0467)	(0.0499)	(0.0505)
Self Emp. > Mean X Δ (1-MRT)	1.1781***		0.9256***
	(0.0893)		(0.0916)
Inv. Income > Mean X Δ (1-MTR)		0.9099***	0.7682***
		(0.0612)	(0.0628)
Observations	516,640	516,640	516,640

Income Components – Descriptives
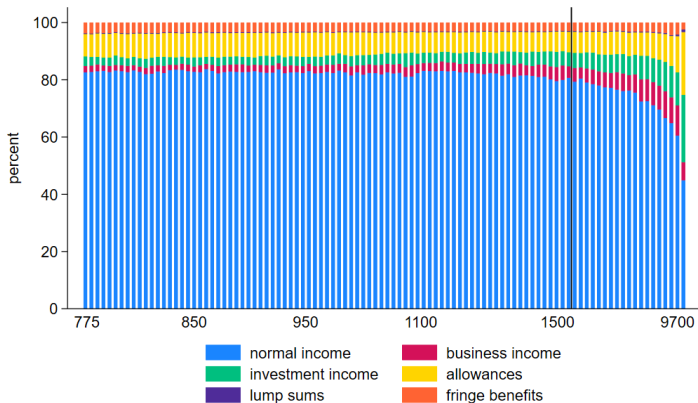

Figure: Income Composition Top Income Taxpayers
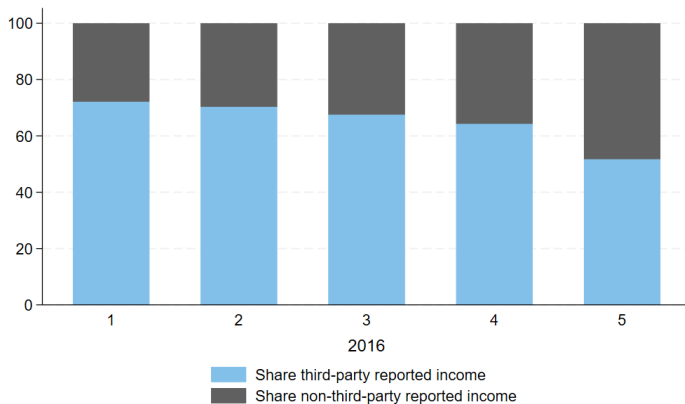
Income Components – Descriptives

Figure: Income Composition Top Income Taxpayers

Responses in Different Components of Taxable Income

	(1) Reduced form	(2) IV estimates
IRP5 income	.2685246	.4129575
	(.1564663)	(.2407134)
Gross inc. minus IRP5	2.731442 ***	4.207036 ***
	(.1716683)	(.2657541)
Business inc.	.2267804	.387447
	(.4082321)	(.6966891)
Investment inc.	1.344722***	2.287353**
	(.4173282)	(.7103372)
Deductions adjusted	-.2993705**	-.4352949**
	(.1121835)	(.1630173)
Fringe benefits	1.061827***	1.53094***
	(.1112455)	(.1607233)
Allowances	1.60788***	2.300651***
	(.1816518)	(.2606523)

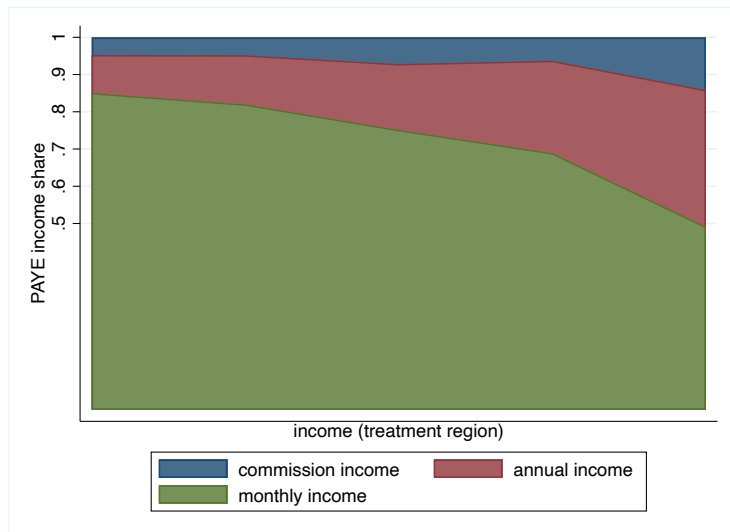# Composition Labor Income – Top of Income Distribution

Figure: Composition PAYE Income
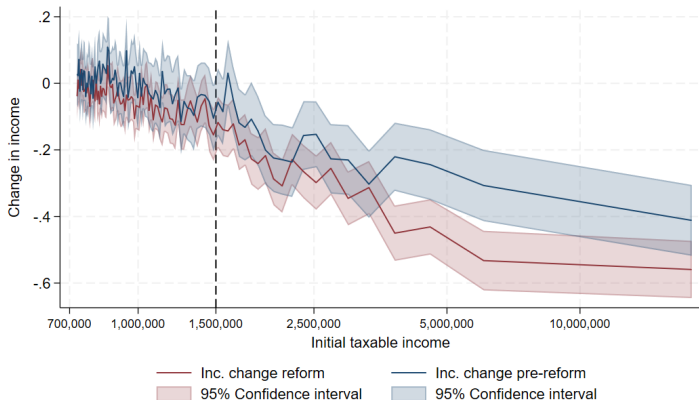
Response of Annual Income (Bonuses/Incentive Pay)

Figure: Changes in Annual Incentive and Bonus Payments

Strong Response in "Annual" Income (Bonuses/Incentive Pay)

	(1)	(2)	(3)	(4)
Dep. Var.	monthly inc	annual inc	commission	annual inc
Net-of-tax rate	-.0658277	1.677873***	-.0034068	.7598315
	(.3974122)	(.6371398)	(.2755556)	(.180798)
Observations	393,430	393,430	393,430	249,603

Table of Contents

Revenue consequences

- **Mechanical Effect:** Using 2017 incomes, additional revenue from the top group should have been 8.3 bn Rand

- **Strong behavioral response**:
  Mean reduction in top incomes close to 10%
  PIT revenue collection drops by 1.1 bn Rand

Inequality consequences

- Actual after-tax Gini in 2017 0.6264
- Drops to 0.6182 because of the tax rate change
- Further declines to 0.6097 due to the behavioural reaction
- But unclear if behavioral reaction is a real response
  - If partly evasion, inequality drops by less
 - But evasion costs $\rightarrow$ Inequality in consumption/utility $\downarrow$

Table of Contents

Real vs. Reporting Response

- Three potential margins to capture real behavior

  - Exits (relocation of tax residence)
    Not reflected in baseline estimates

  - Changes in third-party reported income

  - Changes in firm output and profitability
    If affected employees exert less effort / reduce labor supply
    ⇒ Output and firm income drops

Exits
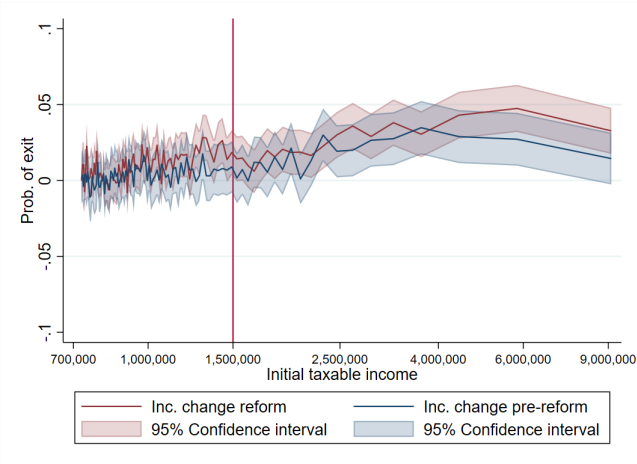
- Changes in performance (measured by sales and CIT income over total assets) of firms that are affected by the PIT reform
    - Mechanism: If key employees work less or exert less effort, sales and income earned by firm drops
    - Treatment status: firms' employees with taxable (not necessarily labor) income > 1.5 Million Rand
    - Treatment indicators: binary or fraction of firms' employees treated

- **Data:**
    - Population of CIT returns in South Africa
      firms taxable income, total assets, MNE status, industry ...

    - PAYE reports: allows for link between PIT and CIT

    - Sample restricted to firms with PAYE reports

    - Drop MNEs from sample   potentially confounding anti-profit shifting provisions
      introduced during sample frame

    - Sample frame: 2014-2020

- **Difference-in Differences Model:**

$$y_{it} = \alpha_0 + \alpha_1 TREAT_i \cdot POST_t + \rho_i + \delta_t + \epsilon_{it} \qquad (7)$$

where

- y_{it}: firms' sales
- $TREAT_i$: firms' treatment status (binary and fraction of empoyees 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)
Treatment	Binary	Binary	Fraction	Fraction
	2015-17	2017	2015-17	2017
Treat	-.0395512***	-.0361288***	-.0968734**	-.1126264**
	(.0095414)	(.0107415)	(.0406303)	(.0493088)
Firm FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Observations	568,804	568,804	568,804	568,804
	(5)	(6)	(7)	(8)
Treatment	Binary	Binary	Fraction	Fraction
	2015-17	2017	2015-17	2017
Treat	-.0497094***	-.0460297***	-.1133484***	-.1319602***
	(.0101033)	(.0112987)	(.0409645)	(.049682)
Firm FE	YES	YES	YES	YES
Size-Year FE	YES	YES	YES	YES
Industry-Year FE	YES	YES	YES	YES
Observations	568,615	568,615	568,615	568,615

Event Study – Reform Effect on Firm Sales
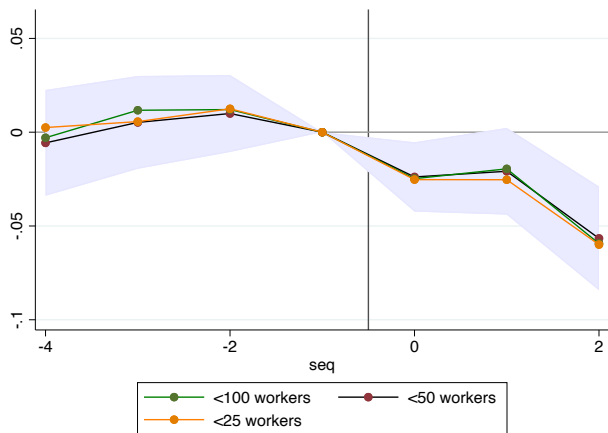
Table of Contents

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 $\rightarrow$ but effect size and set of treated firms small
- **No increase in revenue collection**; but potentially (after evasion costs) less after-tax income inequality