January 10 – 2023

Net-Appendix to:

Do democracy indices tell different stories?

Comparing eight democracy indices

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Content

Cross-references as Figure # is to the main paper, while Figure A# is to this Appendix. Table A1 is the same as Table 1. It is included for easy reference

Table A1. Variables used in main paper and in the Net-Appendix

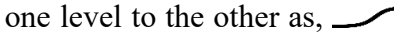
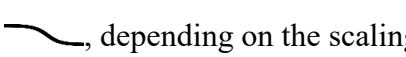
Project		Index	Scale, with range and step width in % of range
Maddison	(1)	***y****, income* = ln *gdp*	*gdp* is the real GDP per capita in PPP prices
Freedom House *FH*	(2)	*CLr* = 7 – *CL*, Civil Liberties	Closed set of [7, 1] integers. 7 is fully authoritarian, 1 is fully democratic. When *r* is added to name it is rescaled to [0, 6]. One year is missing and has been interpolated. Step width is 16.7% for *CL* and *PR*, and 8.3% for *FH*
	(3)	*PRr* = 7 – *PR,* Political rights	
	(4)	***FHr*** = (*CLr* + *PRr*)/2	
		F in the C-scale	
Polity	(5)	***Polity*** (2)	Closed set of [–10, 10] integers. –10 is fully authoritarian, 10 is fully democratic, 0 is no system. Step width is 5%
		P in the C-scale	
V-Dem	(6)	Polyarchy	Open interval]0, 1[2-3 decimals. 0 is perfect authoritarian, 1 is perfect democracy. These ideals are not reached. The de facto width for *Polyarchy* is [0.012, 0.926]. Step width is 0.1%, though the index is often given with 1 decimal less, so the step width is 1%
		V in the C-scale	
	(7)	*Vlib*, liberal dem.	
	(8)	*Vpar*, participatory dem.	
	(9)	*Vdel*, deliberate dem.	
	(10)	*Vega*, egalitarian dem.	
Samples: (i) *All 155 countries*, *N* = 6,599, (ii) *Main:* 139 countries, *N* = 5,872, (iii) *OPEC:* 16 countries, *N* = 727			

The ***C-scale*** is defined in Table 2. It gives the indices the same average and the range 100. Thus, it is in pp (percentage points). It is used on the main indices *FHr*, *Polity*, and *Polyarchy* that become *F*, *P*, and *V.* The paper uses data where observations are available across all series, 1972-2018. It is downloaded in July 2022. When only *P* and *V* are compared the sample starts in 1960. ***Terminology***: *Political system* and *regime* are used as synonyms. *Av* is the arithmetic average. Dem is democracy.

A1 Summary of the democratic transition part (IIA) of my book

Paldam, M., 2021. *The Grand Pattern of Development and the Transition of Institutions*. Cambridge UP, Cambridge UK and New York.

The Grand Transition is an aggregate of the transitions in all socioeconomic variables.

(1) A ***transition*** is a change from the traditional steady state to the modern one. It is a *strong underlying* process in the data. The best proxy for development is y. For a bounded ratio the curve is flat at the two ends. In between it moves from the one level to the other as,  or  , depending on the scaling of the variable. In each country, it is a fuzzy process.

(2) The ***equivalence*** hypothesis: The transition is roughly the same in wide cross-country data and long time-series. It should be tested where data permits. When tested it has proven a fine approximation. It is taken as the default when one dimension is missing from the data.

(3) This allows panel data to be ***unified*** into one big dataset, (x_j, y_j), organized by j. Transition paths are analyzed using kernel regressions on unified data, $x = K(y, bw)$, where bw is the bandwidth. Kernels greatly reduce the fuzziness.

The Democratic Transition is as strong in the data as the demographic transition.

(4) The empiric in the book mainly relies on the Polity index, but the main paper generalizes the findings to seven more democracy indices, and Gundlach (2021) covers two more.

(5) The transition is different in very resource rich countries, notably OPEC countries. This explains why the paper distinguishes between the Main sample and the OPEC sample.

(6) Three causality tests show that the long run causality is from Y to democracy.

Two models explain the Democratic Transition by causality from y to Democracy

(7) The old ***Three Pillars Model*** explains the underlying long-run transition curve. The traditional political system stands on three pillars: (i) A royal family, (ii) a feudal nobility and (iii) a national Church. The Grand Transition undermines the two last pillars, and eventually leads to democracy.

(8) The new ***Jumps Model*** explains how countries moves towards the transition path. Political systems are constant most years, but sometimes they jump. The jumps are generated by triggering events that happens randomly. The key mechanism is that the transition path acts as an attractor for the larger system jumps (above three points).

A2 Correlations between the eight indices and to y

Table A2 is used to calculate Table 5. The six matrices have the same format. Each matrix reports $\binom{9}{2} = 36$ meaningful correlations between all nine series. Of these $\binom{8}{2} = 28$ are between the democracy indices. They can be divided in 17 between indices from different projects (not shaded), 1 between the two indices from Freedom House (shaded), and 10 between the V-Dem indices (shaded). The last row gives 8 correlations between the indices and *y*, income.

Table A2. Correlations 1972-2018

	(1) *CLr*	(2) *PRr*	(3) *P*	(4) *V*	(5) *Vlib*	(6) *Vpar*	(7) *Vdel*	(8) *Vega*	(1) *CLr*	(2) *PRr*	(3) *P*	(4) *V*	(5) *Vlib*	(6) *Vpar*	(7) *Vdel*	(8) *Vega*
Unified: Calculated for all data in one string with N = 5,872 or 727 observations																
	A1. Main sample, N = 5,872								A2. OPEC sample, N = 727							
(2) *PRr*	0.93								0.84							
(3) *P*	0.86	0.90							0.70	0.78						
(4) *V*	0.90	0.92	0.90						0.76	0.84	0.91					
(5) *Vlib*	0.91	0.91	0.86	0.98					0.77	0.88	0.84	0.94				
(6) *Vpar*	0.90	0.89	0.87	0.98	0.98				0.76	0.82	0.91	0.96	0.91			
(7) *Vdel*	0.89	0.90	0.87	0.98	0.98	0.97			0.77	0.85	0.84	0.93	0.96	0.89		
(8) *Vega*	0.87	0.86	0.80	0.95	0.97	0.96	0.96		0.71	0.82	0.83	0.92	0.93	0.89	0.94	
(9) *y*	0.66	0.62	0.54	0.66	0.69	0.68	0.67	0.73	0.05	0.03	-0.16	-0.11	0.05	-0.12	0.05	0.08
Between countries: One correlation on averages for each country																
	B1. Main sample, N = 139								B2. OPEC sample, N = 16							
(2) *PRr*	0.98								0.95							
(3) *P*	0.93	0.95							0.77	0.84						
(4) *V*	0.96	0.96	0.93						0.85	0.90	0.96					
(5) *Vlib*	0.95	0.95	0.89	0.99					0.91	0.98	0.87	0.95				
(6) *Vpar*	0.95	0.94	0.90	0.98	0.98				0.86	0.90	0.96	0.97	0.92			
(7) *Vdel*	0.95	0.94	0.89	0.98	0.99	0.98			0.90	0.95	0.84	0.94	0.96	0.89		
(8) *Vega*	0.92	0.90	0.84	0.96	0.98	0.96	0.97		0.82	0.91	0.85	0.91	0.94	0.87	0.94	
(9) *y*	0.73	0.70	0.62	0.72	0.74	0.73	0.72	0.76	0.03	0.00	-0.44	-0.33	-0.08	-0.30	-0.09	-0.03
Within countries: One average of correlations for each country																
	C1. Main sample, N = 5,872, 139 countries								C2. OPEC sample, N = 727, 16 countries							
(2) *PRr*	0.60								0.58							
(3) *P*	0.58	0.56							0.54	0.47						
(4) *V*	0.55	0.51	0.74						0.35	0.30	0.85					
(5) *Vlib*	0.56	0.53	0.73	0.96					0.35	0.29	0.85	0.86				
(6) *Vpar*	0.52	0.52	0.70	0.88	0.86				0.34	0.29	0.85	0.89	0.86			
(7) *Vdel*	0.54	0.53	0.74	0.91	0.92	0.85			0.35	0.36	0.84	0.77	0.80	0.75		
(8) *Vega*	0.54	0.49	0.68	0.90	0.90	0.85	0.88		0.31	0.24	0.82	0.87	0.87	0.86	0.78	
(9) *y*	0.14	0.24	0.31	0.41	0.42	0.41	0.41	0.39	0.07	0.10	0.51	0.57	0.55	0.47	0.48	0.54

Within-project correlations are shaded in gray.

A3 Country values of Av(Dif), Av(Num) and r(P, V)

The data cover all 155 countries. The four data columns are:

Av *Dif*,	where $Dif = P - V$
Av *Num*,	where $Num = \lvert Dif \rvert$
Av	is the arithmetic average over the N observations for either *Dif* or *Num*
$r(x, y)$	is the correlation of x, y
N	is the number of observations from the country
na	no correlation is available in 27 countries as P is constant all years

Abbreviations: R is republic, N is North, S is South.

To get as long series as possible for each country seven countries are treated as continuations even when they change: (1) Czechoslovakia becomes the Czech R., (2) West Germany becomes Germany. (3) USSR becomes Russia. (4) Yugoslavia becomes Serbia (5). Sudan continues after South Sudan leaves. (6) North Vietnam becomes Vietnam. (7) North Yemen becomes Yemen.

The 155 countries are divided in the Main sample of 139 countries and 16 OPEC countries. Section A6 also consider the MENA group. Table A3 lists the countries in the OPEC and MENA groups.

The statistics for the OPEC countries are calculated in the same way as for the Main sample. While the average *Dif* is positive, in the Main sample and negative in the OPEC sample notably in the Arab countries; see Table 7.

Table A3. The OPEC and MENA groups in the data used

The bolded countries are included in both groups. It is seven Arab countries and Iran

OPEC present or former members. 16 countries: **Algeria**, Angola, Congo Br, Ecuador, Eq Guinea, Gabon, Indonesia, **Iran, Iraq, Kuwait, Libya**, Nigeria, **Qatar, Saudi Arabia, UAE**, and Venezuela. In Table A3 OPEC countries are marked with **O**
MENA (Middle East and North Africa) countries. 18 countries: **Algeria,** Bahrain, Egypt, **Iran, Iraq**, Jordan, **Kuwait**, Lebanon, **Libya,** Morocco, Oman, **Qatar, Saudi Arabia,** Syria, Tunisia, Turkey, **UAE**, and Yemen. The MENA group is all Arab countries, Turkey, and Iran. In Table A3 MENA countries are marked with **M**

Table A4. Average differences and correlations for the 155 countries, 1972-2018

Table A4.1. Countries 1-40

Nr	Country	Av *Dif*	Av *Num*	*r*	*N*
1	Afghanistan	-8.32	8.32	0.98	19
2	Albania	4.99	25.31	0.98	46
3	Algeria, **OM**	-8.06	17.00	0.83	47
4	Angola, **O**	-2.04	6.92	0.80	43
5	Argentina	-4.69	10.14	0.91	47
6	Armenia	16.49	22.06	0.08	28
7	Australia	-2.08	2.08	na	47
8	Austria	-0.19	0.59	na	47
9	Azerbaijan	-17.51	18.07	0.71	28
10	Bahrain, **M**	-23.06	23.06	0.83	17
11	Bangladesh	3.55	18.50	0.81	47
12	Belarus	-19.69	23.67	0.86	27
13	Belgium	-3.48	4.24	-0.71	47
14	Benin	0.15	6.81	0.99	47
15	Bolivia	7.36	10.22	0.90	47
16	Botswana	3.65	3.70	0.93	47
17	Brazil	-5.86	10.11	0.93	47
18	Bulgaria	0.89	12.86	0.98	47
19	Burkina Faso	-13.96	18.92	0.62	32
20	Burundi	7.87	16.44	0.87	43
21	Cabo Verde	2.06	7.35	0.98	44
22	Cambodia	6.76	12.23	0.78	35
23	Cameroon	-18.17	-18.17	0.89	47
24	Canada	3.54	3.54	na	47
25	CAR	2.03	14.44	0.88	44
26	Chad	-1.02	5.34	0.81	41
27	Chile	-3.48	7.19	0.95	47
28	China	-8.29	8.29	0.63	47
29	Colombia	20.55	20.55	-0.47	47
30	Comoros	11.53	22.75	0.91	38
31	Congo Br, **O**	-9.50	13.66	0.80	47
32	Congo Ki	-3.66	24.03	0.86	36
33	Costa Rica	-1.62	3.95	na	47
34	Côte d'Ivoire	-16.63	21.71	0.88	38
35	Croatia	-5.18	7.87	0.95	28
36	Cuba	-9.25	9.25	0.27	47
37	Cyprus	11.34	11.34	0.57	47
38	Czech R	-8.79	9.57	0.99	47
39	Denmark	-4.56	4.56	na	47
40	Djibouti	-0.74	21.07	0.81	42

Table A4.2. Countries 41-80

Nr	Country	Av *Dif*	Av *Num*	*r*	*N*
41	Dominican R	13.11	14.59	0.93	47
42	Ecuador, **O**	4.45	7.41	0.94	47
43	Egypt, **M**	-11.05	11.38	0.06	47
44	El Salvador	19.93	20.97	0.70	42
45	Eq Guinea, **O**	-10.55	10.55	0.68	47
46	Estonia	-8.21	10.27	0.44	28
47	Ethiopia	-0.27	9.93	0.86	43
48	Finland	0.44	1.97	na	47
49	France	-2.84	2.84	0.79	47
50	Gabon, **O**	-14.80	20.46	0.89	47
51	Gambia	6.80	20.26	0.96	47
52	Georgia	11.68	11.68	0.88	26
53	Germany	-2.22	2.28	na	47
54	Ghana	-3.23	8.82	0.93	47
55	Greece	-2.53	3.82	0.96	47
56	Guatemala	13.26	15.11	0.96	47
57	Gu-Bissau	2.51	13.89	0.98	44
58	Guinea	-2.79	12.71	0.92	47
59	Haiti	-2.88	21.39	0.85	35
60	Honduras	20.07	20.07	0.89	47
61	Hungary	1.04	9.39	0.95	47
62	India	10.76	10.76	0.51	47
63	Indonesia, **O**	-7.53	14.04	0.99	47
64	Iran, **OM**	-8.25	16.54	0.73	47
65	Iraq, **OM**	-7.52	15.86	0.94	40
66	Ireland	0.25	2.24	na	47
67	Israel	-6.40	8.95	-0.25	47
68	Italy	3.12	3.33	na	47
69	Jamaica	19.31	19.35	-0.89	47
70	Japan	2.45	2.45	na	47
71	Jordan, **M**	-8.87	11.39	0.91	47
72	Kazakhstan	-17.51	17.51	0.68	28
73	Kenya	4.05	22.91	0.94	47
74	Korea N	-21.62	21.62	0.33	29
75	Korea S	-9.10	10.60	0.97	47
76	Kuwait, **OM**	-27.41	27.41	0.94	44
77	Kyrgyzstan	7.41	16.01	0.89	28
78	Laos	-7.27	7.27	0.78	45
79	Latvia	-3.44	5.22	na	28
80	Lebanon, **M**	16.81	16.81	0.83	17

Table A4.3. Countries 81-120

Nr	Country	Av *Dif*	Av *Num*	*r*	*N*
81	Lesotho	6.20	17.19	0.94	47
82	Liberia	-3.26	10.78	0.93	34
83	Libya, **OM**	-5.90	5.90	na	39
84	Lithuania	3.24	3.24	na	28
85	Luxembourg	-1.10	1.10	na	47
86	Macedonia	27.11	27.11	0.55	27
87	Madagascar	9.37	19.31	0.89	45
88	Malawi	-4.28	20.15	0.97	47
89	Malaysia	29.08	29.08	0.63	47
90	Mali	-1.03	10.85	0.96	46
91	Mauritania	-16.11	16.61	0.79	47
92	Mauritius	10.94	10.94	0.84	47
93	Mexico	1.05	10.86	0.99	41
94	Moldova	21.01	21.01	0.14	28
95	Mongolia	3.24	16.48	0.99	47
96	Montenegro	33.73	33.73	na	13
97	Morocco, **M**	-17.96	17.96	0.94	47
98	Mozambique	5.09	14.15	0.98	44
99	Myanmar	-5.25	12.05	0.76	47
100	Namibia	0.88	3.44	na	29
101	Nepal	9.15	18.86	0.81	47
102	Netherlands	-0.03	0.65	na	47
103	New Zealand	-1.38	1.82	na	47
104	Nicaragua	9.61	18.97	0.76	45
105	Niger	0.34	9.39	0.94	47
106	Nigeria, **O**	2.40	16.40	0.86	46
107	Norway	-1.63	2.16	na	47
108	Oman, **M**	-16.06	16.06	0.91	47
109	Pakistan	15.32	26.32	0.63	47
110	Panama	3.87	9.45	0.94	47
111	Paraguay	3.98	18.43	0.98	47
112	Peru	2.71	6.15	0.96	47
113	Philippines	10.81	21.32	0.97	47
114	Poland	-7.29	10.71	0.97	47
115	Portugal	-0.73	3.83	0.94	47
116	Qatar, **OM**	-17.60	17.60	na	45
117	Romania	-.95	16.13	0.98	47
118	Russia	9.29	16.69	0.85	45
119	Rwanda	-8.39	9.49	0.29	47
120	Saudi Arabia, **OM**	-15.20	15.20	na	47

Table A4.4. Countries 121-155 and statistics

Nr	Country	Av *Dif*	Av *Num*	*r*	*N*
121	Senegal	-13.29	16.40	0.87	47
122	Serbia	1.66	13.64	0.89	47
123	Sierra Leone	-2.01	16.74	0.95	43
124	Singapore	-16.58	16.58	0.77	47
125	Slovakia	0.35	2.83	0.82	26
126	Slovenia	1.50	1.89	na	28
127	South Africa	22.62	22.62	0.96	47
128	Spain	-0.87	4.87	0.95	47
129	Sri Lanka	12.07	12.07	0.65	47
130	Sudan	-5.38	10.14	0.87	47
131	Swaziland	-17.75	17.75	0.34	46
132	Sweden	-5.26	5.26	na	47
133	Switzerland	-1.79	1.96	na	47
134	Syria, **M**	-19.96	19.96	0.38	47
135	Taiwan	4.15	11.94	0.93	47
136	Tajikistan	-1.72	6.07	0.23	28
137	Tanzania	-16.26	17.95	0.81	47
138	Thailand	19.29	21.21	0.85	47
139	Togo	-11.92	11.92	0.85	47
140	Trinidad	3.53	5.66	0.90	47
141	Tunisia, **M**	-9.51	11.69	0.87	47
142	Turkey, **M**	14.97	18.93	0.70	47
143	Turkmenistan	-19.90	19.90	0.42	28
144	UAE, **OM**	-7.32	7.32	na	47
145	Uganda	-4.30	11.35	0.49	45
146	UK	1.63	3.29	-0.28	47
147	Ukraine	18.50	18.50	0.59	28
148	Uruguay	-3.46	5.43	0.99	47
149	USA	-0.72	2.55	0.45	47
150	Uzbekistan	-25.63	25.63	na	28
151	Venezuela, **O**	6.82	10.55	0.83	47
152	Vietnam	-15.54	15.54	na	47
153	Yemen, **M**	-0.86	4.25	0.88	40
154	Zambia	-2.96	21.78	0.90	47
155	Zimbabwe	-1.25	18.36	0.13	39

Statistics

Not available			27	
Av all	0.82	12.88	0.75	155
Av Main	0.00	12.76	0.74	139
Av OPEC	8.00	13.93	0.85	16

A4 Robustness of kernels in Main sample: To time-period and bw

This section only looks at the three main indices and use the C-scale for easy comparison.

Figures A1. The three curves for the *F* (Freedom House index)

Figure A1.1
Annual data.
Figure 3a show the
bw = 0.3 kernel

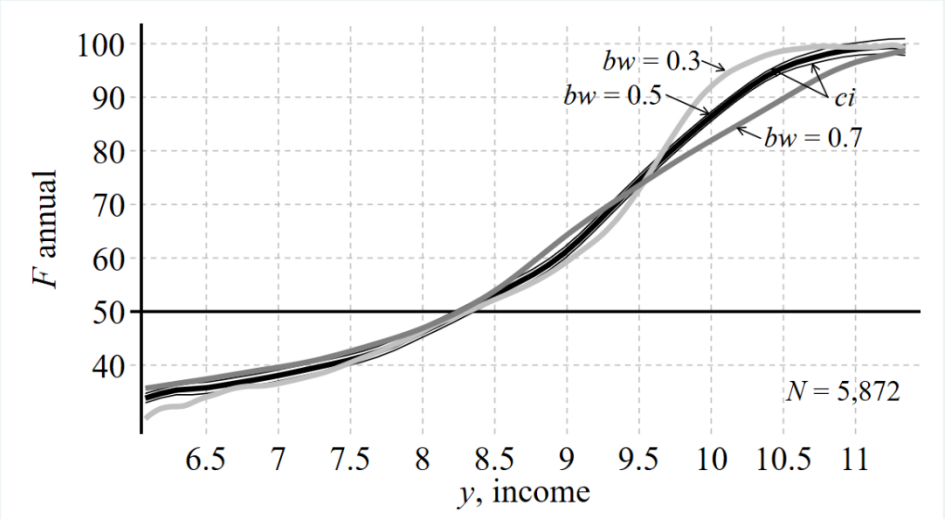


Figure A1.2
5-year data

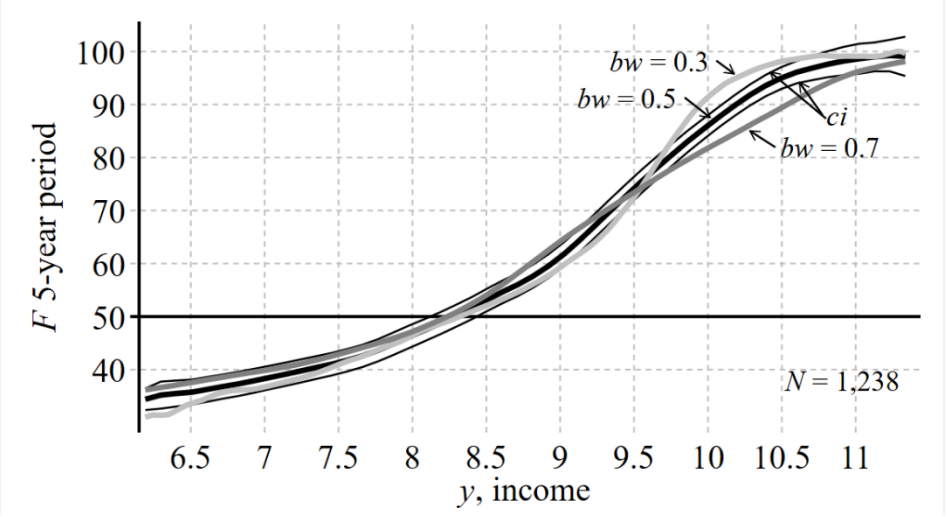
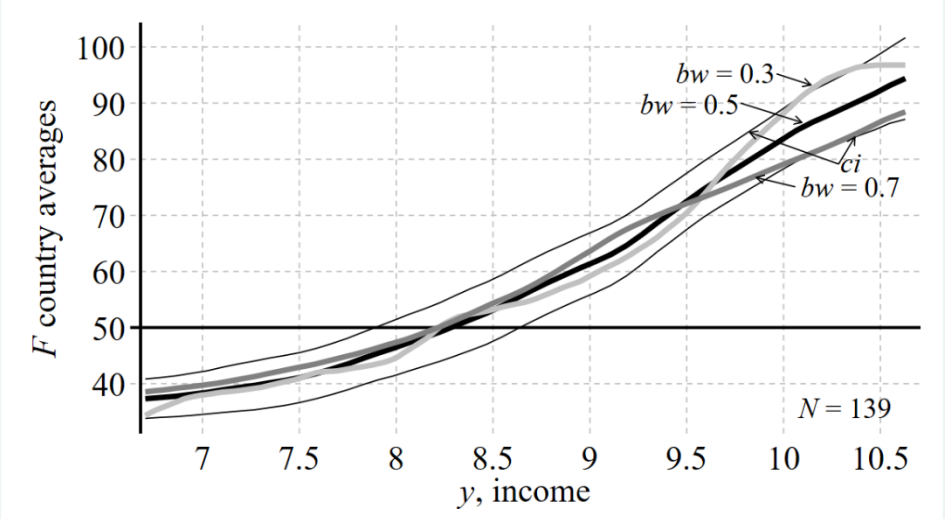


Figure A1.3
Country averages.
Figure 3b show the
bw = 0.3 kernel



Figures A2. The three curves for the *P* (Polity index)

Figure A2.1
Annual data.
Figure 3a show the
bw = 0.3 kernel

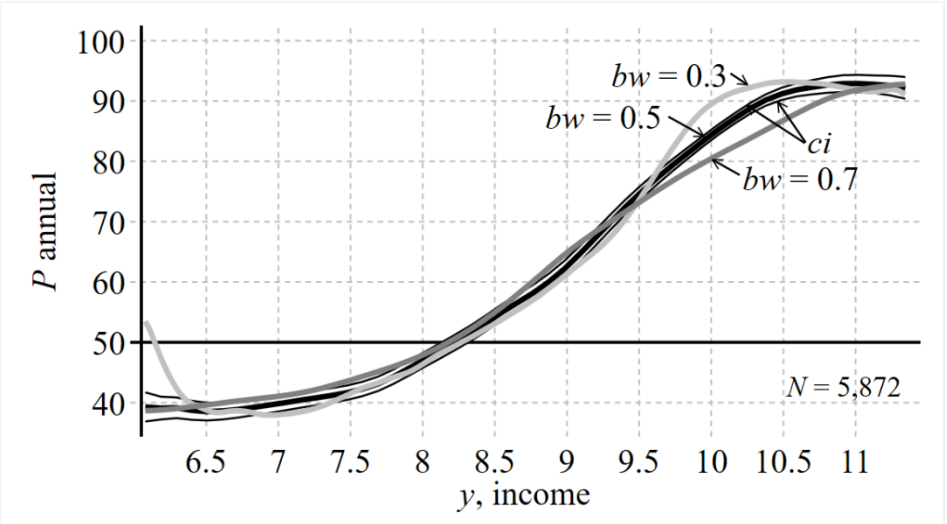


Figure A2.2
5-year data

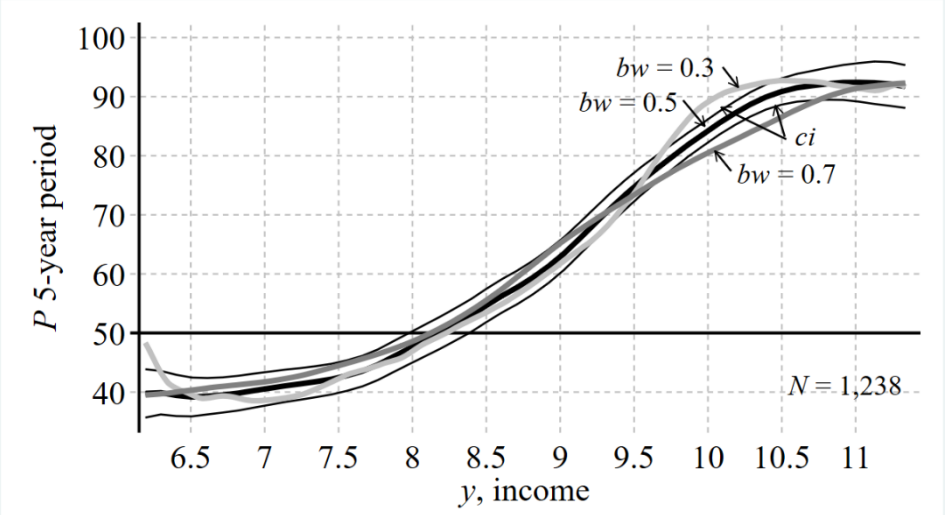
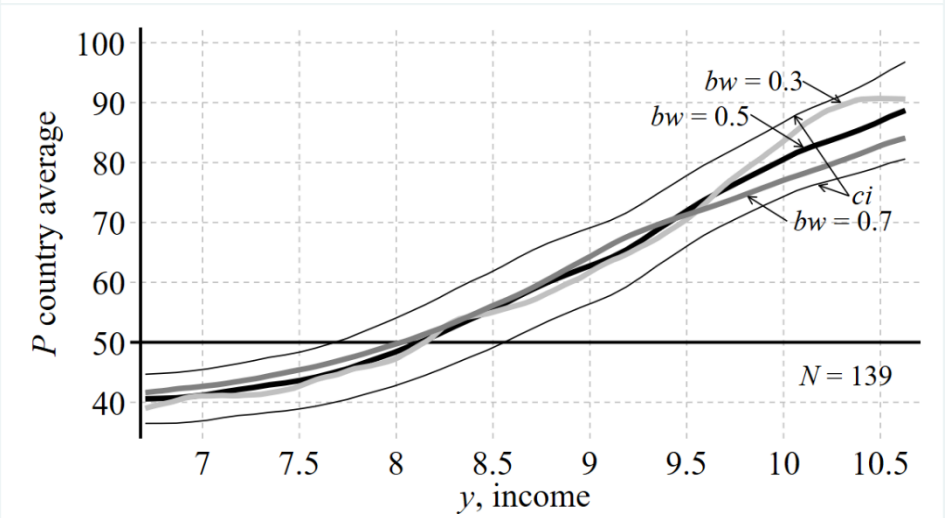


Figure A2.3
Country averages.
Figure 3b show the
bw = 0.3 kernel



The curves show the 95% confidence intervals, *ci*, but only for *bw* = 0.5. They are narrow for the large sample of 5,584 annual observations, then they widen a bit for the 1,124 5-year averages, and finally it widens more for the 139 country averages. Here the three kernels are (almost) within the *ci*'s for the *bw* = 0.5 kernel, an all three figures.

Figures A3. The three curves for *V* (Polyarchy index)

Figure A3.1
Annual data.
Figure 3a show the
bw = 0.3 kernel

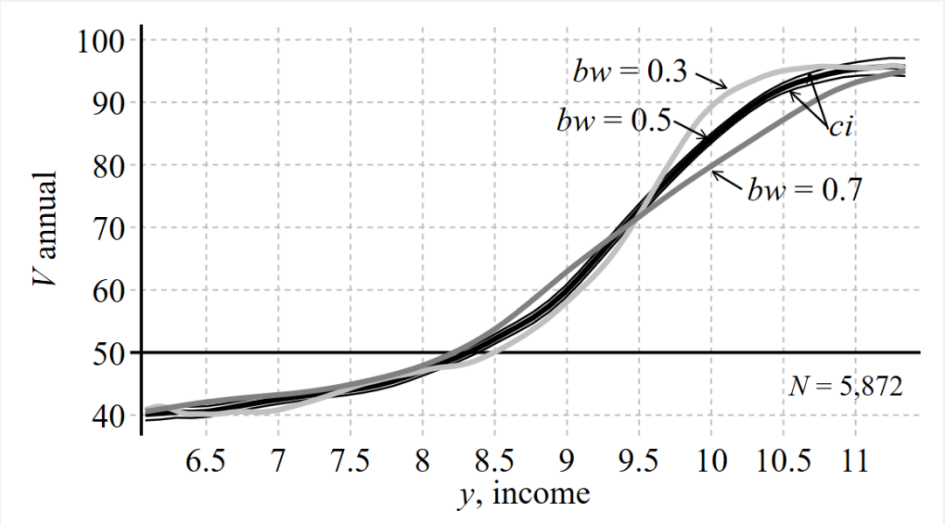


Figure A3.2
5-year data

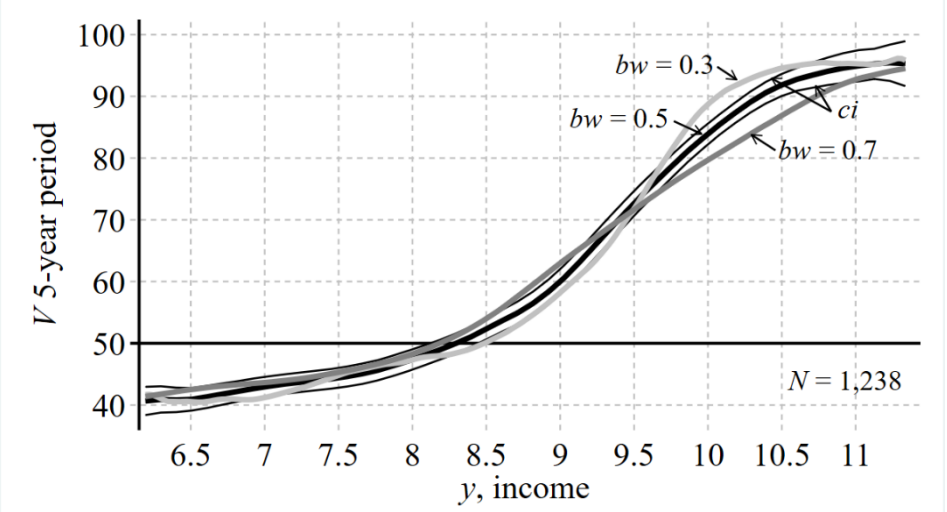
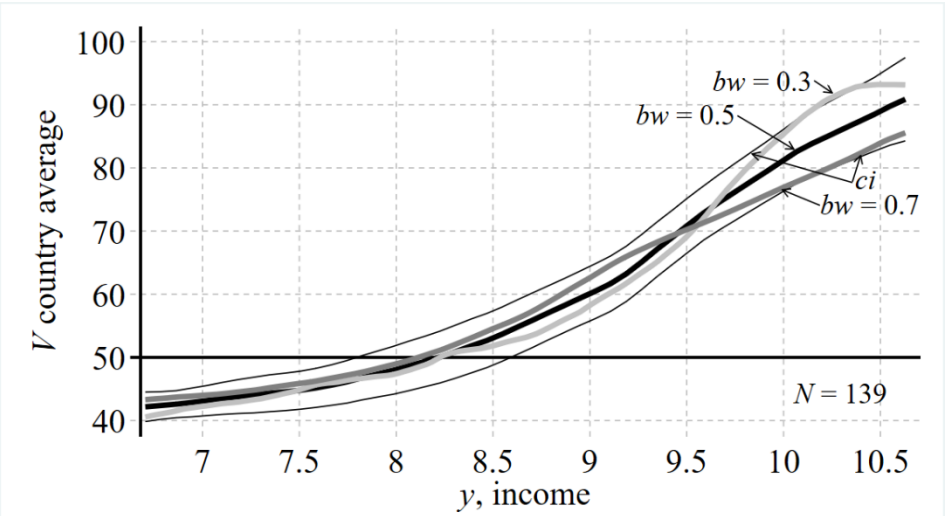


Figure A3.3
Country averages.
Figure 3b show the
bw = 0.3 kernel



All 27 curves on the 9 graphs are rather similar. They are consistent with roughly the same transition curve as argued in the main paper. The curves are shown for *bw* = 0.3, 0.5 and 0.7. This a wide range and the nicest transition curve are always for *bw* = 0.3 as shown in the main paper. As *bw* increases the curve becomes flatter as it should.

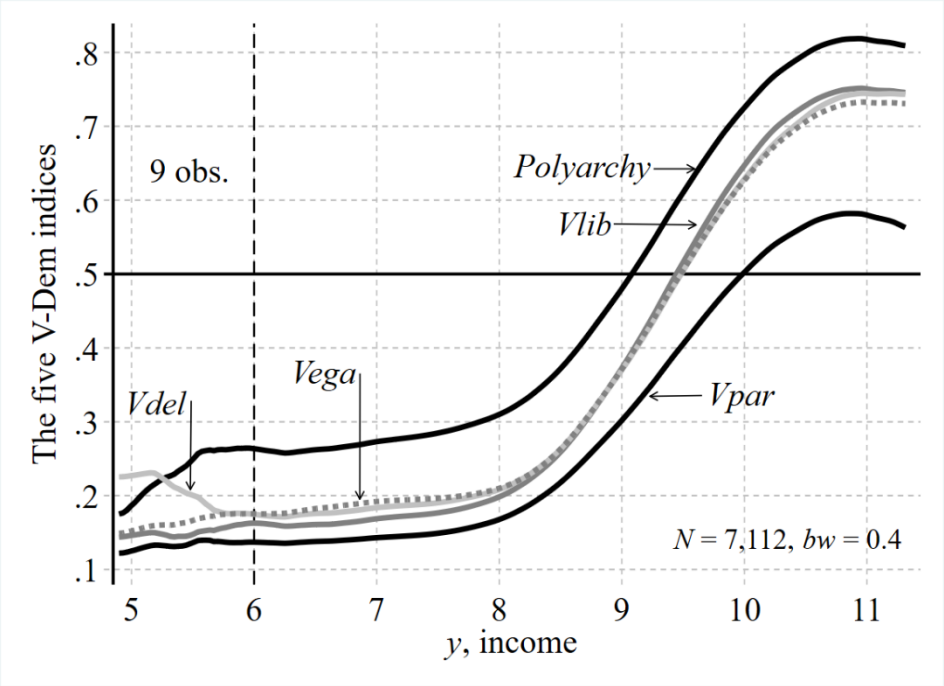
A5 Kernels in the five V-Dem indices compared, 1960-2018

The V-Dem project reports five democracy indices: (i) *Polyarchy*, (ii) *Vlib* liberal democracy, (iii) *Vpar* participatory democracy, (iv) *Vdel* deliberate democracy, and (v) *Vega* egalitarian democracy. The V-Dem manual gives a fine description of the conceptual difference between these indices.

The transition in all five is depicted on Figure A4, using the 7,112 observations from 1960 to 2018 for the observations for the Main sample, i.e., the observations where an *y* observation is available. If the observations were equally distributed, there should be 1,100 observations in each *y* interval of 1. However, there is only nine observations below 6, so we concentrate on the y interval [6, 11.4].

In that interval, the indices have three levels. *Polyarchy* is the highest, *Vlib*, *Vdel* and *Vega* are practically the same, while *Vpar* is lowest. All five transition curves are parallel, and show a fine transition pattern.

Figure A4. The transition in the five V-Dem indices

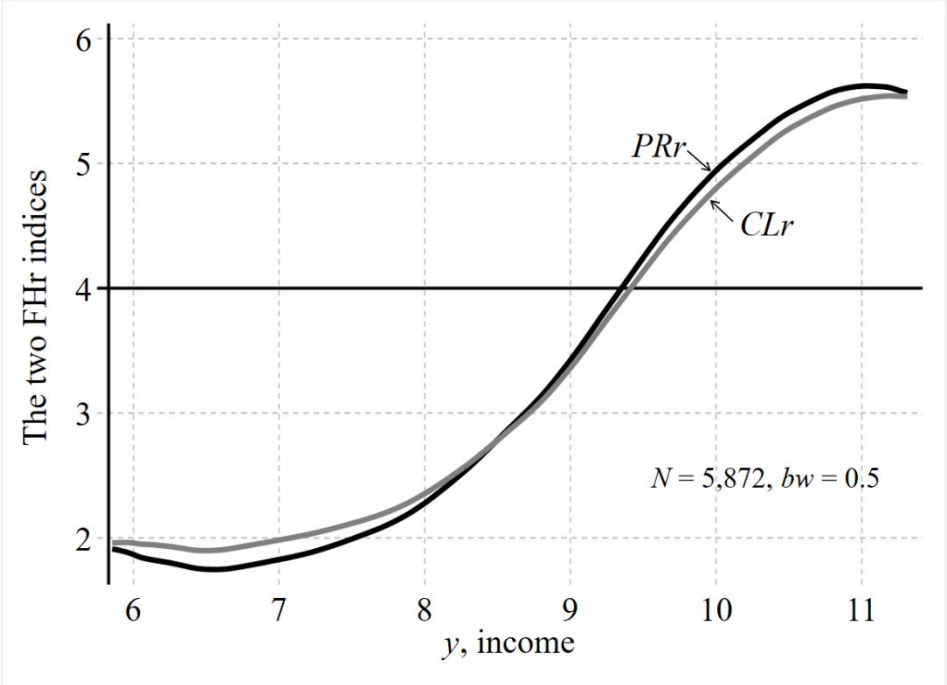


A6 Kernels in the two FHr indices compared, 1972-2018

The Freedom House report two indices *PR* for political rights, and *CL* for civil liberties. They are surely conceptually different, but Table A2 show that they are strongly correlated. Figure A5 show the transition curve in the two series. To make the curves easily comparable to the kernels showed above the figure uses the rescaled series *PRr* and *CLr*. The two curves are very similar and show a fine transition pattern. As the data has the step width of 16.7 pp, the *bw* is 0.5.

Note that while poor countries are doing relatively better on the *CLr* variable, it is the reverse picture for the *PRr* variable. These differences are rather small.

Figure A5. The transition in the two FHr indices



From sections A5 and A6 it should be obvious why the main paper only displays the transition curves for the mains series, *F*, *P* and *V*.

A7 Paths of indices for OPEC and MENA countries

This section looks at the three main indices, 1972-2018, and use the C-scale. The countries of the two country groups are listed in Table A3 above. The OPEC countries on Figure A6 start at an y level at 7, while the MENA countries Figure A7 starts at 6.2. In addition, all MENA countries with high y are also OPEC members. Thus, the two figures can only be compared for the *y* [7, 10.5].

Figure A6. The path of the three main indices in the OPEC countries (same as Figure 3c)

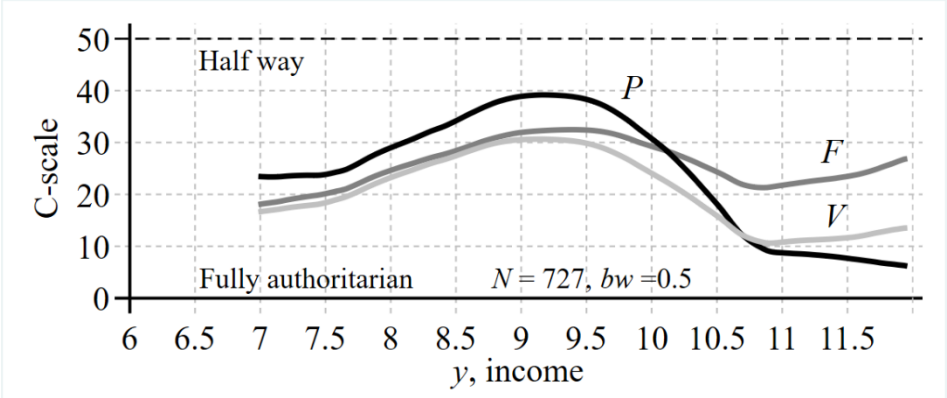
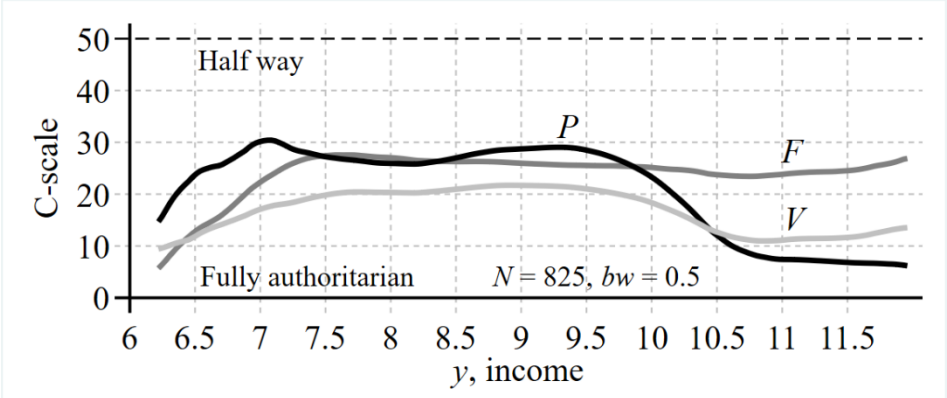


Figure A7. The path of the three main indices for the MENA countries



Neither curve shows a democratic transition. Two explanations seem likely: Oil (for OPEC) and Islam (for MENA). Due to the substantial overlap between the two groups, and the strong spatial effects within the Arab countries, it is not easy to sort out the two explanations.

A8 Reverse kernels for the three annual series in A4

Figure 3 and section A4 show the three main kernels:

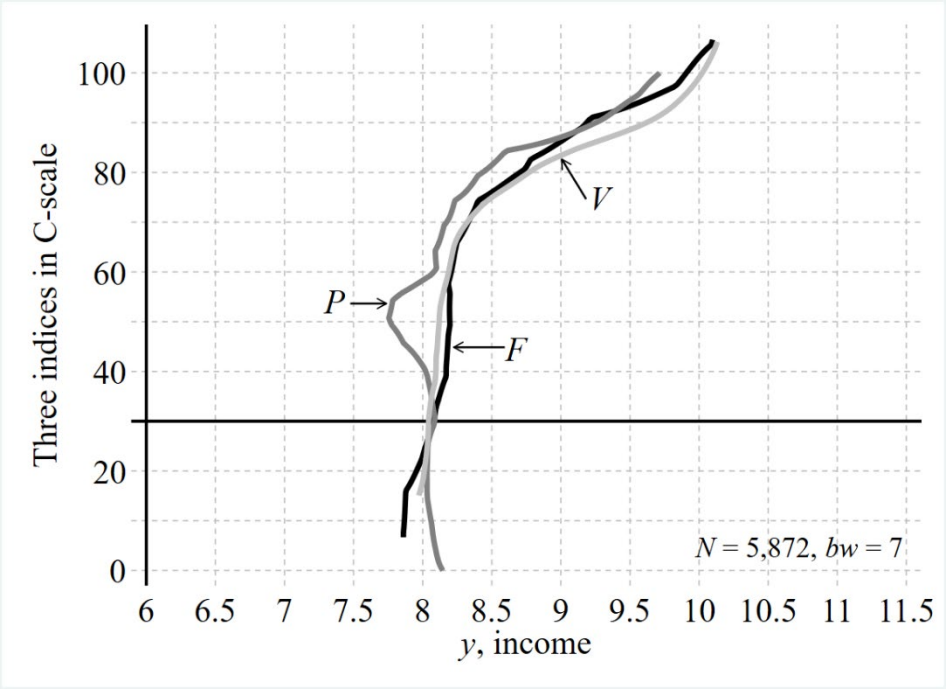
$F = K(y, 0.3)$, $P = K(y, 0.3)$, and $V = K(y, 0.3)$, where the data are ordered by y

Figure A8 are the reverse kernels in the annual data:

$y = K(F, 7)$, $y = K(P, 7)$, and $Y = K(V, 7)$, where the data are ordered by F, P and V

The bandwidth is much higher corresponding the the large diffence in the range on the explained variable. The graph uses the same axes, so that it is obvious that the graphs are different. Note that Income, y, has the range [6, 11.5], where only [7.7, 10.2] is used on Figure A8, and for F, P, and V in the range [0, 80], only the y range [7.7, 8.7] is used.

Figure A8. The three reverse kernels for the annual data



While the kernels on Figure 3 are easy to explain using the transition theory, the reverse kernels on Figure A8 are much less easy to explain, and they explain very little.

A9 Autocorrelations in Polity and Polyarchy, 1960-2018

Figure A9 compares the autocorrelations in the *Polity* and the *Polyarchy* series. It is calculated for all 139 countries in the Main sample. Some series have gaps, in two ways, (ii) if *Polity* is constant no correlation is calculated. The "No gap" line consider the 111 countries where all correlations are calculated. (ii) There may be missing years in the data for a country, such as during a civil war. To make sure that the series are complete the "All 57 obs" line is estimated. It is for 46 countries. Finally, The line where where no correlations are calculated for *Polity* is reported for *Polyarchy* is the 17 cases where all 57 observations are available.

Figure A9. Autocorrelation functions

Figure A9a. For *Polity*

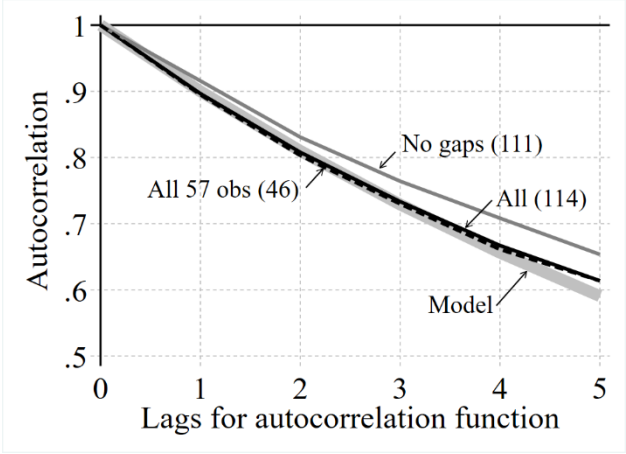
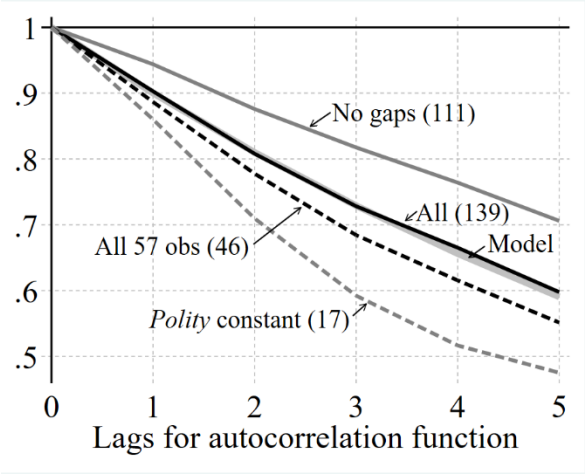


Figure A9b. For *Polyarchy*



The main impression from Figure A9 is that the two comparable autocorrelation lines – for "No gaps" and "All 57 obs" are remarkable similar in *Polity* and *Polyarchy* despite the different "structure" of the two indices, where *Polity* is constant most years, while *Polyarchy* change every year. The first autocorrelation AR(1) ≈ 0.9 in both indices. The fat light gray curve is the model: $AR(i) = 0.9^i$. It is obvious that it gives a good description of the curves.

No autocorrelation is calculated for a constant series, but one may interpret this case as the limiting case where the autocorrelation is 1 for all lags. Hence, the autocorrelation function should be close to one in the *Polyarchy* series in the case of the 17 countries where *Polity* is constant, but they are not. Here the autocorrelations in these *Polyarchy* series are unusually low. The only explanation I have found of this strange fact is that when democracy is high the V-Dem data becomes relatively noisy, as suggested by the Nordic case in the next section.

A9 Leads and lags between the eight indices, 1972-2018

The seven correlograms shown in this section are calculated for 1972 to 2018 as the average for the 117-135 such correlograms for all countries possible. The correlograms allow us to see if any indices predict any other.

The autocorrelation in the series is about 0.9, so the curves should taper off around the peak for the strongest correlation, as indeed they do. Figure A10a shows an almost perfectly symmetric correlogram between *P* and the *F* index. Thus, neither index can be used as a predictor of the other. Figure A10b analyzes the correlations between *P* and *V*. Here, the peak is about 0.74, but the correlation-curve is not perfectly symmetrical, and it appears that *P* leads *V* a little. It is difficult to assess if the difference is significant.

Figure A10a. The relation of *P* and *F*

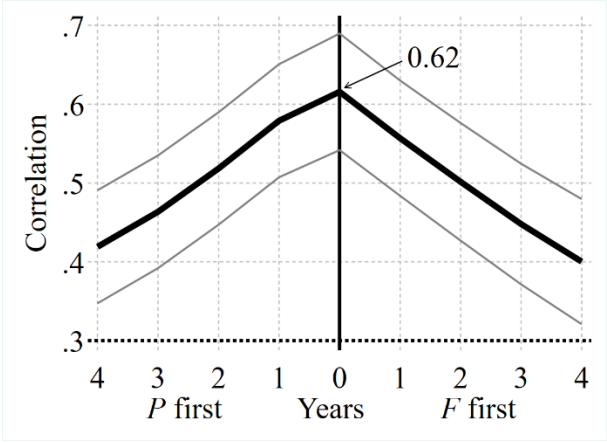
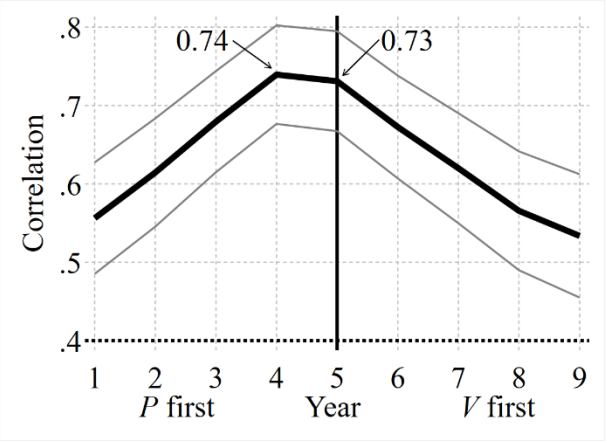
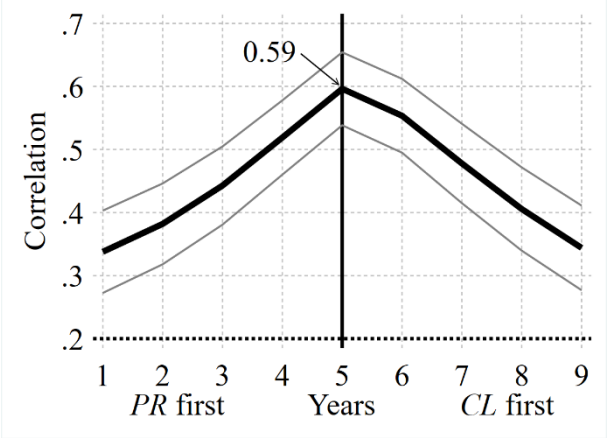


Figure A10b. The relation of *P* and *V*



Note: the arrows point to the average with country correlations.

Figure A11. The relation between *PR* and *CL*



The correlations between the two Freedom House indices are only 0.59 see Figure A11. Thus, the difference to the between country correlations is unusually large. There is a small tendency for *CL* to lead *PR*, but this tendency in surely not significant.

Finally, the four correlograms on Figure A12 report the within project correlations for the five V-Dem indices. The most interesting point about the four graphs is that they are amazingly similar and fully symmetrical. It certainly confirms the observation from section 2 that the story they tell are the same. That is, the information obtained by the whole handful of democracy indices from the V-Dem project similar.

Figure A12a. The relation of *V* and *Vlib*

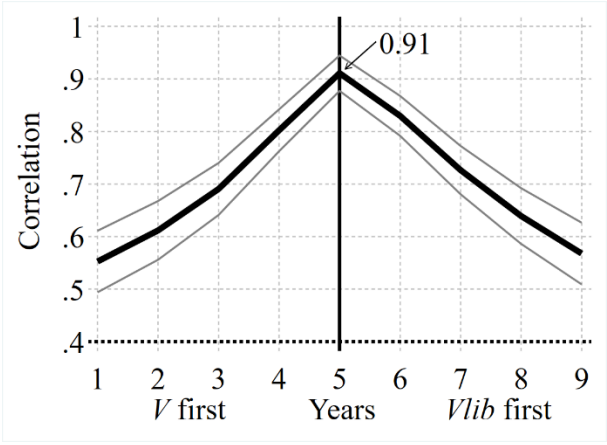


Figure A12b. The relation of *V* and *Vpar*

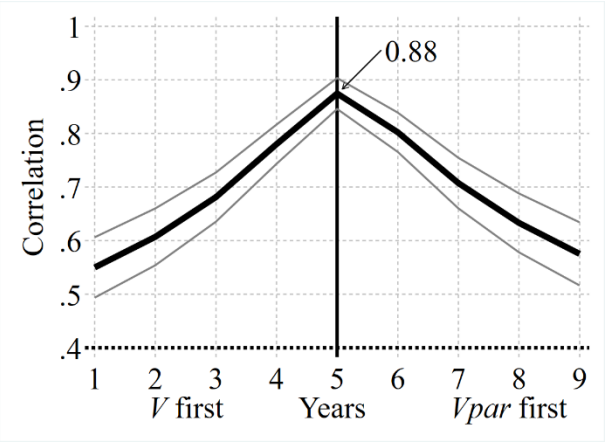


Figure A12c. The relation of *V* and *Vdel*

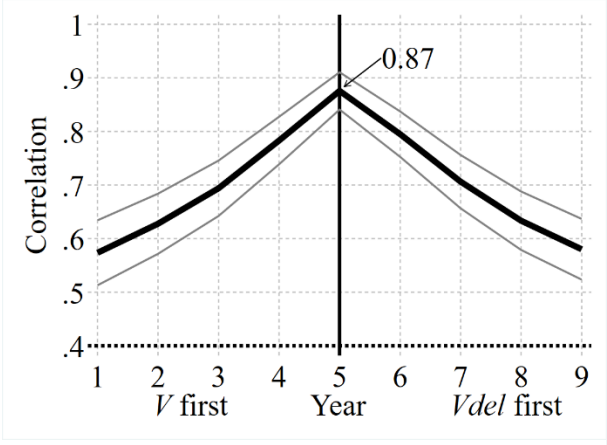
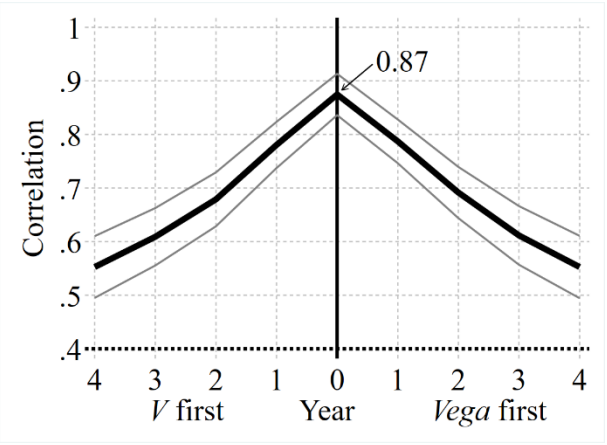


Figure A12d. The relation of *V* and *Vega*



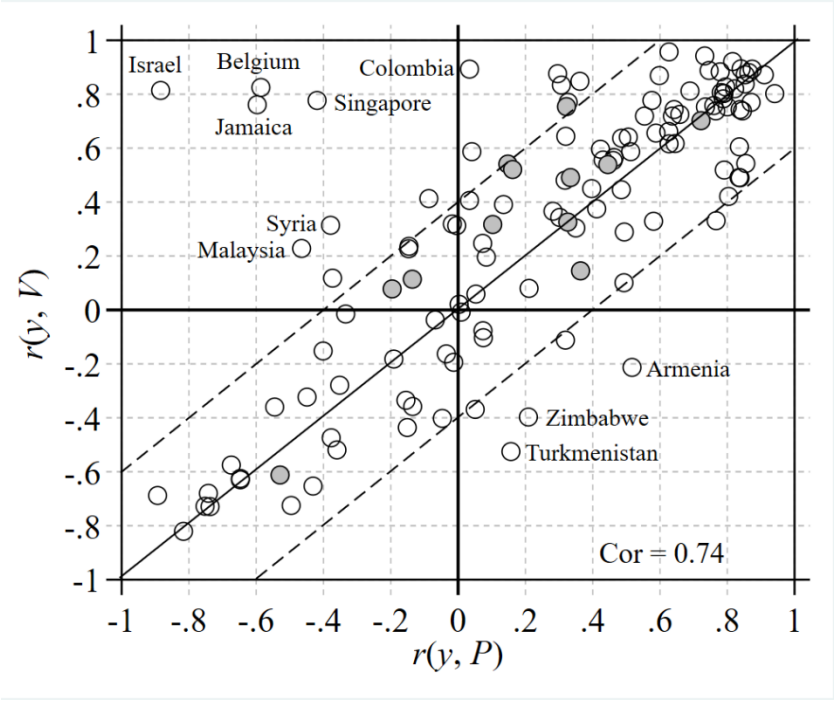
A10 Within-country correlations of Polity and Polyarchy to y

The Democratic Transition is a long-run process that is strongest in the between countries data as shown in Table A2, but as shown in the last row of the Table, the average within-country correlation of *Y* and *Polity* is still 0.31 and of *Y* and *Polyarchy* is 0.41. Figure A13 compare the two sets of correlations for the countries in the two samples.

The correlation between the two correlations is 0.74, so the two indices tell much the same story. However, there are some exceptions. Some are in countries with short series (Armenia and Turkmenistan), and most of the others are already discussed in Section 6. So the results tally fairly well.

Figure A13. Comparing correlations to y

Hollow cirles are for Main sample and gray circles for OPEC sample



A11 Polity and Polyarchy for high-end Nordic and Anglo countries

Figure A14 shows the paths of the two democracy indices in four Nordic countries from 1960 to 2016. They are known as fine democracies, and they are scored at 10 points throughout the *Polity* index. The *Polyarchy* index is converted to *Vp*, which is in Polity scale. The *Vp* index seems to contain a great deal of extra information, but there is a problem: All the extra information is within two and a half points from the *Polity*-line at 10. Table A5 reports that the six pairs of the four countries are at most 1.1 *Polity* points – that is well below 2½ points.

Figure A14. The path of *Polity* and *Vp* in four Nordic countries

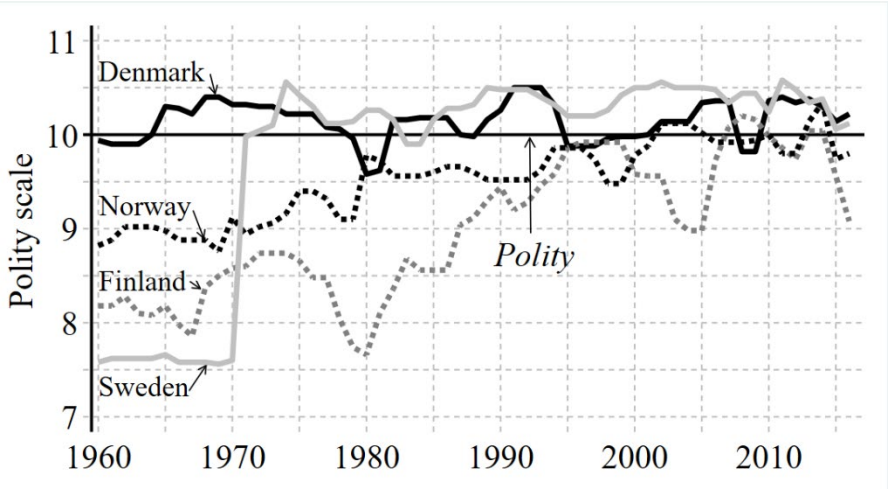


Table A5. Do the four Nordic countries have different levels of democracy?

For *Vp*		Reg. (1) *Dif* = *Con*	Reg. (2) *Dif* = *Con* + *Lag Dif*$_{-1}$	
Difference	*N*	*Constant* (t-ratio)	*Constant* (t-ratio)	*Lag* (t-ratio)
Denmark − Finland	57	1.143 (11.8)	0.091 (1.2)	0.911 (16.9)
Denmark − Norway	57	0.624 (10.0)	0.095 (1.6)	0.829 (11.2)
Denmark − Sweden	57	0.360 (2.5)	–0.007 (–0.1)	0.910 (19.8)
Finland − Norway	57	–0.520 (–7.6)	–0.078 (–1.5)	0.851 (11.9)
Finland − Sweden	57	–0.783 (–6.6)	–0.132 (–1.8)	0.869 (14.2)
Norway − Sweden	57	–0.264 (–2.4)	–0.065 (1.2)	0.858 (14.0)

Regression (1) is the constant in a regression with no explanatory variables. Regression (2) is the same when the lagged endogenous is added.

The difference is for 57 observations. When 2½ is divided by $\sqrt{57} = 7.6,$ it becomes the standard error of 0.3, and then the countries differ as is demonstrated by regression (1) in Table A5. However, there is less information in the series than it looks at first, due to their large autocorrelation estimated by the lag column in regression (2). When the difference is corrected for the lagged endogenous, none of the country pairs are significantly different. Thus, it is

highly dubious what we have learned about the four Nordic countries from the extra information in the V-Dem series.

A similar story can be told about other western countries with a *Polity* score at 10, where the *Vp* index tells a seemingly richer story. Figure A15 and Table A6 looks at five Anglo countries: Australia, Canada, Ireland, New Zealand, and the UK.

Figure A15. The path of *Polity* and *Polyarchy* for five Anglo countries

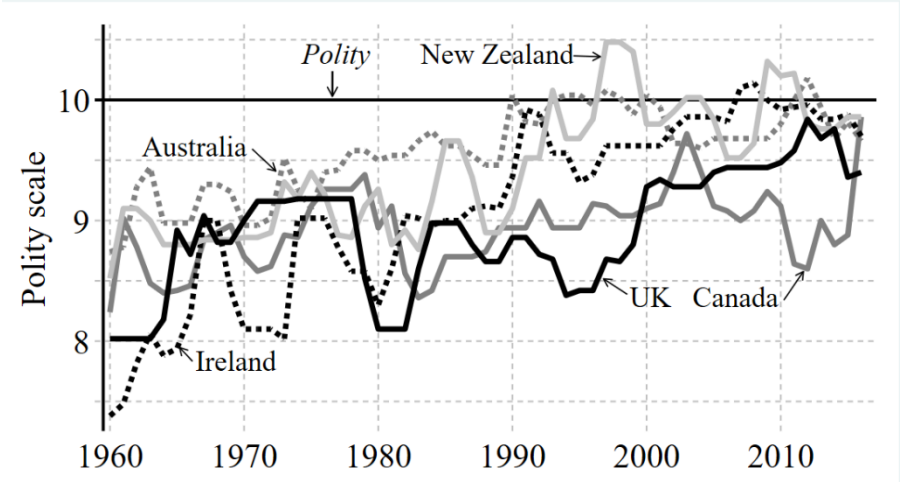


Table A6. Do the five Anglo countries have different levels of democracy?

For *Vp*		Reg. (1) *Dif* = *Con*	Reg. (2) *Dif* = *Con* + *Lag Dif*$_{-1}$	
Difference	*N*	Constant (t-ratio)	*Constant* (t-ratio)	*Lag* (t-ratio)
Australia – Canada	57	0.64 (12.5)	0.22 (2.6)	0.64 (5.7)
Australia – Ireland	57	0.46 (6.9)	0.07 (1.3)	0.81 (10.7)
Australia – New Zealand	57	0.15 (3.1)	0.05 (1.2)	0.60 (5.5)
Australia – UK	57	0.65 (9.7)	0.08 (1.4)	0.87 (12.4)
Canada – Ireland	57	-0.18 (-2.1)	-0.05 (-0.9)	0.83 (11.5)
Canada – New Zealand	57	-0.50 (-8.2)	-0.13 (-2.0)	0.73 (7.8)
Canada – UK	57	0.01 (0.1)	0.00 (0.1)	0.75 (8.3)
Ireland – New Zealand	57	-0.31 (-4.9)	-0.08 (-1.5)	0.69 (7.4)
Ireland – UK	57	-0.31 (-4.9)	-0.08 (-1.5)	0.69 (7.4)
New Zealand – UK	57	0.50 (7.1)	0.11 (1.8)	0.78 (9.0)

A12 Polity and Polyarchy for eight traditional Arab countries

The data covers Bahrain, Jordan, Kuwait, Oman, Morocco, Qatar, Saudi Arabia, and UAE, which have a traditional Emirate/Kingdom. In two cases – Qatar and Saudi Arabia – *Polity* is −10 all years, and in the UAE, *Polity* is −8 all years. In the last three countries there have been some reforms, which is most cases have been reversed after the Arab Spring. Figures A16a and A16b shows the series. Note that while Saudi Arabia and Qatar are at the bottom for both indices while most of the other Arab kingdoms are treated more lenient by *Polyarchy*.

Figure A16a. The eight *Polity* series for traditional Arab Kingdoms/Emirates

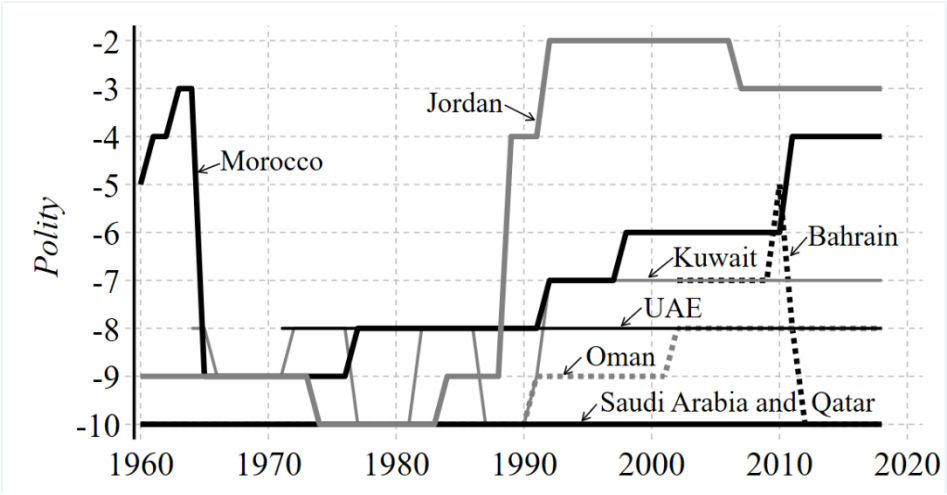


Figure A16b. The eight *Polyarchy* series for traditional Arab Kingdoms/Emirates