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Do relatively democratic countries grow faster?

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Abstract

The growth rate has a small, but significant positive correlation to the main democracy indices. It is often interpreted as the causal effect of democracy on growth. However, it may also be spurious, due to the democratic transition, and the transition in the growth rate. They are both stronger in the data and they have a positive slope over most of the range, so they generate a spurious correlation between growth and democracy. Relative democracy, termed the democratic tension, is the deviation between the actual value of the index and the transition path. It is independent of the spurious part of democracy-growth relation. Hence, the causal effect of democracy on growth is calculated as the effect of the tension. It is very small – even the sign is dubious. Thus, the spurious part is by far the largest part of the correlation between democracy and growth.

Keywords: Economic growth, democracy, causal and spurious effect

Jel: O10, O47, O57

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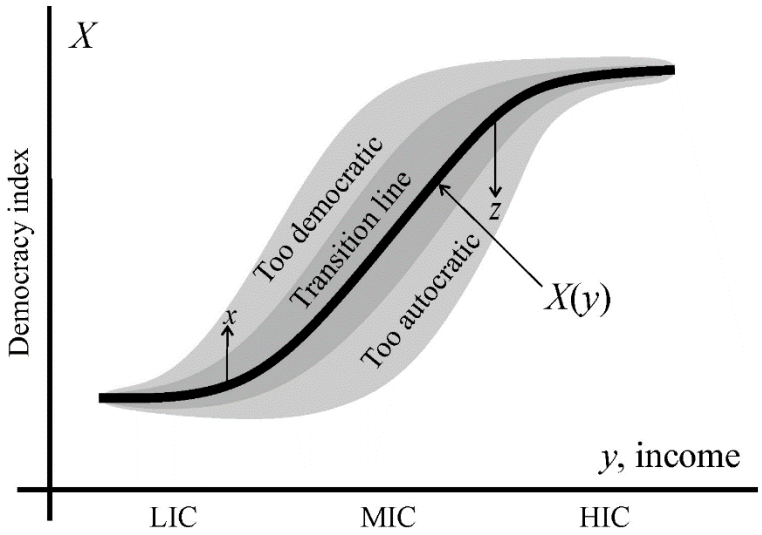
1. Introduction: Spurious vs causal

Let X be a democracy index. Large samples of X and the growth rate, g, have a significant but small correlation, (i) $r(X, g) \approx 0.06$. [2] It is often interpreted as a causal effect of X on g, which is highly desirable as it says that countries that democratize are rewarded by growth.[3]

However, the correlation between X and y, income, is strong (ii) $r(X, y) \approx 0.67$. In addition, there is a modest correlation between income, y, and growth, g, (iii) $r(g, y) \approx 0.12$. Based on prior research, summarized in section 3, the paper takes it for granted that (ii) and (iii) are transitions, so that they are caused by development as proxied by income, $X(y)$ and $g(y)$. Both (ii) and (iii) have a dominating positive slope giving a spurious relation (i) between g and X. In the top income range the slope of the $g(y)$-transition turns negative, and so does the (X, g)-correlation. This supports the spuriousness suggestion. The paper tries to sort out the spurious and the specific part of the (X, g)-correlation.

Relative democracy – termed tension – is the excess democracy over the average level of democracy at that income level. Hence, it is $T^X = X - X(y)$, where $X(y)$ is the transition path. The tension measures the part of X that is independent of y. Thus, the (T^X, g)-relation cannot be spurious, and it allows us to sort out the spurious and the specific effect of X on g.

Figure 1. Stylized picture of the democratic transition



Variables are defined in Table 1. LIC, MIC and HIC are low-income, middle-income, and high-income countries.

[2] The correlations (i), and (ii) and (iii) in the next paragraph, are from Paldam (2024) analyzing 5,668 observations. The product $r(X, y) \cdot r(y, g)$ is close to $r(X, g)$, for all three democracy indices. This suggests spuriousness.

[3] This small effect has been studied in 200 papers. They are covered by two meta-studies Doucouliagos and Ulubaşoğlu (2008) and Colagrossi et al (2020). They conclude that the relation is positive, weak, and unstable.

Table 1. The variables and sample

Variable	Definition	Sources, see references
Part 1: Observed variables		
	National accounts*: gdp* is real GDP per capita from the Maddison project (references)	
y	Income. The natural logarithm to *gdp*, ln *gdp*	Recall that $g \approx \Delta y$
g	Growth of *gdp*, $g = (gdp/gdp_{-1} - 1)$	Calculated as
	Democracy indices*:* $X = F, P,$ or V in C-scale, see Table 2	
F	Average of civil liberties and political rights	Freedom House (references)
P	Polity2 index	Polity project (references)
V	Polyarchy index	V-Dem project (references)
Part 2: Estimates: democratic transition and the relative democracy		
$X(y)$	Democratic transition*:* $F(y)$, $P(y)$, $V(y)$	Kernel regressions $X(y) = K^X(y, bw)$
T^X	Relative democracy: T^F, T^P, T^V	*Tension:* $T^X = X - K^X(y, bw)$
Part 3: Data sample, 1972-2018, $N = 5{,}668$		
The observations where data for all variables are available. Present and former OPEC countries are omitted. Bahrain and Oman are excluded as OPEC-like. The data are unified by stacking the countries. Thus, one variable is one column in the dataset.		

The kernel regression is calculated for the 'best' bandwidth, *bw*. The T^X series is calculated as follows: The kernels give the outputs for an equidistant explanatory variable, and the program has estimated so many points that all observations for y have been matched up with an $y(X)$ where the deviation is within ± 0.005. For an average y equal to 8.7 this is more than enough.

Figure 1 pictures the democratic transition. It is an underlying long-run relation, which is overlaid with a great deal of fuzzy movements around the curve, shown as the gray area. Point x on the figure is an observation with a positive tension, where the country is relatively democratic. Point z is an observation with a negative tension, where the country is relatively authoritarian. Tensions are due to history, regime consolidation, and development. When a country grows and the political system is constant, positive tensions decrease, while negative tensions increase.

The paper looks at a large data set covering 5,668 observations for income, y, growth g, and the three main democracy indices $X = F, P, V$, from Freedom House, the Polity project, and the V-Dem project respectively; see Table 1. It first estimates the three transition curves $F(X)$, and from that it calculates the three tension-series $T^X = X - X(y)$. Then it studies the relation between T^X and g.

Section 2 surveys theory and presents some descriptive statistics. Section 3 presents the claims about the two transitions taken for granted. Section 4 reports the aggregate results that are very close to zero. Section 5 divides the data into four parts by income and shows that weak results, with the reverse sign, emerge in the first and last part. Finally, section 6 concludes. The paper uses a set of techniques and some findings from a handful of papers including a book. Additional results are available in the net-appendix, referred to as *App*.

2. Theory and the C-scale

2.1 Dividing the correlation r(X, g) in the spurious and the causal part

As suggested in the introduction the correlation r(X, g) ≈ 0.06 may have two additive parts, $r_A(X, g)$ and $r_B(X, g)$: [4]

(α) The *spurious* part $r_A(X, g)$. It is generated by the two transitions $X(y)$ and $g(y)$. They are positive. Thus, the spurious part is positive as well. This is part of the theory in 2.2.

(β) The *causal* part $r_B(X, g)$. It is taken to be positive too. This is part of the theory is 2.3.

Given an estimate of the transition relation $X = X(y)$ the *tension* is $T^X = X - X(y)$. Thus, T^X is the democracy index net of the transition, so that $g(T^X)$ cannot be spurious. Hence, the correlation $r(T^X, g) = r_B(X, g)$.

The theory behind (α) is transition theory discussed in section 2.2, while the theory behind (β) is the primacy-of-institution theory discussed in section 2.3.

2.2 (α) The grand transition giving transitions in all (macro) variables

Researchers in the field where economic history, statistics, and growth theory meet, such as Maddison (2002) and Galor (2011) have noted that the world knows two basic steady states: the traditional and the modern. For many centuries, all countries were in the traditional steady state, with growth rates from –10% to 20% per century, but about 250 hundred years ago modern development started – first in a few countries and then gradually in more. Countries diverged from the traditional steady state and much later they converged to the modern one, where they once again become similar as regards income. Transition theory sees 'development' as the exogenous variable, which is due to technology and history. Income is taken as a proxy for development and the theory claims that the transition variable (as X or g) is ***caused*** by income, in the sense that the ***main causal direction*** is from income to the variable transitioning.

The change from one steady state to another is termed a transition. Hence, the transition from the traditional to the modern steady state is ***the grand transition***. It normally takes a couple of centuries. It gives transitions in all (macro) variables. They are slow, but strong underlying processes with a ***distinct form*** looking as  in variables that rise with income (on the horizontal axis) such as democracy. This gives a correlation between the variable and income that is rarely below 0.6 both in wide cross-country samples and in long time-series.

[4] Small correlations are linear, so the sum of the two parts $r_A(X, g)$ and $r_B(X, g)$ sum to $r(X, g)$.

The democratic transition is a typical transition. It is very robust in the data as surveyed in section 3, where the correlation is 0.67.

In the first difference the form of the transition curve becomes hump shaped ⌒ for series where the level is rising. Here the correlation between the variable and income is much smaller. Figure 2b below shows that this also applies to the growth rate, where the hump is so late that the average slope is positive, yielding the correlation of 0.12.

2.3 (β) The primacy-of-institutions theory [5]

The theory takes institutions made by political decisions as the exogenous element in development, though there is the usual chicken-and-egg causality, where decisions are conditioned on the ***power structure*** in society.

The political system, as measured by *X*, is an institution, and of course, an important one. The population in the high-income countries overwhelmingly agree that democracy is a good institution, which helps making good decisions, and hence the theory predicts that $g(X)$ is a relation with a positive slope. It is not only the political decisions that are better (for people) under democracy, but also the administration becomes better as it follows published laws, not the orders of the leader that may not be transparent to the general population.

One should imagine that for example the education and health systems would be better when the population has a say in the decisions. Some evidence supports these views. But the evidence is not strong. While the predictions of the transition theory are distinct the predictions of the primacy-of-institution theory are vaguer, as they mainly predict the signs of the slope of relations including institutions such as *X*. In causa it predicts that the slope of $g(X)$ is positive.

2.4 The C-conversion

The three democracy indices have different scales and when they are used to predict each other they are not very proportional. Hence, the conversion given in Table 2 is a crude approximation, but it has the advantage of simplicity, and it turns the indices into an approximately percentage scale. Thus, the measure uses ***pp***, percentage points.

Thanks to the non-linearity of the conversions a small fraction of the *F* and *V* scores is slightly over 100. The paper disregards this problem, but it is visible on Figure 2a, where the curves differ at the two ends.

[5] A lucid, though early, survey of the primacy-of-institution theory is Acemoglu *et al.* (2005). Many newer papers by this author and his group discuss aspects of the theory, see Paldam (2024) for a discussion of the relevant findings.

Table 2. The C-scale adjusting the three democracy indices to the same range and level

Index	Original	The two adjustments for the C-scale			Original	C-scaled
X	X_0 range	Range adjustment	Level adjustment	Final	Av (std)	Av (std)
F	[7, 1]	$F_1 = 100(7 - F_0)/6$	$L^F = \text{Av}(P) - \text{Av}(F_1)$	$F = F_1 - L^F$	4.29 (2.02)	62.6 (33.7)
P	[−10, 10]	$P_1 = 100(P_0 + 10)/20$	0	$P = P_1$	2.31 (7.24)	62.6 (35.8)
V	]0, 1[	$V_1 = 100V_0$	$L^V = \text{Av}(P) - \text{Av}(V_1)$	$V = V_1 - L^V$	0.479 (0.29)	62.6 (28.9)

The original indices are F_0, P_0, *and* V_0. F_0 and P_0 are integers. After the range conversion they become F_1, P_1, and V_1. After the level adjustment they become F, P, and V used in the paper. Av is the arithmetic average.

Both F and P score many countries as perfect democracies or autocracies, while *Polyarchy* does not use the extremes. Thus, the highest score reached is 0.926, indicating that full democracy is an ideal that has not been (cannot be) reached.

2.5 The technique of kernel regressions on unified data

The data are a (I x t x 5)-panel, where i is country, t is time, and the five columns are for y, g, F, P, and V; see Table 1. Transitions are taken to be general, so that they should be clearest in the average country. Thus, the panel is unified into a (it x 5) matrix with it = N = 5,668 rows. The rows have no natural order, but each analysis makes an order.

The kernel regression is a smoothed MA-process with a fixed bandwidth, done on the data after sorting by the explanatory variable, which on Figure 2 is income. The kernel for $z = z(y)$ is written $K^z(y, bw)$, where variations in the bandwidth bw change the kernel in a predictable way. The kernels reported are robust to a wide interval of bw's.

The estimated kernel assumes no economic theory and no functional form. It provides a curve surrounded by 95% confidence intervals. Consequently, it is a test of a theory if a curve looking as predicted by the theory can be drawn within the confidence intervals. It is a strong test if (i) the prediction is distinct, and (ii) the confidence intervals are narrow. In addition (ii) show that the unification of the panel is justified. These methodological points are further elaborated in Paldam (2021) and (2024).

3. The two transitions, $X(y)$ and $g(y)$, taken for granted

3.1 Transitions are strong statistical regularities in the data

Figures 2a and b report kernel regressions for the three $X(y)$ curves and two $g(y)$ curves from Paldam (2021, 2023a). The $X(y)$ curves follow the convention that the curves for F, P and V are light gray, dark gray and black, respectively. The 95% confidence intervals are not reported

as they would clutter the graph. They are narrow, with an interval of about 2 percentage points. The four parts of the data are divided by three vertical dashed lines, as explained below.

Figure 2a. The democracy transition X(y), for $X = F$, P, and V

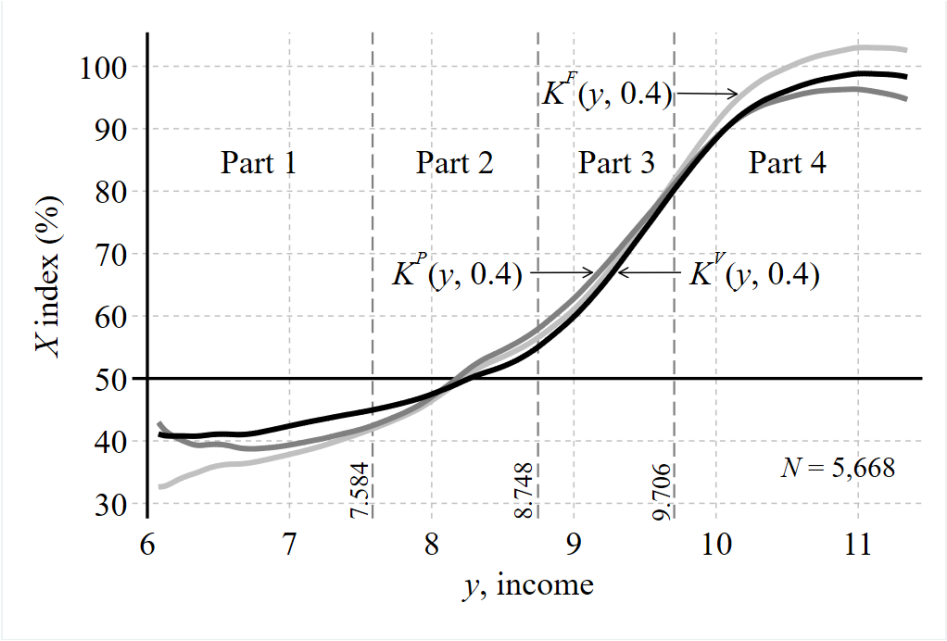
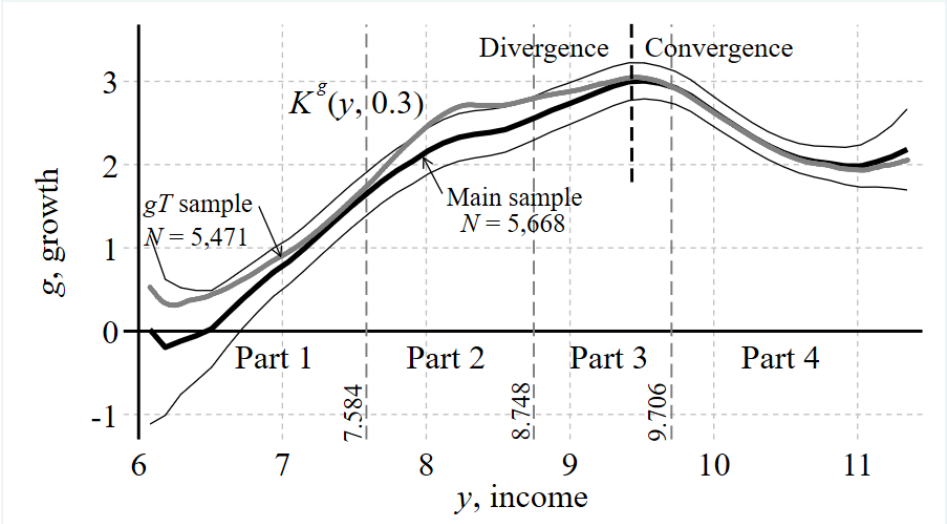


Figure 2b. The transition in the growth rate $g(y)$, for two samples



The gT sample is truncated for extreme growth rates, as only growth in the interval [-10, 12] are included. The three dashed vertical lines divide the data in four parts with the same number of observations.

Figure 2a shows three curves that are very robust. They are shown for annual data, but they look the same for 5-year and 10-year periods and for country averages. They also appear in the data for each decade separately, and in the data for the five major country groups, even when the sample for some groups misses part of the income range. The data for polity and

polyarchy extend back to 1800. Though these data are thin at the start, they still replicate the transitions curves. This confirms *equivalence* of long time series and wide cross-country data as regards transitions; see Paldam (2024). There is one exception: the OPEC countries obtained a high income without the transition. This explains why they are deleted from the main sample.[6]

Figure 2b gives g(y) estimated for the full dataset, and for the gT sample where extreme growth rates outside the [-10, 12] interval are deleted. The 95% confidence intervals are for the full sample. The three vertical lines divide the observations into four parts as before. The g(y) relation is the well-known absolute *convergence* relation from Barro (1991) that has been analyzed in a large literature since then. It is probably uncontroversial that the curve is hump shaped, so that it gives divergence up to an income at $y \approx 9.5$ and convergence at higher incomes. As the hump is late a linear approximation has a small positive slope.

3.2 The theory behind the two curves

The democratic transition follows the basic politico-economic transition of the power structure in society. The steady state of the political system in traditional society – taken to be the 500 years before modern economic development started in the late 19th century – was the three pillars system, with a king, a feudal aristocracy, and a monopoly Church. Modern development caused the agricultural and religious transitions, where the two pillars crumbled, and the old system broke down in bounds and leaps. Modern society became dominated by the middle class that became the main recipient of the vast increase in human capital. It wanted mass representation, and thus democracy; see Paldam(2023a).

The transition in the growth rate follows from the two (or more) sector model of economic growth, where the modern sector starts as a few islands of modern technology. Growth means that the islands expand and gradually come to absorb the traditional sector. A transfer of resources from the low productivity traditional to the high productivity modern sector gives some extra growth. Formal models of this process neatly replicate the hump shaped $g(y)$ relation; see Gundlach and Paldam (2020).

4. The relation between growth and democracy

4.1 The g = g(X) assuming that the whole of the r(g, X) is causal

The key relation analyzed in the paper is the one between g and X. Figure 3 analyzes the relation

[6] The missing democratic transition in the OPEC countries are analyzed in Paldam (2023b).

as a $K^g(X, bw)$ kernel, in the same way as in section 3. Figure 3 shows a weak but significant connection. Thus, it tallies with the correlation of r(X, g) = 0.06. The kernel curves for the three indices have roughly the same pattern, which increase in the interval for X of [20, 80] and mostly fall above 80. The confidence intervals are wide. These observations suggest that Figure 3 looks more like a spurious than a causal relation.

Figure 3. The curve for, $g = g(X)$, democracy causing growth

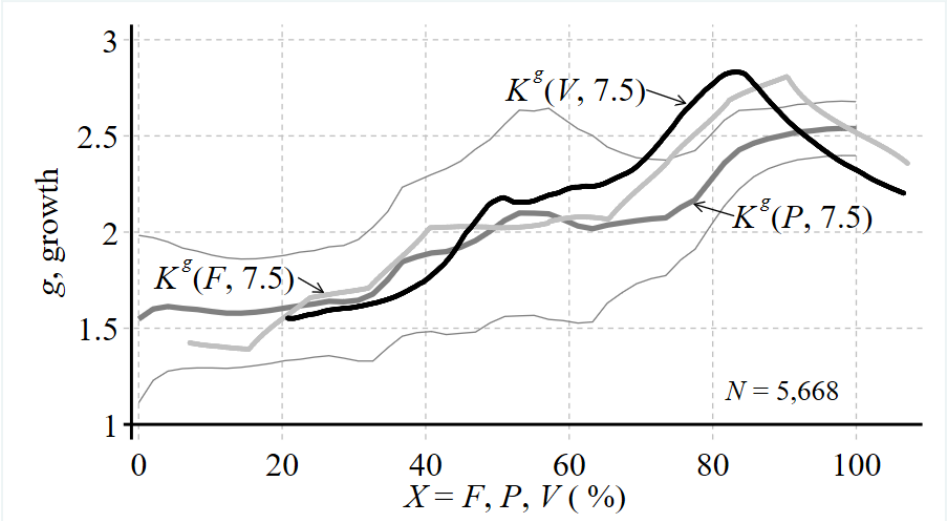


Table 3. The signs of the slopes on Figures 2 and 3

Figure	Slope of kernel curve		
	2a	2b	3
	$X(y)$	$g(y)$	$X(y)$
All	+	+	+
Part 1	(+)	+	+
Part 2	+	+	+
Part 3	+	(+)	+
Part 4	(+)	−	(−)

The signs: + is strong and (+) is weakly positive.

Figure 2a shows that the high values of X are for high income, so Table 3 shows the correspondence of the slopes on the three figures. Everything fits, so the table suggests that the two relations in Figure 2, can in fact explain the $g(X)$ relation.

4.2 Descriptive statistics, and the division in four quarters

The kernel curves for $g(T^X)$ have some sections that are not linear, so the 5,668 data of the sample are first sorted by income, y. Then they are divided into four parts with 1,417 observa-

tions each. Part 1 is the quarter of observations with the smallest income, Part 2 is the next smallest quarter, etc.

Table 4. Statistics for the X and the T^X-series

	All		Part 1		Part 2		Part 3		Part 4	
Var	**Av**	**se**	Av	se	Av	se	Av	se	Av	se
	Democracy indices, X									
F	**62.60**	**0.45**	36.84	0.61	49.71	0.69	65.47	0.78	98.38	0.50
P	**62.60**	**0.48**	38.75	0.76	50.33	0.89	67.47	0.90	93.85	0.46
V	**62.60**	**0.38**	41.53	0.44	49.42	0.54	64.64	0.72	94.81	0.42
Av	**62.60**	**0.44**	39.04	0.60	49.82	0.71	65.86	0.80	95.68	0.46
	Tension variables, $T^X = X - \mathrm{X}(y)$									
T^F	**0.043**	**0.32**	-2.085	0.61	0.238	0.69	-1.677	0.75	3.698	0.48
T^P	**0.089**	**0.38**	-1.515	0.76	0.017	0.89	-0.804	0.88	2.661	0.45
T^V	**0.070**	**0.27**	-1.568	0.44	-0.093	0.55	-1.234	0.68	3.176	0.40
Av	**0.068**	**0.32**	-1.723	0.60	0.054	0.71	-1.238	0.77	3.178	0.44
	The ratio of the averages of T^X and X									
Ratio	**0.001**	**0.74**	-0.044	1.00	0.001	1.00	-0.019	0.97	0.033	0.96
	Income, y, and growth, g									
y	**8.700**	**0.02**	7.149	0.01	8.199	0.01	9.210	0.01	10.243	0.01
g	**2.109**	**0.06**	0.884	0.14	2.322	0.15	2.857	0.13	2.373	0.08

Av is average. The values in the top left column are the same per definition, see Table 2. Note the similarities of the se's for the Xes and the T^Xes in the four parts.

Table 4 report descriptive statistics. The results for all 5,668 observations are bolded (also in Table 5). Standard errors, se, are shaded in gray. The tables will be used as a reference in the text below, but two observations are worth making: (1) The ratio of Av(T^X) to Av(X) is 0.001 for all data as it should. The fall is less in the four parts, but still large. The standard errors, se, falls much less. (2) The key correlation r(X, g) is 0.06 in average for the three Xs. It falls to 0.007 in the r(T^X, g) calculations, thus when instead of the absolute democracy we look at the relative democracy only 11% of the effect remains. In the four groups a more complex picture emerges, as the effects are small and variable.

4.3 Regressions

Table 5 reports a set of simple descriptive regressions trying to explain growth by the three democracy indices (the Xs) in the top panel of the table, and by the three relative indices (the T^Xs) in the bottom panel. The columns with gray shading show no connection. In the column for all observations the three Xs obtain significant positive coefficients, but the relations explain very little of the variation. This is precisely as expected from the literature. When the transition

is removed from the series by using T^X, everything vanishes.[7] Thus the coefficient on X is spurious. Democracy has no independent effect on growth.

Table 5. Linear regressions explaining growth by X or T^X

	For all	Part 1	Part 2	Part 3	Part 4
N	**5,668**	1,417	1,417	1,417	1,417
	Coeff (t)	Coeff (t)	Coeff (t)	Coeff (t)	Coeff (t)
Explaining growth, g, by the three democracy indices $X = F$, P, and V					
F	**0.009 (4.7)**	0.018 (3.1)	-0.004 (-0.8)	0.002 (0.4)	-0.024 (-5.7)
Constant	**1.56 (11)**	0.21 (0.8)	2.54 (8.0)	2.74 (8.5)	4.72 (11.2)
R^2	**0.004**	0.007	0.000	0.000	0.022
P	**0.010 (5.3)**	0.017 (3.5)	0.002 (0.5)	0.001 (0.2)	-0.023 (-5.1)
Constant	**1.51 (12)**	0.22 (1.0)	2.20 (8.4)	2.81 (9.6)	4.55 (10.5
R^2	**0.005**	0.009	0.000	0.000	0.018
V	**0.010 (4.5)**	0.028 (3.4)	0.003 (0.4)	-0.001 (-0.2)	-0.032 (5.1)
Constant	**1.59 (9.7)**	-0.29 (-0.8)	2.19 (5.7)	2.93 (8.6)	5.43 11.3
R^2	**0.004**	0.008	0.000	0.000	0.029
Explaining growth, g, by the three tensions $T^X = T^F$, T^P, and T^V					
T^F	**0.000 (0.0)**	0.017 (2.8)	-0.006 (-1.0)	-0.001 (-0.3)	-0.019 (-4.2)
Constant	**2.11 (33)**	0.92 (6.6)	2.32 (16)	2.86 (21.7)	2.44 (30.0)
R^2	**0.000**	0.005	0.001	0.000	0.012
T^P	**0.003 (1.4)**	0.016 (3.4)	0.002 (0.4)	-0.001 (-0.3)	-0.018 (-3.8)
Constant	**2.11 (33)**	0.91 (6.6)	2.32 (16)	2.86 (21.7)	2.42 (30.0)
R^2	**0.000**	0.008	0.000	0.000	0.010
T^V	**0.000 (0.0)**	0.025 (3.0)	0.001 (0.2)	-0.005 (-1.0)	-0.026 (-5.0)
Constant	**2.11 (33)**	0.92 (6.7)	2.32 (16)	2.85 (21.7)	2.46 (30.2)
R^2	**0.000**	0.006	0.000	0.001	0.017

The shaded columns show no relation at all. The regressions are OLS.

The table also detects no effect of democracy on growth in Part 2 and Part 3 of the data, where all coefficients to both X and T^X have t-ratios that are numerically ≤ 1, and all $R^2 \leq 0.001$. As expected, there is something in Part 1 and Part 2, but here the coefficients on T^X are the reverse: In average they are +0.019 in Part 1 and –0.021 in Part 4. This is consistent with the zero effect for All. In all 6 cases the coefficient on X is larger numerically than the coefficient to T^X, and R^2 is larger in the X relation than in the corresponding T^X relation but the difference is not very large.

[7] If y is added as a regressor in the 15 regressions at the top panel of Table 5 it decreases the effect of the Xs. In most cases as much as by using the T^X variable instead of X, but in some of the regressions the effect is even larger. This is particularly true in the All-column.

5. The aggregate relation between T^X and g

Table 5 showed that the relation between g and the three Xs is zero in the aggregate. However, the regressions were linear and may hide something when non-linearity is permitted. This is analyzed by the three graphs in Figure 4. In reading the graphs it should be noted that the T^Xs have a skewed distribution with a long tail to the left. This is indicated with the 1% line on the graphs.

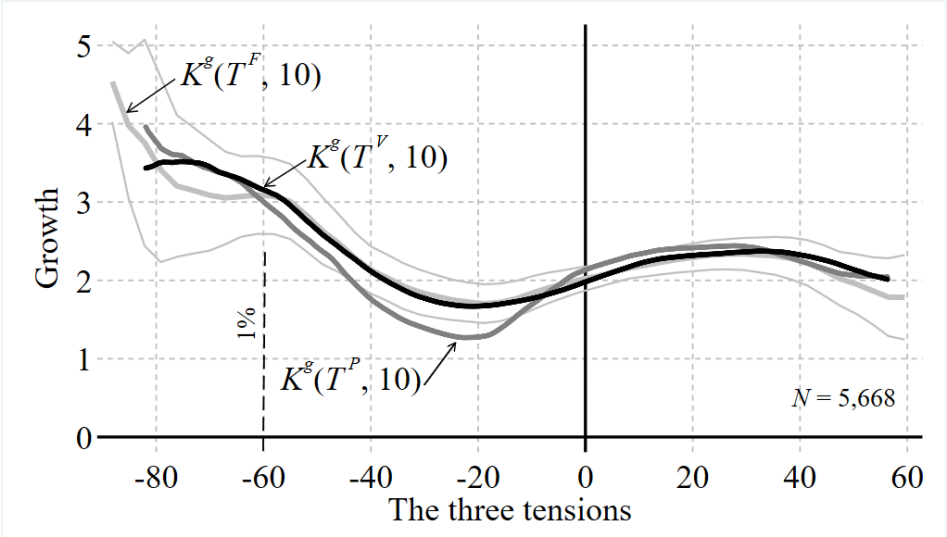
5.1 The three kernel curves explaining growth by the T^X

The first observation from the three curves is that they look alike, just like the three curves in Figure 2a. Figure 5 will confirm this observation. It is a general observation: It rarely matters which democracy index the analysis uses.

As expected, the fit is not impressive. The curves have negative slopes, but this is due to the path for the high negative tensions: Most of the negative path is for the extreme 1% of the observations. It surely is extreme to deviate by -60 pp from the transition path. Thus, it may give high growth to have a tough tyranny, but the evidence for this conclusion is thin.

More ordinary regimes have deviations from the transition path between -40 pp and +40 pp. Here the curves look the same with a small downward bend that bottoms around -20 and an even smaller upward bend that peaks around 30. The two bends are weakly significant, but a linear approximation to the curve has a slope of zero for all indices as shown by the dashed vertical lines and Table 5.

Figure 4. All data, $g(T^X)$ explaining growth by the relative level of democracy



This explains why the correlations are zero while the slopes of the curves look negative. The curves have a significant positive slope for T^Xs from -20 to +30, but it is not very strong. Consequently, the analysis of the full data set supports the evidence from Tables 5. There is little to suggest that g and T^X are related.

6 The (g, T^X)-relation for four income groups

The analysis in Table 5 suggests that there is some relation between g and T^X in Part 1 and Part 4 of the data, but nothing in Part 2 and 3.

The analysis in Figures 4a to d covers all three indices in one figure for each quarter of the data. It is constructed as Figure 2a. The confidence intervals are for the $g(T^F)$-curve. Note that they are either fully within the confidence intervals around T^F, or almost so. The *App* shows all the individual curves with confidence intervals. The desired result is that a relation is found, and thus that the hypothesis that there is no connection is rejected. This is interpreted to mean that a horizontal line cannot be drawn within the confidence intervals.

6.1 Part 1 of the data, the quarter with the lowest income

For the T^P-curve it is just possible to draw a horizontal line between the confidence intervals, but it is not possible for the T^F and the T^V curves. In addition, the three curves look as if they have a common upward trend. The upward movement is strongest on the left-hand side of the graph. There is no upward drift after about +10.

Figure 5a. Part 1, $g(T^X)$ explaining growth by the relative level of democracy

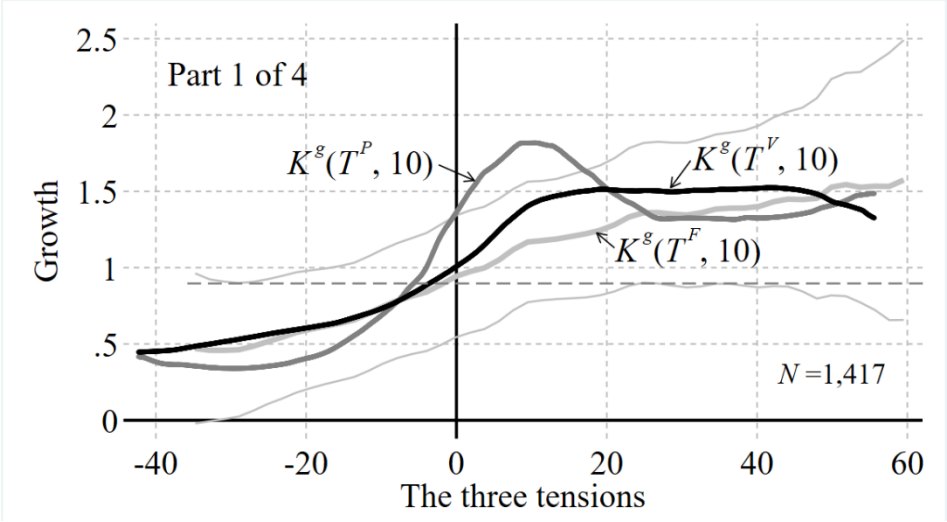


Table 4 reported that the average *X*-values in Part 1 is 30-40. Thus, a T^X value of -30-40 is a hard dictatorship as the one of North Korea. It is clearly bad for development. However, once the worst cases are and moderately positive *T*-values are reached, there are no further gains for development. Note that it is possible to draw a horizontal line within the confidence intervals, but only just so. Thus, the positive slope is dubious.

6.2 Parts 2 and 3 of the data, the two middle quarters

Figures 5b show the three lines for Part 2. They are as close to horizontal lines as they could be. There are no signs of a connection.

Figure 5b. Part 2, $g(T^X)$ explaining growth by the relative level of democracy

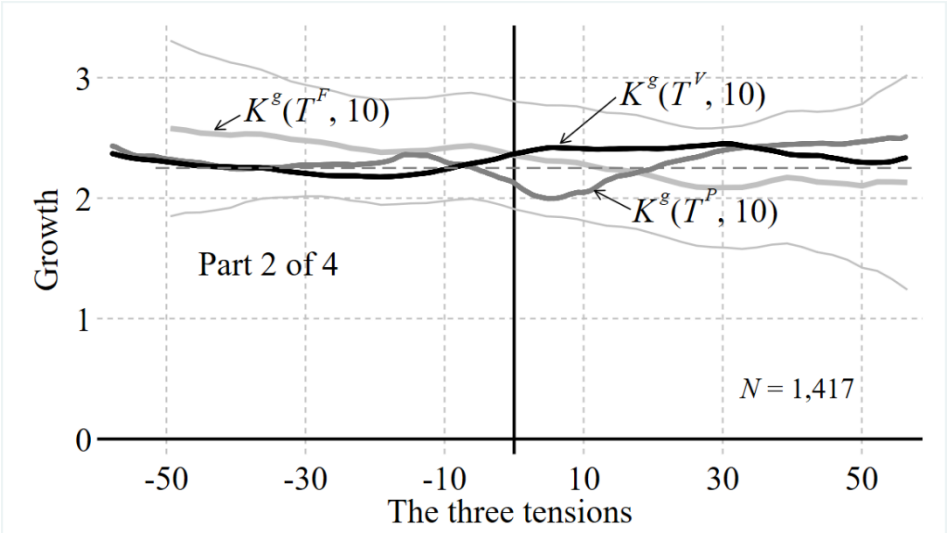


Figure 5c. Part 3, $g(T^X)$ explaining growth by the relative level of democracy

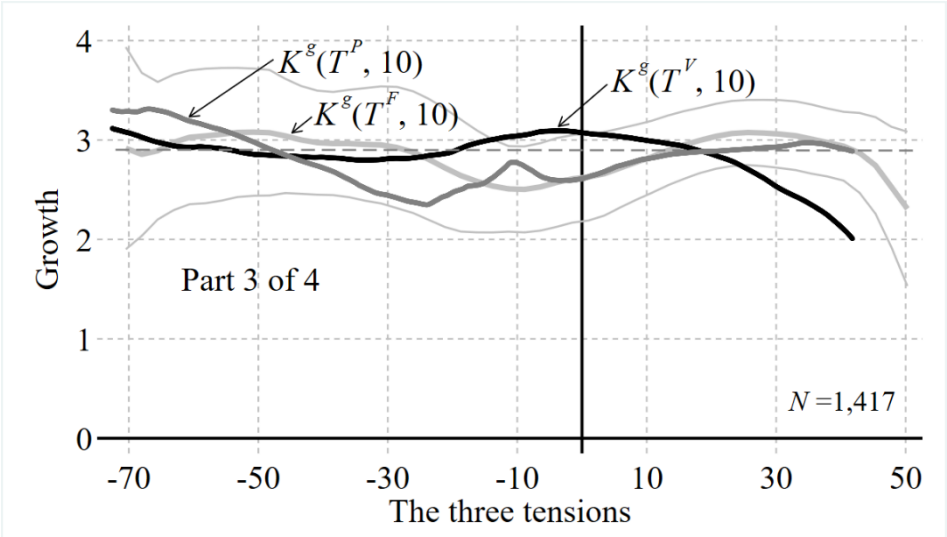
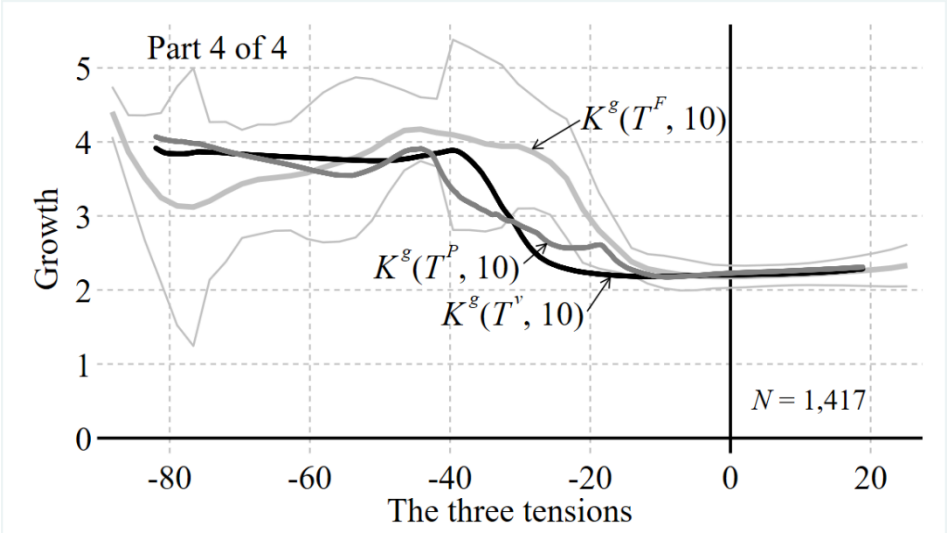


Figure 5c is like Figure 5b, but there are some signs of a downward bend for the T^F and the T^V curves. The bend is within the confidence intervals for the $K^g(T^F, 10)$ curve. So, the only sign of a downward bend at the end is for the $K^g(T^V, 10)$ curve. Thus, Figures 4b and c confirm the findings above. There is no connection from T^X to growth in middle income countries.

6.3 Part 4 of the data, the quarter with the highest income

Figure 5d for the last quarter of the data looks strikingly different from the previous three figures, as it shows two levels of the curves. A high level for the negative tensions from -80 to -30 and a much lower level from -20 to 20. At that level, the confidence intervals narrow.

Figure 5d. Part 4, $g(T^X)$ explaining growth by the relative level of democracy



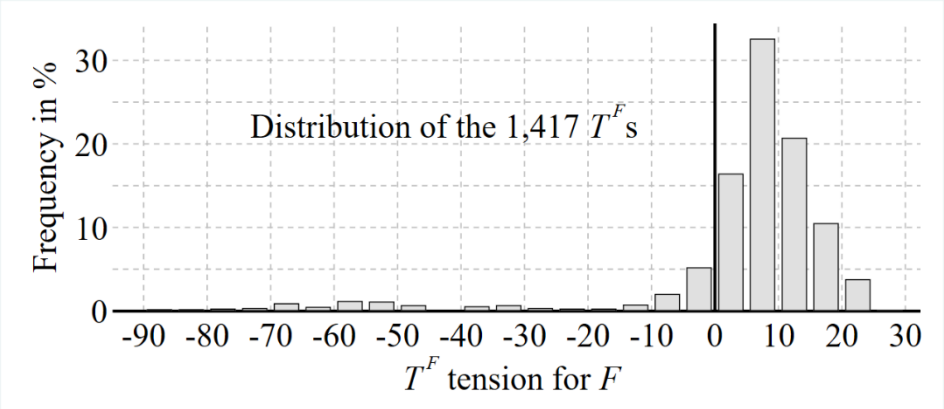
6.4 The distribution of the tensions for Part 4 – one example

Figure 6 shows the distribution of one tension variable T^F for Part 4 of the sample as used for Figure 5d. The histograms for T^P and T^V are similar, see App.[8]

The distributions have two distinct parts as shown. At the low end, the distribution is wide and consists of few observations giving wide confidence intervals. This part of the distribution covers countries catching up, including some with high growth rates. At the other end are the old West of countries that have converged to much the same economic and political system, which is, of course, democratic.

[8] The same histograms are made for the three T^X-series in all data and the 4 four parts. They are reported in *App*. The histograms for Part 4 are the most extreme as the top part to the right is much more concentrated than on any other of these figures.

Figure 6. Histograms for the tensions T^F in Part 4



When the individual observations are considered all observations for income $y > 10.3$ are below 7 except for Singapore that is about -50. Thus, the negative slope on Figure 5d has a special explanation.

7. Conclusions

The paper studies the weak but significant relation between democracy and growth. It is often taken as causal, but a previous paper argued that the relation may be explained as a spurious consequence of the transitions of democracy and of the growth rate. This paper studies if any causal part remains of the relation once the spurious component is taken out of the data.

The paper first estimates the average level of democracy as a function of income, i.e., the transition relation. Then the relative democracy is calculated as tension between the actual level of democracy and the transition path. The growth-tension relation is taken to be the non-spurious part of the growth-democracy relation. The result is clear: The effect of relative democracy on growth is very marginal. Thus, the small correlation between democracy and growth is almost fully spurious.

Policy-wise the conclusion is that while we may safely recommend democracy, for its own sake, it is unlikely that this will lead to a higher income.

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The WPs of the author are at: http://martin.paldam.dk/GT-Main2.php. It also contains *App*, the net-appendix.