Appendix: A Political Economy of Income Tax Policies

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This appendix contains two sections. The first section provides additional details on the constrained optimization approaches used to derive politically optimal taxes. The second section contains alternative specifications and robustness check related to the results shown in the main paper.

1 Political Optimal Taxes: Constrained Optimization

1.1 Small coalition Flat Tax System

The incumbents programming problem is

$$\max_{t,x,g} v(x) + u((1-t)y_W + g)$$

subject to

$$\sum_i \rho_i(y_i(t-\alpha t^2) - \gamma) - px - wg - T_f = 0$$

This is a standard programing problem and proceeds by forming a Lagrangian and then differentiating with respect to policy choices and λ (known as a Lagrangian multiplier):

$L = v(x) + u((1-t)y_W + g) + \lambda(\sum_i \rho_i(y_i(t-\alpha t^2) - \gamma) - px - wg - T_f)$.

The associated First Order Conditions are

$L_x = v'(x) - p\lambda = 0$

$L_g = u'((1-t)y_W + g) - w\lambda = 0$

$L_t = -y_W u'((1-t)y_W + g) + \lambda(\sum_i \rho_i(y_i(1-2\alpha t)) = 0$

$L_\lambda = (\sum_i \rho_i(y_i(t_i - \alpha t_i^2) - \gamma) - px - wg - T_f) = 0$

The Second Order Conditions, $L_{xx} = v''(x) < 0$, $L_{xg} = 0$, $L_{xt} = 0$, $L_{x\lambda} = -p < 0$, $L_{gg} = u''((1-t)y_W + g) < 0$, $L_{gt} = -y_W u''((1-t)y_W + g) > 0$, $L_{g\lambda} = -w < 0$, $L_{tt} = y_W^2 u''((1-t)y_W + g) - 2\alpha\lambda\sum_i \rho_i y_i < 0$, $L_{t\lambda} = \sum_i \rho_i(y_i(1-2\alpha t) > 0$ and $L_{\lambda\lambda} = 0$, produce a Hessian

$$\begin{vmatrix} L_{xx} & L_{xg} & L_{xt} & L_{x\lambda} \\ L_{xg} & L_{gg} & L_{gt} & L_{g\lambda} \\ L_{xt} & L_{gt} & L_{tt} & L_{t\lambda} \\ L_{x\lambda} & L_{g\lambda} & L_{g\lambda} & L_{\lambda\lambda} \end{vmatrix},$$ the determinant of which is $-v''(x)u''((1-t)y_W+g)\left(\sum_i \rho_i(y_i(1-2\alpha t) - wy\right)^2$ $+ 2\alpha\lambda\sum_i \rho_i y_i \left(u''((1-t)y_W + g)p^2 + v''(x)w^2\right) < 0$. Therefore the conditions identified by the FOC constitute a maximum. Given the concavity of the utility functions we ommit subsequent analyses of SOC.

Rearranging the FOCs implies that at the maximum $\lambda > 0, (1-2\alpha t) > 0$, (so $t < \bar{t}$) and the following three constraints hold: $I_1 = \frac{v'(x)}{p} - \frac{u'((1-t)y_W+g)}{w} = 0$

$I_2 = (\sum_i \rho_i(y_i(1-2\alpha t)) - wy_W = 0$

$I_3 = \sum_i \rho_i(y_i(t-\alpha t^2) - \gamma) - px - wg - T_f = 0$ from which the comparative statics follow by standard means.

1.1.1 Large Coalition Flat Tax System

If the coalition is sufficiently large that it draws from multiple income groups then the analysis is similar to that above. Leaders maximize the welfare of their coalition members. Although the coalition is composed of supporters from multiple groups, generically the welfare maximization criteria holds for a single group. If, for instance, $(1-t)u'((1-t)y+g) \geq \theta'(y)$, then the least loyal coalition members are drawn from the poorest income group in the coalition. The maximization proceeds as for the small coalition flat tax case.

1.2 Small Coalition Complex tax structure

The leader's programming problem is policies $(t_1, t_2, ..., x, g)$ that maximize

$$v(x) + u((1-t)y_W + g)$$

subject to the budget constraint

$$\sum_i \rho_i(y_i(t_i - \alpha t_i^2) - 1_{t_i>0}\gamma) - px - wg - T_c = 0$$

Again we complete the constrained optimization using Lagrangian techniques.
$L = v(x) + u(y_W(1-t)+g) - \theta_i + \lambda(\sum_i \rho_i(t_i y_i - \alpha t_i^2 y_i - \gamma 1_{t_i>0}) - gw - px - T_c)$
$L_{t_W} = -y_W u'(y_W(1-t)+g) + \lambda(\rho_W(y_W - 2\alpha t_W y_W)$
$\lambda = \frac{u'(y_W(1-t)+g)}{(\rho_W(1-2\alpha t_W)}$
The First Order Conditions are:
For group $i \in W$, $L_{t_W} = -y_W u'(y_W(1-t)+g) + \lambda(\rho_W(y_W - 2\alpha t_W y_W)) = 0$
for $i \notin W$, $L_{t_i} = \lambda(\rho_i(y_i - 2\alpha t_i y_i) = 0$
$L_x = v'(x) + \lambda(-p) = 0$
$L_g = u'(y_W(1-t)+g) + \lambda(-w) = 0$ $L_\lambda = (\sum_i \rho_i(t_i y_i - \alpha t_i^2 y_i - \gamma 1_{t_i>0}) - gw - px - T) = 0$

As in the flat tax case, optimal spending by the leader implies $\frac{v'(x)}{p} = \frac{u'((1-t)y_W+g)}{w}$ and the budget constraint holds. However unlike the flat tax case, leaders can apply different tax rates to each group. Outside of the coalition group, leaders maximize revenue, the FOC $L_{t_i} = 0$ implies a tax of $t_i = \frac{1}{2\alpha}$ or $t_i = 0$ if $y \leq 4\alpha\gamma$. This is simply the income maximization case discussed in the main text.

Next consider the optimal tax rate for coalition members: Rearranging the FOCs, $\lambda = \frac{u'(y_W(1-t)+g)}{(\rho_W(1-2\alpha t_W)} = \frac{u'(y_W(1-t)+g)}{w}$ which implies the optimal tax solves $w - \rho_W(1-2\alpha t_W) = 0$, which implies a tax rate of $t_W = \frac{\rho_W - w}{2\alpha\rho_W} > 0$ if $y_W(\frac{\rho_W - w}{2\alpha\rho_W} - \alpha(\frac{\rho_W - w}{2\alpha\rho_W})^2) - \gamma > 0$ or $t_W = 0$ otherwise. Note the tax rate of the coalition group becomes zero when a large proportion of the group are members of the winning coalition.

1.3 Large Coalition Complex Tax Structures

The leader's programming problem is

$$Max\{min_{i \in W}\{v(x) + u(y_i(1-t_i) + g_i) - \theta_i\}\}$$

subject to the budget constraint.

We say the tax rate, t_i, is constrained if $t_i = \bar{t}$.

As shown in proposition 2, the optimization implies political equality or constrained tax rates. As seen above, for all $i \notin W$, $t_i = \bar{t}$.

For convenience suppose there are two groups in the coalition, 1 and 2, and consider the interior unconstrained case.

Forming the Lagrangian,

$$\begin{aligned} L &= v(x) + u(y_1(1-t_1)+g) - \theta_1 \\ &+ \lambda(\sum_i \rho_i(t_i y_i - \alpha t_i^2 y_i - \gamma 1_{t_i>0}) - gw - px - T_c) \\ &+ \mu_2(u(y_1(1-t_1)+g) - \theta_1 - u(y_2(1-t)+g) + \theta_2) \end{aligned}$$

the FOC are $L_x = v'(x) - \lambda p = 0$

$L_g = u'(y_1(1-t)+g) - \lambda w + \mu_2(u'(y_1(1-t_1)+g) - u'(y_2(1-t_2)+g))$

$L_{t_1} = u(y_1(1-t_1)+g) + \lambda(\rho_1 y_1(1-\alpha t_1^2))) + \mu_2(-y_1 u'(y_1(1-t_1)+g))$

$L_{t_2} = \lambda(\rho_2 y_2(1-\alpha t_2^2))) + \mu_2(y_2 u'(y_2(1-t)+g))$

L_λ is the budget constraint and

$L_{\mu_2} = u(y_1(1-t_1)+g) - \theta_1 - u(y_2(1-t)+g) + \theta_2) = 0$

These equations provide a system of 6 independent equations in six unknown, x, g, t_1, t_2, λ and μ_2. The results shown in proposition 2 follows from use of parametric assumptions.

2 Alternative Specifications and Robustness Checks

In general the results replicate the tests in the main text. In models annotated with **a** the winning coalition variable has been replaced with Polity's Democracy-Autocracy measure (rescaled between 0 and 1). Models annotated with **b** examine similar models to those in the main text but with a three year lag rather than the five year lag. Models annotated with **c** use a measure of progressivity based on marginal tax rates at one, two, three and four times per capita GDP. The construction of this $Marg.Prog.$ variable is analogous to the $Avg.Prog.$. Table 9 examines analyses that assume the error structure has an AR1 structure.

Table 1: A: Institutions and Flat or No Tax: Democracy-Autocracy

Dependent Variable	Flat or No Tax Model 1a b/se	Flat or No Tax Model 2a b/se	Flat or No Tax Model 2.5a b/se	Flat Tax Model 3a b/se	Flat Tax Model 4a b/se	Flat Tax Model 4.5a b/se
$Demo_{t-5}$	-5.5322***	-4.7640***	-4.5427**	-7.1987***	-6.3090***	-5.8920**
	(1.170)	(1.811)	(1.865)	(1.473)	(2.298)	(2.364)
$Demo^2_{t-5}$	3.5022***	4.6897***	4.5190***	4.6934***	5.8438***	5.6846***
	(1.111)	(1.590)	(1.621)	(1.376)	(1.986)	(2.027)
$ln(Income_{t-5})$	-0.1952***	-0.7002***	-0.7762***	-0.2616***	-0.7018***	-0.7865***
	(0.072)	(0.124)	(0.126)	(0.092)	(0.160)	(0.163)
$ln(Population_{t-5})$	-0.2059***	-0.1059	-0.1115	-0.3250***	-0.1603*	-0.1605*
	(0.051)	(0.071)	(0.071)	(0.065)	(0.083)	(0.084)
$OilOre_{t-5}$		0.0993***	0.1036***		0.0976***	0.1037***
		(0.014)	(0.015)		(0.019)	(0.020)
$Demo_{t-5} * OilOre_{t-5}$		-0.2822***	-0.2981***		-0.2703***	-0.2970***
		(0.043)	(0.044)		(0.052)	(0.054)
War_{t-5}			0.1560			0.2737
			(0.846)			(0.904)
$CivilWar_{t-5}$			-1.7898***			-2.2571***
			(0.438)			(0.669)
$Avg.Tax_{t-5}$				-0.0186	-0.0171	-0.0096
				(0.015)	(0.019)	(0.019)
N	1374	918	918	908	592	592
Random Effect	103 reg-yr	88 reg-yr	88 reg-yr	77 reg-yr	61 reg-yr	61 reg-yr

$*p < 0.10, **p < 0.05, ***p < 0.01$

Table 2: B: Institutions and Flat or No Tax: 3 year lag

	Model 1b	Model 2b	Model 3b	Model 4b
	b/se	b/se	b/se	b/se
Dependent Variable	Flat or No Tax	Flat or No Tax	Flat Tax	Flat Tax
W_{t-3}	-1.0462	0.0428	-1.8844*	-0.6050
	(0.849)	(1.197)	(0.965)	(1.375)
W^2_{t-3}	-1.6048*	-0.5816	-0.2824	0.6244
	(0.838)	(1.116)	(0.971)	(1.278)
L3incomepc	0.1758***	-0.2592***	0.1575**	-0.2649**
	(0.057)	(0.092)	(0.064)	(0.106)
$ln(Population_{t-3})$	-0.3800***	-0.2294***	-0.3803***	-0.2351***
	(0.037)	(0.056)	(0.042)	(0.062)
$OilOre_{t-3}$		0.0777***		0.0917***
		(0.015)		(0.019)
$W_{t-3} * OilOre_{t-3}$		-0.0689***		-0.0882***
		(0.022)		(0.027)
$Avg.Tax_{t-3}$			-0.0585***	-0.0463**
			(0.013)	(0.020)
N	2478	1145	2010	930
Random Effects	167 reg-yr	103 reg-yr	145 reg-yr	88 reg-yr

$*p < 0.10, **p < 0.05, ***p < 0.01$

Table 3: A: Institutions and Progressivity: Democracy-Autocracy

Dependent Variable	*Avg.Prog.*	*Avg.Prog.*	*Avg.Prog.*	*Avg.Prog.*
	Model 5a	Model 6a	Model 7a	Model 8a
	b/se	b/se	b/se	b/se
$Demo_{t-5}$	-5.3603*	-5.6009*	2.3467	-2.8257***
	(3.096)	(3.110)	(2.438)	(1.001)
$Demo^2_{t-5}$	5.5327**	5.7276**	-1.5451	2.8987***
	(2.793)	(2.797)	(2.250)	(0.886)
$ln(Income_{t-5})$	1.1622***	1.1646***	0.3226	1.0760***
	(0.151)	(0.152)	(0.343)	(0.049)
$ln(Population_{t-5})$	-0.1794*	-0.1770*	4.3945***	-0.0675*
	(0.102)	(0.103)	(1.650)	(0.039)
Year	-0.0491***		-0.1421***	
	(0.018)		(0.024)	
Constant	96.6112***	-1.1365	213.3404***	-2.5679***
	(36.309)	(2.213)	(32.044)	(0.781)
N	1789	1789	1789	1789
Fixed Effects		25 Years	125 nations	150 reg-yr

$*p < 0.10, **p < 0.05, ***p < 0.01$

Table 4: B: Institutions and Progressivity: lagged 3 years

Dependent Variable	$Avg.Prog.$ Model 5b b/se	$Avg.Prog.$ Model 6b b/se	$Avg.Prog.$ Model 7b b/se	$Avg.Prog.$ Model 8b b/se
W_{t-3}	-3.7469*	-3.7640*	-0.8937	-0.9363
	(2.220)	(2.259)	(1.400)	(0.705)
W^2_{t-3}	5.2714**	5.2751**	1.1095	2.1549***
	(2.085)	(2.110)	(1.491)	(0.679)
L3incomepc	0.9149***	0.9207***	-0.6910**	0.8910***
	(0.150)	(0.151)	(0.274)	(0.052)
$ln(Population_{t-3})$	-0.2261***	-0.2251***	4.0128***	-0.0937***
	(0.081)	(0.082)	(1.471)	(0.035)
Year	-0.0594***		-0.1145***	
	(0.017)		(0.021)	
Constant	119.0881***	1.0386	174.3486***	-1.4888**
	(34.608)	(1.851)	(27.147)	(0.712)
N	2083	2083	2083	2083
Fixed Effects		25 years	135 nations	167 reg-yr

$*p < 0.10, **p < 0.05, ***p < 0.01$

Table 5: C: Institutions and Progressivity: Marginal Rate Progressivity

Dependent Variable	$Marg.Prog.$ Model 5c b/se	$Marg.Prog.$ Model 6c b/se	$Marg.Prog.$ Model 7c b/se	$Marg.Prog.$ Model 8c b/se
W_{t-5}	0.1842	0.2064	1.7501	2.0569**
	(2.364)	(2.411)	(1.529)	(0.969)
W^2_{t-5}	1.6546	1.6191	-1.2848	-0.3404
	(2.388)	(2.422)	(1.721)	(1.005)
$ln(Income_{t-5})$	0.7355***	0.7408***	-0.2643	0.8762***
	(0.192)	(0.194)	(0.428)	(0.077)
$ln(Population_{t-5})$	-0.2679**	-0.2672**	4.3983*	-0.1406***
	(0.133)	(0.134)	(2.314)	(0.043)
Year	-0.0805***		-0.1349***	
	(0.024)		(0.031)	
Constant	164.2021***	4.7830*	206.7670***	0.3426
	(48.275)	(2.821)	(39.811)	(0.981)
N	2057	2057	2057	2057
Fixed Effects		25 years	135 nations	167 reg-yr

$*p < 0.10, **p < 0.05, ***p < 0.01$

Table 6: A: Institutions and Progressivity: Democracy-Autocracy

Dependent Variable	*Avg.Prog.* Model 9a b/se	*Avg.Prog.* Model 10a b/se	*Avg.Prog.* Model 11a b/se	*Avg.Prog.* Model 12a b/se
$Demo_{t-5}$	-1.8384	-2.3229*	-3.3584**	-2.8421
	(1.156)	(1.272)	(1.419)	(1.831)
$Demo^2_{t-5}$	1.9772*	1.8542	2.4379*	3.1342***
	(1.032)	(1.175)	(1.291)	(1.129)
$ln(Income_{t-5})$	0.9506***	1.2847***	1.0642***	1.1484***
	(0.058)	(0.054)	(0.057)	(0.051)
$ln(Population_{t-5})$	-0.0080	-0.1102***	-0.0896**	-0.1928***
	(0.042)	(0.041)	(0.044)	(0.036)
War_{t-5}	-1.2224***		-1.1319***	
	(0.218)		(0.301)	
$CivilWar_{t-5}$	-0.3599**		-0.3336*	
	(0.145)		(0.169)	
$Avg.Tax_{t-5}$	0.0476***		0.0460***	
	(0.008)		(0.008)	
$OilOre_{t-5}$		-0.0828***	-0.0795***	
		(0.012)	(0.015)	
$Demo_{t-5} * OilOre_{t-5}$		0.1235***	0.1070***	
		(0.018)	(0.023)	
$GINI_{t-5}$				0.0084
				(0.015)
$Demo_{t-5} * GINI_{t-5}$				-0.0194
				(0.018)
Constant	-3.2763***	-3.2352***	-1.9569**	-0.8562
	(0.853)	(0.887)	(0.987)	(1.280)
N	1287	1432	1075	1523
Fixed	120 reg-yr	150 reg-yr	120 reg-yr	149 reg-yr

$*p < 0.10, **p < 0.05, ***p < 0.01$

Table 7: B: Institutions and Progressivity: Lagged 3 years

Dependent Variable	*Avg.Prog.* Model 9b b/se	*Avg.Prog.* Model 10b b/se	*Avg.Prog.* Model 11b b/se	*Avg.Prog.* Model 12b b/se
W_{t-3}	-0.3592	-0.8285	0.3239	0.7573
	(0.828)	(0.954)	(1.055)	(1.385)
W^2_{t-3}	1.5253**	1.5295*	0.3560	0.4840
	(0.765)	(0.832)	(0.919)	(0.739)
$ln(Income_{t-3})$	0.7616***	1.1279***	0.9371***	1.1187***
	(0.060)	(0.059)	(0.056)	(0.055)
$ln(Population_{t-3})$	-0.0676*	-0.1538***	-0.1297***	-0.1709***
	(0.040)	(0.037)	(0.040)	(0.034)
War_{t-3}	-0.5388**		-0.3966*	
	(0.221)		(0.219)	
$CivilWar_{t-3}$	-0.2179		-0.4377**	
	(0.144)		(0.168)	
$Avg.Tax_{t-3}$	0.0511***		0.0586***	
	(0.008)		(0.008)	
$OilOre_{t-3}$		-0.0220	-0.0183	
		(0.019)	(0.025)	
$W_{t-3} * OilOre_{t-3}$		0.0310	0.0145	
		(0.026)	(0.032)	
$GINI_{t-3}$				0.0052
				(0.021)
$W_{t-3} * GINI_{t-3}$				-0.0204
				(0.027)
Constant	-1.4571*	-2.1867**	-1.7139*	-1.7629
	(0.777)	(0.922)	(0.891)	(1.216)
N	1692	1631	1370	1684
Fixed Effects	146 reg-yr	153 reg-yr	134 reg-yr	149 reg-yr

$*p < 0.10, **p < 0.05, ***p < 0.01$

Table 8: C: Institutions and Progressivity: Marginal Rate Progressivity

Dependent Variable	$Marg.Prog.$ Model 9c b/se	$Marg.Prog.$ Model 10c b/se	$Marg.Prog.$ Model 11c b/se	$Marg.Prog.$ Model 12c b/se
W_{t-5}	1.5215	4.9591***	4.7847**	3.1703
	(1.360)	(1.328)	(1.835)	(2.045)
W_{t-5}^2	0.0353	-3.4962***	-2.8479	-2.0711*
	(1.359)	(1.277)	(1.751)	(1.125)
$ln(Income_{t-5})$	1.1084***	1.1875***	1.3408***	1.2715***
	(0.080)	(0.091)	(0.089)	(0.078)
$ln(Population_{t-5})$	-0.0763	-0.2887***	-0.2110***	-0.1180**
	(0.049)	(0.048)	(0.054)	(0.052)
War_{t-5}	-0.8818**		-0.4592	
	(0.402)		(0.511)	
$CivilWar_{t-5}$	-0.1034		-0.1956	
	(0.219)		(0.221)	
$Avg.Tax_{t-5}$	-0.0753***		-0.0734***	
	(0.008)		(0.010)	
$OilOre_{t-5}$		0.0034	0.0210	
		(0.021)	(0.023)	
$W_{t-5} * OilOre_{t-5}$		-0.0691**	-0.0979***	
		(0.030)	(0.031)	
$GINI_{t-5}$				0.0270
				(0.025)
$W_{t-5} * GINI_{t-5}$				-0.0167
				(0.033)
Constant	-1.8268*	0.2391	-2.0620	-3.5996**
	(1.098)	(1.205)	(1.354)	(1.603)
N	1467	1573	1175	1629
Fixed Effects	132 reg-yr	152 reg-yr	120 reg-yr	149 reg-yr

$*p < 0.10, **p < 0.05, ***p < 0.01$

Table 9: D: Institutions and Progressivity: AR1 Error Structure

Dependent Variable	$Avg.Prog.$ Model 7d b/se	$Avg.Prog.$ Model 9d b/se	$Avg.Prog.$ Model 10d b/se	$Avg.Prog.$ Model 11d b/se	$Avg.Prog.$ Model 12d b/se
W_{t-5}	0.6615	0.6615	3.1109***	0.5139	-0.9396
	(0.845)	(0.845)	(0.832)	(0.860)	(1.314)
W^2_{t-5}	-0.7763	-0.7763	-1.7639**	-0.6089	0.4630
	(0.934)	(0.934)	(0.898)	(0.949)	(0.730)
$ln(Income_{t-5})$	-0.1540	-0.1540	-0.8567**	-0.8158**	-0.1639
	(0.296)	(0.296)	(0.351)	(0.340)	(0.359)
$ln(Population_{t-5})$	0.1344	0.1344	0.3825**	0.4624***	0.2564
	(0.130)	(0.130)	(0.159)	(0.150)	(0.163)
War_{t-5}	-0.0236	-0.0236		-0.0213	
	(0.140)	(0.140)		(0.129)	
$CivilWar_{t-5}$	-0.1768	-0.1768		-0.1268	
	(0.109)	(0.109)		(0.117)	
$Avg.Tax_{t-5}$	0.0021	0.0021		0.0005	
	(0.007)	(0.007)		(0.008)	
$OilOre_{t-5}$			0.0050	0.0061	
			(0.015)	(0.015)	
$W_{t-5} * OilOre_{t-5}$			-0.0386**	-0.0190	
			(0.018)	(0.018)	
$GINI_{t-5}$					-0.0196
					(0.020)
$W_{t-5} * GINI_{t-5}$					0.0080
					(0.022)
Constant	3.5136***	3.5136***	4.4624***	3.9578***	2.7733***
	(0.201)	(0.201)	(0.146)	(0.173)	(0.160)
N	1345	1345	1449	1067	1514
Fixed	117	117	111	101	110

$*p < 0.10, **p < 0.05, ***p < 0.01$

Table 10: A: Institutions and Heteroskedascity in Tax Rates and Progressivity: Democracy-Autocracy

Dependent Variable	*Avg.Prog.* Model 13a b/se	*Avg.Prog.* Model 14a b/se	*Avg.Prog.* Model 15a b/se	*Avg.Prog.* Model 16a b/se
xb				
$Demo_{t-5}$	-3.9101	1.7669	-1.2781	-2.7476
	(3.583)	(5.826)	(4.549)	(4.179)
$Demo^2_{t-5}$	4.2274	-0.7182	0.9563	7.1916**
	(2.955)	(4.122)	(3.762)	(3.490)
$ln(Income_{t-5})$	1.1629***	0.5946	0.8089***	1.3202***
	(0.188)	(0.458)	(0.217)	(0.123)
$ln(Population_{t-5})$	-0.1902	0.0107	-0.0659	-0.3030***
	(0.123)	(0.208)	(0.139)	(0.117)
$Avg.Tax_{t-5}$		0.1594***	0.1378***	
		(0.050)	(0.034)	
War_{t-5}		-0.9365***	-0.8472***	
		(0.325)	(0.272)	
$CivilWar_{t-5}$		-0.4276	-0.3985	
		(0.421)	(0.329)	
$OilOre_{t-5}$			-0.0884***	
			(0.029)	
$Demo_{t-5} * OilOre_{t-5}$			0.0942*	
			(0.057)	
$GINI_{t-5}$				0.0926
				(0.080)
$Demo_{t-5} * GINI_{t-5}$				-0.1466
				(0.094)
Constant	-1.7193	-3.0907	-1.9865	-3.0783
	(2.372)	(2.830)	(2.870)	(4.047)
lnsigma				
$Demo_{t-5}$	-0.7390	0.3030	0.7054	0.1249
	(0.833)	(1.097)	(1.340)	(1.208)
$Demo^2_{t-5}$	0.2629	-0.4813	-0.6113	-0.5281
	(0.762)	(0.723)	(1.094)	(1.026)
$ln(Income_{t-5})$	0.0729	0.0051	-0.0792	0.0339
	(0.052)	(0.123)	(0.071)	(0.056)
$ln(Population_{t-5})$	-0.1367**	-0.1028	-0.0949**	-0.2159***
	(0.054)	(0.078)	(0.048)	(0.057)
$Avg.Tax_{t-5}$		0.0099	0.0080	-0.0001
		(0.009)	(0.006)	(0.007)
Constant	2.9507***	2.4057**	2.7463***	4.3490***
	(0.831)	(0.969)	(0.806)	(0.994)
N	2072	1502	1234	1268

$*p < 0.10, **p < 0.05, ***p < 0.01$

Table 11: B:Institutions and Heteroskedascity in Tax Rates and Progressivity: Lagged 3 Years

Dependent Variable	$Avg.Prog.$ Model 13b b/se	$Avg.Prog.$ Model 14b b/se	$Avg.Prog.$ Model 13b b/se	$Avg.Prog.$ Model 16b b/se
$x\beta$				
W_{t-3}	-6.1917**	-3.0475	-6.1917**	0.4396
	(2.416)	(2.163)	(2.416)	(5.703)
W^2_{t-3}	9.0743***	4.8627**	9.0743***	5.7399**
	(2.168)	(2.307)	(2.168)	(2.449)
L3incomepc	0.5547**	0.2189	0.5547**	1.0945***
	(0.281)	(0.225)	(0.281)	(0.173)
$ln(Population_{t-3})$	-0.0586	-0.0001	-0.0586	-0.1842
	(0.116)	(0.101)	(0.116)	(0.117)
$Avg.Tax_{t-3}$		0.1706***		
		(0.033)		
War_{t-3}		-0.6114**		
		(0.301)		
$CivilWar_{t-3}$		-0.2296		
		(0.273)		
$GINI_{t-3}$				0.0867
				(0.100)
$W_{t-3} * GINI_{t-3}$				-0.1431
				(0.125)
Constant	-0.2608	0.1806	-0.2608	-4.5029
	(1.945)	(1.993)	(1.945)	(5.091)
$ln(\sigma)$				
W_{t-3}	0.3107	0.3491	0.3107	0.1143
	(0.889)	(0.651)	(0.889)	(0.941)
W^2_{t-3}	-0.3330	-0.4552	-0.3330	-0.4394
	(0.634)	(0.504)	(0.634)	(0.819)
L3incomepc	0.0074	-0.0287	0.0074	-0.0064
	(0.059)	(0.057)	(0.059)	(0.049)
$ln(Population_{t-3})$	-0.0943***	-0.0789***	-0.0943***	-0.1703***
	(0.025)	(0.027)	(0.025)	(0.041)
$Avg.Tax_{t-3}$		0.0131**		0.0067
		(0.006)		(0.007)
Constant	2.3915***	2.2082***	2.3915***	3.8350***
	(0.536)	(0.551)	(0.536)	(0.975)
N	2494	2044	2494	1550

$*p < 0.10, **p < 0.05, ***p < 0.01$

Table 12: C: Institutions and Heteroskedascity in Tax Rates and Progressivity: Marginal Rate Progressivity

Dependent Variable	$Marg.Prog.$ Model 13c b/se	$Marg.Prog.$ Model 14c b/se	$Marg.Prog.$ Model 15c b/se	$Marg.Prog.$ Model 16c b/se
$x\beta$				
W_{t-5}	-3.3537	-2.3014	-2.9275	7.4006
	(2.277)	(2.605)	(3.765)	(5.391)
W^2_{t-5}	6.7316**	5.5896*	4.1955	2.8765
	(2.711)	(3.090)	(3.894)	(2.677)
$ln(Income_{t-5})$	0.4741	0.3612	0.7810**	1.1184***
	(0.312)	(0.357)	(0.314)	(0.223)
$ln(Population_{t-5})$	0.0245	0.0965	-0.1096	-0.0295
	(0.156)	(0.156)	(0.171)	(0.152)
$Avg.Tax_{t-5}$		0.0355	0.0213	
		(0.028)	(0.028)	
War_{t-5}		-1.0364*	-0.8401	
		(0.556)	(0.572)	
$CivilWar_{t-5}$		-0.2856	-0.3424	
		(0.431)	(0.514)	
$OilOre_{t-5}$			-0.0853	
			(0.058)	
$W_{t-5} * OilOre_{t-5}$			0.0036	
			(0.077)	
$GINI_{t-5}$				0.1913**
				(0.081)
$W_{t-5} * GINI_{t-5}$				-0.2313**
				(0.108)
Constant	-0.2266	-1.0583	0.8928	-10.9242*
	(2.914)	(3.476)	(4.232)	(5.848)
$ln(\sigma)$				
W_{t-5}	1.3705***	1.1771**	0.4801	0.6261
	(0.471)	(0.490)	(0.634)	(0.528)
W^2_{t-5}	-1.4009***	-1.1623**	-0.6047	-0.8203
	(0.429)	(0.486)	(0.649)	(0.529)
$ln(Income_{t-5})$	0.0209	0.0083	-0.0186	0.0403
	(0.046)	(0.056)	(0.061)	(0.039)
$ln(Population_{t-5})$	-0.0776***	-0.0759***	-0.0784***	-0.1131***
	(0.020)	(0.022)	(0.027)	(0.023)
$Avg.Tax_{t-5}$		-0.0104**	-0.0089	-0.0162***
		(0.005)	(0.006)	(0.005)
Constant	2.1273***	2.2242***	2.6347***	2.8059***
	(0.386)	(0.508)	(0.594)	(0.527)
N	2455	1775	1359	1349

$*p < 0.10, **p < 0.05, ***p < 0.01$

Table 13: Institutions, Inequality and Redistribution

Dependent Variable	$\Delta Gini$	$\Delta Gini$	$\Delta Gini$	$\Delta Gini$
	Model 17	Model 18	Model 19	Model 20
	b/se	b/se	b/se	b/se
W_{t-5}	6.4243***	3.4399**	4.2767*	26.0192***
	(1.100)	(1.511)	(2.206)	(3.844)
W^2_{t-5}	-7.2914***	-4.2799***	-3.1936*	-7.6025***
	(0.990)	(1.276)	(1.748)	(1.689)
$ln(Income_{t-5})$	-1.6193***	-1.6322***	-1.8083***	-1.6187***
	(0.089)	(0.108)	(0.138)	(0.132)
$ln(Population_{t-5})$	0.5278***	0.6385***	0.5707***	0.4146***
	(0.052)	(0.063)	(0.080)	(0.077)
$OilOre_{t-5}$		0.0751**	0.1405***	0.1175***
		(0.030)	(0.041)	(0.039)
$W_{t-5} * OilOre_{t-5}$		-0.0293	-0.0740	-0.0805
		(0.042)	(0.056)	(0.053)
War_{t-5}			0.5709	0.8098
			(0.941)	(0.867)
$CivilWar_{t-5}$			-0.7375*	-0.5525
			(0.422)	(0.395)
$Avg.Tax_{t-5}$			-0.1057***	-0.1110***
			(0.016)	(0.015)
$GINI_{t-5}$				0.0136
				(0.055)
$W_{t-5} * GINI_{t-5}$				-0.3785***
				(0.072)
Constant	-2.9835**	-4.8174***	-2.6610	-2.9588
	(1.192)	(1.458)	(1.906)	(2.957)
N	3075	2272	1353	1305
Fixed Effects	207 reg-yr	204 reg-yr	137 reg-yr	137 reg-yr

$*p < 0.10, **p < 0.05, ***p < 0.01$

Table 14: Progressivity and Institutions: 5 Year Averages

Dependent Variable	*Avg.Prog.* Model 21 b/se	*Avg.Prog.* Model 22 b/se	*Avg.Prog.* Model 23 b/se	*Avg.Prog.* Model 24 b/se
W	-1.7869	-3.6395	-2.8591	-4.0988
	(2.208)	(3.079)	(3.046)	(4.971)
W^2	4.8821**	4.3994*	3.3456	0.9793
	(1.870)	(2.330)	(2.387)	(2.119)
$ln(Income)$	0.3425***	0.8012***	0.6831***	0.9629***
	(0.119)	(0.111)	(0.097)	(0.122)
$ln(Population)$	0.1480**	-0.0100	-0.0132	-0.0643
	(0.064)	(0.089)	(0.094)	(0.084)
$OilOre$		-0.0905***	-0.0817***	0.0296
		(0.024)	(0.026)	(0.027)
$W * OilOre$		0.0746*	0.0619	-0.0309
		(0.041)	(0.040)	(0.039)
$Avg.Tax$			0.0793***	0.1035***
			(0.020)	(0.025)
War			-1.8529	-0.8178
			(1.433)	(1.045)
$CivilWar$			-0.4253	-0.5103
			(0.308)	(0.326)
$GINI$				-0.0471
				(0.048)
$W * GINI$				0.0668
				(0.066)
Constant	-2.6694	-1.8934	-1.4324	-0.9120
	(1.689)	(2.221)	(2.081)	(3.710)
N	514	446	446	372
Fixed Effect	35 reg-period	35 reg-period	35 reg-period	32 reg-period

$*p < 0.10, **p < 0.05, ***p < 0.01$

The independent variables are taken are 5 year averages. The progressivity is measured at the end of the five year period.