Democratic Transitions, Breakdowns, and Economic Growth

Lamia Bazzaoui & Jun Nagayasu

Tohoku University
Sendai, JAPAN
In progress

Outline

- Research objectives and motivations
- Literature review
- Statistical methodology
- Data
- Some results
  - A weak (complex?) relationship between econ growth and democracy
  - Cox regression results
  - etc
- Conclusion

Research objectives and motivations

- To clarify the relationship between democracy and econ growth empirically
- Particularly,
  Economic performance $\rightarrow$ Changes in political regime
- Because of very weak empirical evidence of causality,
  Democracy $\rightarrow$ Econ growth
- Evidence helps us think of the type of society we should aim at.

Figure: URL https://www.conceptdraw.com/examples/eastern-asia-map

Specific research questions

Q1 What has affected a country to move to democracy?
Q2 What has influenced a breakdown of democracy?

Q3 Has democracy helped countries to become wealthy?
Q4 Has democracy deterred econ growth?

Study the validity of Modernization theory

Literature review: Econ growth to Democracy

Lipset (1959) The importance of industrialization for sustainable democracy (Modernization theory)

Przeworski and Limongi (1997) No relationship btw democracy and economic development, but btw democracy and property rights.

Modernization theory → Endogenous theory;

Democracy is established independently of econ development but tends to survive in developed countries → Exogenous theory

Zak and Feng (2003) The speed of democratic transitions affected by inequality, autocrat's perceived legitimacy, econ growth rate, etc.

Literature review: Democracy (Governance) to Econ growth

Przeworski and Limongi (1997) Democracy tends to expand current consumption at the expense of investment.

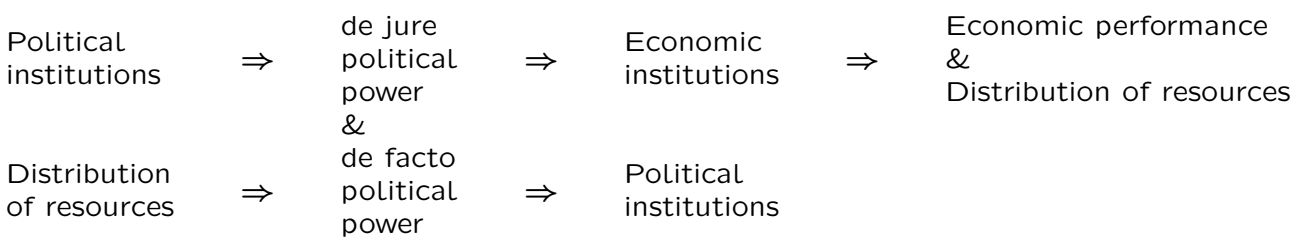
Rivera-Batiz (2002) The quality of governance is higher in democratic countries & low corruption stimulates technological development

Aghion et al. (2007) explains the effect of democracy on growth by the impact on political rights on the freedom of entry in markets

Doucouliagos and Ulubasoglu (2008) An indirect effect of democracy on econ growth; it occurs only through higher economic freedom

Sen (2014) Organized civil society is essential to achieve an efficient implementation of development policies

Acemoglu et al. 2005, p. 392 The complicated and unclear causal relationship



Literature review: Democracy (Governance) to Productivity

Most prior literature focuses on the relationship between democracy and economic growth (e.g., Abeberese et al. (2021)).

There are fewer studies on the relationship between democracy and productivity.

Some examples:

Hall and Jones (1999) institutions and government policies are important determinants of TFP.

Levin (2006) productivity increases when workers within firms can benefit from the productivity gains.

Rodriguez-Pose and Ganau (2021) the quality of regional institutions has a direct impact on labor productivity and in the long run on human capital and innovation.

Statistical methodology (Survival analysis)

The hazard represents the probability that the event occurs or the instantaneous event rate for an entity that survived to time t.

The hazard function focuses on the event occurring.

$$h(t) = \lim_{\Delta t \to 0} \frac{Pr(t < T < t + \Delta t | T \geq t)}{\Delta t}$$

The Cox proportional hazards model (1972) is

$$h(t|X_i) = h_0(t)e^{X_i\beta}$$

Say, death is an event. $\beta > 0$ indicates that the event hazard increases and the survival length declines.
β estimated by maximizing the partial likelihood.
$e(\beta)$ is Hazard Ratio (HR)

The hazard rates for 2 observations (i and j) are assumed proportional, and proportionality is maintained over time.

$$\frac{h_0(t)e^{X_i\beta}}{h_0(t)e^{X_j\beta}}$$

Like previous studies

Feng and Zang (1999, JCR)

$$Transition_i(t) = \lambda_0(t)e(\beta_1 GDP_i(t) + \beta_2 DIST_i(t) + \beta_3 EDU_i + \beta_4 PREFS_i)$$

$Transition$ =1 when a transition to democracy occurs, $DIST$ income distribution, $PREFS$ the strength of preferences for freedom. 75 developing countries over 1962-1992

Rod et al. (2020) studied 67 determinants of democracy in 171 countries from 1960-2015 (Not a survival model)

Rivera-Batiz tests using the following specification of the production function of a given country i

$$\begin{aligned} log[(Y_i/L_i)^{90}/(Y_i/L_i)^{60}] &= \beta_0 + \beta_1 DEMOC_i + \beta_2 GOVERN_i \\ &+ \beta_3 TERTIARY_i + \beta_4 URBAN_i + \beta_5 (K_i/L_i)^{60} \\ &+ \beta_6 log[(K_i/L_i)^{90}/(K_i/L_i)^{60}] + \beta_7 [Ed_i^{90}/Ed_i^{60}] + \epsilon_i \end{aligned}$$

$DEMOC$ a democracy index, $GOVERN$ a governance index, $TERTIARY$ the average of the 1960 and 1990 proportions of the population over 15 that attended some level of tertiary education, $URBAN$ the percentage of the population in 1980 residing in urban areas.

Survival analysis

X in Cox regression (Lipset(1959); Przeworski and Limongi (1997))

Q1 Democratic Transition

- Per-capita income (incrank: average ranking in terms of income per capita; 1 the poorest)
- Distribution of wealth (ineq: share of top 10% in total income)
- Average educational attainment (edu: average total years of schooling)
- Type of colonial occupation (britcol, frcol, spcol, othcol)

Q2 Democratic Breakdown

- incrank, ineq, edu
- Debt crisis (debt)
- Currency crisis (curr)

Q3 & Q4 Becoming wealthy or poor

- edu
- Political variables (elec, libe, part, delib, egal)
- Political instability (polins (Worldwide Governance Indicators))

The cumulative hazard function is

$$H(t) = \int_0^t h(u)du$$

Various definitions of democracy

A traditional definition of democracy a political system where people have the freedom to choose their rulers

Popper (1945) the more important feature of democracy is not the freedom of choice of rulers but the ability to dismiss rulers without restoring to violence (e.g., through elections).

Hayek (1960) considers that political freedom (a concept close to electoral democracy) can be compatible with totalitarianism, which is detrimental to economic performance. In contrast, individual freedom[1] is important for economic performance.

Lindberg et al. (2014) suggest a multi-dimensional definition of democracy and provide a dataset (VDem).

[1] Included in the measure of egalitarian democracy and Lindberg et al. (2014)

Selection of democracy variables (VDem)

Electoral democracy index freedom of association, clean elections, freedom of expression, elected officials, and suffrage.

Liberal democracy index constitutional protection of civil liberties, rule of law, the independence of the judiciary system, and checks and balances that limit the exercise of executive power.

Participatory democracy index active participation by citizens in all political processes, electoral and non-electoral (civil society...).

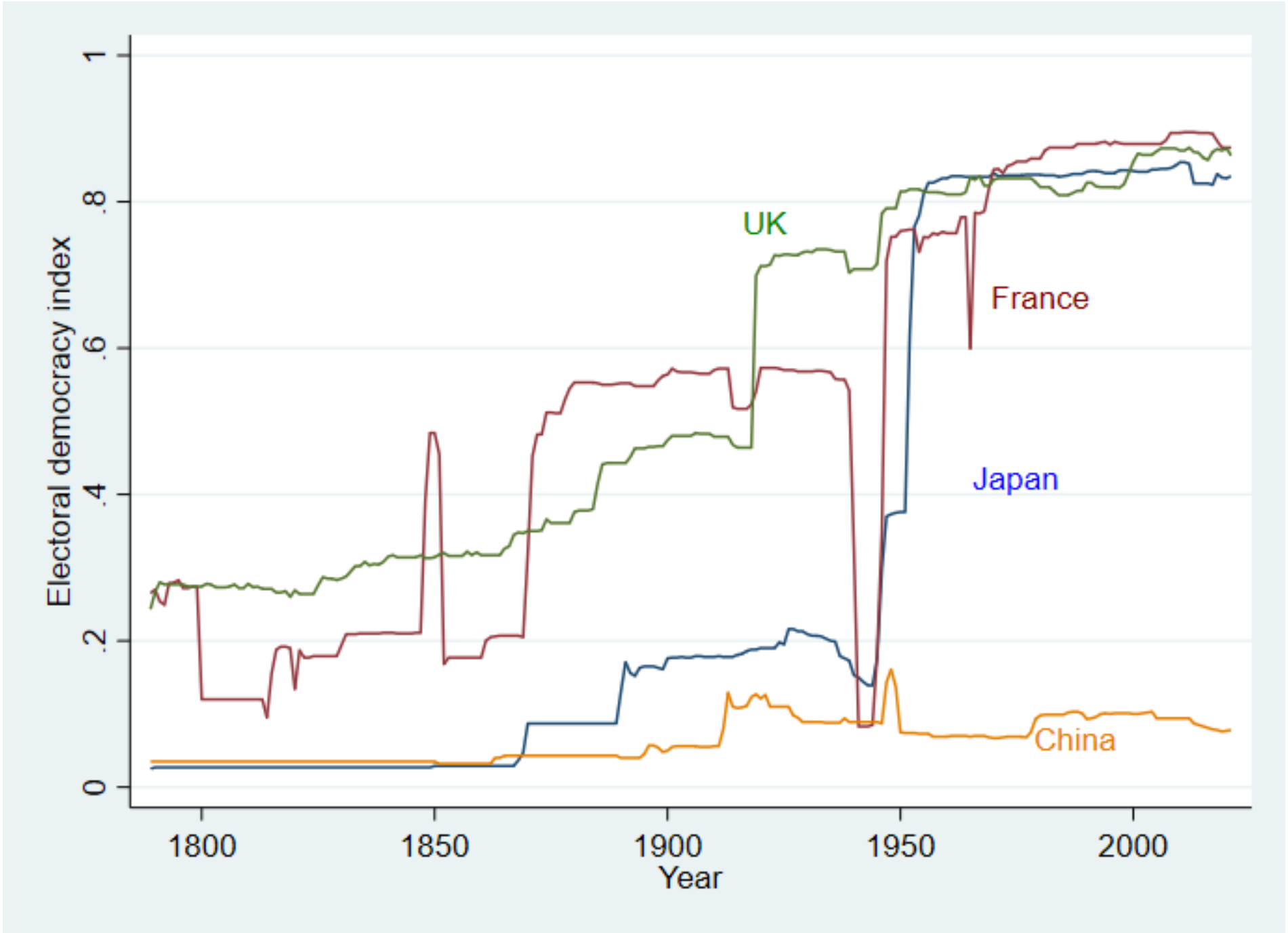
Deliberative democracy index the degree to which decisions are made in the best interest of the people as opposed to due to coercion or narrow interest groups.

Egalitarian democracy index the degree to which rights and freedoms of individuals are protected equally across all social groups; resources are distributed equally across all social groups; and groups and individuals enjoy equal access to power.

Selection of democracy variables

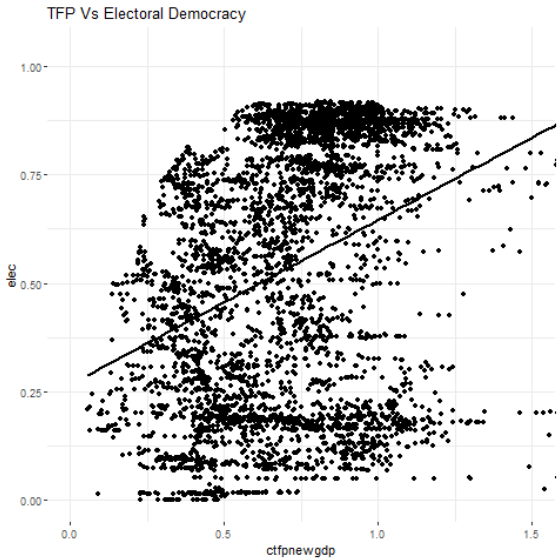
- Top 10 countries in average Democracy measures over the period 1970-2019 by income group

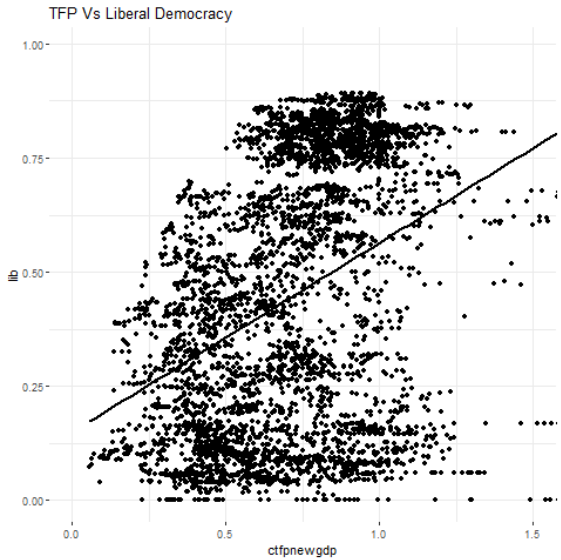
	Electoral Democracy	Liberal Democracy	Participatory Democracy	Deliberative Democracy	Egalitarian Democracy
	High Income				
1	Denmark	Denmark	Switzerland	Sweden	Denmark
2	Sweden	Sweden	Denmark	Denmark	Sweden
3	Germany	Germany	Sweden	Germany	Norway
4	Norway	Norway	New Zealand	Norway	Germany
5	Australia	Australia	Australia	Switzerland	Luxembourg
6	New Zealand	New Zealand	Norway	Luxembourg	Belgium
7	France	France	France	Netherlands	Finland
8	Belgium	Belgium	Germany	France	Switzerland
9	Switzerland	Switzerland	Austria	Australia	Netherlands
10	Luxembourg	Luxembourg	Italy	Belgium	Iceland
	Middle and low income				
1	Costa Rica	Costa Rica	Costa Rica	Costa Rica	Costa Rica
2	Mauritius	Mauritius	Mauritius	Mauritius	Mauritius
3	Botswana	Botswana	Argentina	India	Argentina
4	India	India	Brazil	Botswana	Jamaica
5	Jamaica	Jamaica	Botswana	Argentina	Botswana
6	Argentina	Argentina	India	Jamaica	India
7	Brazil	Brazil	Jamaica	Brazil	Bulgaria
8	Venezuela	Venezuela	Ecuador	Senegal	Venezuela
9	Ecuador	Ecuador	Venezuela	Venezuela	Brazil
10	Senegal	Senegal	Peru	South Africa	Senegal

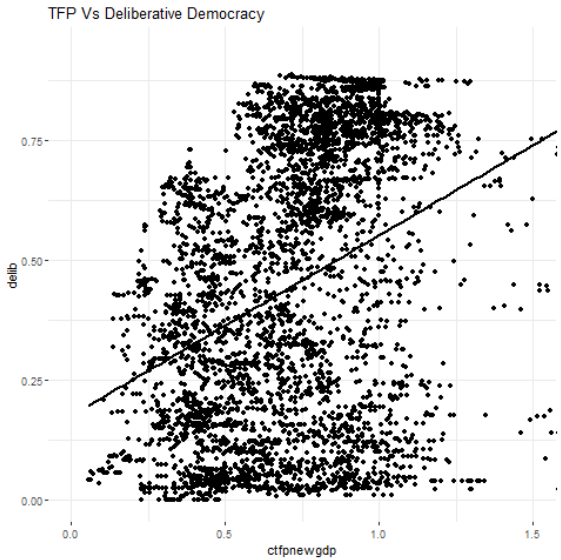

Electoral democracy index
0
.2
.4
.6
.8
1
1800
1850
1900
1950
2000
Year
UK
France
Japan
China

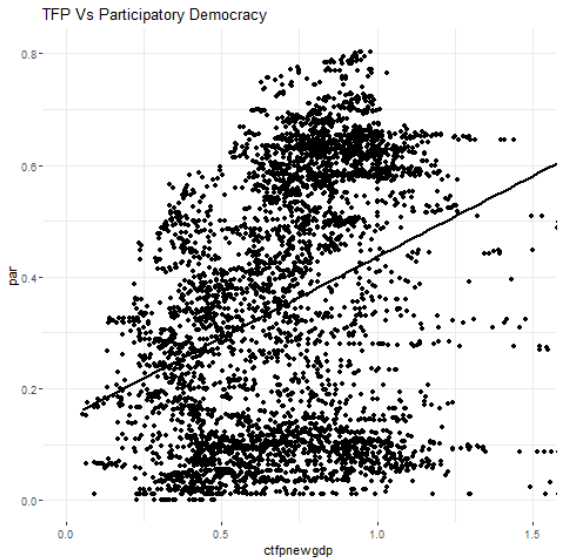
Scatter plots TFP vs Democracy

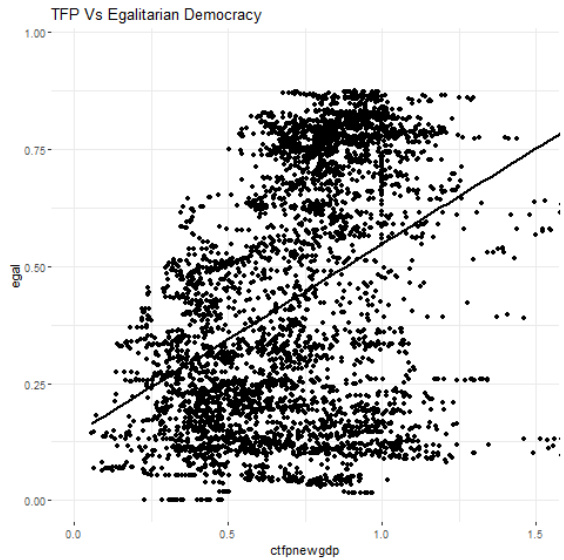
- A positive relationship appears from the plot











Democracy and Economic Growth

Table: Causality between economic growth (TFP) and political variables

	From				
	Egal	Elec	Lib	Par	Delib
To					
GDP growth	5.379 (0.090)	4.874 (0.120)	4.060 (0.009)	5.172 (0.008)	2.984 (0.280)
TFP	8.934 (0.040)	16.4109 (0.000)	11.598 (0.000)	17.738 (0.000)	14.140 (0.000)
	GDP growth	GDP growth	GDP growth	GDP growth	GDP growth
Egal	1.161 (0.550)				
Elec		2.404 (0.240)			
Lib			0.983 (0.630)		
Par				0.578 (0.810)	
Delib					1.356 (0.570)
	TFP	TFP	TFP	TFP	TFP
Egal	9.866 (0.030)				
Elec		11.800 (0.010)			
Lib			10.308(0.030)		
Par				9.076 (0.090)	
Delib					12.034 (0.000)

Notes: Causality tests are Z-bar statistics proposed by Dumitrescu and Hurlin (2012). The appropriate lag length is determined by the AIC with the maximum lag length of 2. P-values using 100 bootstrap replications are in the parentheses. TFP is in line with the Penn World Table.

Event Data (Lexical Index of Electoral Democracy)

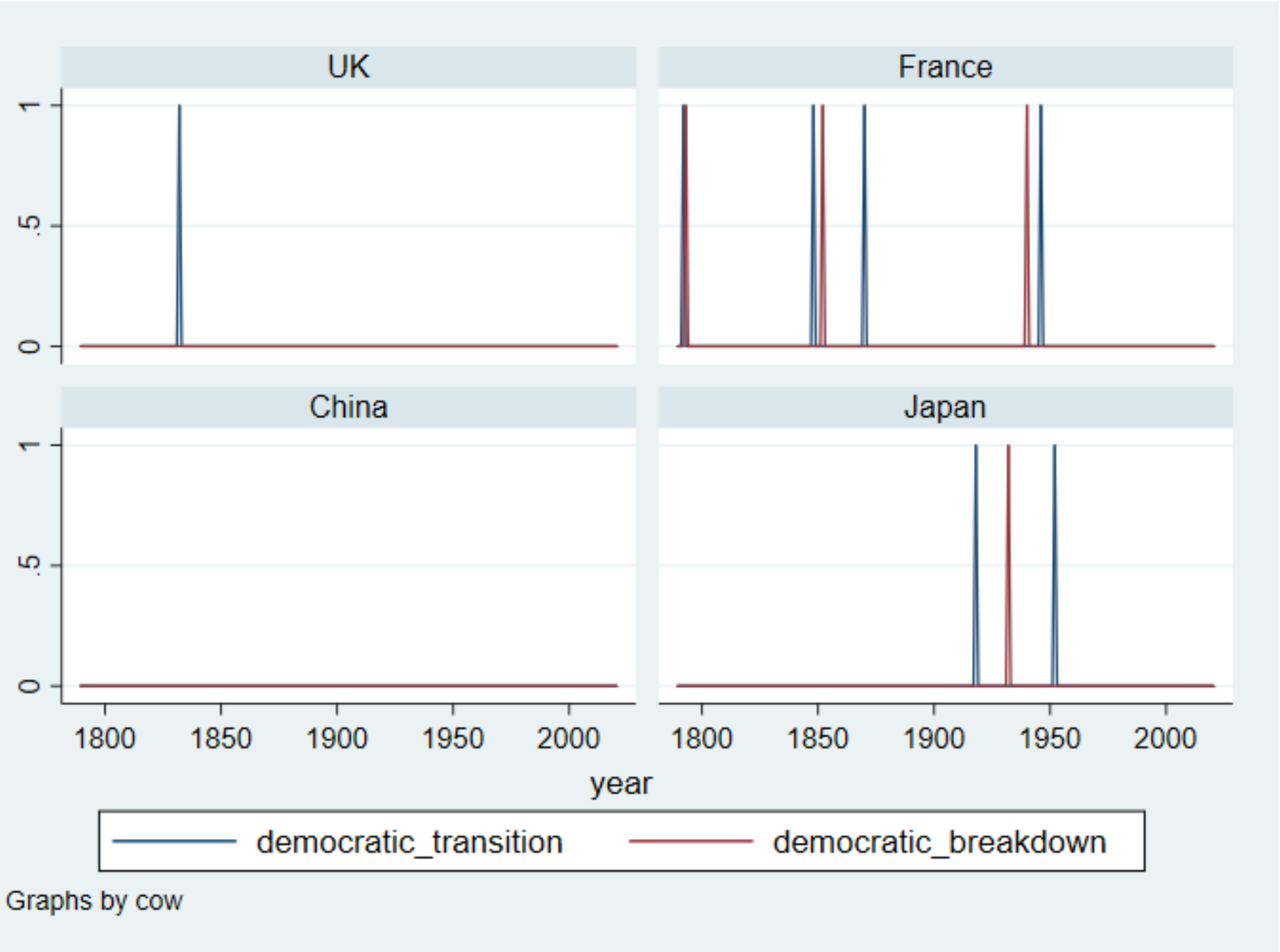
LIED dataset v6.0 provides binary coding of different features of political regimes for 242 states over the period 1789-2021. (Skaaning et al. 2015, CPS)

Type of transition

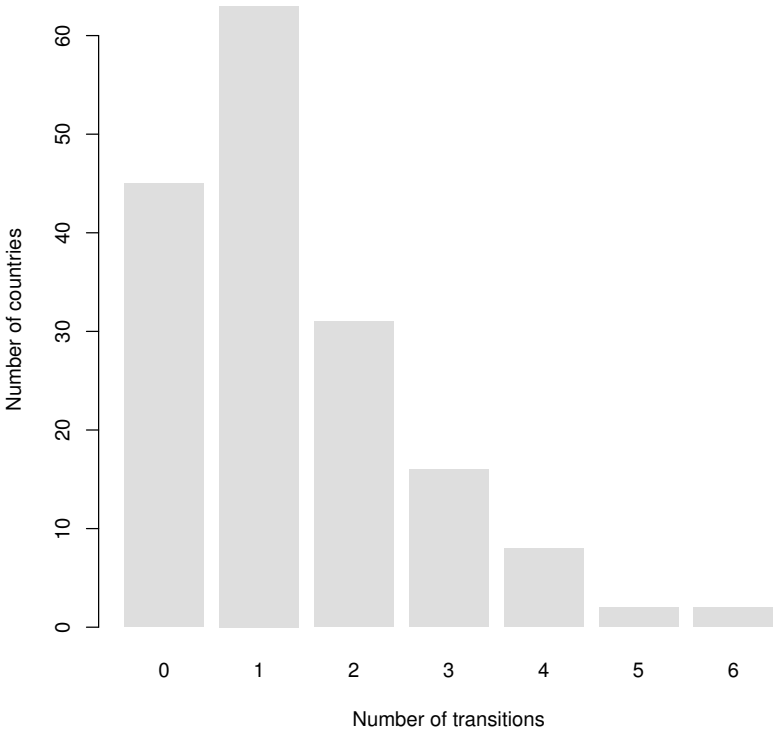
- 1=conversion (incumbent-led),
- 2=cooperative (a pact between incumbents and opposition/balanced influence),
- 3=collapse (opposition-led),
- 4=foreign supervision (imposition by foreign power based on intervention or highly asymmetrical – partial or complete – decolonization),
- 5=foreign liberalization (democracy reemerges after occupational power has lost a war to foreign powers).

Type of breakdowns

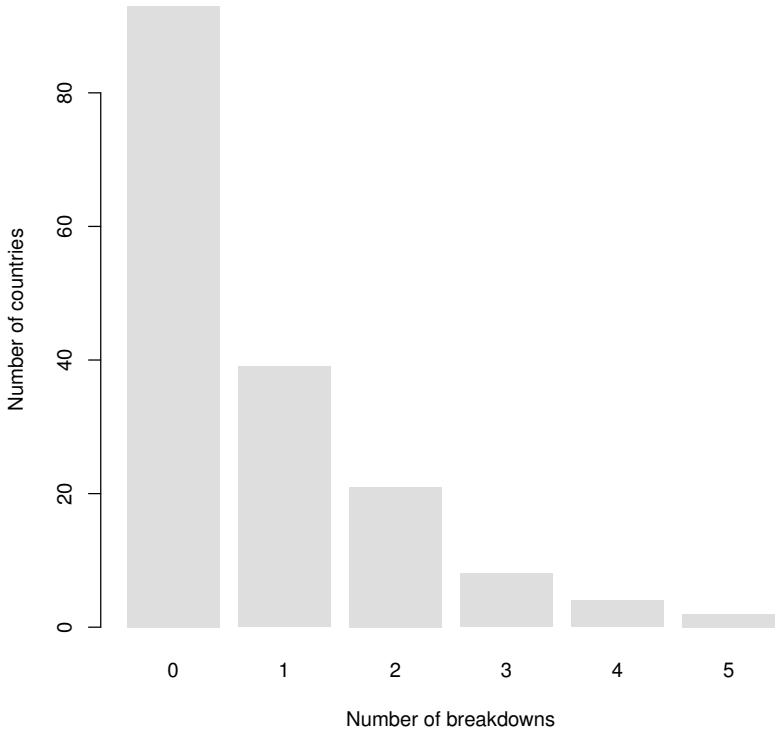
- 1=implicit regression induced by incumbents,
- 2=military coup,
- 3=foreign occupation,
- 4=self-coup (incumbents close down parliament unduly and take full political control),
- 5=coup or civil conflict headed by opposition party/movement,
- 6=coup headed by a monarch.


UK
France
China
Japan
0
.5
1
1800
1850
1900
1950
2000
year
democratic_transition
democratic_breakdown
Graphs by cow

Data, 1789-2021

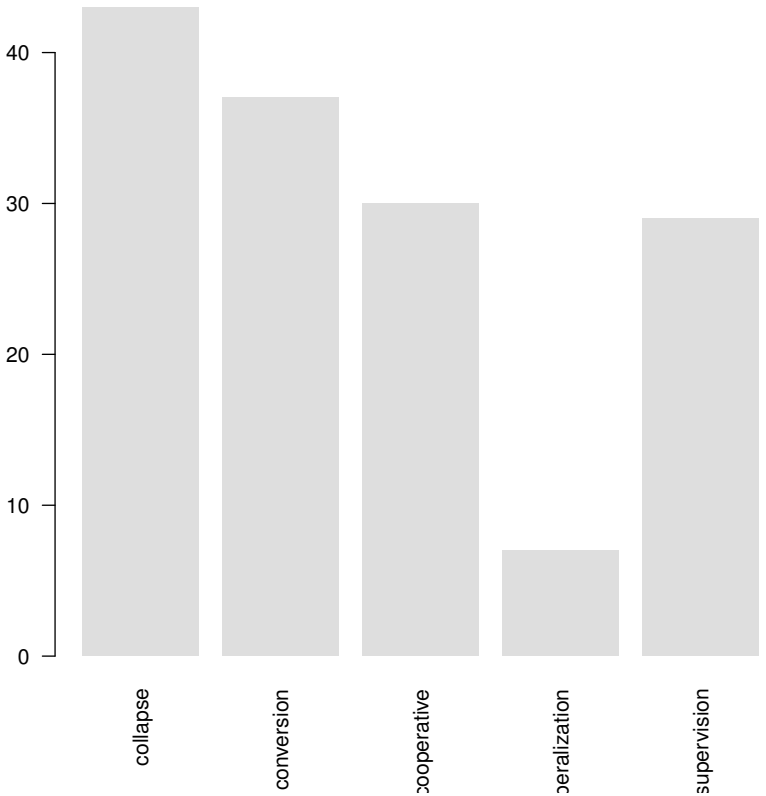


(a) No. of democratic transitions

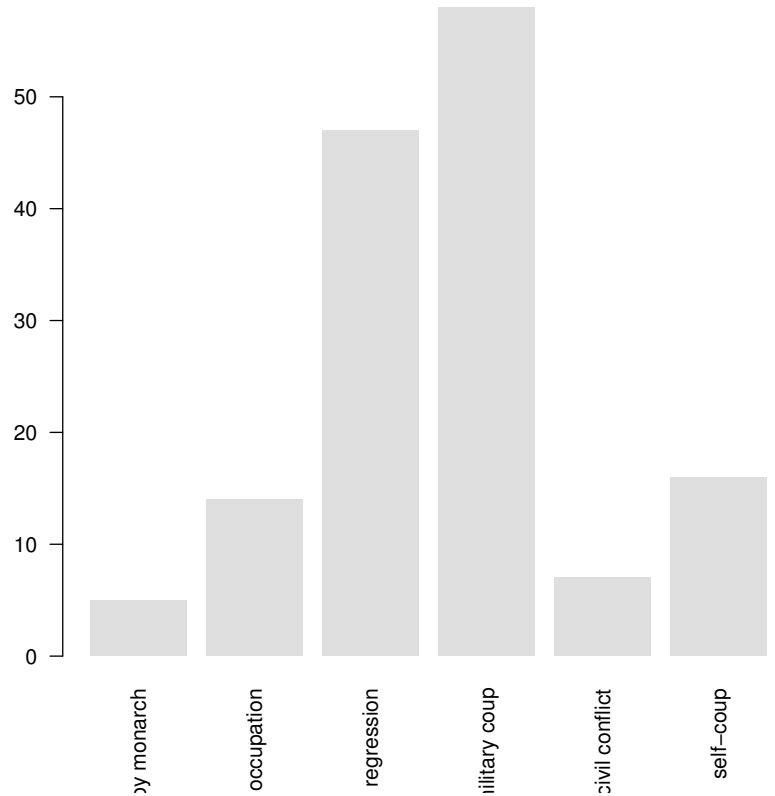


(b) No. of democratic breakdowns

Data, 1789-2021



(a) Democratic transitions by type



(b) Democratic breakdowns by type

Country groups

- Asia
- Eur-NA-Oc (Europe, excluding ex-communist countries), North America & Oceania
- MENA (Middle East & North Africa)
- Latin America
- Sub-Saharan Africa
- Ex-communist Europe

Tests by region for four different events

Logrank test: no difference in survival curves					
Event of a transition	**n**	**Observed**	**Expected**	**$(O-E)^2/E$**	**$(O-E)^2/V$**
Asia	32	20	26.50	1.60	2.24
Eur-NA-Oc	25	23	7.87	29.06	38.32
Ex-communist Europe	18	18	13.44	1.55	1.96
Latin America & Caribbean	25	25	9.36	26.14	33.99
Middle-East and North Africa	20	5	22.91	14.00	19.25
Sub-Saharan Africa	45	30	40.92	2.91	4.84
Chi2(5)	96	p=<2e-16			
Event of a breakdown	**n**	**Observed**	**Expected**	**$(O-E)^2/E$**	**$(O-E)^2/V$**
Asia	20	12	6.39	4.92	5.777
Eur-NA-Oc	23	1	14.66	12.73	19.424
Ex-communist Europe	18	3	8.60	3.64	4.498
Latin America & Caribbean	25	15	10.84	1.59	2.063
Middle-East and North Africa	5	3	1.74	0.92	0.973
Sub-Saharan Africa	30	18	9.77	6.93	8.892
Chi2(5)	33.4	p= 3e-06			
Higher income	**n**	**Observed**	**Expected**	**$(O-E)^2/E$**	**$(O-E)^2/V$**
Asia	32	14	13.51	0.0178	0.0247
Eur-NA-Oc	25	12	10.10	0.3592	0.4717
Ex-communist Europe	18	9	7.61	0.2555	0.3207
Latin America & Caribbean	25	8	10.81	0.7286	0.9628
Middle-East and North Africa	20	8	8.38	0.0168	0.0214
Sub-Saharan Africa	45	18	18.61	0.0198	0.0303
Chi2(5)	1.6	p= 0.9			
Lower income	**n**	**Observed**	**Expected**	**$(O-E)^2/E$**	**$(O-E)^2/V$**
Asia	32	20	15.45	1.33875	2.0593
Eur-NA-Oc	25	8	14.63	3.00116	4.4018
Ex-communist Europe	18	13	8.39	2.539	3.5991
Latin America & Caribbean	25	12	14.35	0.38448	0.5625
Middle-East and North Africa	20	11	10.70	0.00862	0.0122
Sub-Saharan Africa	45	24	24.49	0.00989	0.0169
Chi2(5)	9.2	p= 0.1			

Test of Gorfine et al. (2019)				
P-Values	**Transition**	**Breakdown**	**Higher Income**	**Lower Income**
Chi-square	0.743	0.113	0.61	0.98
Likelihood Ratio	0.001	0.029	0.473	0.99

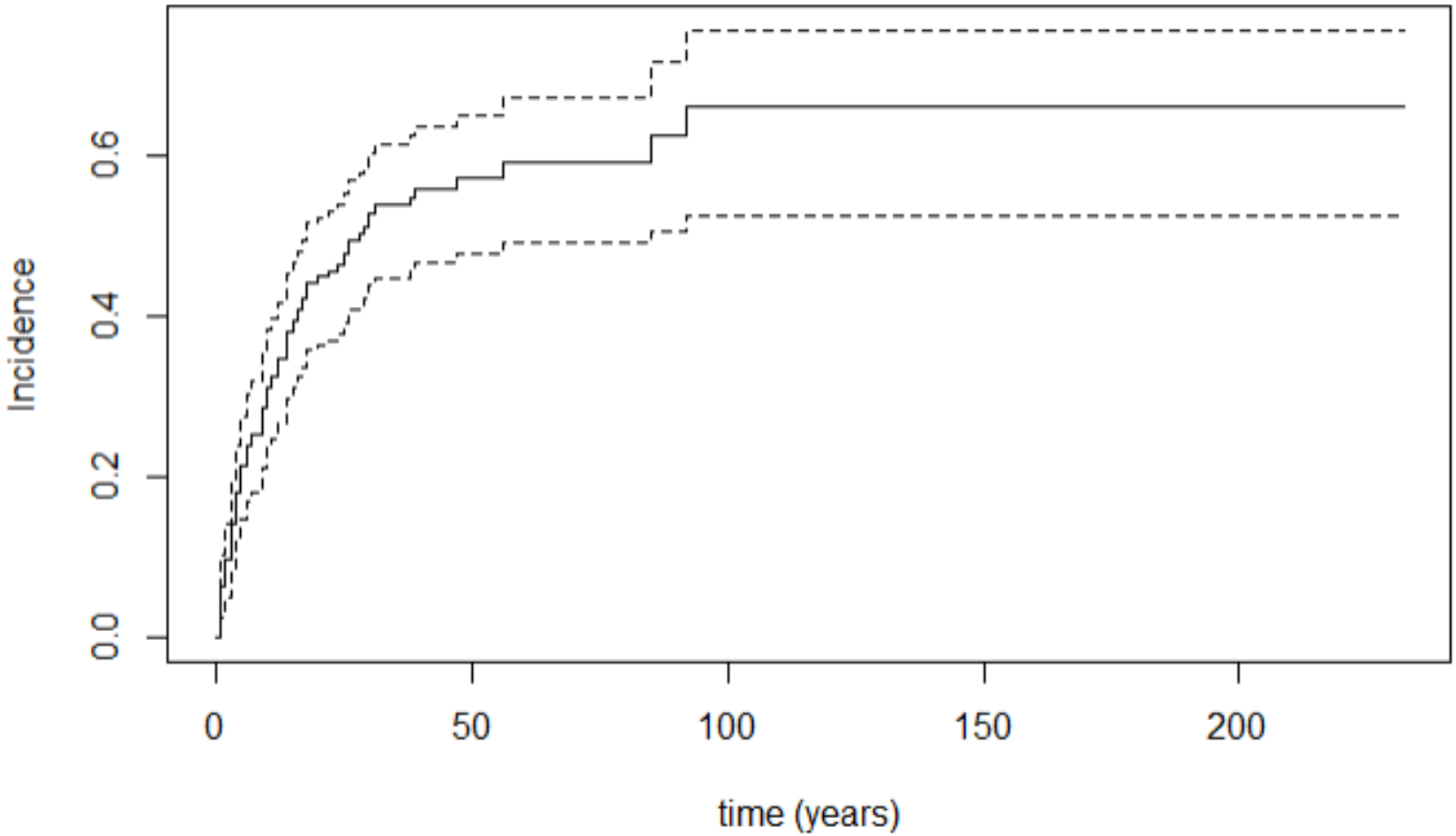


Figure: Kaplan-Meier cumulative incidence of a breakdown (after a first transition)

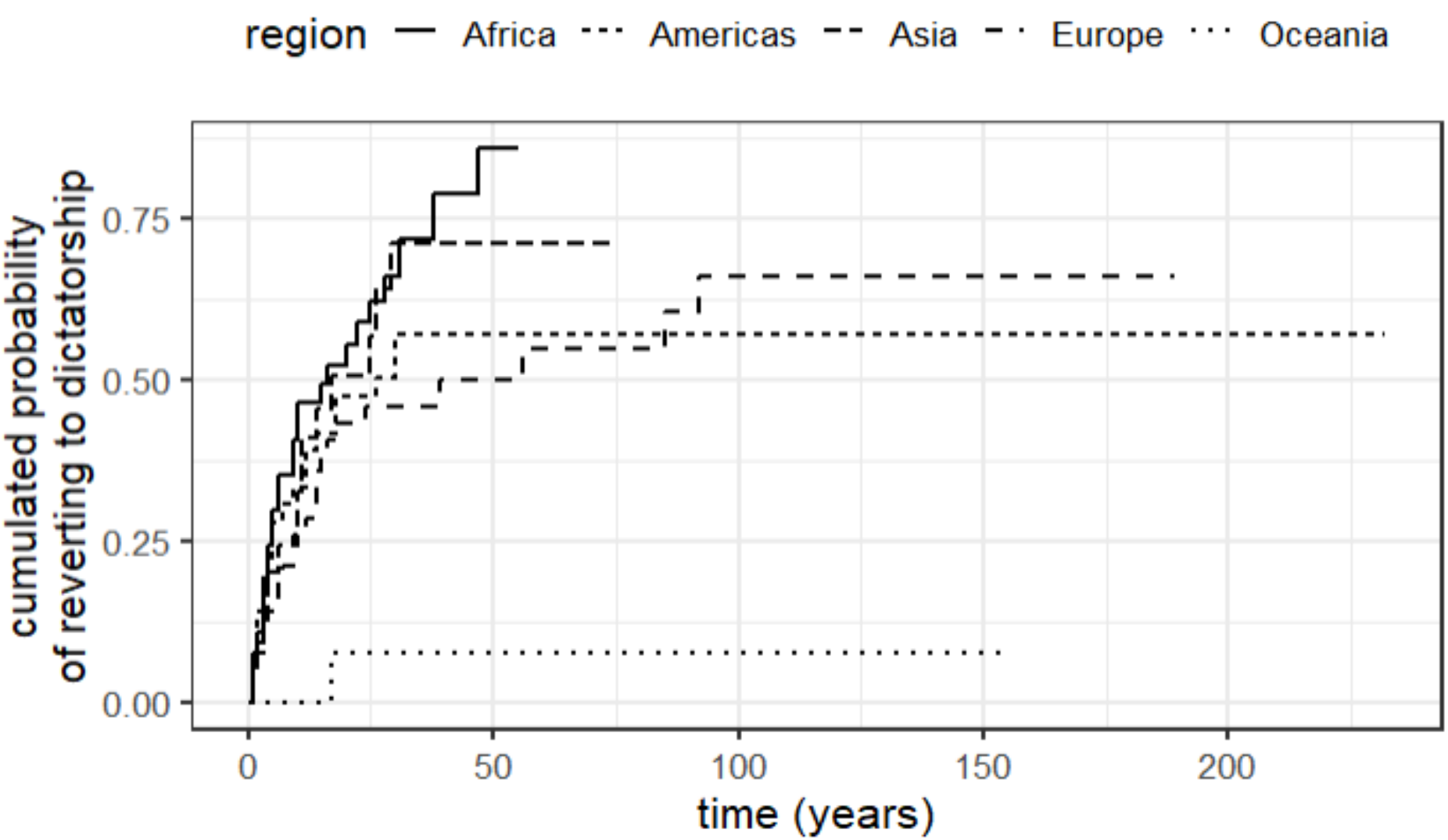


Figure: Cumulative probability of a breakdown (after a first transition), by region

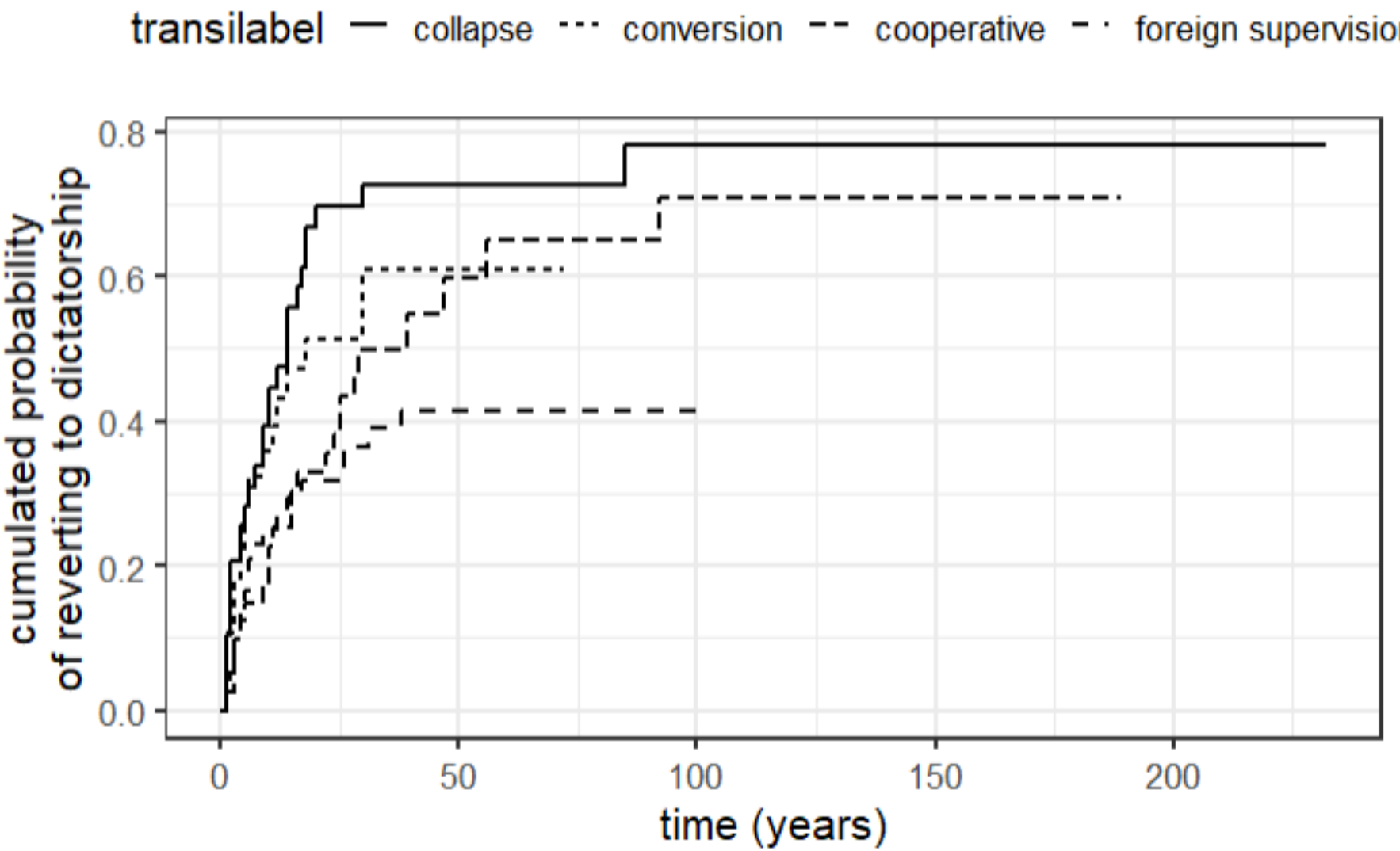


Figure: Cumulative probability of a breakdown (after a first transition), by type of transition

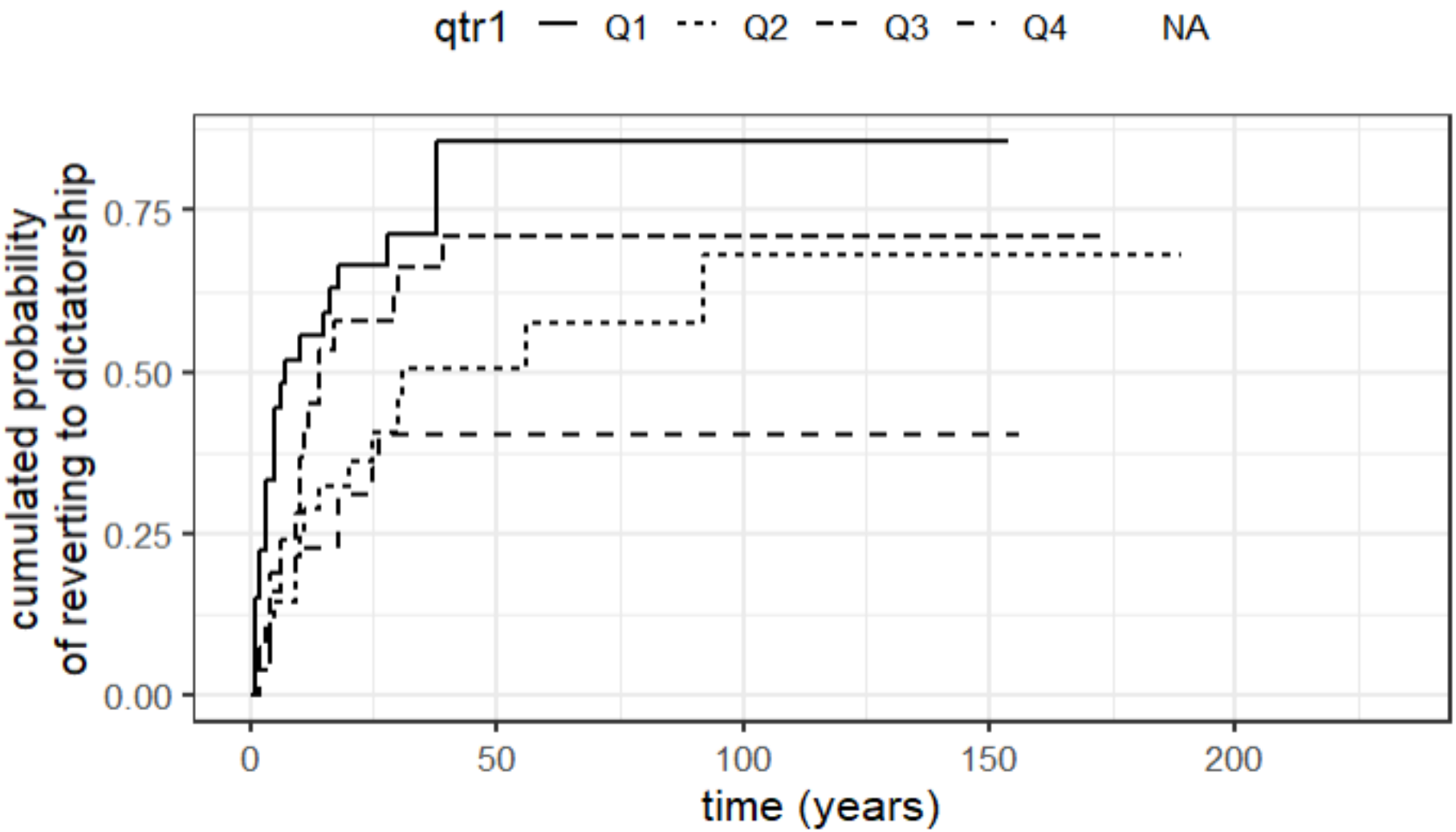


Figure: Cumulative probability of a breakdown (after a first transition), by quartile of GDP growth in the following 10 years (data 1789-2018)

Table: Semi-parametric Cox-regression for chance of a first democratic transition after 1950, excluding countries with past transitions, with interaction terms

	All countries	Asia	Eur-NA-Oc	MENA	Latin America	Sub-saharan Africa	Ex-communist Europe
	estimate	estimate	estimate	estimate	estimate	estimate	estimate
edu	3.451	48.969	-5.277	1554.133	34.725	4.264	-3490.000
	0.0001	*0.0000*	*0.9993*	*0.7359*	*0.0000*	*0.0531*	*0.0000*
incrank	0.004	-5.430	-0.720	-94.678	-0.123	-0.203	346.209
	0.9400	*0.0000*	*0.9996*	*0.7953*	*0.0016*	*0.4353*	*0.0000*
ineq	125.691	1587.866	59.838	-1975.000	-147.626	117.571	____
	0.0000	*0.0000*	*1.0000*	*0.9932*	*0.0368*	*0.0013*	____
britcol	1.313	154.985	____	-447.771	-23.371	70.426	____
	0.6767	*0.0000*	____	*0.9768*	*0.9988*	*0.0735*	____
frcol	8.518	307.759	____	108.966	-45.847	35.124	____
	0.1647	*0.0112*	____	*0.9948*	*0.9954*	*0.1272*	____
spcol	-8.993	0.000	____	0.003	____	-15.833	____
	0.0193	____	____	*1.0000*	____	*0.9985*	____
othcol	6.817	373.769	____	-7861.722	____	38.458	____
	0.4041	*0.0000*	____	*0.5715*	____	*0.0403*	____
eduxln(t)	-0.876	-10.799	-0.033	-363.399	-11.674	-1.180	939.989
	0.0001	*0.0000*	*1.0000*	*0.7481*	*0.0000*	*0.0430*	*0.0000*
incrankxln(t)	-0.003	1.293	0.275	22.138	____	0.051	-93.228
	0.8315	*0.0000*	*0.9999*	*0.8020*	____	*0.4358*	*0.0000*
ineqxln(t)	-34.071	-451.824	3.804	462.043	____	-32.282	-6028.731
	0.0000	*0.0000*	*1.0000*	*0.9924*	____	*0.0011*	*0.0000*
britcolxln(t)	-0.183	-36.815	____	104.701	____	-17.751	____
	0.8283	*0.0000*	____	*0.9776*	____	*0.0814*	____
frcolxln(t)	-2.075	-64.711	____	-25.481	____	-8.670	____
	0.1876	*0.0238*	____	*0.9949*	____	*0.1281*	____
spcolxln(t)	2.496	____	____	____	____	____	____
	0.0151	____	____	____	____	____	____
othcolxln(t)	-1.578	-87.663	____	1912.307	____	-9.537	____
	0.4478	*0.0000*	____	*0.5685*	____	*0.0399*	____

Notes: P-values in italic. HR refers to the hazard ratio compared to a reference value of 1. Regressors are edu: average t

Table: Semi-parametric Cox-regression for risk of a democratic breakdown, with interaction terms

	All countries	Asia	Eur-NA-Oc	MENA	Latin America	Sub-saharan Africa	Ex-communist Europe
	estimate	estimate	estimate	estimate	estimate	estimate	estimate
edu	0.449	8.399	9.926	-25.194	28.443	2.674	-1.624
	0.0075	*0.0000*	*1.0000*	*0.9983*	*0.0000*	*0.0000*	*1.0000*
incrank	0.020	0.378	-0.989	1.527	-0.328	0.502	0.289
	0.1807	*0.0000*	*1.0000*	*0.9981*	*0.0000*	*0.0000*	*1.0000*
ineq	26.163	693.397	273.464	-322.665	870.742	741.065	-37.758
	0.0000	*0.0000*	*1.0000*	*0.9991*	*0.0000*	*0.0000*	*1.0000*
curr	2.789	184.923	-17.914	-20.907	-53.621	-136.724	33.879
	0.0234	*0.0000*	*1.0000*	*0.9993*	___	*0.0000*	*0.9999*
debt	-0.833	-124.311	73.314	-6.223	-29.332	152.901	20.172
	0.5066	*0.0000*	*1.0000*	*0.9999*	*0.0000*	*0.0000*	*1.0000*
eduxln(t)	-0.300	-1.335	-2.010	0.017	-9.186	-6.737	0.355
	0.0000	*0.0000*	*1.0000*	*1.0000*	*0.0000*	*0.0000*	*1.0000*
incrankxln(t)	-0.006	-0.189	0.218	-0.016	0.132	-0.172	-0.073
	0.2940	*0.0000*	*1.0000*	*0.9999*	*0.0000*	*0.0000*	*0.9999*
ineqxln(t)	-10.086	-10.365	-55.870	0.647	-264.393	-386.626	10.356
	0.0000	*0.1270*	*1.0000*	*1.0000*	*0.0000*	*0.0000*	*1.0000*
currxln(t)	-1.028	-68.232	3.856	1.041	19.782	68.492	-9.769
	0.0238	*0.9416*	*1.0000*	*0.9999*	*0.0000*	*0.0000*	*0.9999*
debtxln(t)	0.268	28.972	-16.579	1.061	14.853	-76.015	-5.859
	0.5651	*0.0000*	*1.0000*	*1.0000*	*0.0000*	*0.0000*	*1.0000*

Notes: Crisis dummy (curr) takes 1 if a crisis occurred within a period of 10 years before the breakdown or during the entire period following a transition if no breakdown happened. Debt crisis (debt), and both from the Behavioral Finance & Financial Stability (HBS).

Table: Semi-parametric Cox-regression for chance of income per capita>Q3

	All countries	Asia	Eur-NA-Oc	MENA	Latin America	Sub-saharan Africa	Ex-communist Europe
	estimate	estimate	estimate	estimate	estimate	estimate	estimate
edu	0.081	-0.095	-0.027	0.377	0.016	0.044	0.014
	0.1230	*0.4798*	*0.9006*	*0.1749*	*0.9578*	*0.6655*	*0.9591*
elec	-6.214	-8.672	-22.915	-16.765	-6.649	-2.147	-25.195
	0.0107	*0.2740*	*0.2838*	*0.0679*	*0.5310*	*0.7451*	*0.1723*
polins	-0.247	-0.165	_____	_____	-0.387	-0.309	_____
	0.6121	*0.8566*	_____	_____	*0.7589*	*0.6970*	_____
libe	16.126	11.226	32.443	8.780	9.699	31.980	23.473
	0.0000	*0.1752*	*0.1856*	*0.5079*	*0.3000*	*0.0001*	*0.1462*
part	-9.277	-11.526	14.791	-8.272	-15.036	-19.709	-2.893
	0.0071	*0.1705*	*0.1768*	*0.5928*	*0.1875*	*0.0604*	*0.8710*
delib	-2.520	-6.878	-7.979	15.206	5.261	-1.432	-15.275
	0.3438	*0.3382*	*0.5629*	*0.2200*	*0.5299*	*0.8390*	*0.2713*
egal	-0.981	16.903	-16.792	4.153	1.224	-23.325	22.852
	0.7096	*0.0151*	*0.0511*	*0.8048*	*0.8663*	*0.0097*	*0.1403*

Notes: Take a value of 1 if income per capita increases above Q3 of the group at some given period and stays at this level for more than three years.)

Table: Semi-parametric Cox-regression for risk of income per capita<Q1

	All countries	Asia	Eur-NA-Oc	MENA	Latin America	Sub-saharan Africa	Ex-communist Europe
	estimate	estimate	estimate	estimate	estimate	estimate	estimate
edu	-0.119	-0.078	0.060	-0.167	0.903	-0.615	-0.252
	0.0375	*0.4025*	*0.7239*	*0.4206*	*0.2046*	*0.0244*	*0.0974*
elec	-3.449	5.708	3.331	-5.092	-10.137	-17.982	7.943
	0.1974	*0.5972*	*0.7152*	*0.5550*	*0.3282*	*0.0227*	*0.8016*
polins	-0.126	-0.305	————	————	1.547	-0.594	————
	0.7316	*0.7857*	————	————	*0.2930*	*0.3958*	————
libe	1.838	-13.560	20.222	18.976	26.726	13.709	-17.514
	0.5563	*0.1994*	*0.2450*	*0.2092*	*0.2216*	*0.0680*	*0.6724*
part	-1.158	-7.263	-9.235	24.695	-16.327	-5.605	5.281
	0.7075	*0.4394*	*0.3555*	*0.1010*	*0.2336*	*0.5742*	*0.9041*
delib	-6.385	2.594	-22.291	-14.176	8.986	-2.618	-2.048
	0.0382	*0.7753*	*0.0407*	*0.3448*	*0.5048*	*0.7637*	*0.9080*
egal	4.745	2.012	-0.464	-25.113	-36.942	1.060	0.735
	0.0347	*0.6800*	*0.9594*	*0.0536*	*0.0664*	*0.8885*	*0.9725*

Notes: Take a value of 1 if income per capita drops below Q1 of the group at some given period and stays at this level for more than three years.

Conclusion

The relationship between democracy and economic growth is very complex. So we have tried to study how political regime changes using the Cox regression.

Q1 Democratic transition affected by education, income inequality, and colonial experiences.

Q2 Democratic breakdown affected by education, income inequality, and colonial experiences.

Q3 Some political variables (elec, libe, part) influence a chance to become wealthy.
But the overall effect is mixed.

Q4 Education and some political variables (delib, egal) influence the risk to become poor.
But the overall effect of political variables is mixed.

Conclusion

- Overall, Income has no effect on democratic transitions (in favor of Exogenous Theory) or breakdowns
  - Utility $\neq$ Consumption?
  - Utility $>$ Consumption, at least in Western countries?
- A breakdown of democracy is influenced by education and income inequality.
- Education may be an important factor for a transition to democracy, but may also hinder it.
- But, the impact of education and income inequality is bigger on a chance of a first democratic transition than that of a breakdown.

Further consideration

- Recurrent event study?
- Interval censoring?
- Need to clarify the definition (or contents?) of education?
- Governance?

End