

# Measuring democracy, 1972-2016

## How different are eight democracy indices?

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### Abstract:

The paper is an empirical study of *income*, the *Polity* index, five of the *V-Dem* indices, and the two *FH*-indices from Freedom House. It is done on 6,394 overlapping observations, from 1972-2016, for 155 countries. The countries are divided in the M-Main and the MENA samples. The paper deals with the fact that although all eight democracy indices are conceptually different, they are highly correlated. Income and all eight indices have one and only one common factor, which is identified as the Democratic Transition. It gives the same grand pattern, both as a function of time and income. It is demonstrated that the within-project indices are even more correlated than the indices from different projects. Thus, the details of the assessments used by the three projects is more important than the conceptual differences.

Keywords: Democracy indices, aggregation problem, democratic transition

Jel.: A12, K10, P51

Paper #2 in measuring democracy project <sup>2</sup>

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<sup>2</sup> Paper #1 is the main paper. Paper #3 covers the period 1960-2016 where the two Freedom House indices are unavailable. The project is a follow up of a book Paldam (2021). Section 1 in the appendix (paper #4) contains a summary of the relevant parts of the book.

# 1. Introduction

The paper compares the grand pattern in eight democracy indices from three projects: Two indices from Freedom House, Polity from the Polity Project, and five indices from the V-Dem project; see Table 1. A large literature use these indices to study the causes and effects of the democratization in the world during the last 4-6 decades; see Paldam (2021) for a survey.

The indices are conceptually different, but they are highly correlated. While it is academically interesting to discuss the differences, it seems a bit futile given the high correlations. The indices have three deep problems; see Paper #1: They have a large gray zone of indeterminacy; they have no natural scale; and the top anchor of democracy is treated differently.

The eight indices overlap for  $N = 6,394$  observations from 1972 to 2018 from  $n = 155$  countries. The observations, where Polity is zero are deleted, are divided into two samples: The M-Main sample of  $N = 5,584$  ( $n = 137$ ), and the MENA sample of  $N = 707$  ( $n = 18$ ). This contrasts with the Papers #1 and #3 where the data are divided in the Main sample ( $n = 139$ ) and the OPEC sample ( $n = 16$ ). The paper shows how this change matters.

Section 2 reports correlations, and factor analyses for the indices. Section 3 consider the development over time, and the income dependency of the indices, and replicates figures in Paper #1 for different time units. Section 4 looks at the relations between the series, and report correlation between series. Section 5 concludes. A net appendix gives more calculations.

Table 1. Eight democracy indices and income

Project	Index	Scale
Freedom House	(1) $CL = 8 - CLr$ , Civil Liberties (2) $PR = 8 - PRr$ , Political rights $FH = (CL + PR)/2 = 8 - FHR$	Closed set $[7, 1]$ integers. 7 is fully authoritarian, 1 is fully democratic. $CL$ and $PR$ are highly correlated. The $FH$ index is considered the main index from this project. The ' $r$ ' indicates a rescaling
Polity	(3) $Polity$ (the Polity2 series)	Closed set of $[-10, 10]$ integers. -10 is fully authoritarian, 10 is fully democratic, zero is no system. 18% of the data are +10
V-Dem	(4) $Vpol$ (Polyarchy) (5) $Vlib$ liberal democracy (6) $Vpar$ participatory democracy (7) $Vdel$ deliberate democracy (8) $Vega$ egalitarian democracy	Open interval $]0, 1[$ , 2 to 3 decimals. 0 is perfect authoritarian, 1 is perfect democracy. These ideals are not reached. The highest is 0.924 until now. The V-Dem project stresses the conceptual difference between the indices, but the indices are highly correlated. The $Vpol$ index is considered the main index from the project
Maddison	(9) $Income\ y = \ln\ gdp$	$gdp$ is GDP per capita. The $cgdppc$ series from the project
Four data samples in two pairs: The <b>M-Main</b> and the <b>MENA</b> samples, and the <b>Main</b> and the <b>OPEC</b> samples		
OPEC and Main	Organization of Oil Exporting Countries. Sample 16 countries, of which half are MENA countries	Algeria, Angola, Congo Br, Ecuador, Eqt Guinea, Gabon, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, UAE, Venezuela. The Main sample are all other countries
MENA and M-Main	Middle East and North Africa. Sample 18 countries, of which 8 are OPEC countries	Algeria, Bahrain, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia, Turkey, UAE, Yemen. The M-Main sample are all other countries

The references give the index manuals and the home pages where the data are posted. The table lists eight indices, but one for each project are considered the main ones: It is  $FH$ ,  $Polity$ , and  $Vpol$  (Polyarchy). Israel is geographically in the MENA region, but is treated as a western country.

## 2. Some descriptive statistics

Section 2.1 and 2.2 look at correlations in the two samples, while section 2.3 shows that within-project correlations are higher than between-project correlations. Section 2.4 compares the correlation in the OPEC/Main and the M-Main/MENA samples. Section 2.5 reports four factor analyses. When the *FH* indices are rescaled it is indicated by adding ‘*r*’:  $FHr = 8 - FH$ , etc. All variables are panels with a country and a time dimension.

### 2.1 Correlations for M-Main sample: Democracy indices are highly inter-correlated

Table 2 is for the M-Main sample and the parallel Table 3 are for the MENA sample. Each of the four tables contains 36 meaningful correlations, of which eight are between income and the democracy indices, while the remaining 28 are inter-correlations between the democracy indices. The within-project correlations are shaded gray.

Table 2a. M-Main sample: Correlation of unified annual data.  $N = 5,584$ , 1972-2016

	<i>CLr</i>	<i>PRr</i>	<i>Polity</i>	<i>Vpol</i>	<i>Vlib</i>	<i>Vpar</i>	<i>Vdel</i>	<i>Vega</i>
(1) <i>CLr</i>	1							
(2) <i>PRr</i>	0.932	1						
(3) <i>Polity</i>	0.867	0.909	1					
(4) <i>Vpol</i>	0.903	0.921	0.902	1				
(5) <i>Vlib</i>	0.903	0.907	0.863	0.979	1			
(6) <i>Vpar</i>	0.896	0.897	0.869	0.972	0.973	1		
(7) <i>Vdel</i>	0.893	0.898	0.868	0.977	0.982	0.966	1	
(8) <i>Vega</i>	0.867	0.861	0.809	0.950	0.975	0.951	0.960	1
(9) <i>Income</i>	0.671	0.629	0.566	0.674	0.707	0.699	0.682	0.740

*PR* and *CL* are rescaled as  $PRr = 8 - PR$  and  $CLr = 8 - CL$ . Within-project inter-correlations are shaded in gray.

Table 2b. M-Main sample: Correlation of country averages.  $N = 137$ , 1972-2016

	<i>CLr</i>	<i>PRr</i>	<i>Polity</i>	<i>Vpol</i>	<i>Vlib</i>	<i>Vpar</i>	<i>Vdel</i>	<i>Vega</i>
(1) <i>CLr</i>	1							
(2) <i>PRr</i>	0.982	1						
(3) <i>Polity</i>	0.941	0.964	1					
(4) <i>Vpol</i>	0.967	0.967	0.932	1				
(5) <i>Vlib</i>	0.953	0.946	0.894	0.985	1			
(6) <i>Vpar</i>	0.953	0.946	0.903	0.977	0.976	1		
(7) <i>Vdel</i>	0.950	0.943	0.898	0.980	0.987	0.970	1	
(8) <i>Vega</i>	0.917	0.901	0.852	0.962	0.979	0.954	0.968	1
(9) <i>Income</i>	0.749	0.722	0.669	0.761	0.771	0.763	0.752	0.794

Table 2a are calculated for the 5,616 unified observations, while Table 2b are for the 137 country averages. The two tables are similar, but the correlations in Table 2b are always a little larger. In average by 4.4%. This has two consequences: It must mean that that if a time unit of 5 or 10 years had been used, the result would still be the same, and it suggests that the average of the within-country correlations are smaller, as shown in Table 7 of section 4.2.

2.2 Correlations for MENA sample: Similar correlations except to income

Table 3 is much as Table 2 as regards the 2 x 28 inter-correlations between the democracy indices. However, Tables 2 and 3 have a major difference. While the correlation between income and the democracy indices that were all positive and substantial in Table 2, they are all negative and (numerically) smaller in Table 3. Given that the main direction of causality is from income to democracy, as demonstrated in Paldam (2021), the effect of rising income is different in MENA countries and other countries.

Table 3a. MENA sample: Correlation of unified annual data. N = 707, 1972-2016

	<i>CLr</i>	<i>PRr</i>	<i>Polity</i>	<i>Vpol</i>	<i>Vlib</i>	<i>Vpar</i>	<i>Vdel</i>	<i>Vega</i>
(1) <i>CLr</i>	1							
(2) <i>PRr</i>	0.759	1						
(3) <i>Polity</i>	0.530	0.611	1					
(4) <i>Vpol</i>	0.598	0.702	0.863	1				
(5) <i>Vlib</i>	0.675	0.771	0.740	0.897	1			
(6) <i>Vpar</i>	0.586	0.681	0.863	0.953	0.889	1		
(7) <i>Vdel</i>	0.663	0.696	0.800	0.909	0.924	0.867	1	
(8) <i>Vega</i>	0.519	0.604	0.745	0.858	0.855	0.832	0.886	1
(9) <i>Income</i>	-0.001	-0.093	-0.206	-0.221	-0.045	-0.156	-0.055	0.034

Table 3b. MENA sample: Correlation of country averages. N = 18, 1972-2016

	<i>CLr</i>	<i>PRr</i>	<i>Polity</i>	<i>Vpol</i>	<i>Vlib</i>	<i>Vpar</i>	<i>Vdel</i>	<i>Vega</i>
(1) <i>CLr</i>	1							
(2) <i>PRr</i>	0.893	1						
(3) <i>Polity</i>	0.660	0.756	1					
(4) <i>Vpol</i>	0.740	0.858	0.923	1				
(5) <i>Vlib</i>	0.837	0.949	0.802	0.890	1			
(6) <i>Vpar</i>	0.730	0.866	0.932	0.970	0.899	1		
(7) <i>Vdel</i>	0.843	0.887	0.847	0.912	0.937	0.871	1	
(8) <i>Vega</i>	0.653	0.737	0.812	0.858	0.844	0.835	0.894	1
(9) <i>Income</i>	-0.041	-0.162	-0.320	-0.353	-0.168	-0.282	-0.143	-0.064

See note to Table 2a. Note that the series have 16 observation only.

Table 4. Comparing the within-project and between-project correlations

Project		N	Main sample		OPEC sample	
			Unified	Countries	Unified	Countries
(1) All	Average (St.dev.)	28	0.916 (0.046)	0.994 (0.033)	0.760 (0.126)	0.844 (0.081)
(2) Between projects	Average (St.dev.)	17	0.884 (0.026)	0.931 (0.031)	0.685 (0.101)	0.814 (0.087)
(3) Upper 95% limit	Av + 2se	17	0.897	0.946	0.734	0.865
(4) Within FH	One obs.	1	0.932	0.982	0.759	0.893
(5) Within V-Dem	Average (St.dev.)	10	0.969 (0.011)	0.974 (0.010)	0.887 0.034	0.891 (0.040)
(6) Compare to (2)	t-test, p%	17	1.5·10 <sup>-7</sup>	0.04	3.7·10 <sup>-4</sup>	1.7

Row (3) show the upper 95% confidence limit of the average in row (2). Row (4) show the correlation between the two FH-indices. It is higher than the upper limit in row (3). Row (6) tested if the average in row (2) can be the same as the average in row (5). This is rejected in all four columns – in two cases strongly.

All 4 x 28 inter-correlations between democracy indices are high and similar, as seen in row (1) of Table 4. This is not due to the extreme ends; see section 2.6 in Paper #1.

Row (2) show the averages of the correlations between projects. In all cases they are smaller than the correlations in row (1). Thus, the within-project correlation must be higher. Row (4) shows the correlations within the FH-project. They are larger than the between project correlations + 2se in row (3), taken as the 95% confidence interval. Row (5) show the average of the 10 correlations within the V-Dem project. Row (6) demonstrates that the within-project correlations are larger.

### 2.3 Comparing the OPEC and MENA correlation matrices

The main paper #1 calculate precisely the same tables as Tables 3a to d, but for the Main and the OPEC samples. Table 5 compare the correlations. The table shows two points:

Table 5. Comparing the correlations for the Main/OPEC and the M-Main/MENA samples

	Unified annual data			Country averages		
	Main	M-main	Difference	Main	M-main	Difference
Within indices	0.942	0.942	0.000	0.959	0.960	-0.002
Income and indices	0.655	0.671	-0.016	0.703	0.747	-0.044
	OPEC	MENA	Difference	OPEC	MENA	Difference
Within indices	0.919	0.855	0.103	0.941	0.903	0.066
Income and indices	-0.171	-0.106	-0.065	-0.310	-0.213	-0.101

(i) The pattern is almost the same with a high correlation between the democracy indices in all four samples, a substantial positive correlations between income and the indices in the Main and M-Main samples, and a negative (but numerically smaller) correlation between income and the indices in the OPEC/MENA sample. (ii) While the correlations are virtually the same in the two big samples, they are larger numerically for the OPEC sample than for the MENA sample.

#### 2.4 *The within-project indices are more correlated: An interpretation*

Each project has its own theory and develop a set of common principles for the assessments of the underlying indicators in accordance with the theory. That is, each project has its own assessment package. Democracy indices differ for two reasons:

- (i) Because they are conceptually different, i.e. they measure something different.
- (ii) Because the assessment package differ between the projects.

We have just seen that the within-project correlations are significantly higher than the between project correlations. Consequently, (ii) is more important than (i). This is an important finding that tallies with the very high factor loadings on the within-project variables reported in the next section. It makes it hard to believe that conceptual differences between democracy indices is an important phenomenon. The devil is in the details, not in the concepts.

#### 2.5 *The factor analysis: Both samples contains one and only one common factor*

The four factor analyses in Table 6 are closely related to the correlation analysis, but it still adds an important point. For a factor to matter, it should have an eigenvalue of at least one. The analyses finds one large eigenvalue only.

As expected all loadings of the democracy indices to factor1 are high – notably within the V-Dem family, where the average loading is 0.98, while it is 0.95 in the OPEC sample. The loadings barely change if income is excluded. In the Main sample Factor1 is strong and all nine variables loads strongly and positively – including income. Section 3.2 shows how the joint variable looks – it is termed the ***Democratic Transition***. In the OPEC sample the factor loading on *Income* is small and negative. This gives a different transition see section 3.3.

The analysis until now has shown that income and the strong common factor in all eight democracy indices are strongly correlated. The causal structure is between income and the Polity index is a main theme in Paldam (2021) where, as already mentioned, it is demonstrated

that the main causal direction is from income to Polity. This finding is controversial, but it will be taken for granted from now, furthermore I assume that same causality applies to the other political indices.

Table 6. Four factor analyses

Factor	M-Main sample				MENA sample			
	Annual data N = 5,584		Country averages N = 137		Annual data N = 707		Country averages N = 18	
	Eigenv	Cumul	Eigenv	Cumul	Eigenv	Cumul	Eigenv	Cumul
Factor1	7.86	0.97	8.20	0.97	6.23	0.89	6.91	0.85
Factor2	0.25	1.00	0.22	1.00	0.52	0.96	0.74	0.94
Variable	Factor loadings		Factor loadings		Factor loadings		Factor loadings	
	Factor1	Factor2	Factor1	Factor2	Factor1	Factor2	Factor1	Factor2
(1) <i>CLr</i>	0.93	-0.12	0.98	-0.11	0.70	0.36	0.83	0.29
(2) <i>PRr</i>	0.94	-0.22	0.97	-0.19	0.78	0.27	0.93	0.15
(3) <i>Polity</i>	0.90	-0.27	0.93	-0.27	0.85	-0.24	0.90	-0.23
(4) <i>Vpol</i>	0.99	-0.02	0.99	-0.00	0.96	-0.21	0.97	-0.20
(5) <i>Vlib</i>	0.99	0.09	0.99	0.10	0.95	0.12	0.96	0.12
(6) <i>Vpar</i>	0.98	0.06	0.98	0.04	0.95	-0.18	0.96	-0.15
(7) <i>Vdel</i>	0.98	0.06	0.98	0.07	0.95	0.04	0.96	0.13
(8) <i>Vega</i>	0.96	0.21	0.97	0.21	0.88	0.00	0.88	0.10
(9) <i>Income</i>	0.71	0.23	0.77	0.19	-0.11	0.41	-0.23	0.69

The gray shading indicate results with a low reliability. The two abbreviations are 'eigenv' is eigenvalue and 'cumul' is cumulative.

### 3. The Grand Pattern: The paths of the indices as a function of income

The Grand Pattern is analyzed in two dimensions. Over time and as a function of income. The average development over time of the 8 indices is reported in Paper #1, but the path on the OPEC and MENA samples are not shown, this is done by Figure 1.

Figure 1a. The development over time for the *FH*-index

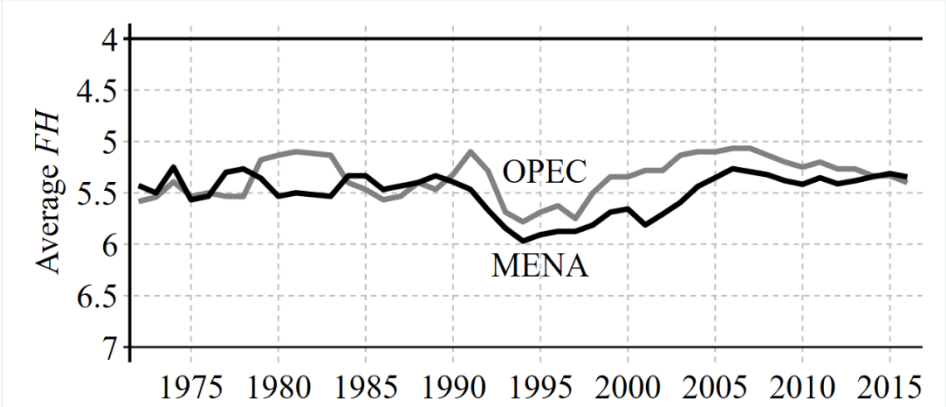


Figure 1b. The development over time for the *Polity*-index

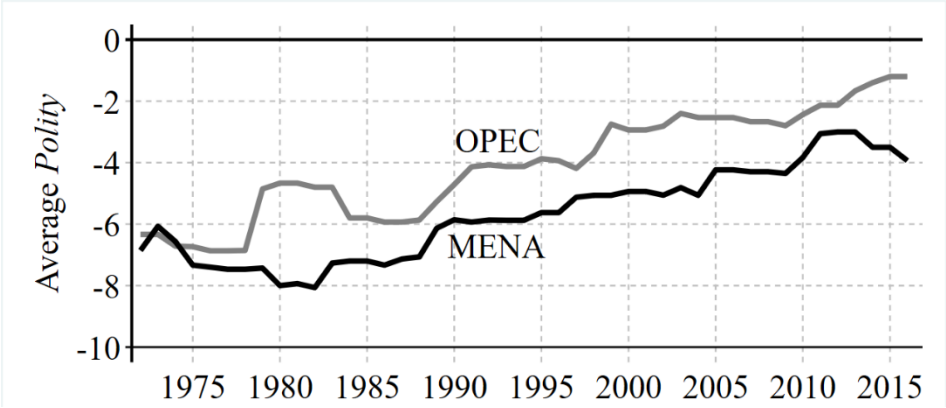
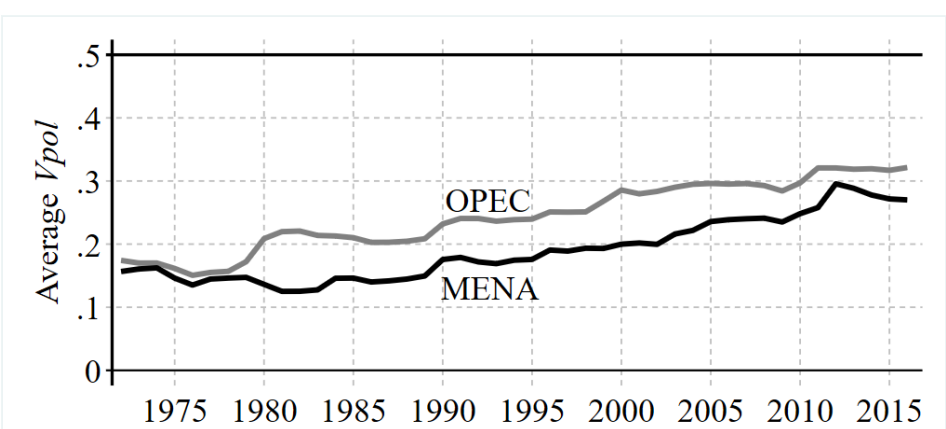


Figure 1c. The development over time for the *Vpol*-index





### 3.1 The path over time for the OPEC and MENA samples

Both Paper #1 and #3 show that the paths of the five V-Dem indices are very similar as suggested by the correlations as well. Thus, the analysis of the path as a function of time and income only consider the main index from each project.

When the three graphs of Figure 1 are compared with the corresponding graphs in Paper #1 there is a marked difference, which is reported in Table 7 for an easy overview. The increase in democracy over time is smaller in the OPEC/MENA samples than in other countries. The MENA curves are below the OPEC curves. In addition, it increases less. In the FH index there is no trend at all in the MENA sample. So perhaps the effect of Arab/Muslim culture is stronger than the effect of oil wealth.

Table 7. The increase in the main indices 1972-1016 – averages of the countries covered

Index	All	MENA	M-Main	OPEC	Main
<i>FH</i>	0.953	0.085	1.064	0.183	1.052
<i>Polity</i>	6.608	2.920	7.080	5.133	6.805
<i>Vpol</i>	0.231	0.113	0.246	0.147	0.242

### 3.2 The income effect in the M-Main sample: Almost perfect transition curves

The large literature on economic growth, shows that the political system is a weak causal factor explaining growth, while the reverse causality is strong; see Paldam (2021).

Figure 2 show the effect of income on the three main democracy indices. The method used on index:  $P = Polity$ ,  $Vpol$  and  $FH$ , is to run Kernel regressions  $P = K(Income, 0.3)$ , where  $bw = 0.3$  is the bandwidth. The regressions use the `lpoly` function from Stata, with the standard defaults.<sup>3</sup> The kernel is a smoothed moving average with a constant bandwidth. It is calculated for the unified data (the stacked panel), organized by income. The sorting by income means that the data are scrambled in all other dimensions than income. Chpt 2 of Paldam (2021) demonstrates that the scrambling is rather fine, as regards years and countries. Thus, the kernel regression is a fine univariate analysis for the M-Main sample.

This section is parallel to section 3.2 in Paper #1, but it is made for the M-Main sample while Paper #1 uses the Main sample. The effect of this change is small.

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<sup>3</sup> The defaults are the Epanechnikov kernel, and the degree of polynomial smooth at zero. The options `nosc` is used to suppress the scatter and `ci` provides the 95% confidence intervals. The program calculates a rule-of-thumb bandwidth that is rounded up slightly; see chpt. 2 of Paldam (2021).

Figure 2a. Democratic Transition in the *FH* index. M-Main sample, annual data

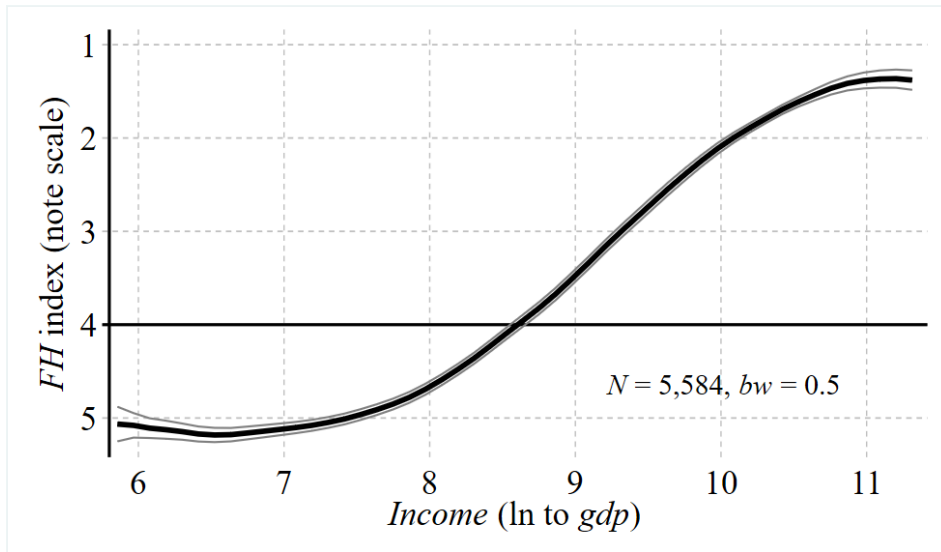


Figure 2b. Democratic Transition in the *Polity* index. M-Main sample, annual data

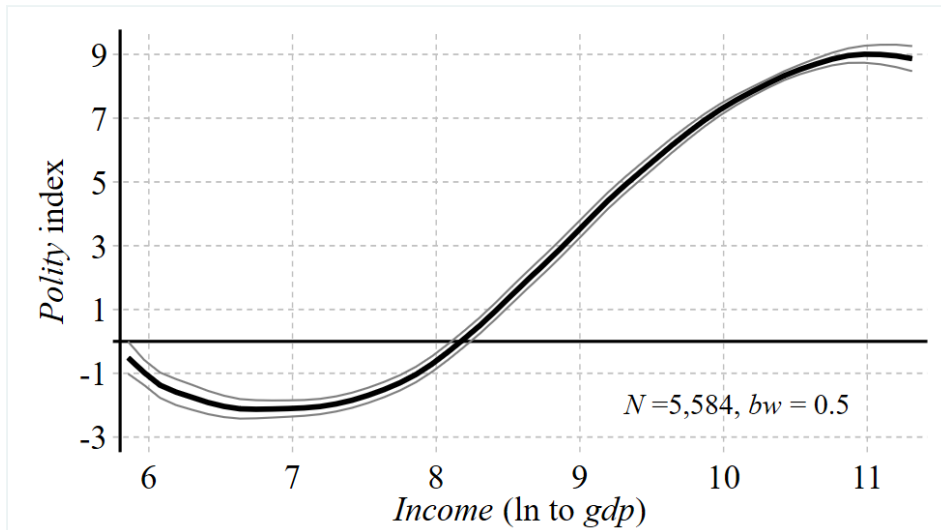


Figure 2c. Democratic Transition in the *Vpol* index. M-Main sample, annual data

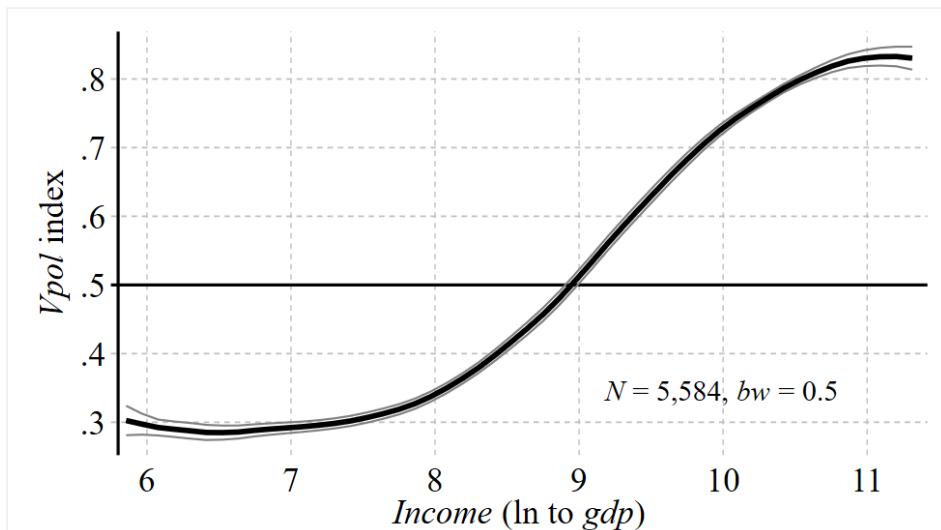


Figure 3a. The income effect on the *FH* index in the MENA sample

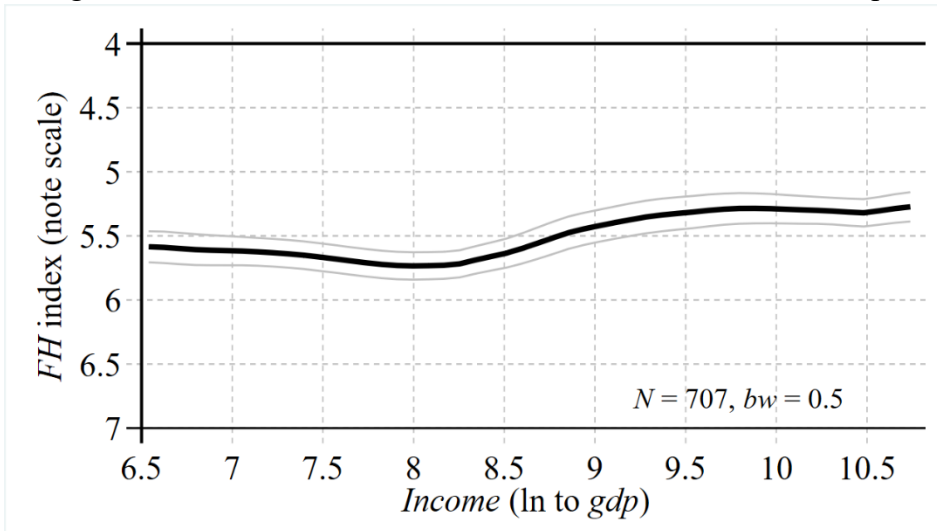


Figure 3b. The Income effect on *Polity* index in the MENA sample

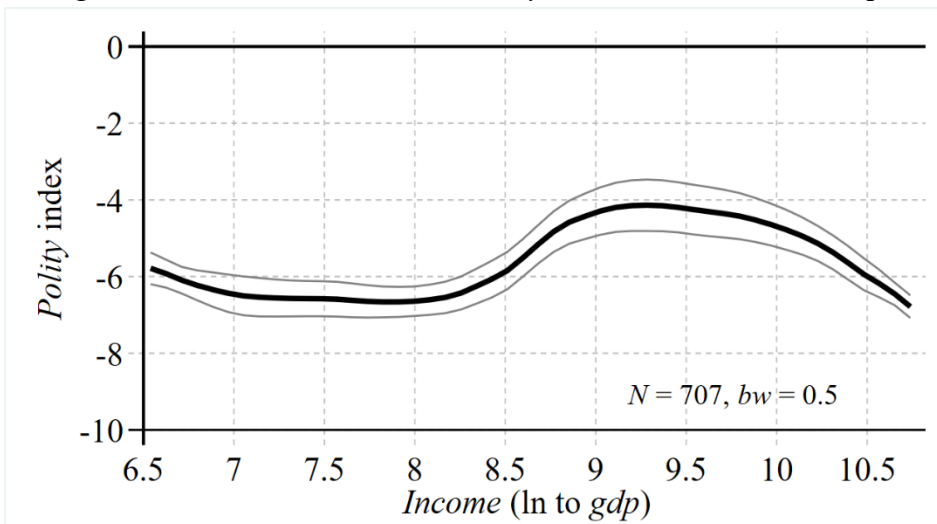
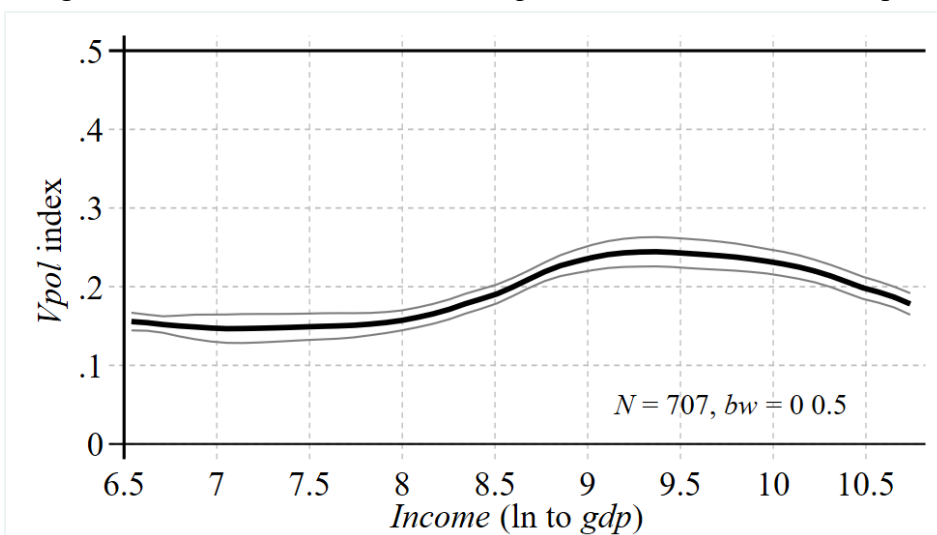


Figure 3c. The Income effect on the *Vpol* index in the MENA sample



The three curves shown on Figure 2 look the same and precisely as transition curves should. In the other work referred to it appears that the transition form of the curve is robust to the bandwidth, the country groups analyzed, the time period covered, also, it looks rather similar when long time series are considered. An explanation of the fine transition paths on Figure 1 is provided in Chpts. 4-7 of Paldam 2021), see Paper # for a brief summary.

### 3.3 *The MENA sample: A different story*

The three graphs of Figure 3 are parallel to Figure 2, but looks at the MENA sample. They are drawn at the same scale as the corresponding OPEC graphs in Paper #1. As the annual curves are estimated from much fewer observations than Figure 2, the curves have wider confidence intervals. In addition, the observations for the 16 countries are less well scrambled, so that the curves have sections, which are dominated by one to two countries. Still they show a pattern.

The three curves have interesting difference. While the curves are similar up to the income of  $y = 10$ , the *FH*-curve is different from the other two after that. The Freedom house score Qatar at 5.5, which is less authoritarian than the other indices.

When the three OPEC-curves are compared with the three MENA-curves the later is much flatter and closer to the bottom of the scale. The three curves are basically trendless at a low level. Thus, it is clear that there is no democratic transition in the OPEC/MENA countries. The evidence rather say that when income rises oil-countries turn more authoritarian, while MENA remains steadily at a high level of authoritarianism. This was also the finding in the correlation and factor analysis.

Various explanations are given in Paldam 2021), the main one is that the methods used by rulers to consolidate their rule, becomes much easier to apply when the ruler receives vast funds from resource rents. This neutralize the pressure for more democracy as countries develop. The reader may recall the story of the failed Arab Spring.

### 3.4 *Changing the time unit, some calculations using the Main sample.*

In cross-country studies it is often preferred to use a time unit that is longer than a year. The data allow us to calculate  $N = 1,124$  observations with a 5-year unit for the Main sample. The transition curves are reported on Figure 4 – the 5-fold reduction in  $N$  increases the confidence intervals, but they are still narrow. When the three graphs are compared with the correspondent graphs in Paper #1 using annual data they are virtually the same.

Figure 4a. Democratic Transition in the *FH* index. Main sample, 5-year averages

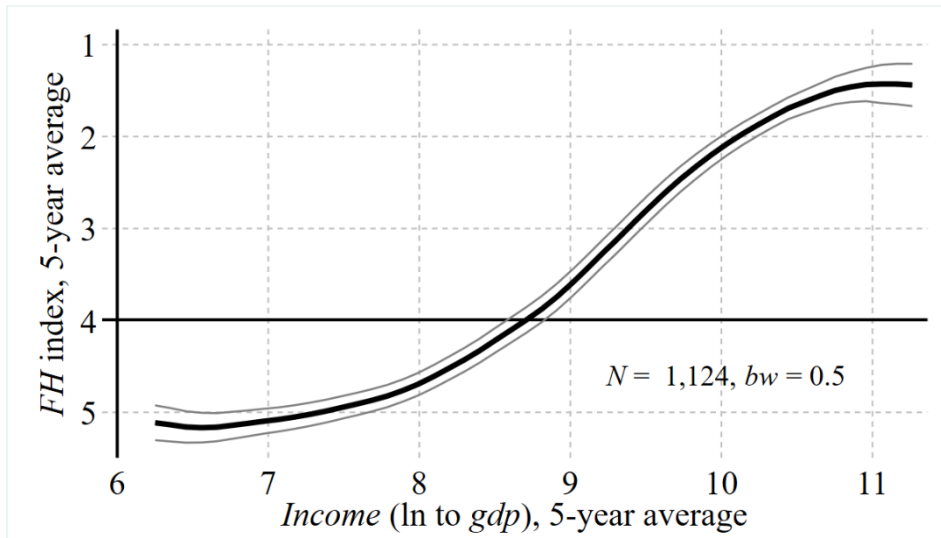


Figure 4b. Democratic Transition in the *Polity* index. Main sample, 5-year average

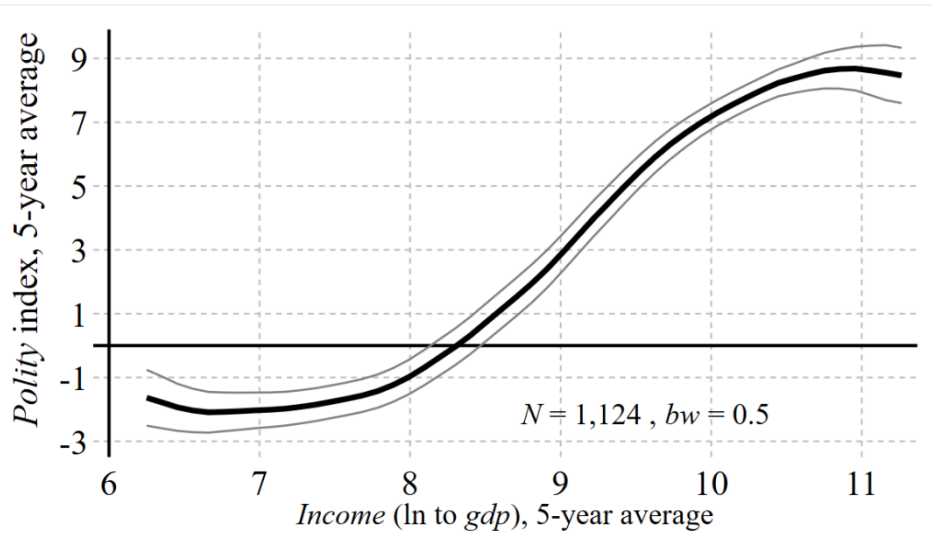


Figure 4c. Democratic Transition in the *Vpol* index. Main sample, 5-year average

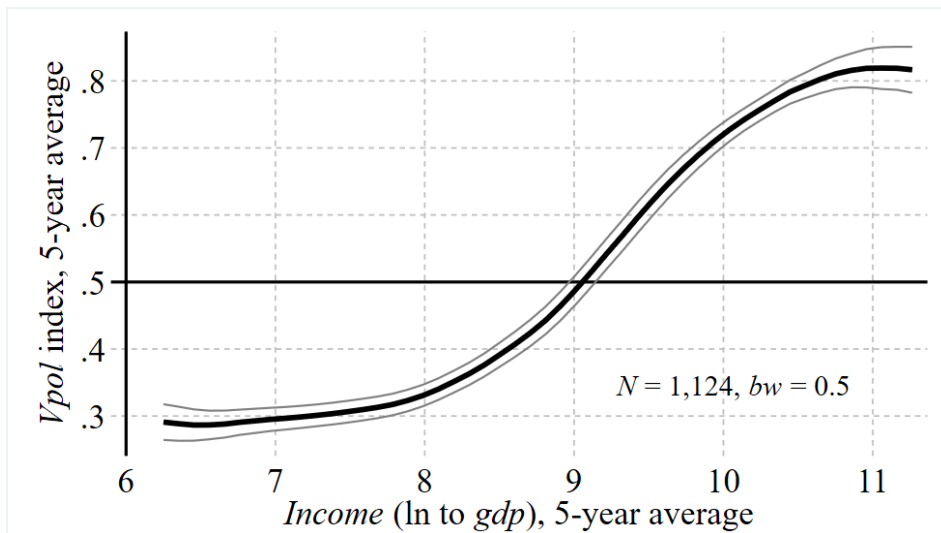


Figure 5a. Democratic Transition in the *FH* index. Main sample, country averages

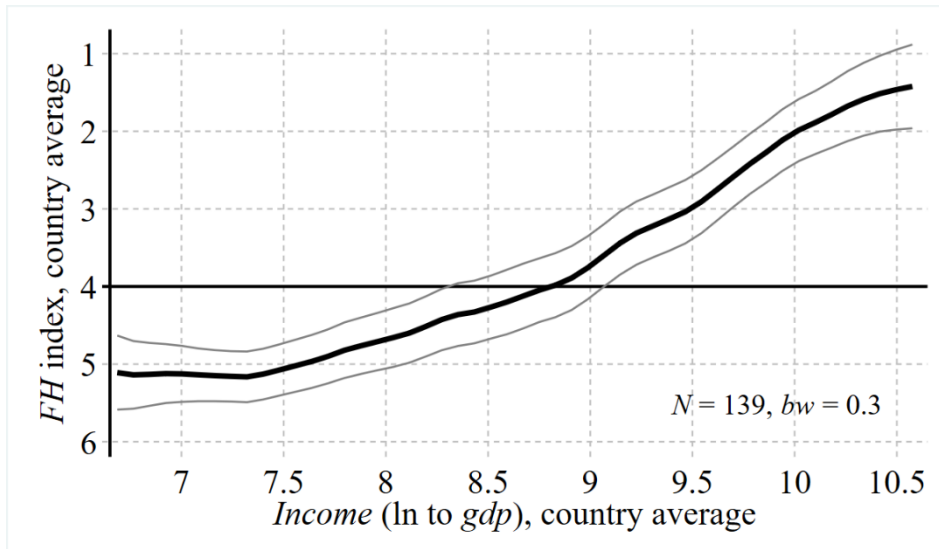


Figure 5b. Democratic Transition in the *Polity* index. Main sample, country averages

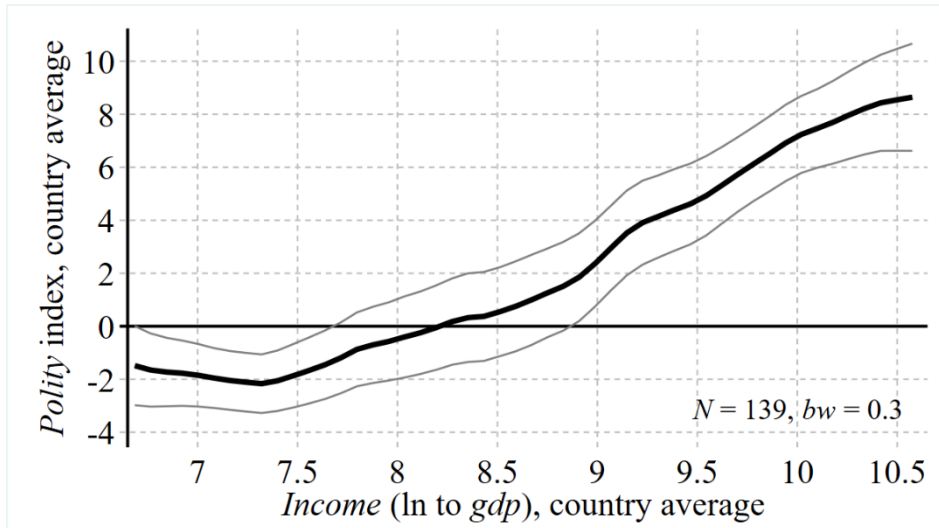


Figure 5c. Democratic Transition in the *Vpol* index. Main sample, country averages

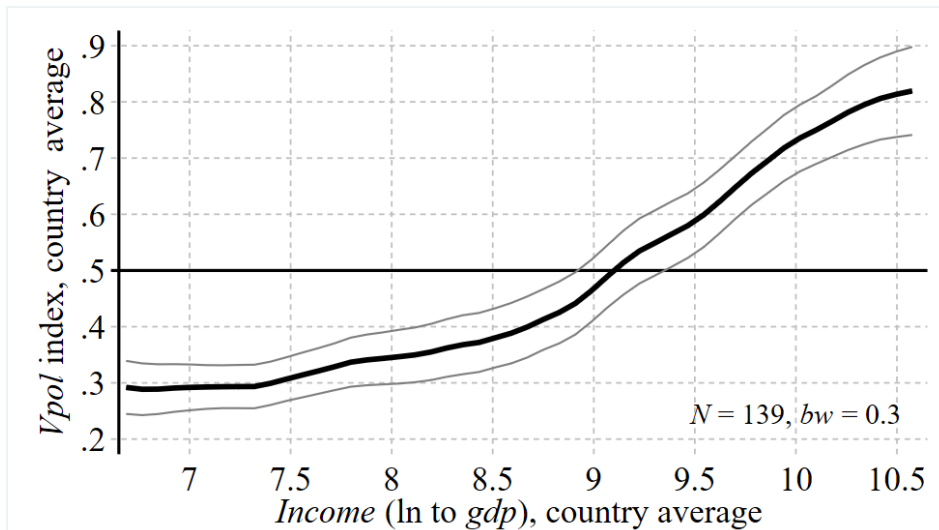


Figure 5 reports the same three transition curves as Figures 4 for the 139 country averages. With only 139 observations, the kernel becomes less smooth, and the confidence intervals widens, but it is clear that a rather similar pattern emerges. The three graphs for country averages of Figure 5 uses averages over, in average, 40 years. Thus, it is clear that if a 10-year or a 20-year time unit had been used the same basic result would have appeared.

Transition theory claims that the curves of Figures 2 to 5 represents the underlying pattern beneath the fuzzy short run variation. The within-country pattern is closer to the short run, which is rather fuzzy, while the between-country pattern is closer to the long run and thus to the stable underlying pattern. All three papers gives a clear conclusion: The Democratic Transition is a very robust phenomenon.

#### 4. The relation between the indices

The relation is analyzed in three ways: Section 4.1 study how well the indices explains each other, using kernel regression. Section 4.2 study the lead-lag structure between the three main indices, while 4.3 turn to the lead-lag structure within projects.

Figure 6a. Polity explained by the HF index

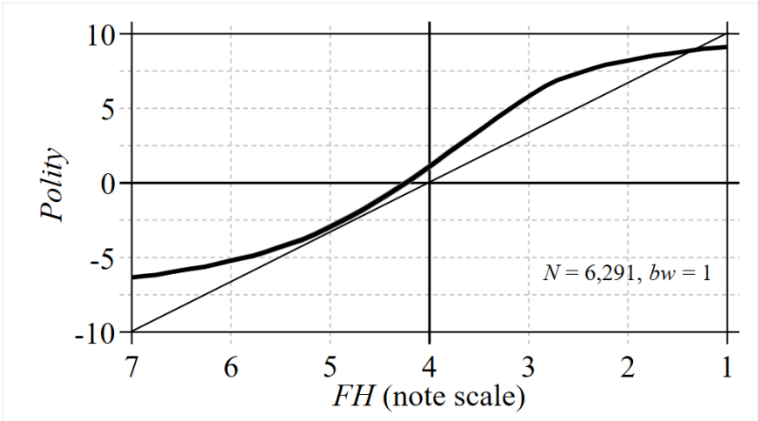


Figure 6b. Polity explained by the *Vpol* index

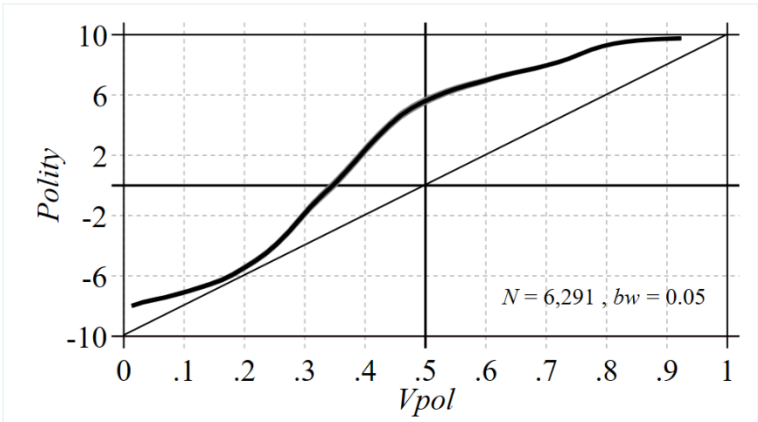
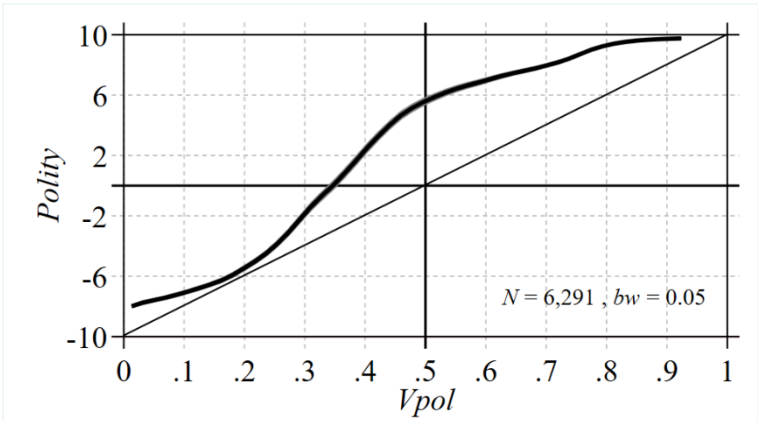


Figure 6c. *Vpol* explained by the HF index





#### 4.1 The relation between the indices analyzed by kernel regressions

The introduction argued that no natural scale exists for democracy indices. Consequently, the indices are not related by linear relations. This is revealed by Figure 9, which tries to explain one index by another. In all three cases, the reverse curves look much as a mirror image. The three curves largely confirm what we have already seen: the *Polity* and the *Vpol* indices are the most different, especially at the upper half of the scale, while the *FH*-index is in-between. However, the three curves have so narrow 95% confidence intervals that they are hard to see. Thus, they are strongly related, but the relations are not linear.

#### 4.2 The lead-lag structure of the three main indices, calculated within countries

The correlation matrices in Tables 2 and 3 are for the unified data and the between-country data. As the between country correlations are larger, it follows that the within-country correlations are lower. Table 7 in Paper #1 shows that this is always the case. This is confirmed in 7 cases of Figures 7 to 9. The 7 graphs add four leaded and four lagged correlations. The resulting correlograms allow us to see if any of indices predict any other.

Figure 7a. The relation of *Polity* and *FH*

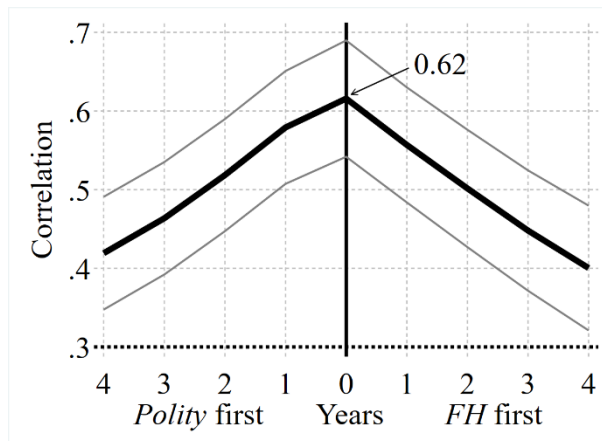
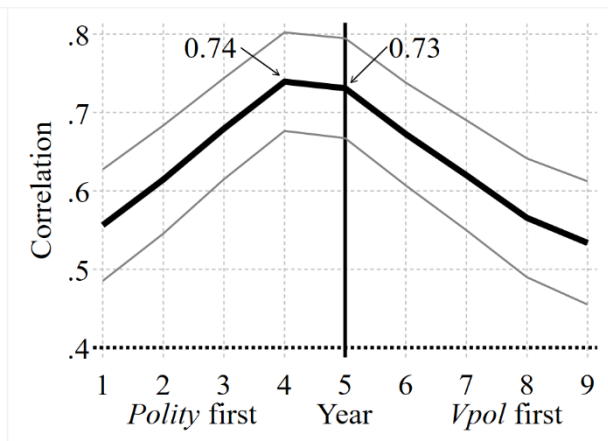


Figure 7b. The relation of *Polity* and *Vpol*



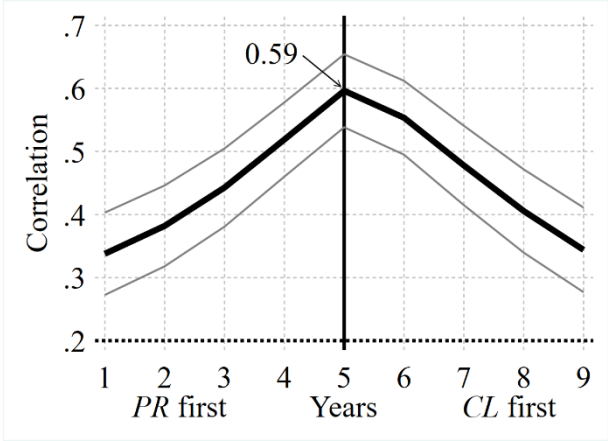
Note: the arrows point to the average with country correlations.

The autocorrelation in the series is about 0.9 (see the net appendix), so the curves should taper off around the peak for the strongest correlation, as indeed they do.

Figure 7a shows an almost perfectly symmetric correlogram between *Polity* and the *FH* index. Thus, neither index can be used as a predictor of the other. Figure 7b analyzes the correlations between *Polity* and *Vpol*. Here, the peak is about 0.74, but the correlation-curve is

not perfectly symmetrical, and it appears that *Polity* leads *Vpol* a little. It is difficult to assess if the difference is significant.

Figure 8. The relation between *PR* and *CL*



4.3 The lead-lag structure of the inter-project indices, calculated within countries

The correlations between the two Freedom House indices is only 0.59 see Figure 8. Thus, the difference to the between country correlations is unusually large. There is a small tendency for *CL* to lead *PR*, but this tendency is surely not significant.

Finally, the four correlograms on Figure 9 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 confirm 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 9a. The relation of *Vpol* and *Vlib*

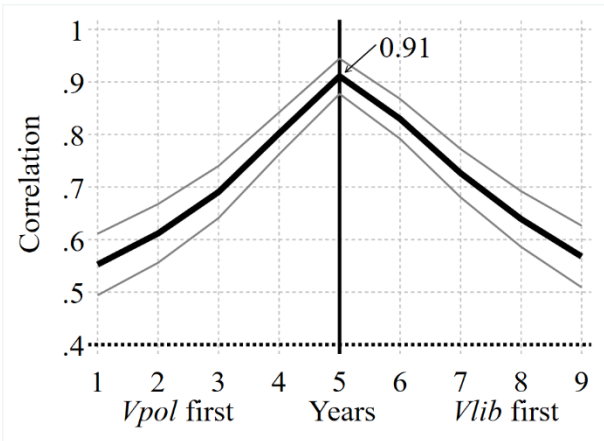


Figure 9b. The relation of *Vpol* and *Vpar*

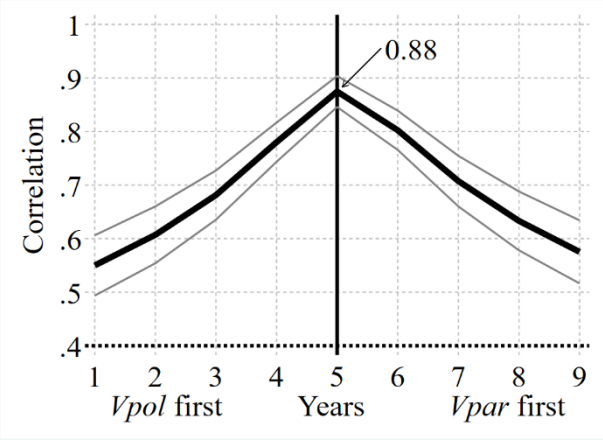


Figure 9c. The relation of  $V_{pol}$  and  $V_{del}$

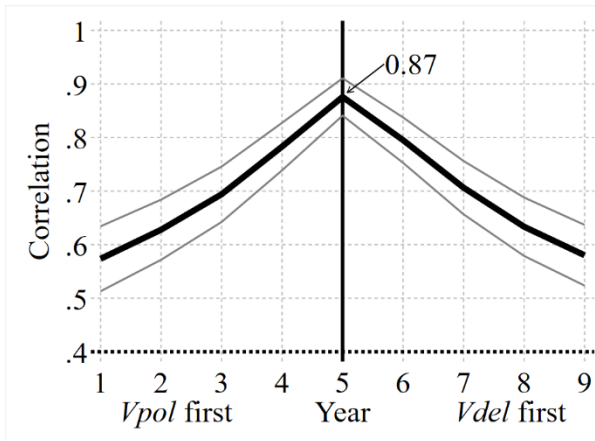
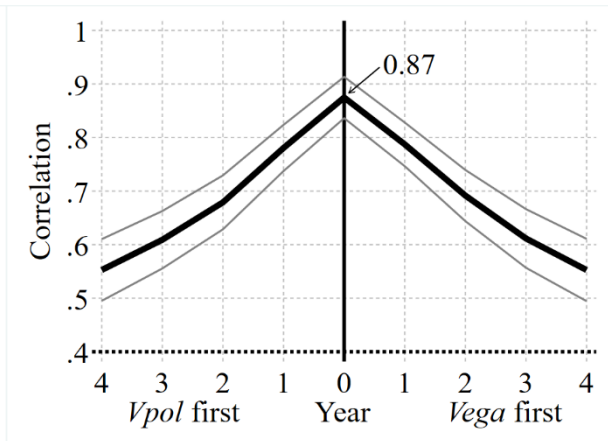


Figure 9d. The relation of  $V_{pol}$  and  $V_{ega}$



## 5. Conclusions

The theory of the Grand Transition is developed in considerable detail in the authors book (Paldam 2021) that consider seven datasets measuring institutions. It is shown that both wide cross country samples and long time series contains transitions, so they have one level in traditional society and a different level in modern society. The transition happens when countries change from the traditional to the modern level. Transitions are *strong but fuzzy* underlying processes in the data. The empirical analyses cover the political and economic systems, as well as corruption and religiosity. It is also well known that similar strong but fuzzy transitions occurs in most socio-economic variables, such as the shares of the main sectors in the economy and the demographic variables.

The present paper shows that the transition happens in all eight democracy indices in much the same way. A large literature presents and discuss a dozen political system indices – often termed democracy indices. At conferences, I have often listened to quite heated debates about the virtues of the various indices. The debates often concentrates on the conceptual differences between the indices.

The present paper concentrate on the differences between the indices in practice. The parallel paper Paper #3 finds the same pattern for 1960 to 2016, for *Polity* and the five V-Dem indices. In addition, Paldam (2021) shows that the same pattern appears in the long historical series from 1800 to 2016. The Democratic Transition is surely a robust pattern.

Consequently, the conceptual differences does not matter for the grand pattern in the indices. The paper is a bit in the spirit of Lord Curzon, who was not sure he could define an elephant, but he was sure he could recognize one.

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- V-Dem home page: <https://www.v-dem.net/en/login/>

**Measuring Democracy Project.** The present paper is paper #2 in my project that consists of four papers

- #1. Main paper: Measuring Democracy. Eight indices: Polity, Freedom House and V-Dem
- #2. Measuring democracy, 1972-2016. How different are eight democracy indices?
- #3. Measuring democracy, 1960-2016. How different are the Polity and the V-Dem indices?
- #4. Net-Appendix to: Measuring democracy

The papers are all from 2021. They are available at <http://martin.paldam.dk/GT-Main2.php>

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<sup>4</sup> Contains a detailed reference list of seven pages.