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# Net Appendix to:
# The OPEC/MENA/Arab nexus and the missing democratic transition

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This appendix considers three variables: ***P***, polity, and ***V***, polyarchy, and ***y***, income (ln to the real GDP per capita), and one abbreviation **ci**, for 95% confidence interval. All graphs are made with stata. The kernels are calculated with the command lpoly, using the defaults, including the Epanechnikov kernel.

Kernel regressions and frequency distributions are bulky to report, thus the main paper shows only 7 graphs with 24 kernels and 4 graphs with as many frequency diagrams. Also, the reporting of confidence intervals (ci) quickly make the graphs messy, Hence, this Appendix provides 12 additional graphs reporting 72 kernels of which 8 have cis, and 52 are in 6 bundles. In addition, it provides 10 frequency diagrams.

Democracy indices *P* and *V* have no natural scale. As a crude indication of the scale the 22 graphs are provided with half or quarter way lines separating authoritarian and democratic regimes. Polity is the more 'positive' index that make more countries democratic. This is evident throughout when the curves or frequency distribution for the two indices are compared.

Section 11 explains how the paper fits into the project of the author.



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## A1. Main sample. Income and time kernels with ci's. Period 1950-2018

Figure A1. Income-kernels for Main sample, transitions

Figure A1a. Polity, income: $K^P(y, 0.3)$

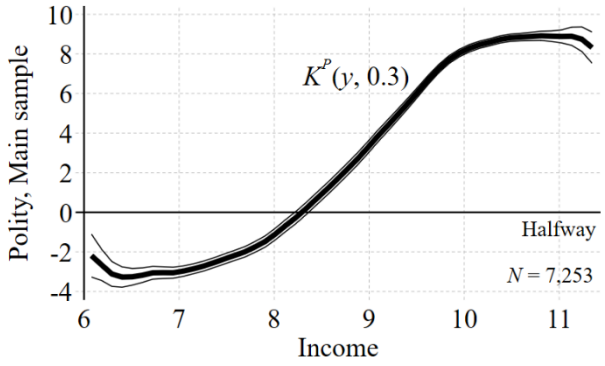



Figure A1b. Polyarchy, income: $K^V(y, 0.3)$

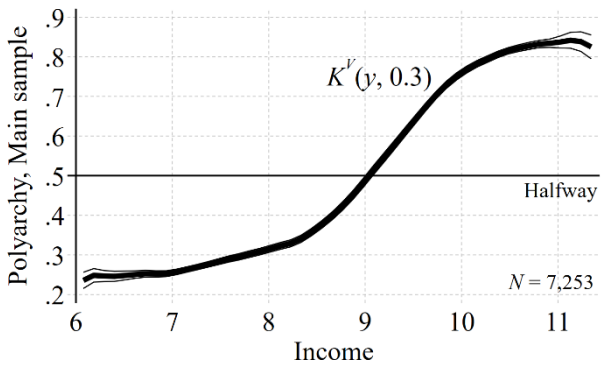



Figure A2. Time-kernels for Main sample, development 1950-2018

Figure A2a. Polity, time: $K^P(t, 2.7)$

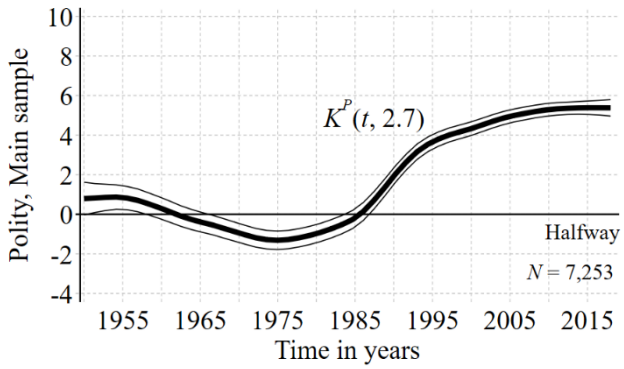
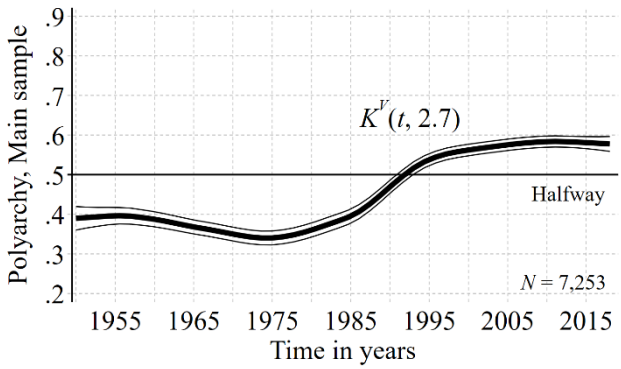



Figure A2b. Polyarchy, time: $K^V(t, 2.7)$




The figures are made to show the ci's for the 4 curves for the Main sample in Figures 1 and 2 of the main paper, and to show another time-period. In other papers that are estimated for other periods such as 1960 to 2018 or from 1972 to include it Freedom House index – they are very robust. The figures call for two comments:

1: They look very much like the corresponding figures (Figures 1 and 2) in the main paper. Even when the data for the main sample is much shorter at present.

2: The two income-kernels are 'better' than the two time-kernels. The income-kernels look like perfect transition curves, while no theory explains the time-kernels. The confidence intervals are narrower for the income-kernels.

As income grows over time the income and the time graphs have a connection, but the income path is the primary one, while the path over time is a secondary effect.

## A2. OMA sample. Income and time kernels with ci's. Period 1950-2018

Much of the comments made in section A1 also apply to section A2, but there are no transitions in the A3 figures, and the curves have a smaller range as reported in Table A1. The kernels over time have wider confidence intervals, and hence they explain less of the variation.

The two time-kernels show a period from 1975 to 2014 where they rise, but then they turn. It is nice to see that income curves have their strongest rise before the time curves, so the income rise affects the time curves with a considerable lag.

Figure A3. Income-kernels for OMA sample

Figure A3a. Polity explained by income

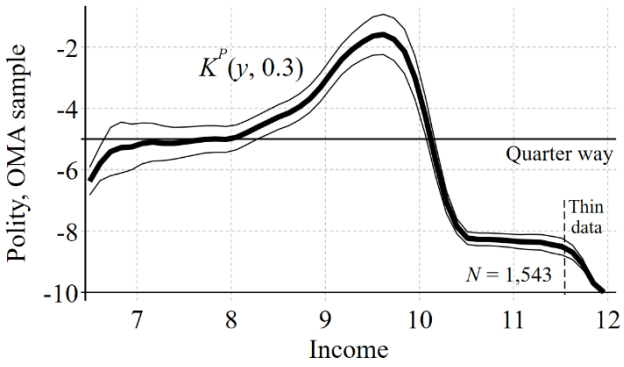



Figure A3b. Polyarchy explained by income

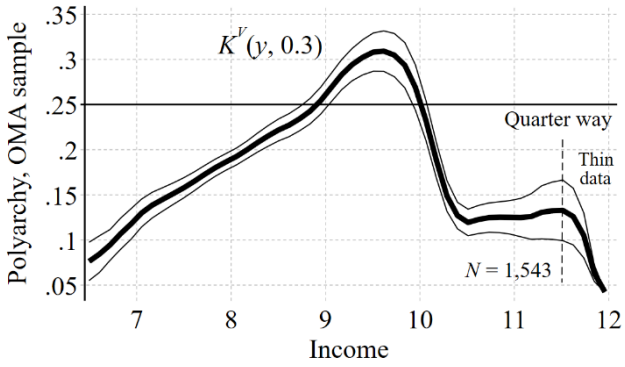



Figure A4. Time-kernels for OMA sample. Development 1950-2018

Figure A4a. Polity explained by time

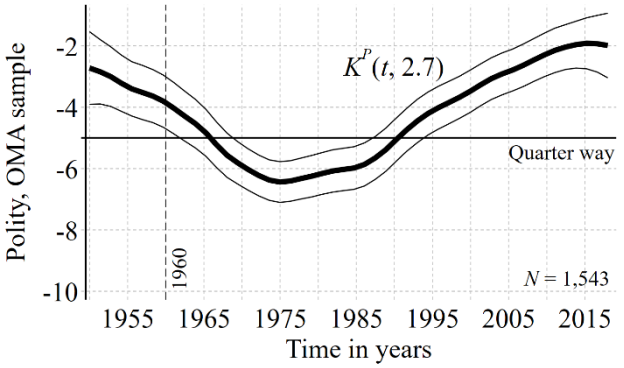



Figure 4b. Polyarchy explained by time

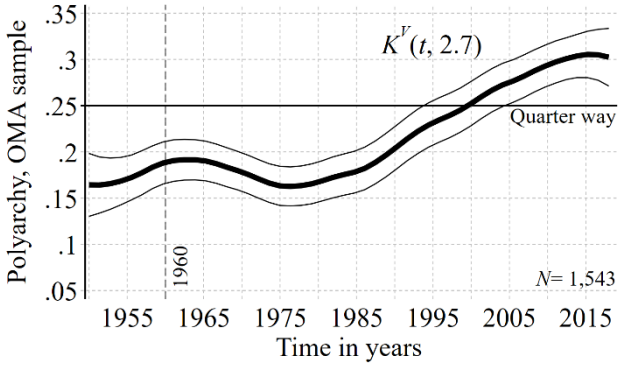



Table A1. The range of the curves

| Samples | Income kernels | | | Time kernels | | |
|---|---|---|---|---|---|---|
| | Figure | Polity | Polyarchy | Figure | Polity | Polyarchy |
| Main sample | A1 | 11.9 | 0.58 | A2 | 6.7 | 0.25 |
| OMA sample | A3 | 6.6 | 0.19 | A4 | 3.7 | 0.14 |

The tails with thin data on Figures A3 are disregarded

## A3. The gap between the curves for the Main and OMA samples

Figure A5a compares the gaps between the income path for polity on Figures A1a and A3a, i.e., the OMA-curve is subtracted from the Main curve. Figure A5b makes the same comparison for polyarchy. Both figures show a strong divergence of the political systems, reaching a large difference at the end.

Figure A5. The difference between the income-kernels for the Main and the OMA groups

Figure A5a. Gap for polity

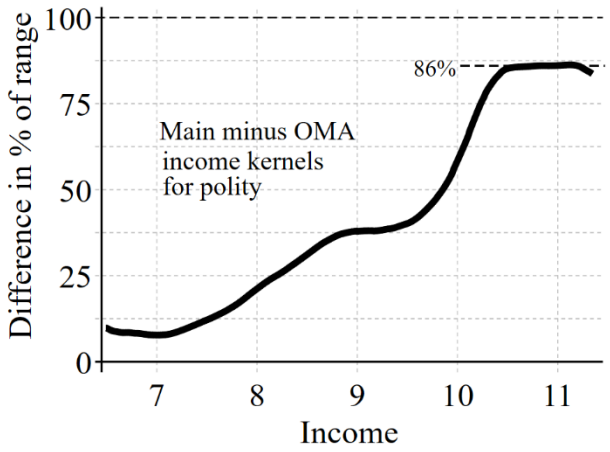
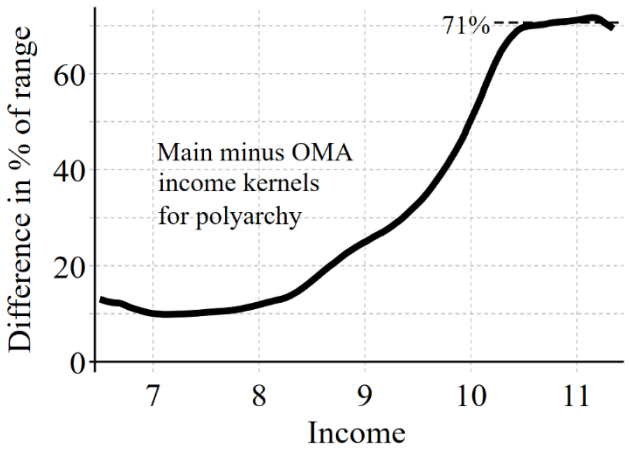



Figure A5b. Gap for Polyarchy




In the same way Figure A6 shows how the gap grows over time, i.e., Figures A2 and A4. The two curves show a large divergence, but here the divergence is less monotone.

Figure A6. The difference between the time-kernels for the Main and the OMA groups

Figure A6a. For polity

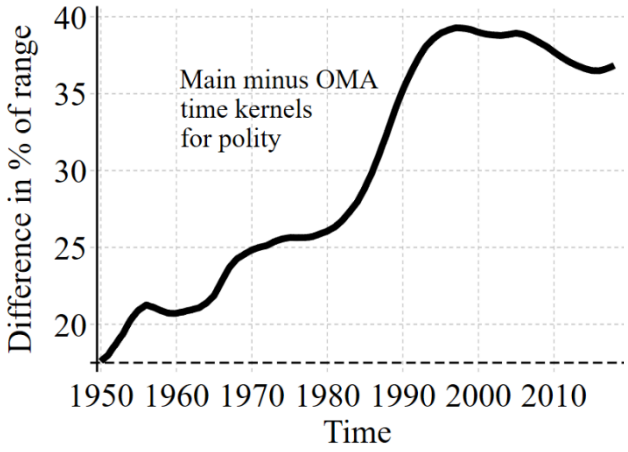
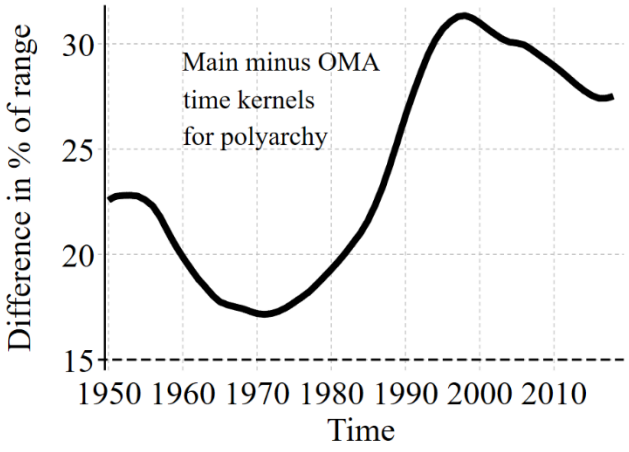



Figure A6b For Polyarchy



## A4. OMA sample. Robustness of the income kernels to the bandwidth, *bw*

Figure 7 shows the robustness of the two OMA-kernels. The basic form is robust especially the part before the hump. The hump moves a little on Figure A7a, and all curves fall after the hump. The kernel-curve from the main paper is highlighted as the bold black curve. Experiments showing the robustness of kernels to the *bw* for the Main sample are reported in Paldam (2021).

Figure A7. Kernel from Figure A3. Experiments with bw = 0.1, 0.2, …, 0.6

Figure A7a. $K^P(y, bw)$ for polity from Figure A3a

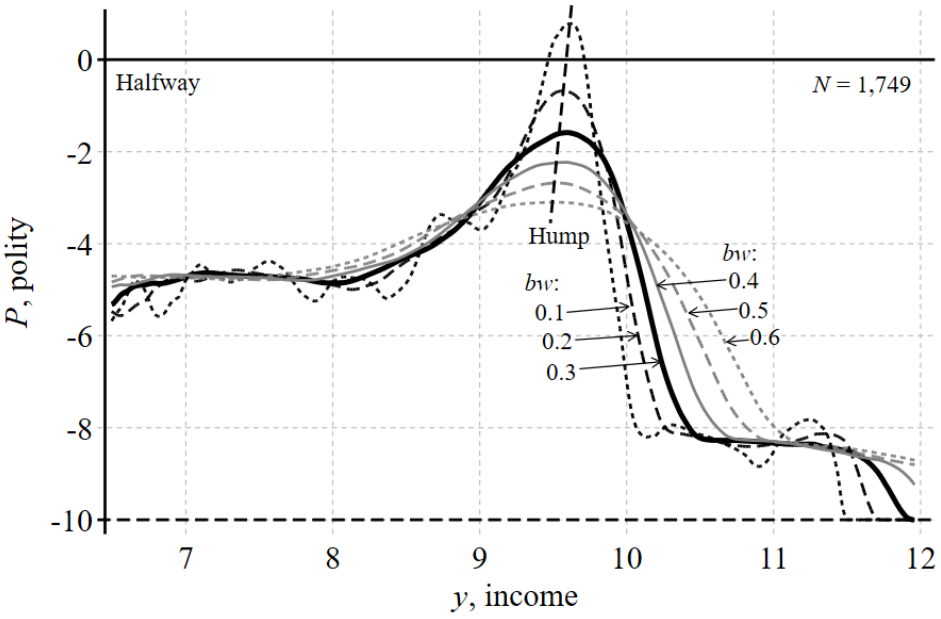
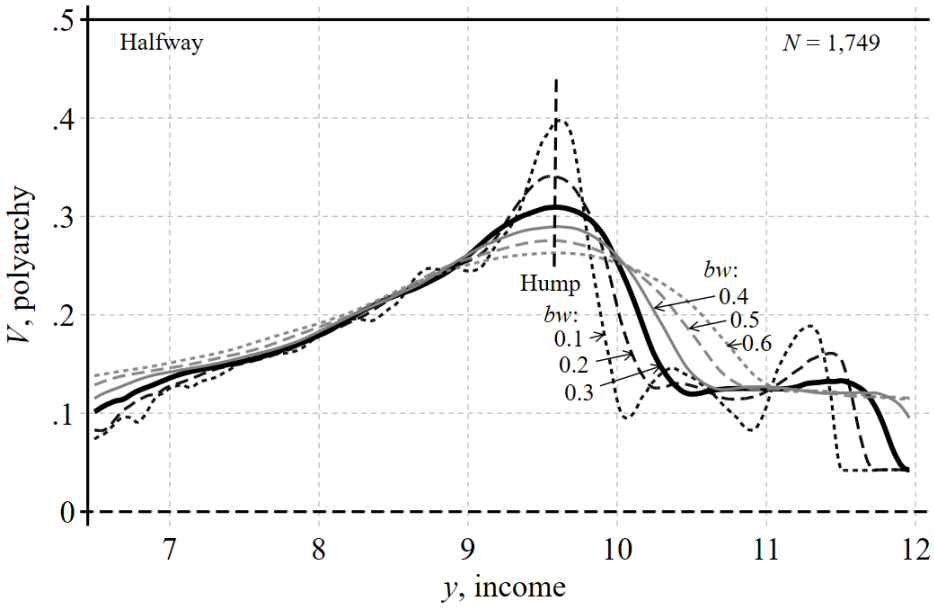



Figure A7b. $K^V(y, bw)$ for polyarchy from Figure A3b



## A5. Frequency distribution in % for the three groups

Figure 4 in the main paper has frequency distribution for the Main and the OMA groups. Figures A8-A10 are the frequency distributions for the three groups: OPEC, MENA and Arab. They look a great deal like Figure 4. As expected, the curves for polyarchy are more skewed to the left than the polity curves. The skewest distribution are as expected from Table 5a and Figure 5 the ones for the Arab group. The Arab countries have very little democracy.

Figure A8. OPEC group, $N = 1{,}224$

Figure A8a Polity

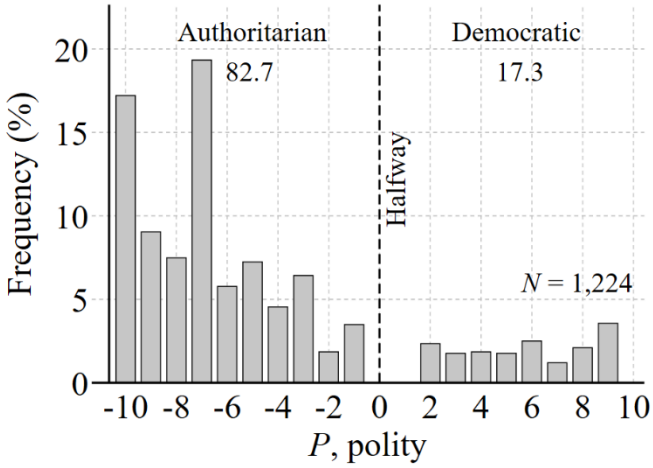



Figure A8b. Polyarchy

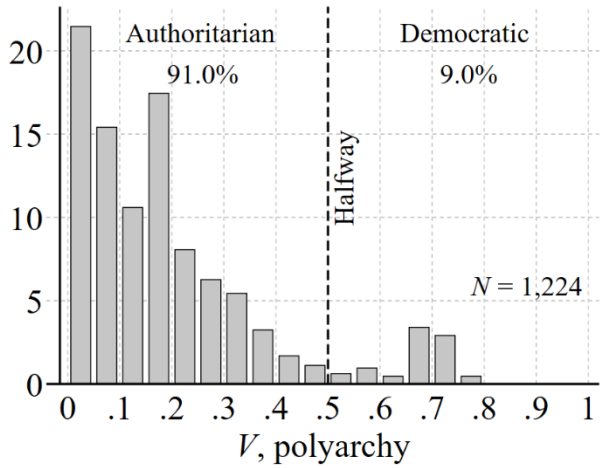



Figure A9. MENA group, $N = 1{,}107$

Figure A9a. Polity

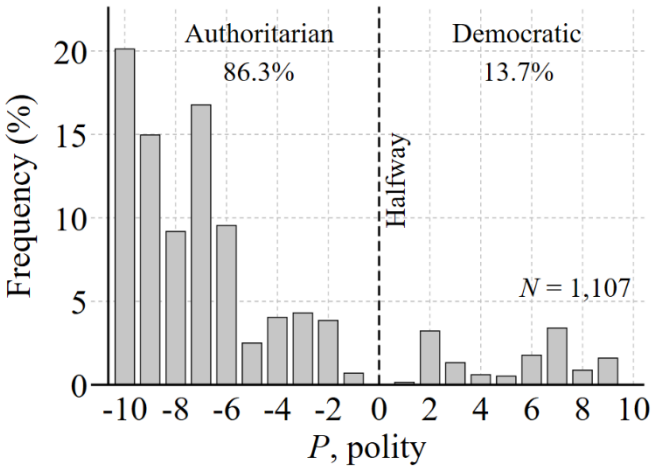



Figure A9b. Polyarchy

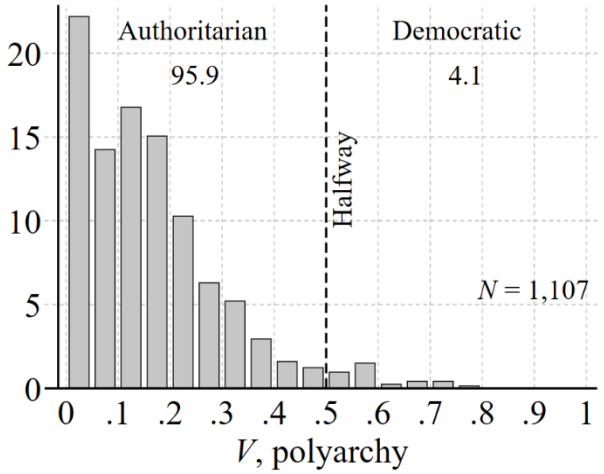


Figure A10. Arab group, $N = 940$

Figure A10a. Polity

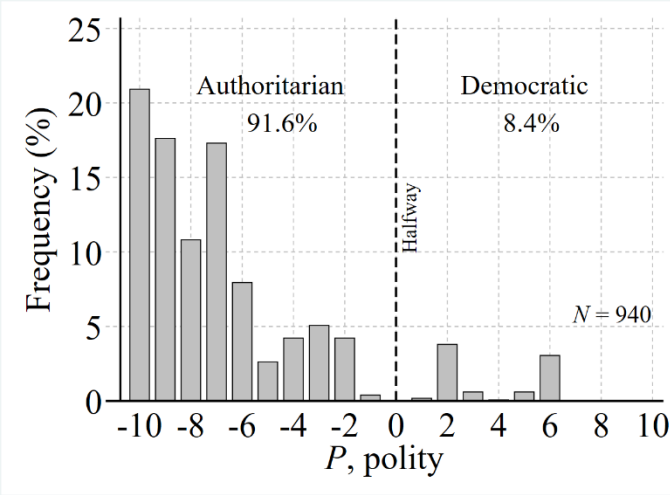
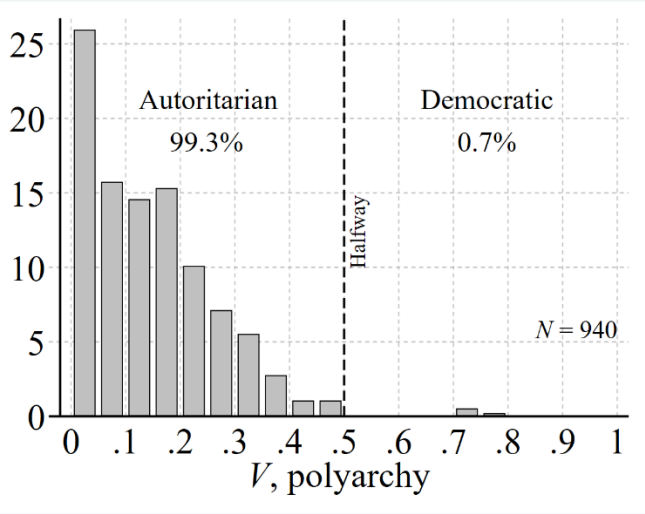



Figure A10b. Polyarchy




When the distributions for the main sample on Figure 4a for polity is compared with Figure 4b, A8a, A9a, and A10a using the standard $\chi^2$-test all four results are abundantly clear rejecting that the distributions are the same. The same result applies when Figure 4c for polyarchy is compared to Figure 4d, A8b, A9b, and A10b.

## A6. Frequency distribution of Arab oil countries and other Arab countries

The four graphs in this section show that Arab oil countries are a little more authoritarian than other Arab countries. This is as predicted by the oil theory in the main paper, and as also found in the larger groups, when the OMA oil countries are compared with other OMA countries.

Figure A11. Arab oil countries

Figure A11a. Polity

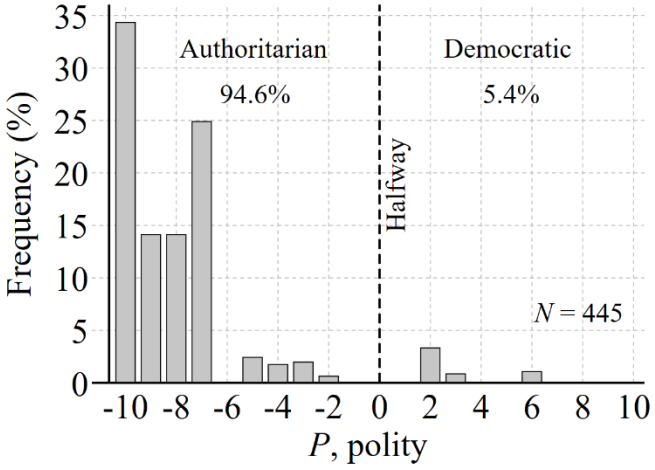



Figure A11b. Polyarchy

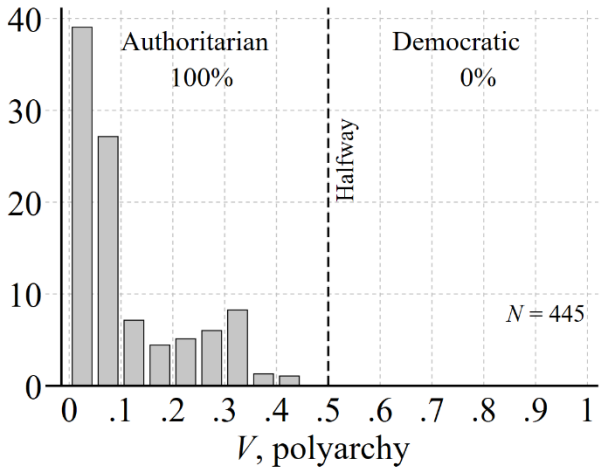



Figure A12. Other Arab countries

Figure A12a. Polity

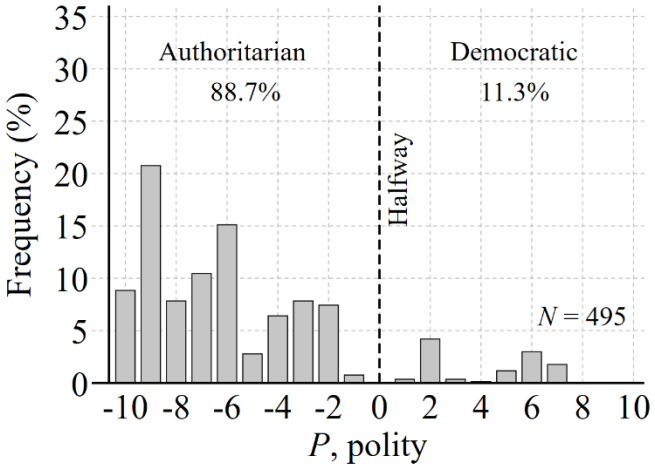
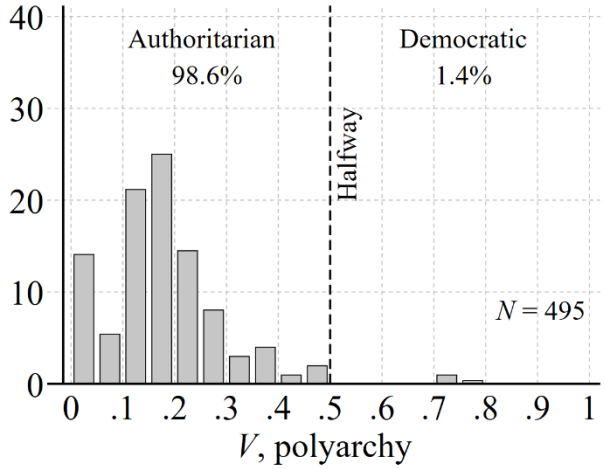



Figure A12b. Polyarchy



## A7. Country bundles for the sub-groups: OPEC-only MENA-only and overlap

The three subgroups have 8 to 10 countries, so, they may be sensitive to individual countries. This is examined by the country-bundle technique, which shows the kernel estimated without each country. The two countries that influence the kernel most are indicated.

**OPEC-only**. The two bundles are relatively high and have a strong peak.

Figure A13. Bundles for OPEC-only sub-group

Figure A13a. Polit. $K^P(y, 0.4)$. Bundle for the eight countries

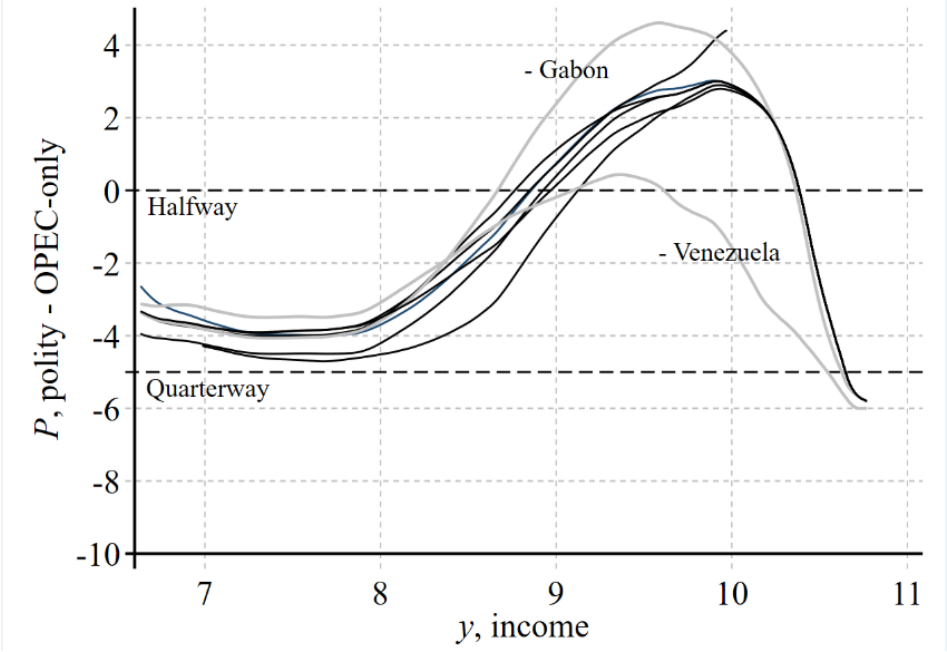
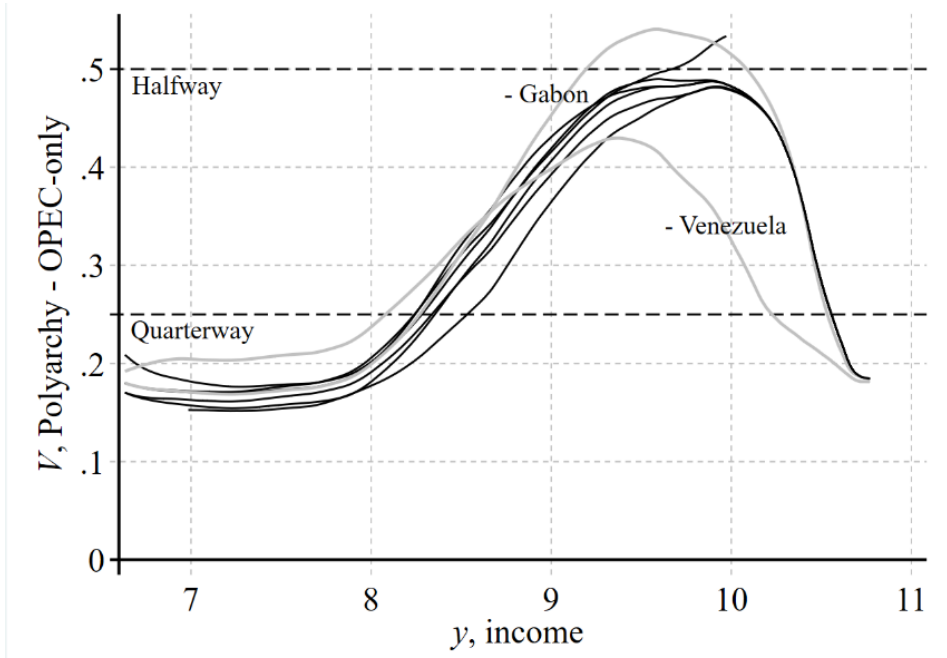



Figure A13b. Polyarchy $K^V(y, 0.4)$. Bundle for the eight countries



**MENA-only:** The two MENA-only bundles are fairly high and have no peak. When the richest country Turkey is excluded, the kernels become a bit shorter.

Figure A14. The MENA-only sub-group of eight countries

Figure A14a. Polity $K^P(y, 0.4)$. Bundle for the eight countries

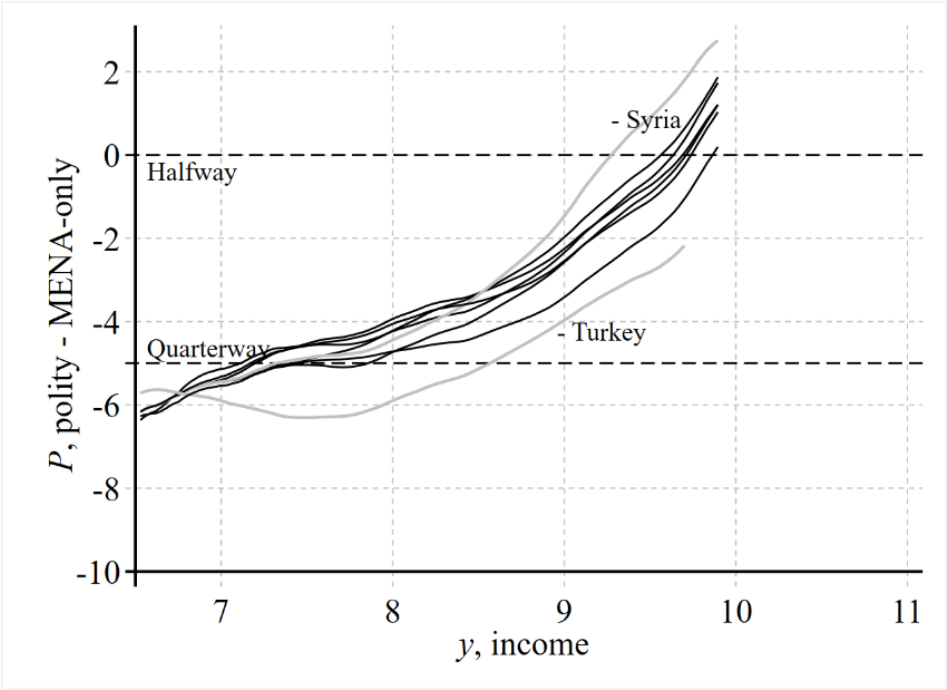
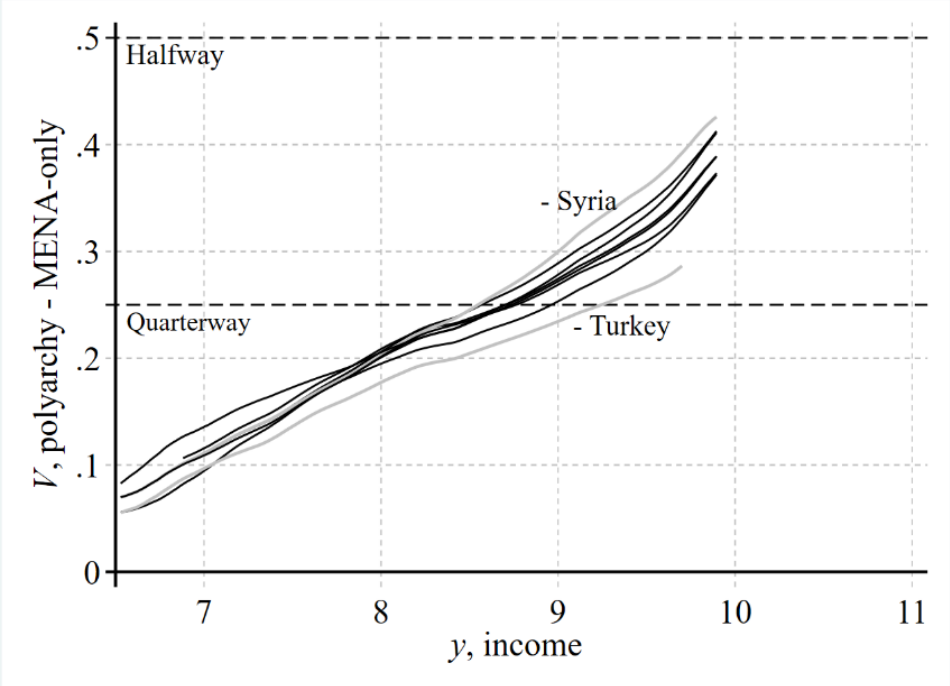



Figure A14b. Polyarchy $K^V(y, 0.4)$. Bundle for the eight countries



**Overlap**. The two Overlap bundles never leave the low quarter of the ranges of the indices. While the hump is clear on Figure A15a it is unclear on Figure A15b.

Figure A15. The Overlap sub-group of ten countries

Figure A15a. Polity $K^P(y, 0.4)$. Bundle for the ten countries

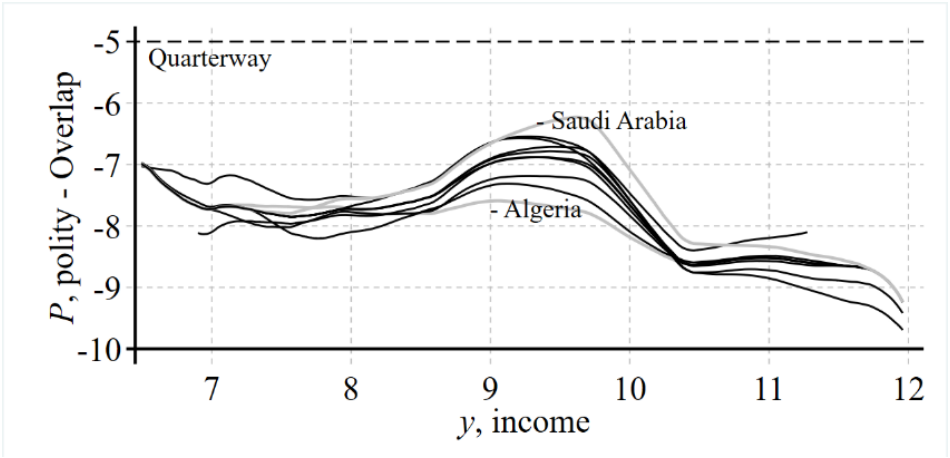
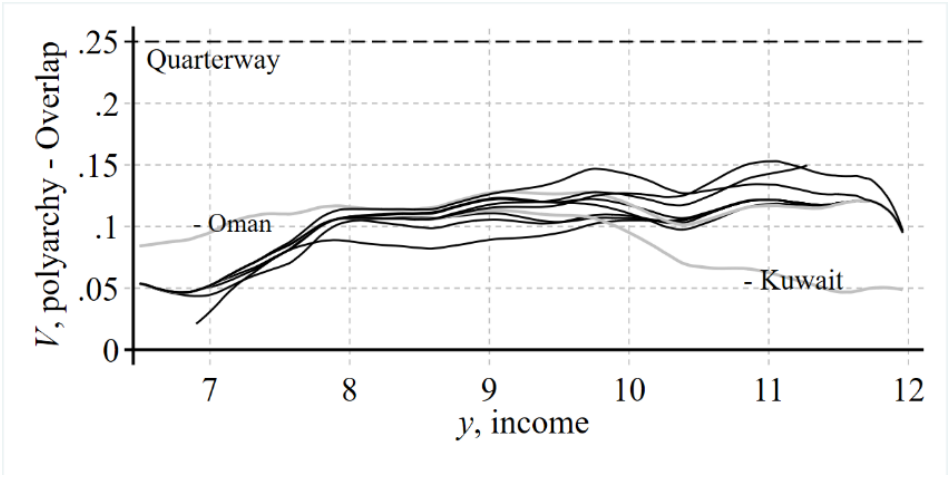



Figure A15b. Polyarchy $K^V(y, 0.4)$. Bundle for the ten countries



## A8. Averages over time

Section 2.2 in the paper considers the development over time using kernel regressions with time as the explanatory variable. Figure A16 gives the standard graphs that look much the same as the kernels over time. Each figure shows 4 lines. The thick black line is for all available observations. The moderately thick black line is for the countries with at least 50 observations. The thick gray line is for the countries with at least 60 observations. Finally, the moderately thick gray curve is for 6 countries with all 69 observations (including Iran where one observation is interpolated). Both figures show an increase in the indices from 1980 to 2012, but while Figure A16a has no long run trend there may be a trend on Figure A16b, just like on Figure 2 in the paper.

Figure A16. Annual averages for the OMA sample

Figure A16a. Polity

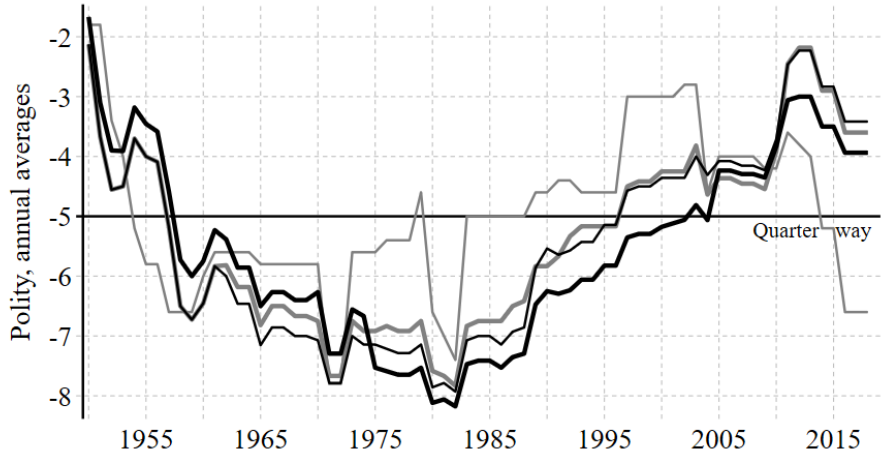
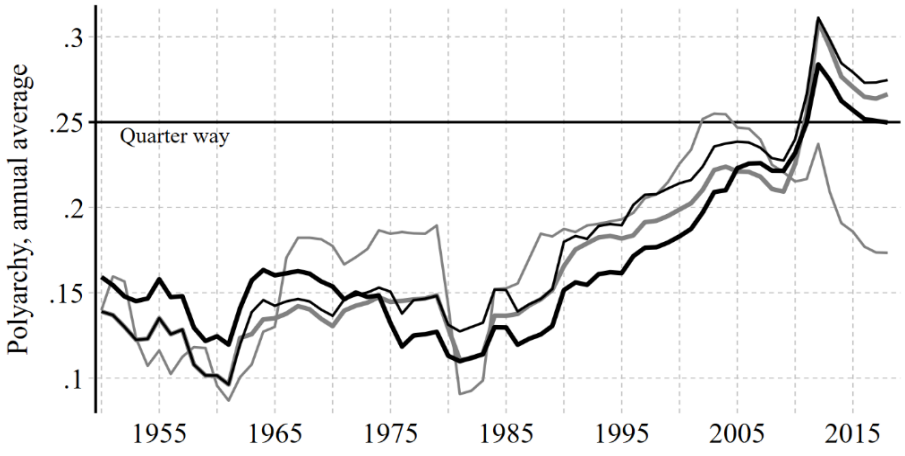



Figure A16b. Polyarchy



## A9. Extension of the period to 2023

Everything until now has been done on the data defined in Table 1 of the paper. However, some evidence exists about the 4 years from 2019 to 2023. The polyarchy index has been updated to 2023, and the Freedom House index – that has not been used until now – is similarly updated. For the period 1990-2023 both indices are complete for all countries in the OMA sample. The Freedom house index has two components: PR, democratic rights and CL, civil liberties. Both are given on a 6-points integer scale, where 7 is the most authoritarian and 1 the most democratic. To make the two Figures comparable the Freedom House index is converted to: FH = 7 – (PR + CL)/2 that is defined on the interval [0, 6].

Note that the trends for the two indices are surprisingly different. While the Polyarchy index shows a small fall, the fall is substantial for the FH-index.

Figure A17. The path of two democracy indices from 1990 to 2023 for the three sub-groups

Figure A17a. Polyarchy

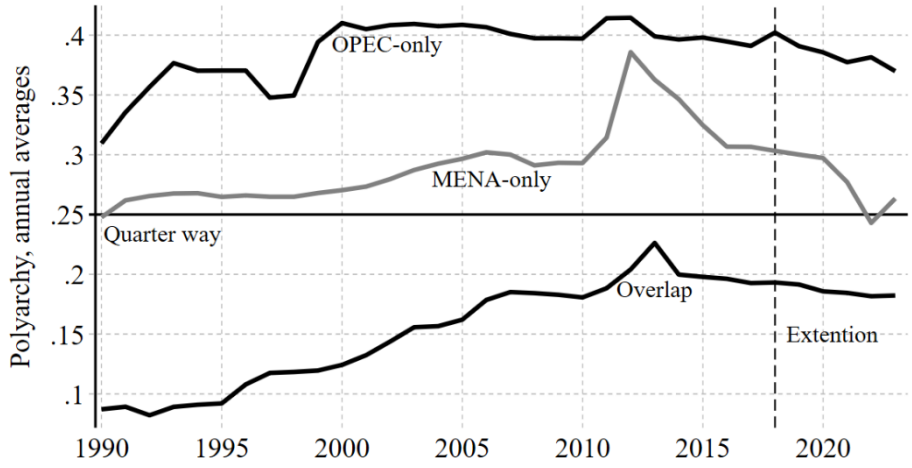
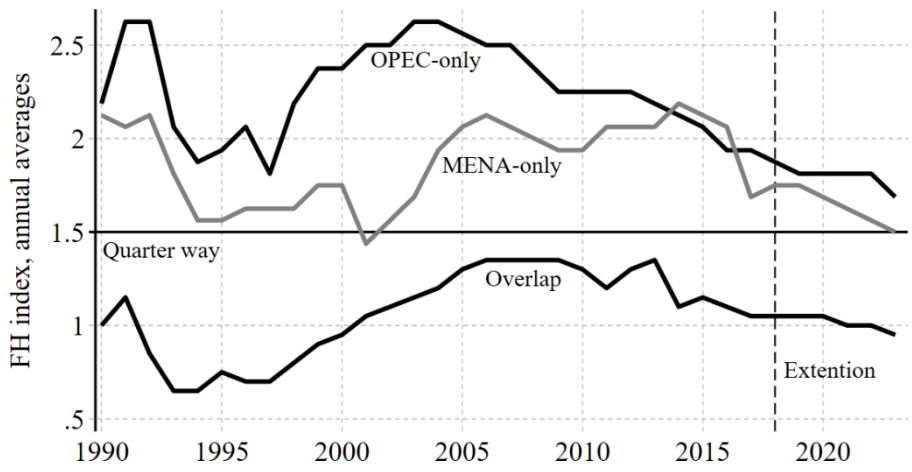



Figure A17b. Freedom House, FH



## A10. The effect of the two non-Arab MENA countries: Iran and Turkey

The MENA countries are all Arab except Iran and Turkey. Both have their own language, and a long history as an independent country. Iran is the only Shiia Muslim country. Turkey has been a colonial superpower ruling most of the MENA area. It is a NATO country and has applied to be an EU country as well, but with no success. Both tables are for all $N$ = 12,332 observations

Table A2. The effect of the two countries on the relevant relations in Table 5 for groups

Estimating equation: $X = Constant + a_1Income + a_2OMA + a_3Group + a_4Iran + a_5Turkey + u$

| | Part A: $X = P$ polity | | | | | | Explained | |
|---|---|---|---|---|---|---|---|---|
| | *Constant* | *Income* | *OMA* | *OPEC* | *Iran* | | $aR^2$ | $\Delta aR^2$ |
| (3) | -26.7 (-62) | 3.38 (67) | -5.23 (-20) | -2.52 (-8) | | | 0.325 | |
| (A3) | -26.7 (-62) | 3.38 (67) | -5.23 (-20) | -2.42 (-8) | -1.88 (-2.5) | | 0.326 | 0.001 |
| | *Constant* | *Income* | *OMA* | *MENA* | | *Turkey* | $aR^2$ | $\Delta aR^2$ |
| (4) | -27.4 (-64) | 3.46 (69) | -3.27 (-14) | -5.92 (-20) | | | 0.343 | |
| (A4) | -27.8 (-66) | 3.51 (71) | -3.27 (-14) | -6.96 (-23) | | 11.30 (11) | 0.361 | 0.018 |
| | Part B: $X = V$ polyarchy | | | | | | Explained | |
| | *Constant* | *Income* | *OMA* | *OPEC* | *Iran* | | $aR^2$ | $\Delta aR^2$ |
| (9) | -0.92 (-64) | 0.159 (95) | -0.198 (-22) | -0.093 (-9) | | | 0.464 | |
| (A9) | -0.92 (-64) | 0.159 (95) | -0.198 (-22) | 0.090 (-9) | -0.058 (-2.3) | | 0.464 | 0.000 |
| | *Constant* | *Income* | *OMA* | *MENA* | | *Turkey* | $aR^2$ | $\Delta aR^2$ |
| (10) | -0.94 (-67) | 0.162 (95) | -0.128 (-16) | -0.215 (-22) | | | 0.481 | |
| (A10) | -0.95 (-68) | 0.164 (99) | -0.127 (-16) | -0.244 (-24) | | 0.314 (15) | 0.490 | 0.009 |

Table A3 The effects of the two countries on the relevant relations in Table 6 for sub-groups

Estimating equation: $X = Constant + a_1Income + a_2OMA + a_3Sub\text{-}group + a_4Iran + a_5Turkey + u$

| | Part A: $X = P$ polity | | | | | | Explained | |
|---|---|---|---|---|---|---|---|---|
| | *Constant* | *Income* | *OMA* | *MENA-only* | | *Turkey* | $aR^2$ | $\Delta aR^2$ |
| (4) | -26.7 (-62) | 3.38 (67) | -7.75 (-43) | 2.52 (8) | | | 0.325 | |
| (A4) | -26.7 (-62) | 3.38 (67) | -7.76 (-43) | 1.06 (3.1) | | 7.76 (12) | 0.333 | 0.012 |
| | *Constant* | *Income* | *OMA* | *Overlap* | *Iran* | | $aR^2$ | $\Delta aR^2$ |
| (6) | -28.6 (-68) | 3.60 (72) | -4.15 (-23) | -8.75 (-29) | | | 0.366 | |
| (A6) | -28.6 (-68) | 3.61 (73) | -4.15 (-23) | -9.19 (-29) | 3.72 (5) | | 0.367 | 0.001 |
| | Part B: $X = V$ polyarchy | | | | | | Explained | |
| | *Constant* | *Income* | *OMA* | *MENA-only* | | *Turkey* | $aR^2$ | $\Delta aR^2$ |
| (10) | -0.92 (-64) | 0.159 (95) | -0.291 (-48) | 0.093 (9) | | | 0.464 | |
| (A10) | -0.92 (-64) | 0.159 (95) | -0291 (-48) | 0.060 (5) | | 0.173 (8) | 0.466 | 0.002 |
| | | | | | | | $aR^2$ | $\Delta aR^2$ |
| (12) | -0.98 (-71) | 0.167 (102) | -0.159 (-27) | -0.319 (-32) | | | 0.503 | |
| (A12) | -0.99 (-71) | 0.168 (102) | -0.159 (-27) | -0.337 (-33) | 0.146 (6) | | 0.504 | 0.001 |

For both countries a binary dummy is made the usual way, so that it is 1 when the country is included and zero otherwise. Iran is an OPEC country and Turkey is a MENA country.

Table A2 starts from Table 5 of the paper, the dummies are included in relations (3), (4), (9) and (10). The estimates from the paper are shaded in gray. Both country dummies become significant, but while the Iran dummy change very little in the relation the Turkey dummy has an effect.

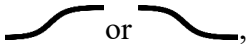
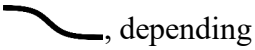
Table A3 is made in the same way as Table A2 but for the sub-groups. Turkey is part of the MENA-only group and Iran is in the Overlap sub-group. The pattern is similar to the one in Table A2. The Iran dummy change very little, but though the Turkey dummy has a larger effect it is not as large as in Table A2.

Another illustration of the effect of the two countries is to look at the country bundles in section A7. In the bundle for the MENA-only sub-group on Figure A14 it has a clearly visible effect to exclude Turkey. In the bundle for Overlap sub-group on Figure 15 it changes very little to exclude Iran.

## A11. A short survey of the project of the author

The project started as a cooperation with Erich Gundlach (EG.) in 2005 and during the next 15 years it led to a dozen papers, mostly coauthored, which were integrated and updated in the book MP (2021).

The main message is that the skeleton of development is a cluster of highly confluent transitions in most socioeconomic time series. ***The Grand Transition*** is overlaid with a lot of fuzzy movements of the series, but most (all?) series have a strong long run common trend in the representative country looking as a transition should. There as surely exogenous chocks as well, but they are scattered throughout the system. The transitions are strong in the main institutional indices as well. Much we would like to see as primary for development is in fact endogenous.

The book looks at the main democracy indices, economic freedom, corruption, and religiosity. Later work looks at human capital. The main transition curves look as  or  , depending on the scale of the variable. The flat sections are for the two steady states, the curves become hump-shaped for the first differences, such as the growth rate.

The book makes considerable efforts to document empirical facts, to study the causality, and the medium-term theory, especially for the democratic transition. The long-run theory briefly summarized in the paper, is from MP (2024a). The causal structure is further analyzed in Paldam (2024b and d).

Publications:


MP, EG., 2008. Two Views on Institutions and Development: The Grand Transition vs the Primacy of Institutions. *Kyklos* 61, 65-100. 2008

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

MP, 2024a. The long-run path of the democratic transition. The inevitable collapse of three pillars model. To appear in *Kyklos*

MP, 2024b. The transition of education. A cross-country macro analysis. *European Journal of Political Economy* 84, 102362 with net appendix

MP, 2024c. Income, Growth, and Democracy. Looking for the main causal directions in the nexus. *European Journal of Political Economy* 83, 102532 with net-appendix


Working papers:


MP, 2024d. Do relatively democratic countries grow faster? With net-appendix

MP, 2024e. Can democracy and religiosity explain corruption? An empirical survey of cross-country data


The papers are posted at: http://www.martin.paldam.dk/GT-Main2.php in the last version, i.e., in the pre-print version together with the net appendices. The papers that led to the book are on http://www.martin.paldam.dk/GT-Main1.php, that also refers to a dozen net appendices.