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The democratic transition in a generic country

A graphical exposition

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Abstract

The democratic transition is the change from an authoritarian system in a low income country to democracy in a developed country. Income is measured by (the log to) GDP per capita, and democracy is measured by the Gastil and the Polity indices. These data are used to show the path of democracy as a function of income in the generic country, which is generated by two tricks: (1) The data for all countries are merged and sorted by income. (2) A MA(250) process is used to make multi-country averages of democracy at each income level. The resulting curve shows the transition to democracy.

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1. Introduction

The democratic transition reflects the causal effect of development upon the political system: It changes from an authoritarian system in a traditional low income country (LIC) to a democratic one in a modern developed country (DC). We treat the transition as a causal affect from (produced) income to the level of democracy, as measured by a democracy index.

The purpose of this note is to illustrate two papers by the authors (Gundlach and Paldam (2009), Paldam and Gundlach (2010b)), which analyze the democratic transition in the Polity and the Gastil democracy indices respectively. Here the illustration is done by a simple graph that shows the transition in a generic country. The graph covers all data available from three main data sources: Income from the Maddison data set, and the Gastil and Polity data.

The democratic transition is a complex process with many variants and much noise in the data due to historical accidents in every country. Two tricks are used to generate the path of democracy as a function of income in the generic country: All available data are *merged and sorted by income*, and the observations at about the same income level are averaged by a *moving average process*, where each average covers so many country observations that it is impossible for even a handful of countries to dominate any part of the resulting curve.

The graphs shown below use $M = 250$ as the number of observations averaged in a MA-process, but we have found the lines to be robust from $M = 100$ to $M = 500$, and even higher. To construct moving averages at all income levels, we need samples of more than 10 times as many observations N as indicated by the MA-process. In fact, we use three alternative samples with observations of $N = 4982$, 3760, and 6151.

Section 2 defines three data samples and explains how a graph is constructed from each sample. Section 3 shows the three graphs and discusses their properties. Section 4 is a short summary giving a stylized version of the graph. The appendix gives some estimates.

2. The three data samples and the construction of the graphs

Income, y, and the two main democracy indices, $D = G, P$. The three series are:
Income, y, is the natural logarithm to GDP per capita, from *the Maddison data set*.[3]
The *Gastil Index*, G, from *Freedom House.*[4]

3. The data are available in the last update from February 2010 at the home page of the late Angus Maddison http://www.ggdc.net/maddison/.

The *Polity Index*, *P*, from the *Polity Project.*[5]

All three data sets are compiled to allow for comparisons across countries and over time. We are aware that all three data sets contain considerable measurement problems. However, we believe that sorting by income and using a moving average of income cancels out a good deal of these problems.

Table 1 shows the numbers of *all* overlapping observations available as of February 2010. These data are divided into three samples with 4982, 3760 and 6151 observations respectively which are large enough for the calculations done. The first and the last sample cover only about 40 years. They will be referred to as the *new* samples. The middle sample covers a time span of 140 years. It will be referred to as the *old* sample.

Table 1. Overlapping observations of the two democracy indices and the Maddison income data

Sample	Index	Period	*N*	Sum	Shown as
1, new	Gastil	1972-2006	4982	4982	Figure 1
2, old	Polity	1820-1840	150		
		1841-1860	200		
		1861-1880	350		
		1881-1900	426		
		1901-1920	539		
		1921-1940	809		
		1941-1960	1286	3760	Figure 2
3, new	Polity	1961-1980	2457		
		1981-2006	3694	6151	Figure 3

The table shows the number of income data overlapping with the Polity data for periods of 2 decades. The first of these periods have rather few observations. Here, the Maddison data are in the form of a set of comparative data for 30-50 countries for one year, with large gaps between the years.

Figures 1, 2 and 3 display the data samples as indicated by the definitions of the samples. The generic country is constructed by three steps, where (1) and (2) represent the

4. The URL of Freedom House is http://www.freedomhouse.org, from where the index can be downloaded. The aggregation formula of the index was developed by Raymond Gastil, from data collected by Freedom House. The Gastil data are used in Paldam and Gundlach (2010).

5. The project is now at the Center for Systemic Peace which is affiliated with the Center for Global Policy at George Mason University. The data can be downloaded from: http://www.systemicpeace.org/inscr/inscr.htm together with Marshall and Jaggers (2009) which is a useful manual by the main researchers of the project. For historical references it should be noted the project used to be at the CIDMC, the Center for International Development and Conflict Management at the University of Maryland. The Polity data are used in Gundlach and Paldam (2009), see also Paldam (2009).

first trick, and (3) the second one:

(1) All (y, D)-observations in the sample are merged into a (N x 2)-matrix with a y and a D column, where each row is for the same country and year.

(2) The matrix is then sorted by y. Each row still holds a (y, D)-pair for one country and one year, but now it is rare that two succeeding rows are for the same country.

(3) The columns in the sorted matrix are averaged by a MA(250) process into a new ($\underline{y}_{250}$, $\underline{D}_{250}$)-matrix with (N – 249, 2)-elements.

The three graphs show the ($\underline{y}_{250}$, $\underline{D}_{250}$) scatter for the three samples defined in Table 1. The sorting and the averaging are done to make sure that no point on any of the three graphs is dominated by a few countries only, but represents the "pure" effect of income on democracy in an average. We interpret the average as the generic country.

In the figures for the two new samples – Figure 1 and Figure 3 – *four oil-countries* are singled out: Kuwait, Qatar, Saudi Arabia and UAE. They are rich countries – have high y's – due to resource rents. They have not passed through the Grand Transition and have kept traditional political systems. Some other oil countries are in the same situation, but here data are missing. Further oil countries, such as Venezuela and Mexico, are widely dispersed in the data by the two tricks so they have no individual effect on the graphs.

The three figures use the same scale on the income axis, and Figures 2 and 3 use the same Polity-axis. Since income has grown in many countries from 1960 to 2006, Figure 2 is more compressed than Figures 1 and 3.

2. The three figures of the democratic transition

The three samples are now used for one figure each. The figures show the path of a democracy index when the generic country passes through the full development from the LIC to the DC level.

2.1 Figure 1: Gastil-income 1972-2006

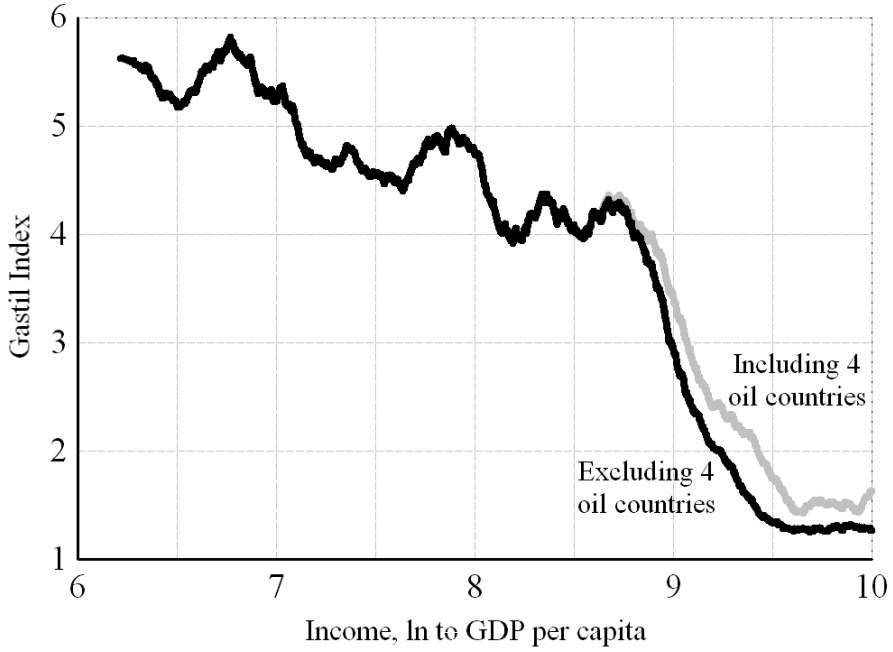
The Gastil index has a range from 7 for full dictatorship to 1 for full democracy. Hence, the democratic transition predicts that the index falls, when income rises, as indeed it does. The graph has three important features:

(F1) The generic LIC, with $y < 7$, has stable authoritarian rule: $5 < G < 6$.

(F2) The generic DC, with $y > 9^1/_2$, has stable democracy: $1 < G < 1½$.

(F3) The generic transition in the *G*-level occurs in between, i.e., for $7 < y < 9.5$. The transition path has two sections (F3a) divided at about 8¾. First the path is *rocky*, but then (F3b) the curve shoots *smoothly* downwards.

Figure 1. The path of the transition in sample 1: The Gastil index (new)



The path during the tradition looks like the proverbial *ketchup effect* (see below). We shall return to these three features as we go along and add a short discussion in section 3.

2.2 Figure 2: Polity-income 1820-1960

The Polity index goes from –10 for a fully authoritarian system to +10 for a fully democratic country. Hence the democratic transition predicts that the index rises with income, as indeed it does. We compare the Gastil and the Polity indices in Paldam and Gundlach (2010) and show that they are fairly different within intervals of 30% of their range. Also, their relation is non-linear. Yet Figure 1 and Figure 2 appear to contain the same transition story for the generic country, even though Figure 2 has no overlap with the data used for Figure 1.

Figure 2 confirms the three features of Figure 1 fairly well:

(F1) The generic LIC, with $y < 7$, has a flat level of authoritarianism: $P \approx -4$.

(F2) The generic DC, with $y > 8¾$, has a flat level of democracy: $P \approx 9$.

(F3) The transition between the two levels is very clear, but the division of the transition into a rocky and a smooth part is less visible as in Figure 1.

Figure 2. The path of the transition in sample 2: The Polity index (old)

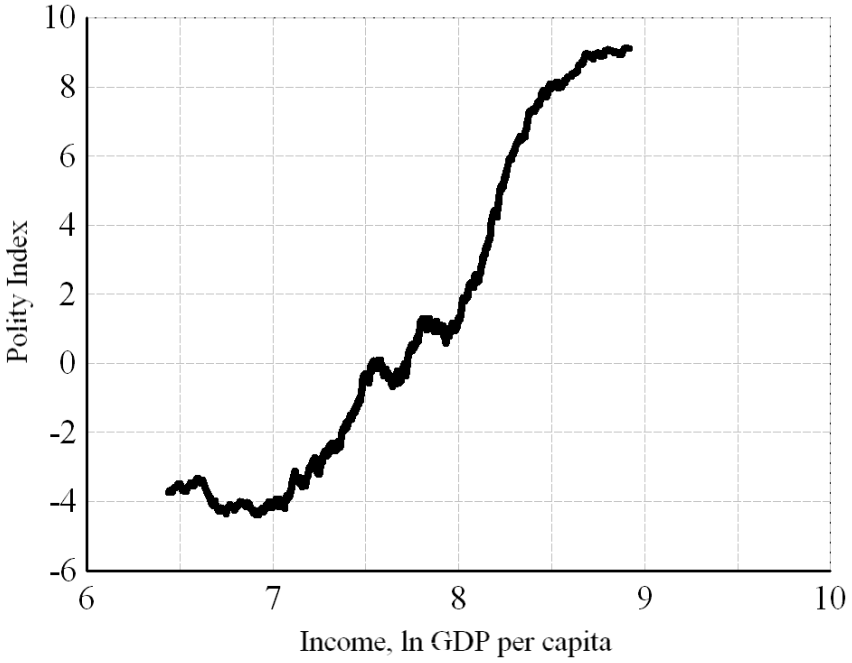
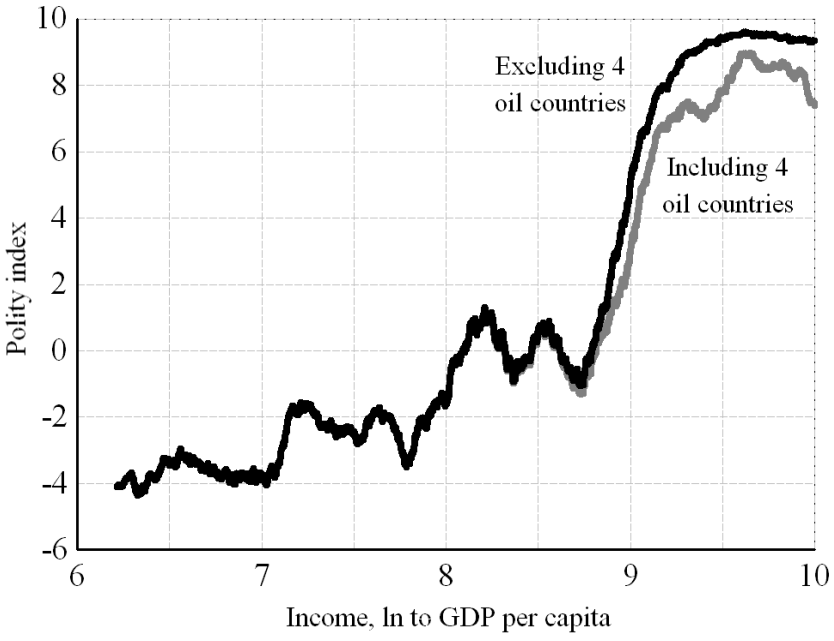


Figure 3. The path of the transition in sample 3: The Polity index (new)



2.3 Figure 3: Polity-income 1961-2006

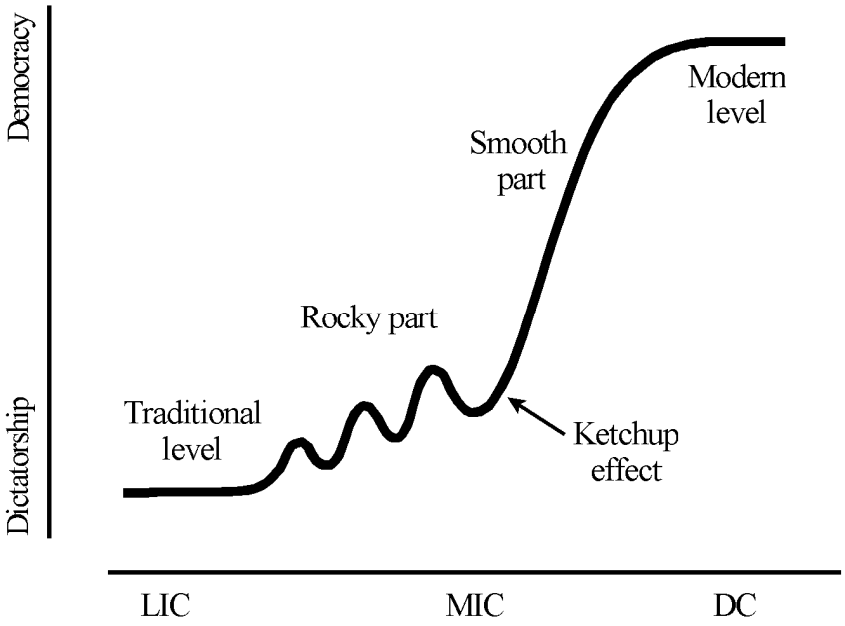
Figure 3 is based on sample 3 (new) and has a considerable overlap in countries and years with Figure 1, but it contains 23% more observations and it uses a democracy index with different properties. Hence, it is not trivial that Figure 3 should neatly replicate all features of Figure 1, as indeed it does.

Note that the steep part of the transition curve is precisely at the same location on the income axis on Figures 1 and 3, while it is a little earlier in Figure 2 (old sample). This might be interpreted as a relative effect. The countries at an income of $8½ < y < 9$ are at the top of the world in the old sample used for Figure 2, while they are a bit behind the top in the two new samples used for Figures 1 and 3.

3. Conclusion

We summarize the three curves for the generic country in Figure 4. A traditional economy with a low income has a constant level of authoritarian government, and a modern developed economy has stable democracy. The transition hypothesis outlined in Gundlach and Paldam (2009) and Paldam and Gundlach (2010b) shows that causality runs from income to democracy. This suggests that if democracy is introduced at a low level of income, it will be unstable, and conversely that an authoritarian coup in a developed country is unlikely to last.

Figure 4. The stylized path of the democratic transition



The path of the transition has two parts. It is somewhat rocky in the beginning, causing the average rise to be slower and more uncertain, but then at some stage democratization reaches the smooth part, when things move fast towards full democracy.

The metaphor that was used to describe the transition is the process of applying ketchup on a dish, where you shake the bottle with somewhat disappointing results, till, all of a sudden, everything comes out!

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Paldam, M., 2009. The polity data: An analysis of their properties. Background paper

Paldam, M., 2010. The demographic transition. An estimate of the typical path. Background paper

Paldam, M., Gundlach, E., 2010. The Democratic Transition: A study of the causality between income and the Gastil Democracy index. Accepted for publication in the *European Journal of Development Research*

Gundlach and Paldam (2010a) estimate the agricultural transition in the same way as used above. Paldam (2010) generates the path of the demographic transition, but due to the structure of the data a different technique is used.

Note: Unpublished papers by the authors are posted on their home pages: http://www.martin.paldam.dk and http://www.erichgundlach.de

Appendix: Some estimates

Section 4.4 of Gundlach and Paldam (2010b) reports a set of estimates of the transition path. The main estimate is the one for the Base model (1). It gives a rather precise linear estimate of the change shown on Figure 3 of the transition from -4 to + 9½ over 4 logarithmic income points. The estimate is 3.33, very much as the 3 estimates in column (1) of the table below. The table below differs from the one in the cited paper in two ways:

(a) The paper brings the results for the 5-year averages only. Here they are supplemented with panels of 3-year averages and 7-year averages.

(b) The paper allows for averages based on four instead of five annual observations. Here the sample used to estimate the income effects in the table below only allows for averages based on a full set of observations, and the averages always include the most recent sample years instead of the first sample years. (The first sample years are not included if there are not enough observations for a full average, such as in case of the 3-year and 5-year averages).

Table. The Background-B-Table for the democratic transition

Dependent variable: Π_{it}	Base model	AJRY model	Mixed model variants				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
			3-year averages				
β_1 on income, y_{it-1}	**3.30**	-2.60	2.74	**-0.61**	**7.72**	**2.40**	1.71
	(25.8)	(-1.3)	(1.5)	(-2.1)	(2.5)	(8.4)	(1.1)
Number of observations	2129	2129	2129	2129	2129	2129	2129
			5-year averages				
β_1 on income, y_{it-1}	**3.27**	-5.11	-5.35	**-0.80**	33.66	**2.53**	-3.84
	(19.5)	(-0.9)	(-0.2)	(-2.0)	(0.7)	(6.2)	(-0.4)
Number of observations	1206	1206	1206	1206	1206	1206	1206
			7-year averages				
β_1 on income, y_{it-1}	**3.21**	-3.96	-1.94	-0.90	7.56	**2.60**	-1.29
	(16.0)	(-1.2)	(-0.3)	(-1.8)	(1.0)	(4.9)	(-0.3)
Number of observations	805	805	805	805	805	805	805
			Characteristics of model				
Lagged dep. variable, Π_{it-1}	no	yes	yes	no	yes	no	yes
Country fixed effects	no	yes	no	yes	yes	yes	no
Time fixed effects	no	yes	no	yes	no	no	yes

We first note that the results are very similar to each other and to the ones in the paper cited – especially in columns (1), (2), (4), (6) and (7). In columns (3) and (5), the coefficient to the lagged dependent variable sometimes gets so close to 1 that the estimate collapses. Thus the estimates in the cited paper appear to be robust to the changes in the calculation of the averages and the time periods selected for the averages.