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Online Appendix of the paper titled:

"Do dictatorships redistribute more?"

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Appendix B
Table B1. List of countries and political regime changes

		Cheibub et al. (2010)		Boix et al. (2012)		Marshall and Jaggers (2010)		Soviet and Soviet satellite countries	Sub-Saharan African countries
		Democratisation	Reversal	Democratisation	Reversal	Min POLITY2	Max POLITY2		
	Country	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Albania	1991		1997		0.05	0.95	√	
2	Angola					0.60	0.85		√
3	Argentina	1983	1966	1983	1966	0.10	0.95		
4	Armenia					0.15	0.80	√	
5	Australia					0	0		
6	Austria					0	0		
7	Azerbaijan					0.65	0.85	√	
8	Bahrain					0.85	1.00		
9	Bangladesh	1986		1986		0.20	0.85		
10	Belarus			1991	1994	0.15	0.85	√	
11	Belgium					0	0		
12	Benin	1991		1991		0.15	0.85		√
13	Bhutan					0.75	1.00		
14	Bolivia	1982		1982		0.05	0.85		
15	Bosnia and Herzegovina							√	
16	Botswana					0.10	0.20		√
17	Brazil	1985		1979		0.10	0.95		
18	Bulgaria	1990		1990		0.05	0.85	√	
19	Burkina Faso					0.50	0.85		√
20	Burundi	2005		2005		0.20	0.85		√
21	Cambodia					0.40	0.45		
22	Cameroon					0.70	0.90		√
23	Canada					0	0		
24	Central African Republic	1993	2003	1993	2003	0.25	0.85		√
25	Chad					0.50	0.95		√
26	Chile	1990	1973	1990	1973	0	0.85		
27	China					0.85	0.95		
28	Colombia					0.05	0.15		
29	Comoros	1990, 2004	1995	2006		0.05	0.85		√
30	Congo	1992	1997			0.25	0.90		√
31	Congo, the Democratic Republic					0.25	0.95		√
32	Costa Rica					0	0		
33	Croatia			2000		0.05	0.75	√	
34	Cyprus	1983		1977		0	0.15		
35	Czech Republic					0	0.10	√	
36	Denmark					0	0		
37	Djibouti					0.40	0.90		√
38	Dominican Republic					0.10	0.65		
39	Ecuador	1979, 2002	2000	1979, 2003	2000	0.05	0.75		

40	Egypt					0.65	0.85		
41	El Salvador	1984		1984		0.15	0.55		
42	Estonia					0.05	0.20	√	
43	Ethiopia					0.45	0.90		√
44	Fiji	1992	2000		1987	0.05	0.65		
45	Finland					0	0		
46	France					0.05	0.25		
47	FYR Macedonia					0.05	0.20	√	
48	Gabon					0.70	0.95		√
49	Gambia			1972	1994	0.10	0.80		√
50	Georgia	2004		2004		0.15	0.30	√	
51	Germany					0	0		
52	Ghana	1969, 1993	1972	1970, 1997	1972	0.10	0.85		√
53	Greece	1974		1974		0	0.85		
54	Guatemala					0.10	0.75		
55	Guinea					0.55	0.85		√
56	Guinea-Bissau	2000		1994	1998	0.20	0.90		
57	Honduras	1971, 1982	1972	1971, 1982	1972	0.15	0.55	√	
58	Hungary					0	0		
59	India					0.05	0.15		
60	Indonesia	1999		1999		0.10	0.85		
61	Iran					0.35	1.00		
62	Iraq					0.95	0.95		
63	Ireland					0	0		
64	Israel					0	0.05		
65	Italy					0	0		
66	Jamaica					0	0.05		
67	Japan					0	0		
68	Jordan					0.60	1.00		
69	Kazakhstan					0.70	0.80	√	
70	Kenya	1998		2002		0.10	0.85		√
71	Korea, Republic of	1988	1961	1988	1961	0.10	0.90		
72	Kuwait					0.85	1.00		
73	Kyrgyz Republic	2005				0.30	0.65	√	
74	Laos					0.85	0.85		
75	Latvia			1993		0.10	0.10	√	
76	Lebanon					0.20	0.50		
77	Lesotho			2002		0.10	0.95		√
78	Liberia					0.50	0.85		√
79	Lithuania					0	0	√	
80	Luxembourg					0	0		
81	Madagascar	1993		1993		0.05	0.80		√
82	Malawi	1994		1994		0.20	0.95		√
83	Malaysia					0	0.35		
84	Mali	1992		1992		0.15	0.85		√

85	Mauritania					0.80	0.85		√
86	Mauritius					0	0.05		√
87	Mexico	2000		2000		0.10	0.80		
88	Moldova					0.05	0.25	√	
89	Mongolia					0	0.40	√	
90	Montenegro					0.05	0.05	√	
91	Morocco					0.75	0.95		
92	Mozambique			1994	2004	0.25	0.90		√
93	Namibia					0.20	0.20		√
94	Nepal	1990	2002	1991	2002	0.20	0.95		
95	Netherlands					0	0		
96	New Zealand					0	0		
97	Niger	2000		1999		0.20	0.85		√
98	Nigeria	1979, 1999	1983	1979	1983	0.15	0.85		√
99	Norway					0	0		
100	Oman					0.90	1.00		
101	Pakistan	1972, 1988	1977, 1999	1972, 1988	1977, 1999	0.10	0.85		
102	Panama	1989		1991		0.05	0.85		
103	Paraguay			2003		0.10	0.40		
104	Peru	1980, 2001	1968, 1990	1980, 2001	1968, 1990	0.05	0.85		
105	Philippines	1986	1965	1986	1965	0.10	0.95		
106	Poland	1989		1989		0	0.85	√	
107	Portugal	1976		1976		0	0.95		
108	Qatar					1.00	1.00		
109	Romania	1990		1991		0.05	0.90	√	
110	Russia				1999	0.20	0.35	√	
111	Rwanda					0.65	0.85		√
112	Saudi Arabia					1.00	1.00		
113	Senegal	2000		2000		0.10	0.85		√
114	Serbia					0.10	0.10	√	
115	Sierra Leone	1998		2002		0.25	0.85		√
116	Singapore					0.15	0.60		
117	Slovak Republic					0	0.15	√	
118	Slovenia					0	0	√	
119	South Africa			1994		0.05	0.30		√
120	Spain	1977		1977		0	0.85		
121	Sri Lanka	1989	1977	1991	1977	0.10	0.25		
122	Sudan	1986	1989	1986	1989	0.15	0.85		√
123	Suriname	1988	1980	1988	1980	0.25	0.80		
124	Swaziland					0.95	1.00		√
125	Sweden					0	0		
126	Switzerland					0	0		
127	Syrian Arab Republic					0.85	0.95		
128	Tajikistan					0.55	0.80	√	
129	Tanzania					0.55	0.80		√

130	Thailand	1979, 1992	1991, 2006	1983, 1992	1991, 2006	0.05	0.85			
131	Togo					0.60	0.85			√
132	Trinidad and Tobago					0	0.10			
133	Tunisia					0.65	0.95			
134	Turkey	1983	1980	1983	1980	0.05	0.75			
135	Turkmenistan					0.90	0.95	√		
136	Uganda	1980	1985	1980	1985	0.35	0.85			√
137	Ukraine					0.15	0.20	√		
138	United Kingdom					0	0			
139	United States					0	0			
140	Uruguay	1985	1973	1985	1973	0	0.90			
141	Uzbekistan					0.95	0.95	√		
142	Venezuela				2005	0.05	0.25			
143	Vietnam					0.85	0.85			
144	Yemen					0.60	0.70			
145	Zambia					0.20	0.95			√
146	Zimbabwe					0.30	0.80			√

Notes: Columns (1) and (3) report the democratisation years of our sample according to Cheibub et al. (2010) and Boix et al. (2013) classifications, respectively, whereas columns (2) and (4) the reversals to dictatorship. In cases that countries democratise or reverse to dictatorial rule, but the sample does not cover the period before the regime change, the years are not reported in the Table. Columns (5) and (6) report by country the minimum and maximum values, respectively, of the variable *POLITY2* for the years covered in the empirical analysis - higher values indicate more authoritarianism. Finally, columns (7) and (8) indicate the Soviet and Soviet satellite countries and Sub-Saharan Africa countries, respectively, which are dropped from the estimates in Subsection 2.4.1 of the paper.

Appendix C. A theoretical framework along the lines of McGuire and Olson (1996)

We develop a simple theoretical model that builds upon Olson (1993; 2000) and McGuire and Olson (1996). More precisely, we consider an endogenous growth model where the ruler (whether democratically elected or not) determines the level of the income tax rate and the amount of tax revenues directed to public production services. Tax revenues that are not directed to public production services remain in the discretion of the ruler to be used for his own purposes. These resources can affect the welfare of the ruler either directly by increasing his own consumption, or indirectly by increasing his ability to "buy" political support through targeted transfers to politically influential groups of agents. In both cases, this share of tax revenues is directed away from productive activities.

B.1 Households

The intertemporal utility of the representative household is:

$$U = \sum_{t=0}^{\infty} \beta^t (\log c_t) \qquad (1)$$

where c_t is the private consumption at time t, and $0 < \beta < 1$ is the discount rate.

At each time t, the household rents its predetermined capital, k_t, to the firm and receives $r_t k_t$, where r_t is the return to capital. It also supplies inelastically one unit of labor services per time-period so that labor income is w_t. Further, it receives firms' profits, π_t. Thus, the household's budget constraint is:

$$k_{t+1} + c_t = (1 - \theta_t)(r_t k_t + w_t + \pi_t) \qquad (2)$$

where k_{t+1} is the end-of-period capital stock, and $0 < \theta_t < 1$ is the income tax rate. For simplicity, we assume full capital depreciation. The initial capital stock, k_0, is given.

The household chooses the paths of c_t and k_{t+1} to maximize its intertemporal utility subject to the budget constraint. In doing so, it acts competitively by taking prices, profits and policy variables as given. The first-order conditions of the household's problem are:

$$\frac{1}{c_t} = \beta\left[\frac{(1-\theta_{t+1})r_{t+1}}{c_{t+1}}\right] \tag{3}$$

and the budget constraint in (2).

B.2 Firms

The representative firm maximizes the usual profit, π_t, function:

$$\pi_t \equiv y_t - r_t k_t - w_t l_t \tag{4}$$

As in the literature introduced by Barro (1990), we assume that public services provide production externalities to private firms. We also assume that technology at the firm's level takes a Cobb-Douglas form. Thus, the firm's production function is:

$$y_t = A k_t^{\alpha} l_t^{1-\alpha} G_t^{1-\alpha} \tag{5}$$

where y_t, l_t, and g_t denote output, labor and public production services, respectively, at time t. Also, $A>0$ and $0<\alpha<1$.

The firm chooses k_t and l_t. In doing so, it acts competitively by taking prices and policy variables as given. The first-order conditions of the firm's problem are:

$$r_t = \frac{\alpha y_t}{k_t} \tag{6a}$$

$$w_t = \frac{(1-\alpha) y_t}{l_t} \tag{6b}$$

B.3 Government budget constraint

To finance the public good the ruler taxes the household's income at a rate $0<\theta_t<1$. Thus,

$$R_t + G_t = \theta_t\left(r_t k_t + w_t + \pi_t\right) \tag{7a}$$

Without loss of generality, we assume that a share $0 < b_t < 1$ of total tax revenues finances public production services, G_t, and the rest $0 < (1 - b_t) < 1$ is used by the ruler for his own purposes. These resources can finance either the ruler's own consumption or other non-productive activities. Thus, (7a) is decomposed into:

$$G_t = b_t \theta_t \left(r_t k_t + w_t + \pi_t \right) \tag{7b}$$

$$R_t = \left(1 - b_t\right) \theta_t \left(r_t k_t + w_t + \pi_t \right) \tag{7c}$$

where inspection of (7a)-(7c) reveals that θ_t and b_t can summarize fiscal policy at time t.

B.4 Competitive decentralized equilibrium (for given economic policy)

Given the paths of the policy instruments $\{\theta_t, b_t\}_{t=0}^{\infty}$, a Competitive Decentralized Equilibrium (CDE) is defined to be a sequence of allocations $\{y_t, c_t, k_{t+1}, G_t, R_t\}_{t=0}^{\infty}$ and prices $\{r_t,\ w_t\}_{t=0}^{\infty}$ such that: (i) households maximize utility and firms maximize profits by taking prices, policy and public services as given; (ii) all budget constraints are satisfied; (iii) all markets clear.[1] This CDE is summarized by the following equations that give the paths of output, private consumption, private capital accumulation:

$$y_t = A^{\frac{1}{\alpha}} \left(b_t \theta_t \right)^{\frac{1-\alpha}{\alpha}} k_t \tag{8a}$$

$$c_t = \left(1 - \alpha\beta\right) A^{\frac{1}{\alpha}} \left(1 - \theta_t\right) \left(b_t \theta_t \right)^{\frac{1-\alpha}{\alpha}} k_t \tag{8b}$$

$$k_{t+1} = \alpha\beta A^{\frac{1}{\alpha}} \left(1 - \theta_t\right) \left(b_t \theta_t \right)^{\frac{1-\alpha}{\alpha}} k_t \tag{8c}$$

$$G_t = b_t \theta_t A^{\frac{1}{\alpha}} \left(b_t \theta_t \right)^{\frac{1-\alpha}{\alpha}} k_t \tag{8d}$$

$$R_t = \left(1 - b_t\right) \theta_t A^{\frac{1}{\alpha}} \left(b_t \theta_t \right)^{\frac{1-\alpha}{\alpha}} k_t \tag{8e}$$

[1] In the labor market, the market-clearing condition is $l_t = 1$.

In this solution, y_t, c_t, k_{t+1}, G_t and R_t depend on the beginning-of-period capital stock and the current value of the policy instruments.[2]

B.5 Optimal fiscal policy

We now endogenize policy by assuming that the ruler chooses the paths of θ_t and b_t in order to maximize his own well-being (see Equation (9) below). In doing so the ruler takes into account the CDE as summarized by Equations (8a)-(8e).

The ruler's problem

Following McGuire and Olson (1996) we assume that the ruler (whether democratically elected or not) maximizes the following intertemporal objective function:

$$W = \sum_{t=0}^{\infty} \beta^t \left(F \log c_t + (1-F) \log R_t \right) \qquad (9)$$

where $0 < \beta < 1$ is the discount rate of the ruler, and $0 < F < 1$ is a parameter that captures the degree of the encompassing interest of the ruler in the private consumption of citizens, and consequently in the productivity of the whole economy. The second term of the objective function captures the incentive of the ruler to extract the maximum amount of resources from the public funds and to be used for his own purposes. As can be easily verified, when parameter *F* tends to zero the ruler gains utility solely through rent extraction (this is the case of "pure autocracy"). In contrast, when *F* is larger than zero, the ruler also cares for the welfare of the citizens -who earn a significant share of the market income of the economy - and this inevitably lead him to care about the performance of the private market (this is the case of the "redistributive democracy")[3]. We will use dynamic programming to solve the ruler's problem. From the governor's point of view, the state at any time *t* is the predetermined economy-wide capital stock, k_t. Then $V(k_t)$ denote the value function at time *t*. This function must satisfy the Bellman equation:

[2]As is known, the model specification (logarithmic preferences and Cobb-Douglas constraints with full depreciation) allows us to obtain a closed-form solution at the level of CDE. In this equilibrium, private consumption-saving decisions are proportional to current output, and the degree of proportionality depends on the current policy instruments only.

[3]Though essentially ad hoc, this characterization of policy-makers' preferences is a convenient way of encompassing a wide range of possibilities by supposing that policy makers are neither wholly benevolent nor wholly self-serving Leviathan (see, e.g., Edwards and Keen, 1996 for more details on this).

$$V(k_t) = \max_{\theta_t, b_t}[F \log c_t + (1-F)\log R_t + \beta V(k_{t+1})] \quad (10)$$

where c_t, k_{t+1} and R_t follows (8b), (8c) and (8e) respectively.

Inspection of the above problem reveals that the value function in (10) is expected to be of the log-linear form $V(k_t)=u_0+u_1\log k_t$,where u_0 and u_1 are undetermined coefficients. Using this conjecture for the value function into (10), the first order conditions for θ_t and b_t are respectively:[4]

$$\theta_t = 1 - a\beta - a(1-\beta)F \quad (11a)$$

$$b_t = \frac{1-a}{1-a\beta-a(1-\beta)F} \quad (11b)$$

As can be easily verified, the chosen policy instruments are independent of the state of the economy k_t and they are constant over time $\theta_t=\theta$ and $b_t=b$ for all t. Moreover, we note that $\frac{\partial \theta_t}{\partial F} < 0$ and $\frac{\partial b_t}{\partial F} > 0$. Thus, a higher encompassing interest of the ruler in private consumption, and consequently in the productivity of the private markets, leads: (i) to lower level of tax rates and (ii) to higher share of tax revenues directed to finance public production services relative to rents' extraction. It is worth noting that a higher tax rate do not necessarily induce higher tax revenues. This is because in this model national income (i.e., the tax base) is endogenous to the implemented fiscal policy. These theoretical results are in line to those obtained by McGuire and Olson (1996): rulers that are characterized by a higher (lower) encompassing interest in the welfare of the majority direct a larger (lower) share of the tax revenues to public production services, and they impose lower (higher) tax rates.

[4] Using the conjecture $V(k_t)=u_0+u_1\log k_t$ into (10) and equating coefficients on both sides of the Bellman, we get $u_1=1/(1-\beta)>0$. Plugging this into the first order conditions for θ_t and b_t we obtain (11a) and (11b). This also confirms the conjecture for the value function in (10).

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