Constancy spells for the polyarchy democracy index

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A constancy spell for a variable, V, is a period where the first difference, dV, is (practically) zero. V is the polyarchy index from the V-Dem project. dV is analysed by frequency diagrams of samples unified across countries and over time. The range for V is [0, 1], and for dV the range is [-0.54, 0.66]. V starts in 1789 and pt. ends in 2023. It has 26,595 data, which gives 26,340 annual changes, dV, of which most are constant. The analysis looks at eight samples by reporting a frequency histogram, and five variables, z, s, n, p, and g:

Two variables are related to the spells of constancy. z (zero) is the frequency of data that is 0 ± 0.05, and $s = 1/(1 - z/100)$ is an estimate of the average constancy spell.

Three variables are related to the growth of V. The sums of negative and positive frequencies are n (< -0.05) p (> 0.05). The net 'growth' toward democracy is $g = p - n$.

Income is y, and the ***democratic transition***, $V(y)$, looks as follows ⌒ , which in the first difference $dV(y)$ becomes ⌒⌣, *ibid*. The process of the democratic transition takes a century or more. The analysis provides an alternative approach to the democratic transition. As all regimes try to survive, they have ***spells of constancy***. The process has three stages:

a.   Traditional ***steady state*** equilibrium: $V \approx 0.2$, long spells, low growth.
b.   Transition. Regimes are in shifting ***status quo*** equilibria: Medium spells, higher growth.
c.   Modern ***steady state*** equilibrium: $V \approx 0.8$, long spells, moderate growth

The transition starts as a divergence from the traditional steady state and ends when the countries have converged to the modern steady state. The two types of equilibria differ in their reaction to a disturbance. If a steady state is disturbed the system returns to the same equilibrium after some little time. If a status quo is disturbed, it is gone, and the system finds another, normally after a system jump. The ***jumps model*** says that the transition path is an attractor for jumps that happens randomly, *ibid*.

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1. All 26,340 observations for *dV*, the first difference of polyarchy

The observations can be divided into two samples: 23,741 observations are the Main sample. 2,599 observations for the OPEC sample of present and past OPEC countries including Bahrain and Oman. Figure 1 shows the frequency distributions for these samples.

Figure 1. The frequency distribution for *dV*, the first differences or the polyarchy index
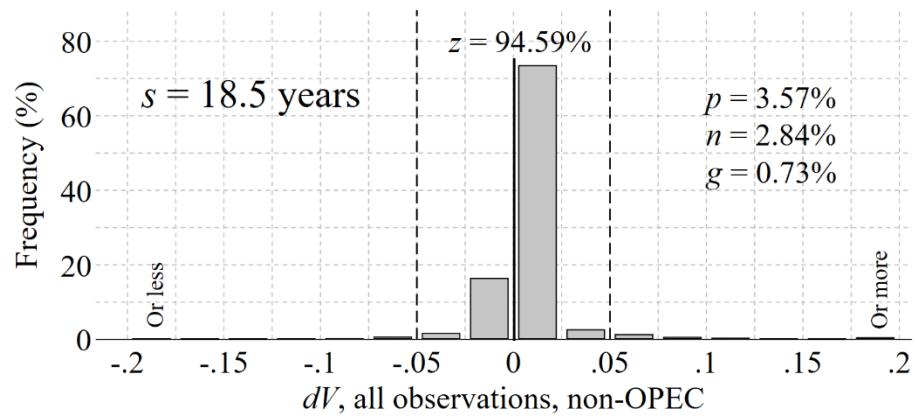
Figure 1a

Main sample
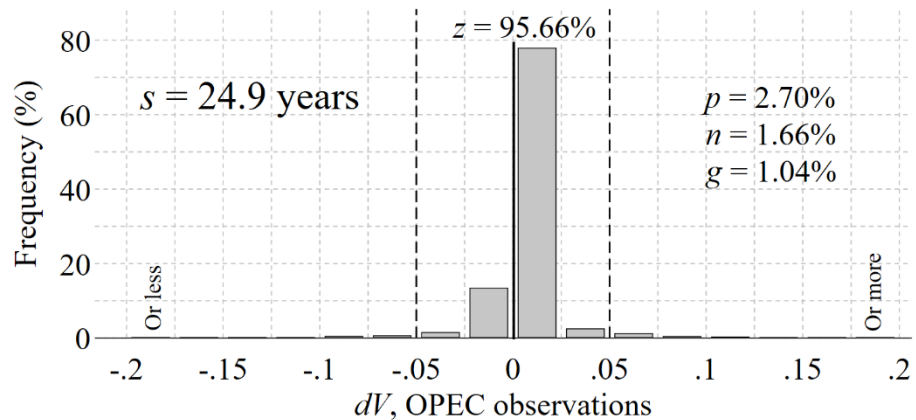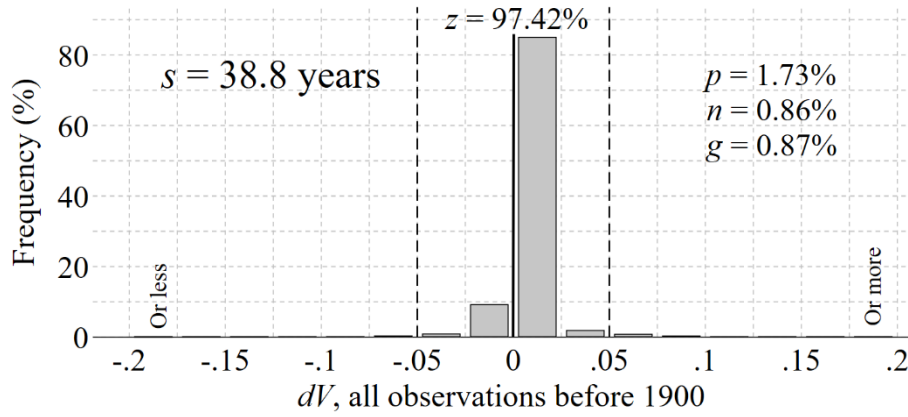
$N = 23,741$

Figure 1b

OPEC sample

$N = 2,599$

Figure 1a for the Main sample has $z = 94.59\%$, so the average constancy spell is $s = 18.5$ years. Thus, most observations for polyarchy are constant. The measure for growth is $g = 0.73\%$ giving the polyarchy index a slow grows towards democracy.

The OPEC countries have no democratic transition, *ibid*. The constancy spells are a bit longer $s = 24.9$ years, which is a quarter century. The net growth is also slow in the OPEC sample. Still $g = 1.04$.

These data do not contain income, so it is difficult to catch the three stages. However, Figure 2 is the 'old' sample stopping in 1900. About 20 countries had started the democratic transition, but the great majority had not. The sample includes many countries that are colonies.
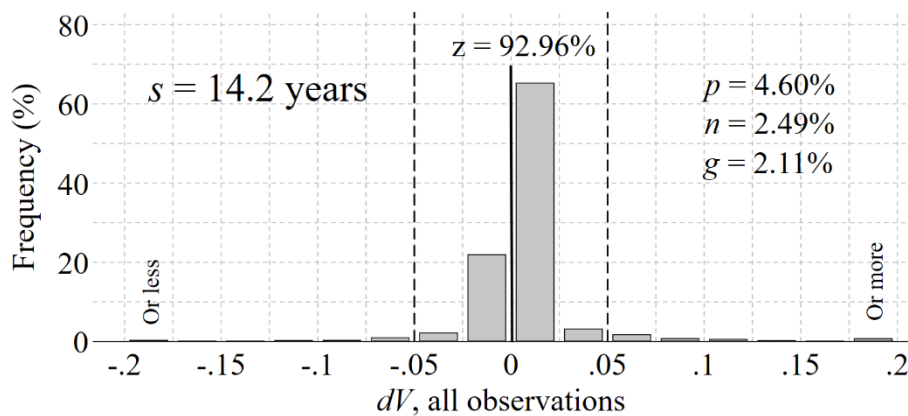
Figure 2. All 7,128 observations before 1900

In the old sample the constancy spells s is s = 38.8 years. It increases the stability marginally only if the last 50 years for the 20 western countries is omitted. The growth measure g is only 0.87%. This points to the low growth in the traditional steady state.

2.   The (V, y) pairs where polyarchy are combined with income

From now the observations for the OPEC sample is deleted. Income, y, is the logarithm to real GDP per capital (from the Maddison project. From 1800 to 2023 this reduces the data to N = 13,215 pairs of non-OPEC (y, dV) observations. y is in [5.9, 11.4] and dV in the [-0.53, 0.66]. The missing data in this sample is mainly old data for colonies, reducing the stability spells.

Figure 3. All 13,216 non-OPEC observations with (dV, y) data.

The polyarchy index is quite sensitive in the developed countries, where it has tiny changes every year. Recall that changes within ± 0.05 represent stability. Hereby, 93% of the

observed first differences are zero showing that the political system is stable. Thus, the spells of stability are 14 years in average.

Figure 4 is an attempt to catch the three stages: Figure 4a is for the poorest countries that should be closest to the traditional steady state, but as will be discussed it is not very stable. Figure 4b looks at the transition period, while Figure 4c is close to the modern steady state. Figure 4c show that the modern period has reached considerable stability with almost the same frequency of (small) increase and decreases.

Figure 4. The frequency distribution of the dV in the three states with (dV, y) data

Figure 4a

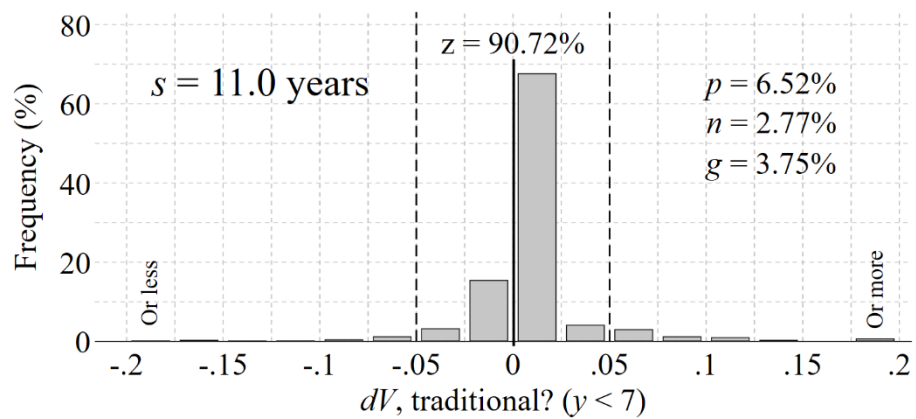Close to traditional

steady state

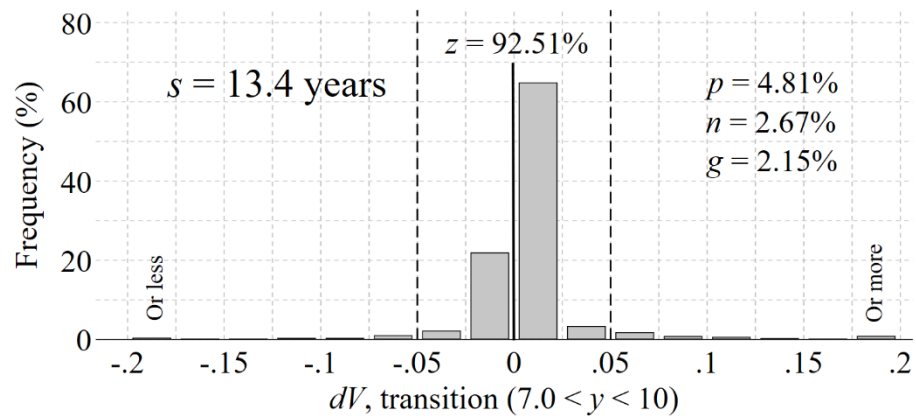$N = 1,335$

Figure 4b

During transition

$N = 10,577$

Figure 4c
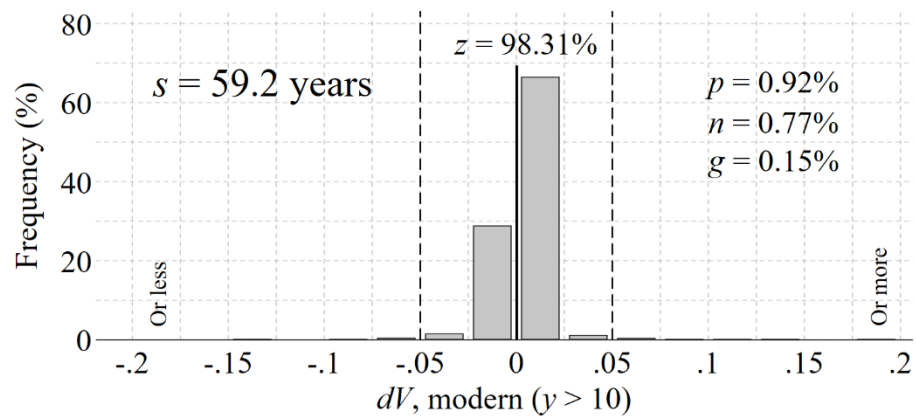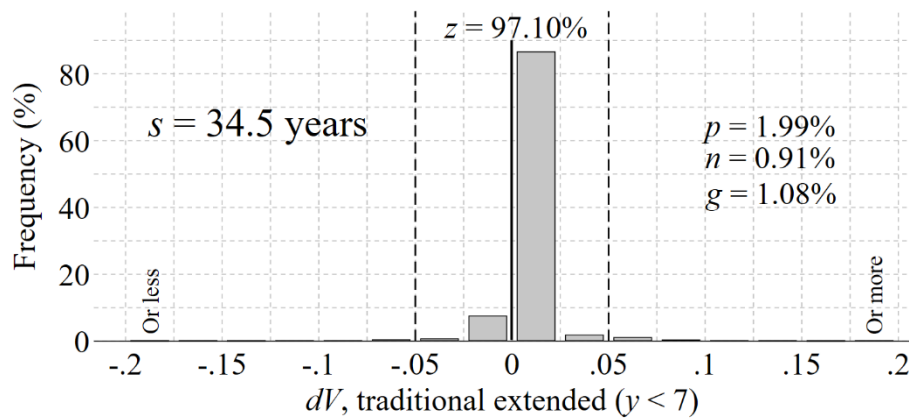
Modern steady state

$N = 1,303$

Figure 4a shows that the transition has already started. To get closer to the traditional steady state the data are extended backward. Figure 5 assume that the income series would have grown or at least not fallen in the periods where polyarchy goes further back than income. Most Latin American countries have data back to 1800 or even before, here the data to 1850 are included. Figure 5 show that the stability of the political system in a sample that is closer to the traditional steady state. It looks like Figure 2.

Figure 5. The extended sample for the low end of Figure 4a, $N = 6,912$

$z = 97.10\%$

$s = 34.5$ years

$p = 1.99\%$
$n = 0.91\%$
$g = 1.08\%$

dV, traditional extended ($y < 7$)

3.   Conclusions

Table 1 summarize the 8 Figures. Political indices are normally constant, especially in two steady states: the traditional on Figures 2 and 5 and the modern on Figure 4c

Table 1 summary of the 8 Figures, dV is first differences to polyarchy, y is income.

Table	Sample	N	z%	s years	n%	p%	g%
			All dV				
1a	Main	23,741	94.59	18.5	2.84	3.57	1.73
1b	OPEC	2,599	95.66	24.9	1.66	2.70	1.04
2	Before 1900	7,128	97.42	38.8	0.86	1.73	0.87
		All non-OPEC dV where (dV, y) pairs exist					
3	Main	13,216	92.96	14.2	2.49	4.60	2.11
4a	7.0 > y	1,335	90.72	11.0	2.77	6.52	3.75
4b	7.0 < y < 10	10,577	92.51	14.4	2.67	4.81	2.15
4c	10 < y	1,304	98.31	59.2	0.77	0.92	0.15
5	4a extended	6,913	97.10	34.5	0.91	1.99	1.08

Main are all non-OPEC data. s is the frequency in % of the observations in [-0.05, 0.05].
$s = 1(1 - z/100)$ is an estimate of the average spell of constancy in years. n is the share of negative frequencies, p is the share positive frequencies, while g is the net positive.

However, they are less stable in the period of the transition on Figures 4a and 4b, where there is clear upward drift, as modelled by the jumps model, *ibid*. But even during the transition regimes has average constancy spells is more than a decade.

Sources and references:

Sources:
  y, income. The natural logarithm to GDPpc from: https://www.rug.nl/ggdc/historicaldevelopment/maddison/-releases/maddison-project-database-2023
  V, polyarchy, is from https://v-dem.net/data/the-v-dem-dataset/
References: The following papers referred to as *ibid*. The papers include many references to the literature.
  MP, 2021. *The Grand Pattern of Development and the Transition of Institutions*. Cambridge UP, New York. The democratic transition is analyzed in part II of the book
  MP, 2024. Income, Growth, and Democracy. Looking for the main causal directions in the nexus. *EJPE* 83, 10253
  MP, 2025a. Explaining the Path of the Democratic Transition. *Kyklos* 78, 1142-57
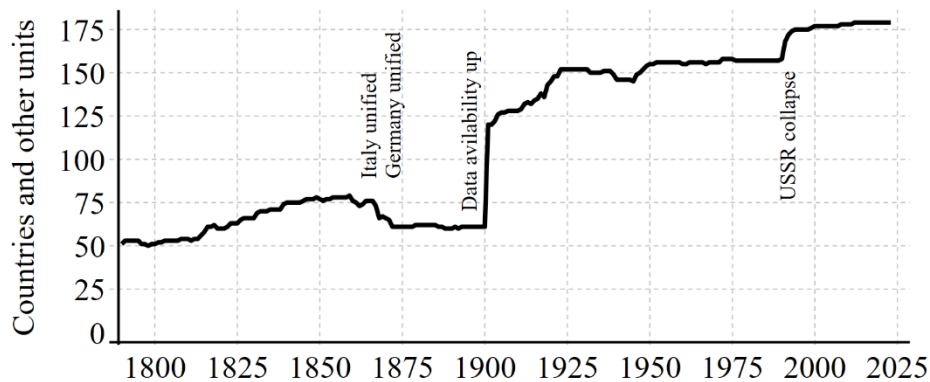 MP, 2025b. The OPEC/MENA/Arab nexus and the missing democratic transition. *EJPE* 90 102731

Appendix:

Statistics for all *V* and *dV*

	All		Main		OPEC	
Count	26,340		23,741		2,599	
	V	*dV*	*V*	*dV*	*V*	*dV*
Avrage	0.2627	0.0026	0.2774	0.0027	0.1284	0.0015
Std dev.	0.2624	0.0338	0.2673	0.0345	0.1580	0.0258
Skewness	1.12	2.66	1.04	2.19	2.08	2.19
Kurtosis	0.03	74.0	-0.20	73.2	4.42	54.2

Figure A. Number of countries and other units covered by the *dV* data each year

The path of the curve is determined by both political events and data availability.