

Multiple Dimension Inequality and Individual Tax Decision: The Case of Sub-Saharan Africa.

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Outline

1 Motivation

- Context
- Conceptualizing the relation

2 Empirical Strategy

- Model
- Data
- Challenges

3 Results

4 Appendix

- Data
- Results

5 Regression Diagnostics

Motivation

- Addis Ababa Action Agenda and domestic resource mobilization
- Tax compliance (Ali et al., 2014; Fjeldstad et al., 2012):
 - Economic deterrence
 - Fiscal exchange
 - Social influence
 - Comparative treatment
 - Political legitimacy
- Does inequality influence tax compliance?

Conceptualizing Inequality - Tax Compliance Relation

- Link between inequality and tax compliance has not yet been formalized.
- Inequality [theoretically] affects the demand for redistribution; Median voter (Romer, 1975; Meltzer and Richard, 1981), however
 - Elites role (Benabou, 2000)
 - Prospect of social mobility (Piketty, 1995; Benabou and Ok, 2001)
 - Ethnic composition (Alesina et al., 2001)
- Demand for redistribution does not necessarily translate into compliance.

How does inequality influence compliance decision?

Our Study and the Main Findings

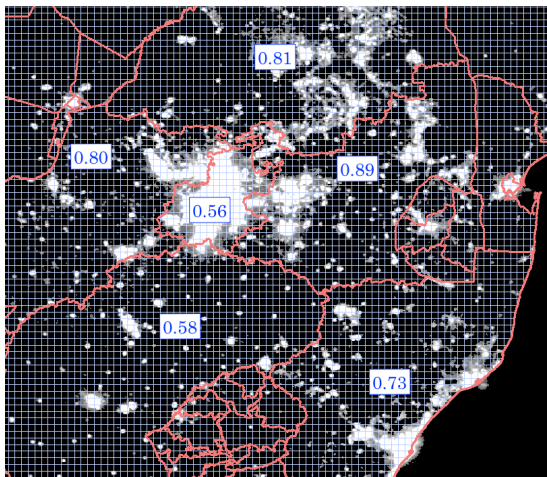
In order to examine the relation between inequality and tax compliance,

- We stack two latest (available) rounds of Afrobarometer
- Tax-compliance at individual-level
- Spatial inequality at subdivision level (ADM1) constructed from night light data

We find that,

- On average inequality does not have a direct effect on tax compliance, however it is negatively associated with compliance decision of those at the bottom of wealth distribution.
- Perceived wealth attenuates the effect of inequality.
- Better institutional environment weakens the effect as well.

Computing Light Gini



DMSP-OLS, for illustration purpose only.

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Model

- **1st unit of analysis:** Individual level (63106 individuals)
- **Time span:** Two points in time per country between 2012 - 2015.
- **Geographic spread:** 303 subdivisions (2nd unit of analysis) in 27 African countries.
- **Tax Compliance:** “whether you, personally, have refused to pay a tax or fee to government during the past year? If not, would you do this if you had the chance?” (Transformed to 0/1)

$$TAXCOMP_{i,s,c,t} = \alpha_{c,t} + \theta_s + \beta INEQ_{s,c,t} + \gamma CHANNELS_{i,s,c,t} + \delta X_{i,s,c,t} + \varepsilon_{i,s,c,t}$$

where,

$INEQ_{s,c,t}$ is a measure of inequality

$CHANNELS_{i,s,c,t}$ are different channels influencing tax compliance

$X_{i,s,c,t}$ is a vector of individual characteristics

$\alpha_{c,t}$ and θ_s are country-year and subdivision fixed-effects

Measuring Inequality

Horizontal inequality

- **Spatial inequality:** Spatial Gini based on night light (VIIRS)
- **Ethnic inequality:** “How often, if ever, [Your] ethnic group is treated unfairly by government?” (Afrobarometer, r5 and r6)

Vertical Inequality

- **Wealth Gini:** based on asset index at subdivision level (DHS)

Endogeneity Concerns

- Time invariant sources of heterogeneity
 - Subdivision fixed-effects
 - urban/rural fixed effects
- Time varying sources of heterogeneity
 - Country-year fixed effects
 - Control for individual heterogeneity
- Reverse causality
 - Different disaggregation level between inequality and tax compliance
- To be done
 - Instrumental variable à la Boustan et al. (2013)
 - Individual fixed effect (matching)

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Determinants of Tax Compliance

<i>Dependent: Tax Compliance</i>	(1)	(2)	(3)	(4) Gini Light			(6)	(7)	(8) Theil Light	(9) Gini DHS
	Channels: Spatial	Ethnic	Econ. deterrence	Fiscal Exch.	Comp. Treatment	Pol. Legit.	All Channels			
INEQUALITY _{s,c,t}	-0.129 (0.102)	-0.124 (0.101)	-0.131 (0.099)	-0.123 (0.101)	-0.120 (0.101)	-0.130 (0.101)	-0.132 (0.098)	-0.001 (0.014)	-0.436** (0.182)	
ETHNIC_UNFAIR _{i,s,c,t}		-0.025*** (0.003)	-0.024*** (0.003)	-0.024*** (0.003)	-0.024*** (0.003)	-0.021*** (0.003)	-0.019*** (0.003)	-0.019*** (0.003)	-0.020*** (0.004)	
DIFF_AVOID_TAX _{i,s,c,t}			0.022*** (0.005)				0.023*** (0.005)	0.023*** (0.005)	0.026*** (0.006)	
PEOPLE_UNPUNISHED _{i,s,c,t}			-0.027*** (0.003)				-0.026*** (0.003)	-0.026*** (0.003)	-0.030*** (0.004)	
DIFF_OBTAIN_MEDIC _{i,s,c,t}				-0.011*** (0.004)			-0.008* (0.004)	-0.008* (0.004)	-0.007 (0.005)	
DIFF_OBTAIN_POLICE _{i,s,c,t}				-0.003 (0.004)			0.000 (0.004)	0.000 (0.004)	-0.000 (0.005)	
POVERTY_RELATIVE _{i,s,c,t}					-0.010*** (0.003)		-0.009*** (0.003)	-0.009*** (0.003)	-0.011*** (0.004)	
TRUST_TAX_DEP _{i,s,c,t}						0.013*** (0.003)	0.013*** (0.003)	0.013*** (0.003)	0.016*** (0.003)	
TRUST_PRESIDENT _{i,s,c,t}						0.012*** (0.002)	0.011*** (0.002)	0.011*** (0.002)	0.012*** (0.003)	
N.	63106	63106	63106	63106	63106	63106	63106	63106	41588	

Spatial Inequality and Tax Compliance W/R to Position in the Wealth Distribution.

<i>Dependent: Tax Compliance</i>	(1)	(2)
	Inequality = Gini	
INEQUALITY _{s,c,t}	-0.082 (0.099)	-0.124 (0.098)
q1=1 × INEQUALITY _{s,c,t}	-0.104*** (0.038)	
q2=1 × INEQUALITY _{s,c,t}	-0.051 (0.037)	
q3=1 × INEQUALITY _{s,c,t}	-0.046 (0.036)	
q4=1 × INEQUALITY _{s,c,t}	-0.022 (0.030)	
Median - Wealth (Ind.)		-0.232 (0.256)
INEQUALITY _{s,c,t} × Median - Wealth (Ind.)		-0.040*** (0.013)
Joint Sig. P-value (interaction of interest)	0.010	0.004
R ²	0.124	0.124
PCP	0.740	0.740
Weighted PCP	0.522	0.522
All Controls	Yes	Yes
All FE	Yes	Yes
N. Obs.	63106	63106
N. Subdivisions	303	303
N. Countries	27	27

Relative Poverty and Tax Compliance

	(1)	(2)
Dependent: Tax Compliance	Inequality = Gini	
INEQUALITY _{s,c,t}	-0.170*	-0.093
	(0.099)	(0.101)
Perceived Relative Poverty		
Better or Much better	-0.045**	
	(0.020)	
Better or Much better × INEQUALITY _{s,c,t}	0.076**	
	(0.031)	
Worse or Much Worse × INEQUALITY _{s,c,t}	0.038	
	(0.027)	
Social Mobility		
Fairly bad		0.035*
		(0.020)
Very Bad × INEQUALITY _{s,c,t}		-0.037
		(0.035)
Fairly bad × INEQUALITY _{s,c,t}		-0.075**
		(0.033)
Fairly good × INEQUALITY _{s,c,t}		-0.018
		(0.030)
Very good × INEQUALITY _{s,c,t}		-0.083
		(0.060)
Joint Sig. P-value (interaction of interest)	0.023	0.027
N.	63106	62905

Interaction with Institutional Characteristics

<i>Dependent: Tax Compliance</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Trust				Corruption				
<i>X =</i>	Tax	Presid.	Parliam.	Rulling Party	Courts	Elected Locals	Tax	Courts	Gov. Officials
GINI_LIGHT _{<i>i,s,c,t</i>}	-0.204** (0.101)	-0.182* (0.102)	-0.228** (0.101)	-0.193* (0.103)	-0.227** (0.101)	-0.218** (0.104)	-0.048 (0.108)	-0.066 (0.102)	-0.110 (0.104)
Trust									
TRUST_TAX_DEP _{<i>i,s,c,t</i>}	-0.003 (0.007)	0.013*** (0.003)	0.013*** (0.003)	0.014*** (0.003)	0.014*** (0.003)	0.012*** (0.003)	0.011*** (0.003)	0.012*** (0.003)	0.012*** (0.003)
TRUST_PRESIDENT _{<i>i,s,c,t</i>}	0.011*** (0.002)	0.001 (0.006)	0.011*** (0.003)	0.010*** (0.003)	0.012*** (0.003)	0.011*** (0.003)	0.010*** (0.002)	0.010*** (0.002)	0.010*** (0.002)
GINI_LIGHT _{<i>s,c,t</i>} × TRUST_TAX_DEP _{<i>i,s,c,t</i>}	0.029*** (0.011)								
GINI_LIGHT _{<i>s,c,t</i>} × TRUST_PRESIDENT _{<i>i,s,c,t</i>}	0.018* (0.010)								
TRUST_X _{<i>i,s,c,t</i>}			-0.013* (0.007)	-0.016** (0.007)	-0.022*** (0.008)	-0.018** (0.008)			
GINI_LIGHT _{<i>s,c,t</i>} × TRUST_X _{<i>i,s,c,t</i>}			0.026** (0.012)	0.029** (0.011)	0.034*** (0.012)	0.035*** (0.013)			
Corruption									
CORRUPTION_X _{<i>i,s,c,t</i>}							0.012 (0.011)	0.010 (0.010)	-0.000 (0.010)
GINI_LIGHT _{<i>s,c,t</i>} × CORRUPTION_X _{<i>i,s,c,t</i>}							-0.037** (0.018)	-0.033** (0.015)	-0.010 (0.015)
Joint Sig. P-value	0.011	0.088	0.020	0.019	0.007	0.014	0.039	0.042	0.307
N. Obs.	63106	63106	62534	62010	63076	61464	63106	63106	63106

Robustness checks

The results are robust to:

- Sample dependence tests:
 - Dropping countries one-by-one
 - Dropping subdivisions one-by-one
 - Dropping bottom and top 10% Gini values.
- Alternative specification
 - Different inequality measure (Theil index)
 - Different estimation method (logit, ologit)
 - Control for tax attitude (tax attitude, pay attitude, in favor of taxation)
- Correcting for sample incoherence:
 - Dropping “non taxpayer”
 - Dropping those who pay tax but have no moral objection against evasion/avoidance.

Conclusion

- Although negatively associated, inequality does not have a (significant) direct effect on tax compliance.
- Conditional on the position in “wealth” distribution, inequality plays a significant role particularly for the poor.
- Perceived wealth attenuates the effect of inequality.
- Better institutional environment weakens the effect as well.

Next steps

- Econometrics
 - Endogeneity
 - Ethnic inequality
 - Regression diagnostics
- Analytic
 - Other potential mechanisms
 - Demand for redistribution vs. compliance

Thank you for your attention!

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Measuring Tax Compliance

$TAXCOMP_{i,s,c,t}$	$TAXATT_{i,s,c,t}$		Total
	0 (Not Wrong)	1 (Wrong)	
0 (Do not comply)	9,895	7,282	17,177
(%)	57.61	42.39	100
1 (Comply)	19,429	26,623	46,052
(%)	42.19	57.81	100
Total	29,324	33,905	63,229
	46.38	53.62	100.00

Tax Compliance by Wealth Quintiles

Quintiles	<i>TAX_COMP</i> _{<i>i,s,c,t</i>}		Total
	Do not comply 0	Comply 1	
q1=1 %	3,471 27.43	9,181 72.57	12,652 100.00
q2=1 %	3,385 28.49	8,498 71.51	11,883 100.00
q3=1 %	3,715 27.40	9,843 72.60	13,558 100.00
q4=1 %	3,448 27.00	9,324 73.00	12,772 100.00
q5=1 %	3,098 25.31	9,143 74.69	12,241 100.00
Total	17,117 27.12	45,989 72.88	63,106 100.00

Tax Compliance and Tax Morale

<i>Dependent: Tax Compliance</i>	(1)	(2)	(3)	(4)	(5)	(6)
	Tax Att.		Pay Att.		In Favor of Taxation	
$GINI_LIGHT_{s,c,t}$	-0.158 (0.097)	-0.110 (0.098)	-0.150 (0.097)	-0.100 (0.098)	-0.159 (0.099)	-0.113 (0.100)
$q1=1 \times GINI_LIGHT_{s,c,t}$		-0.100*** (0.037)		-0.106*** (0.037)		-0.094** (0.038)
$TAX_ATT_{i,s,c,t}$ (1= Wrong, 0=Not Wrong)	0.104*** (0.007)	0.104*** (0.007)				
$PAY_ATT(0-1)_{i,s,c,t}$			0.070*** (0.007)	0.070*** (0.007)		
$TAXATION_In_FAVOR_{i,s,c,t}$ (0-1)					0.052*** (0.007)	0.052*** (0.007)
Joint Sig. P-value		0.008		0.006		0.016
R^2	0.136	0.136	0.130	0.130	0.127	0.127
PCP	0.740	0.740	0.740	0.740	0.740	0.740
Weighted PCP	0.519	0.520	0.520	0.520	0.521	0.521
All Channels Controls	Yes	Yes	Yes	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes	Yes	Yes	Yes
Subdivision FE	Yes	Yes	Yes	Yes	Yes	Yes
Country-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Urban/Rural FE	Yes	Yes	Yes	Yes	Yes	Yes
Wave FE	Yes	Yes	Yes	Yes	Yes	Yes
N. Obs.	63106	63106	62795	62795	62087	62087
N. Subdivisions	303	303	303	303	303	303
N. Countries	27	27	27	27	27	27

Restricted Sample

	(1)	(2)	(3)	(4)
<i>Dependent: Tax Compliance</i>		Taxpayers	W/O Type I	
GINLLIGHT _{s,c,t}	-0.136 (0.097)	-0.080 (0.098)	-0.033 (0.135)	0.031 (0.136)
q1=1 × GINLLIGHT _{s,c,t}		-0.117*** (0.038)		-0.130*** (0.049)
Joint Sig. P-value		0.004		0.030
R ²	0.126	0.127	0.191	0.192
PCP	0.739	0.739	0.689	0.689
Weighted PCP	0.520	0.520	0.414	0.414
All Channels Controls	Yes	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes	Yes
Subdivision FE	Yes	Yes	Yes	Yes
Country-Year FE	Yes	Yes	Yes	Yes
Urabn/Rural FE	Yes	Yes	Yes	Yes
Wave FE	Yes	Yes	Yes	Yes
N. Obs.	60524	60524	43703	43703
N. Subdivisions	303	303	303	303
N. Countries	27	27	27	27

Logistic Estimations

<i>Dependent:</i>	(1)	(2)	(3)	(4)
	Tax Compliance (0/1)		Tax Compliance (0/4)	
	Logit		Ologit	
main				
GINI' LIGHT _{s,c,t}	-0.214 (0.559)	0.058 (0.575)	-0.333 (0.539)	-0.108 (0.556)
q1=1 × GINI' LIGHT _{s,c,t}		-0.559** (0.232)		-0.485** (0.229)
Joint Sig. P-value		0.051		0.085
Log pseudolikelihood	-23749.6	-23742.0	-33825.4	-33818.3
pseudo R ²	0.119	0.119	0.094	0.094
All Channels Controls	Yes	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes	Yes
Subdivision FE	Yes	Yes	Yes	Yes
Country-Year FE	Yes	Yes	Yes	Yes
Urabn/Rural FE	Yes	Yes	Yes	Yes
Wave FE	Yes	Yes	Yes	Yes
N. Obs.	62313	62313	63106	63106
N. Subdivisions	296	296	303	303
N. Countries	27	27	27	27

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Without Influential Observation

	(1)	(2)
<i>Dependent: Tax Compliance</i>	Inequality = Gini	
INEQUALITY _{s,c,t}	-0.310*** (0.117)	-0.218* (0.122)
q1=1 × INEQUALITY _{s,c,t}		-0.113** (0.051)
q2=1 × INEQUALITY _{s,c,t}		-0.095* (0.053)
q3=1 × INEQUALITY _{s,c,t}		-0.095** (0.046)
q4=1 × INEQUALITY _{s,c,t}		-0.079* (0.044)
Joint Sig. P-value		0.004
R ²	0.154	0.155
PCP	0.771	0.772
Weighted PCP	0.544	0.544
All Controls	Yes	Yes
All FE	Yes	Yes
N. Obs.	59549	59549
N. Subdivisions	302	302
N. Countries	27	27