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Institutional indices

Distributions and measurement errors

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1. Introduction

Institution is a woolly word that is used for different phenomena.[2] Some institutions are concrete like the police. Others are in the minds of people like corruption. Still others are both, like the Catholic Church.

This paper discusses three main institutional indices see Table 1. A main problem with such indices is that our intuition about the institution is qualitative – they have no natural scale. It is demonstrated that the indices have a different statistical structure from standard economic variables. They have a substantial measurement uncertainty, and their connection to other variables has softer lags, as they involve political decisions that have long decision and implementation lags. These problems are particularly acute for the democracy index.

It is widely agreed that institutions are important. Consequently, the analysis of many interesting questions requires quantitative data for institutions over time or across countries. Thus, institutional indices are needed. Such indices are less objective than the statistics compiled by statistical agencies, so the market has created NGOs that provide the indices needed. They are much used by the media and in research. An NGO that provides a respected index receives much publicity, and hence sponsors.

Table 1. The three indices analyzed: *V*, *E*, or *T*

Institution		The three indices		Compared with (r for rescaled version of index)
Democracy	*V*	polyarchy index, V-Dem project Range]0, 1[, ends never reached	*P* *Pr*	polity index, range [-10, 10] ends used. Center for Systemic Peace. Rescaled to *Pr* = (*P*+10)/20
Economic freedom	*E*	Fraser Institute index Range [0, 10] ends rarely reached	*H* *Hr*	Heritage Foundation index, range [0, 100]. Rescaled *Hr* = *H*/10
Corruption	*T*	Based on *TI* as *T* = 10 – *TI*	*TI*	Transparency International index, measuring honesty

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[2] Gräbner and Amineh (2019) is a comprehensive attempt to summarize all definitions of the concept of institutions. This paper assumes that we all agree what institutions are, even if it doubtful that we do.

2. Four theoretical points

Table 2 gives some statistics for the three indices from Table 1. The first differences are tested for normality by the standard Shapiro-Wilks test. It confirms the impression from the graphs shown in sections 2-5 that normality is rejected in all three cases.

Table 2. Descriptive statistics for the three indices

		Level			First difference			
Index	Scale	Av (Std)	Min	Max	Av (std)	Min	Max	S-W test
V	]0, 1[	0.505 (0.268)	0.013	0.922	0.0029(0.339)	-0.353	0.443	18.957
E	]0, 10[	6.523 (1.129)	2.25	9.20	0.0172 (0.207)	-1.60	1.57	13.846
T	[0, 10]	5.677 (2.098)	0	10	-0.0140 (0.228)	-1.5	1.3	12.463

S-W test is the Shapiro-Wilks test for normality. In all three cases the probability of normality is less than 0.000005.

The four points are: (1) The indices have similar long-run transitions. (2) Political decisions shift over time from exogeneity to endogeneity (3) The indices have substantial measurement uncertainty. (4) The NGOs compiling the indices have missions, influencing their reporting.

2.*1* *Prior research: The indices have strong, robust, and similar transitions*

The author has analyzed the long-run transitions in the three indices in a handful of papers, notably (Paldam 2021, 2024, 2025, and Paldam and Saadaoui 2026), from now *ibid*. The transitions have similar shapes as sketched in Table 2. They are taken for granted at present.

Table 3. Stylized transition shapes in the long run

Variable	Level variable	First difference
a. Rising		
b. Falling		

Societies know two steady states – the traditional and modern – with stable but different institutions. The transition is the path between the steady states – it takes more than a century. Transition theory sees countries with different income levels as being in different stages of the transition. Hence, transition theory predicts *equivalence* of the patterns in cross-country datasets and long time series. Development has started in all countries, so even the low-income countries are moving away from the traditional steady state.

The data samples used have about 5,000 observations for each of the three series. To catch

a bit of the transition two groups are singled out on the graphs. It is the 18 countries of the *old west* that have made the transition, and the 7 countries of the *new west* that are close, see Table 4 in section 3 for lists of the countries in these groups.

As transitions have much the same shape, variables have a lot of long-run *confluence*. This makes it difficult to sort out causality, and it causes multicollinearity that makes coefficients in cross-country regressions quite sensitive to the choice of control variables.

2.2 Political decisions: The shift from short-run exogeneity to long-run endogeneity

Institutions are shaped by political decisions that give an exogenous element in the short run. However, the transition is a general pattern, and thus political decisions are endogenous in the long run. Over time political decisions *shift from exogeneous to endogenous*.

Figure 1a. *V* polyarchy for France and Germany, 1789 - 2023

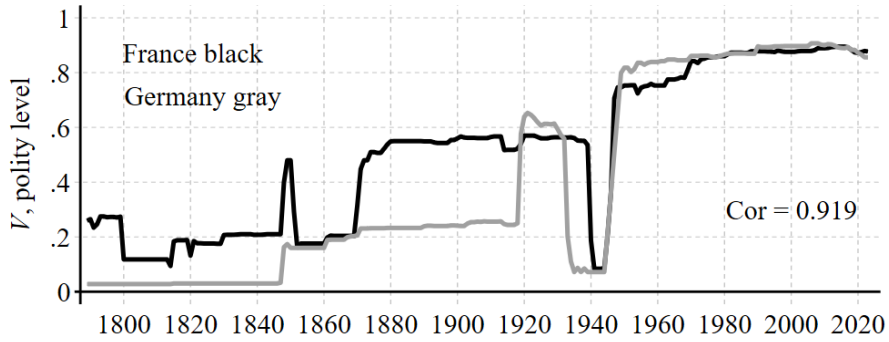


Figure 1b for *ΔV is* in section 3.1 page 7.

This point is illustrated by Figure 1a that show the (polyarchy) democracy indices for France and Germany from 1789 to 2023.The history of the two countries is known to be complex and different. However, the correlation between the indices for the two countries is no less than 0.92. Both started as authoritarian countries. France even had a military dictator from 1800 to 1814, but both countries have strong long-run trends towards democracy. Though they had bumps on the way they have both been typical western democracies for the last 80 years. The underlying transition process has dominated the complex politics of the two countries in the long run.

2.3 Measurement uncertainty due to error and the impossibility of perfect aggregation

Like all statistics, institutional indices have measurement errors. Some indicators are judgmental and the assessments may have overlooked something. Indicators collected from published statistics replicate their mistakes plus coding errors. In addition, the indices may be biased due to the mission

of their NGOs.

Think of national accounts. They are made by large public bureaus, and they have a natural scale, supported by quantitative intuition and internationally accepted manuals. Still, they are revised for about 5 years, finding and correcting mislabeled and overlooked observations. Methods are revised, etc. The errors are found are typically around ½%, and most revisions are upward. It is likely that institutional indices have (much) larger errors.

A deeper problem is the measurement uncertainty caused by the impossibility of perfect aggregation of diverse indicators. An old literature deals with this problem: It starts by defining a set of axioms a perfect measure should fulfill. Then it shows that no index can fulfill all axioms. It started by Arow (1951) on the impossibility of a perfect aggregation of preferences. And then a whole literature of impossibility theorems developed, as surveyed by Sen (1986). A branch of the literature studied the price index, to show that the prefect price index is impossible, see Eichhorn and Voeller (1976). Nevertheless, indices are made, published, and used. The impossibility literature is dormant, maybe practitioners want to forget that they are engaged in an imperfect endeavor.

Little is known about the size of the measurement uncertainty for *V* and *E*, while something is known about *T*. An attempt will be made to tease out some numbers also for *V* and *E,* but much remains to be done. The main method is to compare alternative indices and see how much they differ. Individual observations for the same country and year often differ substantially. But the grand pattern is the same. They have similar transitions, and high correlations in large datasets.

2.4 A story of bias: What to expect

The indices discussed are made by NGOs which have missions that easily turn index-makers into zealots. In addition, it is expensive to make an international index, so NGOs need to attract sponsors and hence they want media attention. Media dislike moderate problems, but love crises, so it is tempting for NGO to report crises in their field. Sponsors are likely to support the mission, but they may also have views of their own. Thus, NGOs may have biases that are important to know.

An example where the bias of an NGO is obvious and easily explained is the annual red lists of threatened species of animals and plants from IUCN, see https://www.iucnredlist.org/. It is made by a large group of scientists that fear that the variety of species on the earth is threatened by the expansion of our own species, homo sapiens. IUCN makes it clear that they are highly alarmed. And the message that we are facing a biodiversity crisis is widely believed. The IUCN home page gives the threatened species in percent of all species for the major groups of animals and plants.

The following looks at the birds, which is the group with the *smallest* fraction of threatened species. IUCN report that 11% of the bird species are threatened, and more than half of all bird species are in decline.[3] This is surely alarming.[4] The world has 11-12,000 bird species – where 1-2,000 are still unknown,[5] – so IUCN claims that about 1,200 bird species are threatened. Much is done in the west to halt the decline. In addition, the increase in the human population has slowed – it is even negative in the West.

It is also known that about 40 species disappeared in the 20th century. Most were endemic species with small populations on isolated islands. They developed without native enemies but then rats and (feral) cats came to the islands. The last extinct bird in Europe is the great auk that disappeared in 1844, so in the 20th century no European bird has been exterminated, while 3-4 North American species have disappeared.

The numbers of 1,100 and 40 differ by 27 times – this seems excessive. The theory of evolutionary biology predicts that the composition of species should change due to evolution. Less fit species should be replaced by more fit ones. There seems to be no accepted estimate of the natural rate of replacements in the bird population. If the natural rate is one species every second year it explains the extinction of the 40 species. In some cases, a story explaining an extinction is known, so the natural rate is probably lower, but not negligible.

Thus, the red lists exaggerate the threat to the world bird species by 5-10 times. It illustrates the problem of dealing with zealots. When you are fighting against a problem it is tempting to exaggerate its size to alert people. Fortunately, much smaller exaggerations are found for the three indices.

[3] If all species are in steady state equilibrium each one will have some variation around a stable level. It will decline half of the time and increase the other half. Thus, at any time half the species are declining.
[4] In several developed countries bird censuses have been made using a dense geographical net and many bird watchers. The results are bad for the alarmists. The number of species are (slowly) increasing, but the density of the species has developed differently in parallel with the different biotopes and their protection.
[5] During the last couple of decades about 200 new bird species have been discovered in the less accessible parts of the world. There are still large areas of the world that have few bird watchers.

3. *V*, polyarchy index for democracy: long constancy spells and jumps

Sections 3, 4 and 5 discuss three indices *V*, *E*, and *T* and their first differences *ΔV*, *ΔE*, and *ΔT*. The graphs use the legend of Table 4.

Table 4. Legend for Figures. *Nc* is the number of countries

Group	Marker	*Nc*	Countries
Old west	Black	18	Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Iceland, Ireland, Luxembourg, Netherlands, New Zealand, Norway, Sweden, Switzerland, UK, USA
New west	Dark gray	7	Cyprus, Greece, Israel, Italy, Malta, Portugal, Spain
Others	Light gray	ap.135	differ somewhat for the indices

Note: The new west are countries that have converged to the modern steady state in the last half century.

3.1 Polyarchy in the long run

The V-Dem project has gradually conquered the market for democracy indices. Mainly because of its comprehensive data collection. The polyarchy index is taken as the main one from the project. It is scaled in the interval]0, 1[, which gives a percentage score. The V-Dem institute started in 2014, and the *V* index has been compiled back to 1789, the year of the US constitution.

Table 5 shows the trends in the 234 years of data for the 10 old western countries in this sample. The average trend is 0.4% per year that is determined by a t-ratio of no less than 33. The trend explains almost 80% of the variation (i.e. $R^2 = 0.79$). Thus, the underlying long run trends in the series are strong. It is a common trend, and thus it is an endogenous element in each country.

Table 5. Trends in the long *V* series for 10 western countries

		Trend	(t)	Consta	(t)	*N*	R^2
1	Denmark	0.46	(41)	-8.18	(-38)	235	0.88
2	France	0.37	(32)	-6.50	(-30)	235	0.82
3	Germany	0.47	(32)	-8.55	(-31)	231	0.82
4	Italy	0.43	(30)	-7.79	(-29)	235	0.79
5	Netherlands	0.41	(39)	-7.35	(-36)	233	0.87
6	Portugal	0.34	(18)	-6.15	(-17)	235	0.57
7	Spain	0.33	(16)	-6.01	(-15)	235	0.52
8	Sweden	0.38	(42)	-6.76	(-39)	235	0.88
9	UK	0.33	(52)	-5.79	(-47)	235	0.92
10	USA	0.28	(33)	-4.73	(-30)	235	0.82
	Average	0.38	(33)	-6.78	(-31)	234.4	0.79
	Cross-country (t)	(20)	(10)	(-19)	(-10)	-	(20)

Note: The trend is the coefficient to year used as regressor. It is multiplied by 100. (t) is the t-ratio with two digits.

Figure 1b. *ΔV* polyarchy changes for France and Germany, 1789 – 2023

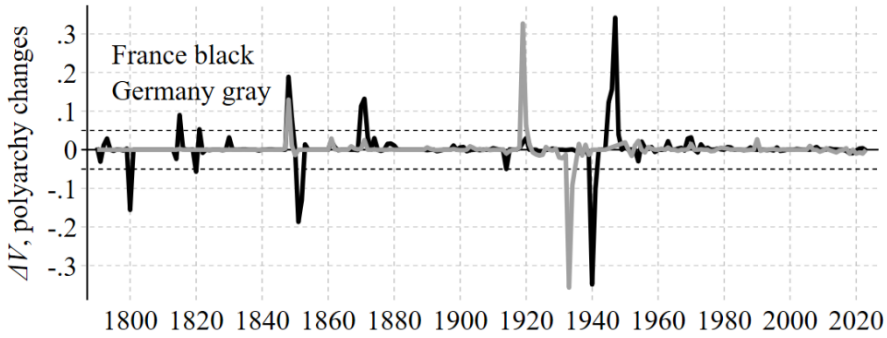


Figure 1a for *V is* in section 2.2 page 3.

Recall Figure 1a from section 1.2 showing the *V* series for France and Germany. Figure 1b shows the corresponding graph for the Δ*V* series. It is typical for Δ*V* pictures, which show long *spells of constancy* interrupted by occasional jumps, appearing as spikes. The two dashed lines at ±0.05 show the limits of significant changes, see section 3.3. There are 7 changes in France and 4 changes in Germany, where one is hidden by the data break, 1945 – 48. Thus, the average spell of constancy is 33 in France, and 58 years in Germany. The constancy spells reflect the fact that all regimes try to stay in power. Governments may change, but regimes often remain. This characteristic of political regimes is reflected in all democracy indices.

3.2 The distributions of the democracy index: V and ΔV

Figure 2a shows the frequency distribution of the last 5,903 observations for *V*. It has two peaks, a low one at 0.15 – 0.30, and a high one at 0.8 – 0.95 for the two steady states. It is interesting that the countries of the new west are well on the way to the high peak. Paldam (2025) reports the frequency distribution for 11,120 observations. Here the low peak is prominent.

Figure 2a. Frequency distribution for *V*, polyarchy 1990 – 2023

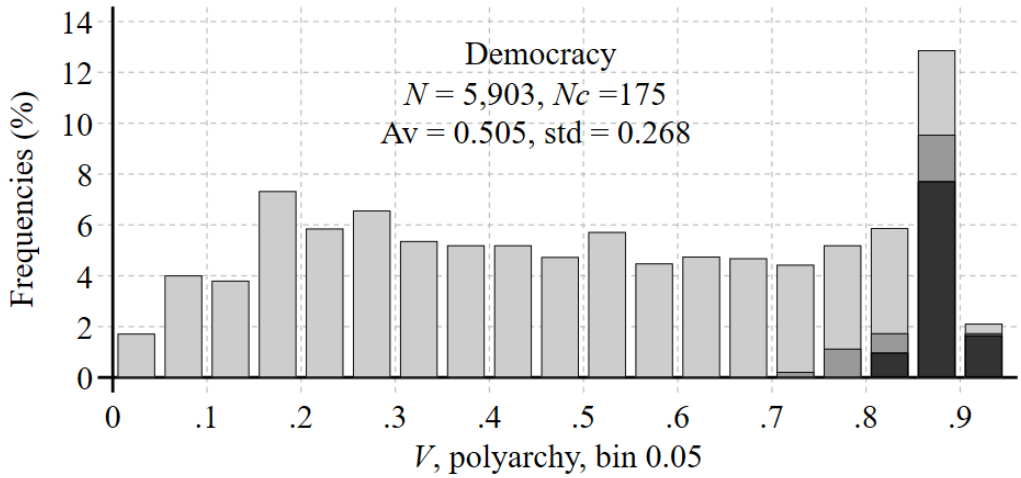
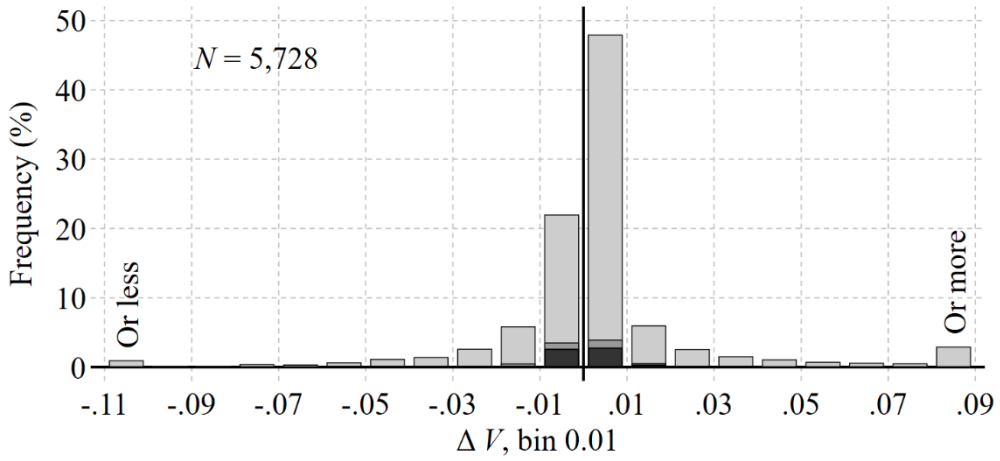
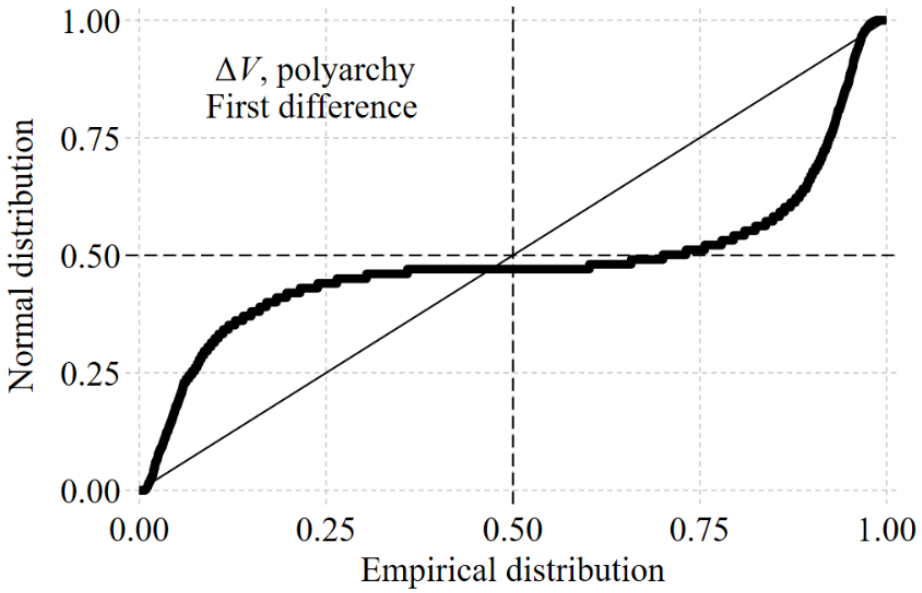


Figure 2b. Frequency distribution for ΔV, polyarchy changes, 1991 – 2023



As polyarchy is compiled from a large set of indicators, it changes most years, but most ΔVs are so small as to leave the index practically constant as shown on Figure 2b. If the interval ± 0.05 is taken for constant, 94% of all 5,728 observations used for Figure 3b are constant. Thus, in the period 1990 to 23 the average constancy spell is about 11 years. Paldam (2026a) calculates the constancy spells for other periods. Especially, the data for the two steady states have much longer spells – this explains the long spells for France and Germany on Figure 1b.

Figure 2c. Probit diagram for ΔV, same data as Figure 2b



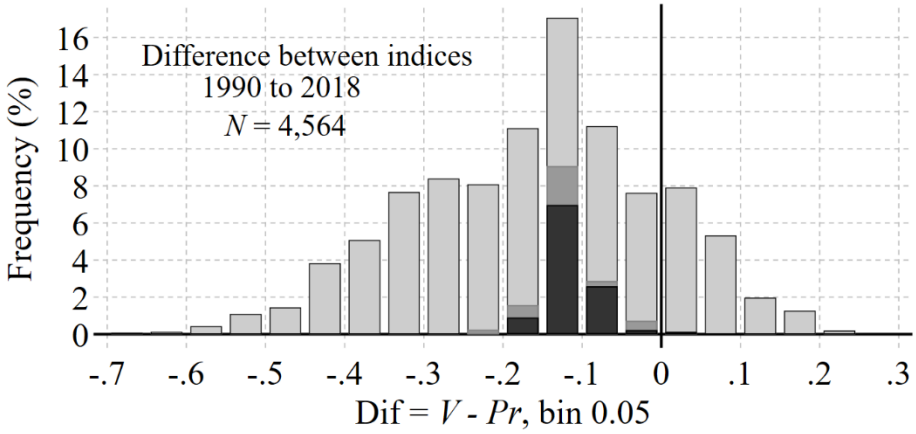
Another way to analyze the distribution of the ΔV data is the probit diagram of Figure 2b, where the data are shown relative to a normal distribution. If the observations were normally distributed it would show a straight line from (0, 0) to (1, 1). This is surely far from being the case,

but the figure is almost symmetrical, and thus the diagram shows strong kurtosis, as the constancy spells dominate.

3.3 The measurement error for the democracy index: Comparing with the polity index

For long the best democracy index was *P*, polity that was defined on [-10, 10]. It ceased publication with the 2018 data. It has now been replaced by polyarchy. To make the two indices comparable polity is rescaled to $Pr = (P + 10)/20$. Figure 3a shows the difference between *V* and *Pr* for 4,751 observations from 1990 to 2018. Three points emerge from the figure:

Figure 3a. The difference between the *V* and *Pr* indices for democracy



(i) The averages are 0.664 for polity(r), while it is 0.507 for polyarchy. Thus, they differ by no less than: (0.664-0.507)/0.507 = 0.310 or 31%.

(ii) Most of the distribution is to the left of zero, so polyarchy is systematically smaller than polity. One reason is that while polity frequently uses the extremes of the scale, notably +10 (for full democracy) polyarchy has never been above 0.95.

(ii) The differences have a rather wide distribution. Some countries differ by half the scale others are almost the same. Table 6 show examples of both extremes. Some countries seem to wrongly recorded by an index such as Somalia, Hungary, Myanmar, and Serbia by polity, India, and Nicaragua by polyarchy.

The evidence presented in Figure 3a can also be reported as a scatter diagram of *Pr* over *V*, as done on Figure 3b. The scatter is averaged by a kernel regression *Pr*(*V*).[6]

[6] The kernel method sort *Pr* by *V* polyarchy and estimate a smoothed average – over a fixed bandwidth, *bw* – of the sorted *Pr* observations. Thus, it is MA (moving average) process of *Pr* over *V*. If the two indices are proportional the kernel curve will be linear, see *ibid.*

Figure 3b shows the lack of proportionality of the indices. The dashed line from (0.2, 0.2) to (0.9, 0.9) is below the polity curve all the way – thus, the relation is convex. Polyarchy is made to show the variation of democracy so that the distance between democratic countries is relatively large, while the distance between non-democratic countries is smaller. This produces the convexity of the curve.

Figure 3b. Kernel regression explaining *Pr* by *V*

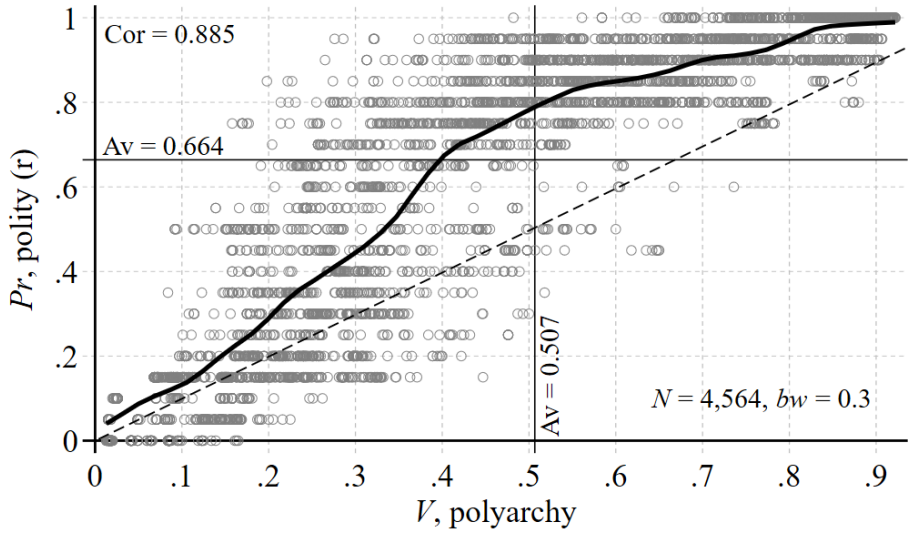


Table 6. The 20 countries with large or small differences in the two indices in 2018

Ten largest differences				Ten smallest differences			
Countries	Polity (r)	Polyarchy	Difference	Countries	Polity (r)	Polyarchy	Difference
Somalia	0.75	0.16	-0.59	Laos	0.15	0.13	-0.02
Nicaragua	0.80	0.22	-0.58	Eq. Guinea	0.20	0.18	-0.02
Serbia	0.90	0.36	-0.54	Mauritania	0.40	0.39	-0.01
Hungary	1.00	0.48	-0.52	UAE	0.10	0.09	-0.01
Myanmar	0.90	0.39	-0.51	Turkey	0.30	0.29	-0.01
Montenegr	0.95	0.47	-0.48	Cameroon	0.30	0.30	0.00
Honduras	0.85	0.37	-0.48	Suriname	0.75	0.75	0.00
India	0.95	0.48	-0.47	Vietnam	0.15	0.16	0.01
Zambia	0.80	0.34	-0.46	Saudi	0.00	0.02	0.02
Kenya	0.95	0.50	-0.46	Comoros	0.35	0.38	0.03

Section 1.2 mentioned that the perfect price index does not exist, but still, everybody knows that it measures the average price rise, in %, and it is surely one number, so the intuition is qualitative. If two independent groups would collect a dataset and calculate a price index it would

probably give much the same result.[7] Democracy indices have no natural scale so the index maker must make a scale. It is somewhat arbitrary. The Orange revolution in Ukraine in 2004, caused a de facto regime change, but the change was much smaller de jure. The index makers did choose, but the two indices discussed made amazingly different choices.[8]

Finally, Figure 3b mentions that the correlation between the two democracy indices is 0.885, which confirms that the grand pattern in the two indices is closely correlated, just as their transitions look the same. Thus, the noise around the two indices is largely random.

It is obvious that the difference of 31% from Figure 5b should be divided between the two indices. The polyarchy index is based on more indicators so polyarchy should probably have the smallest part of the error. But it is likely that the measurement error is substantial also for polyarchy. If it is 1/3 of the 31% it means that democracy is measured ±0.05.

Polyarchy score democracy in Pakistan to 0.40 in 2018. With an 95% confidence interval of twice the error it is from 0.30 – 0.50, which means that it is the same as Serbia, Hungary, Myanmar, Honduras, India etc.

3.4 Bias in the democracy index

The *V*-dem institute makes no secret that it fights for democracy. Recently V-dem has stressed that democracy is threatened around the world. There is a democracy crisis. There has actually been a small reduction in the average democracy indices recently, but the fall is well within the measurement error in most cases, see Paldam (2026b).

However, a moderate fall is not very interesting for the media. The 2026 V-Dem report stressed the fall in a dramatic way – this has contributed to the big media discussion of the crisis of democracy. It also led to a heated discussion within the V-Dem group, where some of the leading researchers argued that the annual report from V-Dem has developed in an alarmist direction that is not justified by the data collected (see the journal Kvartal April 16th 2026).

[7] The author and 5 research assistants made a quick and dirty index comparing consumer prices in Greenland and Denmark. This prompted the two statistical agencies to replicate the calculation using all the bells and whistles. The results were practically the same. Price indices are imperfect but robust.

[8] For 2003 to 2006 the two indices are *Pr* (0.8, 0.8, 0.8, 0.85) and *V* (0.39, 0.38, 0.45, 0.57).

4. *E*, economic freedom: The ideal of libertarianism

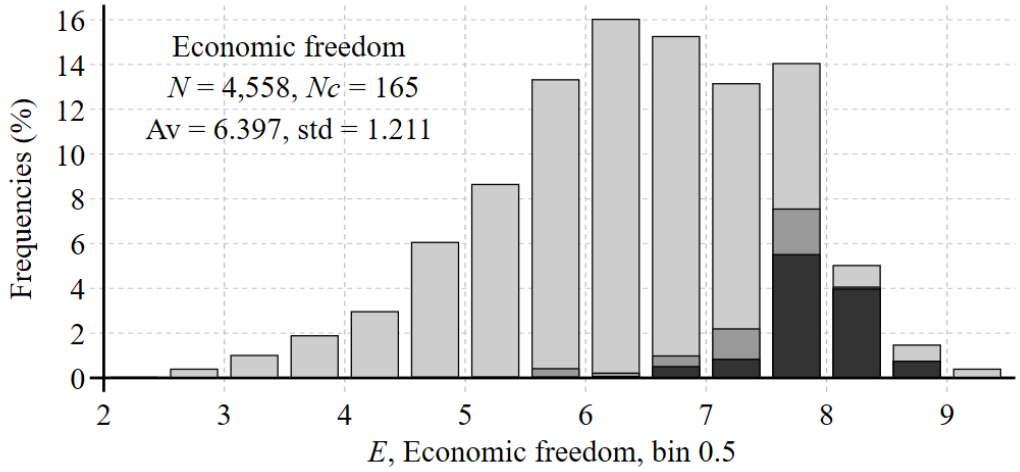
Economic freedom means that the agents are free to run their lawful business as they please, Thus, low scores are given for socialism and lack of law and order. Both *E*, the Fraser Institute index for economic freedom, and *H*, the Heritage Foundation index, are made to support libertarian beliefs. This is clearly stated on their home pages, which further state that economic freedom gives both higher welfare and more wealth.

The Fraser index is the main economic freedom index as it is better documented and builds on more indicators. The data for this index is mostly official statistics. It started in 1970, so the long run is much shorter for *E* than for *V*. From 1970 to 2000 the *E* index was reported every 5th year, but since 2000 it has been annual. Figure 4a is for all 4,556 observations, while Figures 4b and 4c are for the 3,724 annual observations only.

4.1 The distribution of the Fraser index of economic freedom: E and ΔE

Figures 4a, 4b and 4c analyze economic freedom index in parallel with Figures 2a, 2b and 2c. Figure 4a shows that the old west is at one end of the distribution. Also, it has a tail to the left.

Figure 4a. Frequency distribution for *E*, economic freedom, 1970 – 2023



Figures 4b and 4c analyze the first difference of the annual observations. Both figures are fairly symmetrical. Normality was rejected in Table 3 and Figure 4c shows that the distribution has some kurtosis, though much less than the democracy index.

Figure 4b. Frequency distribution for *ΔE,* economic freedom changes, 2001 – 23

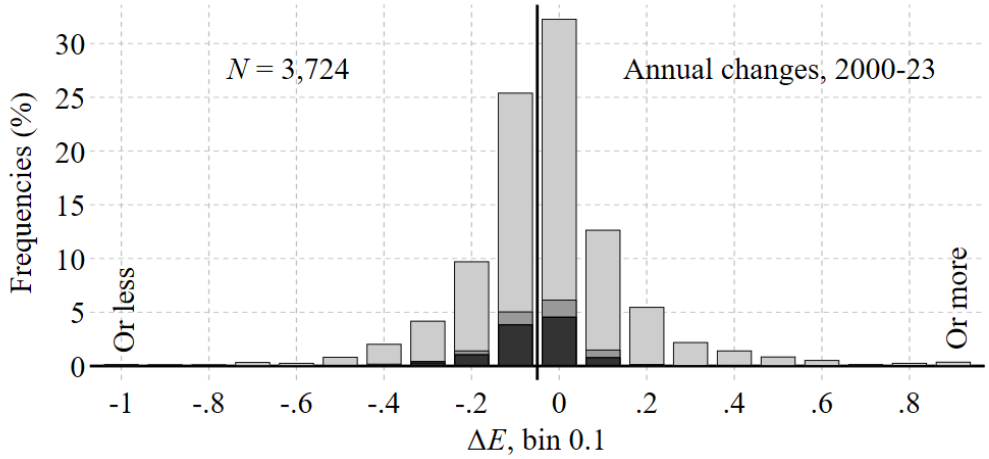
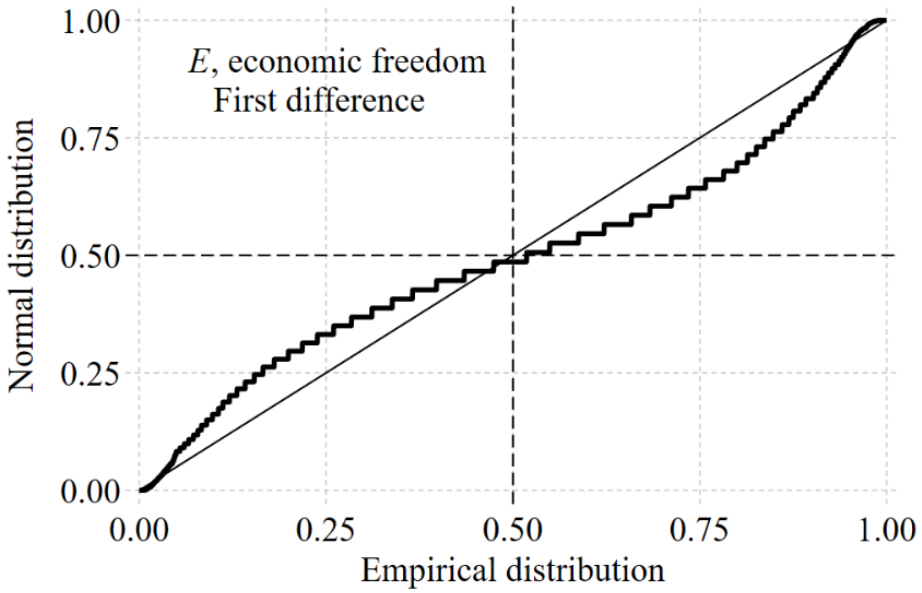


Figure 4c. Probit diagram for *ΔE*, same data as Figure 4b



4.2 The measurement error for the Fraser index: Comparing with the Heritage index

Figures 5a and 5b compares the *E* and *H* indices in the same way as Figures 3a and 3b compared *V* and *P*. The dashed line on Figure 5b is included to show how the connection between the indices deviates from linearity.

The averages reported on Figure 5b show that the deviation between two indices is (6.568 – 6.102)/6.568 = 0.0703, or 7%, so the measurement error for economic freedom is much less than for democracy. This is already obvious when Figure 5a is compared with Figure 3a. The range of *V* is 1/10 of the range of *E*, but the range of Δ*V* is almost the same as the range of Δ*E*.

Figure 5a. The difference between the *E* and *Hr* indices for economic freedom

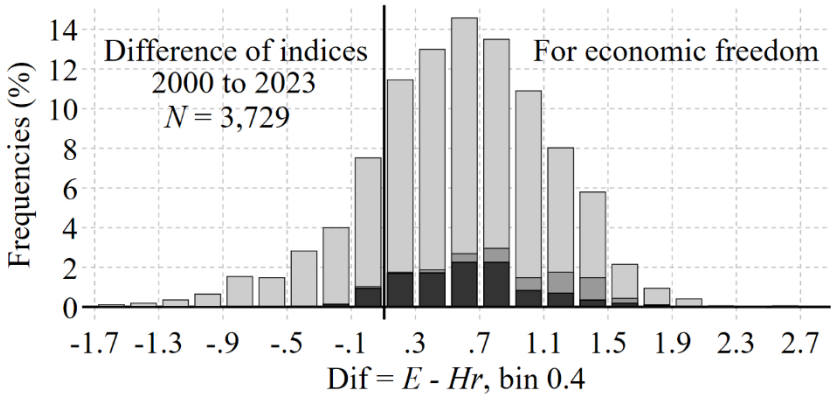
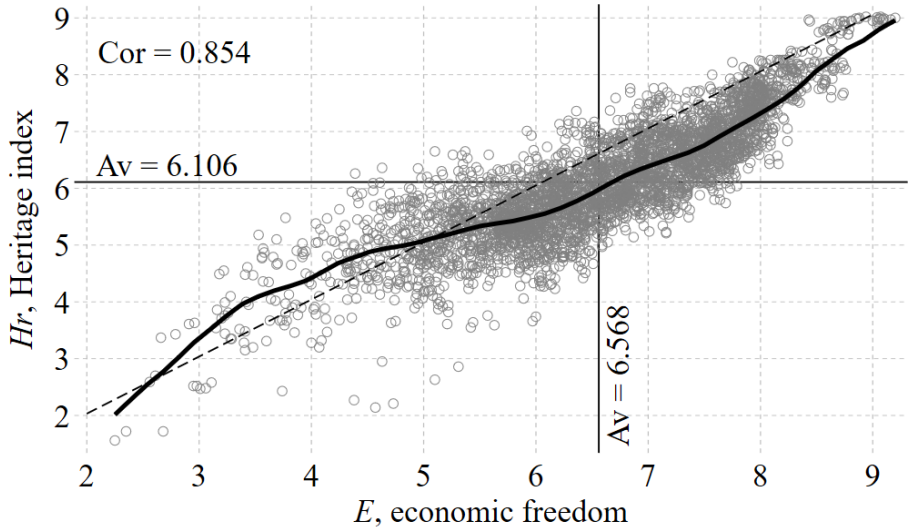


Figure 5b Kernel regression explaining *Hr* by *E*



In the same way Figure 5c is much more condensed around the kernel curve than Figure 3c. Also, the concavity on Figure 5c is much smaller than the convexity on Figure 3c.

4.3 Bias in the economic freedom index

There is an interesting paradox involved. Nearly everybody agrees with the preferences of the NGOs making *V* and *E*. That is, democracy is better than autocracy, and honesty is better than corruption. However, the NGO making the economic freedom index is more libertarian than most people. Nevertheless, the economic freedom index seems to be more precisely measured.

The Fraser Institute index was designed by a group of well-known libertarians including Milton Friedman and they surely knew that most people would be suspicious of such a group. So maybe they made a particularly large effort to make their index as transparent and easy to check as possible.

5. *T*, corruption index from Transparency Internationals honesty index

The *TI* index from Transparency International measure corruption on a scale from 0 for complete corruption to 10 for complete honesty. Thus, it is an honesty index. To make it a corruption index it is subtracted from 10. So, the corruption index is $T = 10 - TI$.

5.1 The distribution of the corruption index: T and ΔT

The corruption index is compiled from polls of corruption perceptions. It is likely that people's perceptions are formed over more years, so that there is a built-in smoothing of the series. In addition, the perceptions are likely to be influenced by scandals reported in the media.

Figure 6a shows the distribution of 4,419 data for *T*. It has a peak at 7 - 8.5 and a long tail to the left. A new peak is emerging between 1 and 2.5 for the high-income countries. As more countries become wealthy the peak will become more prominent.

Figure 6a. Frequency distribution for *T,* corruption index 1990 – 2023

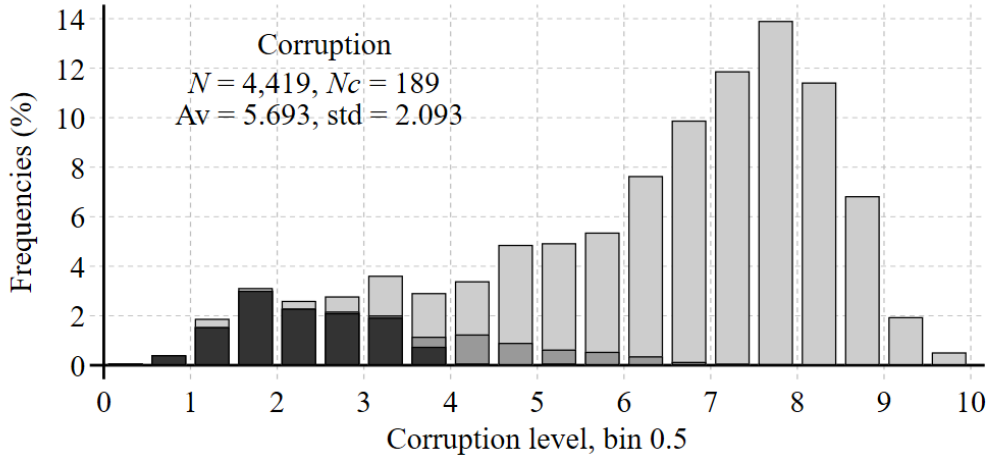


Figure 6b. Frequency distribution for Δ*T*, corruption index changes, 1991 – 2023

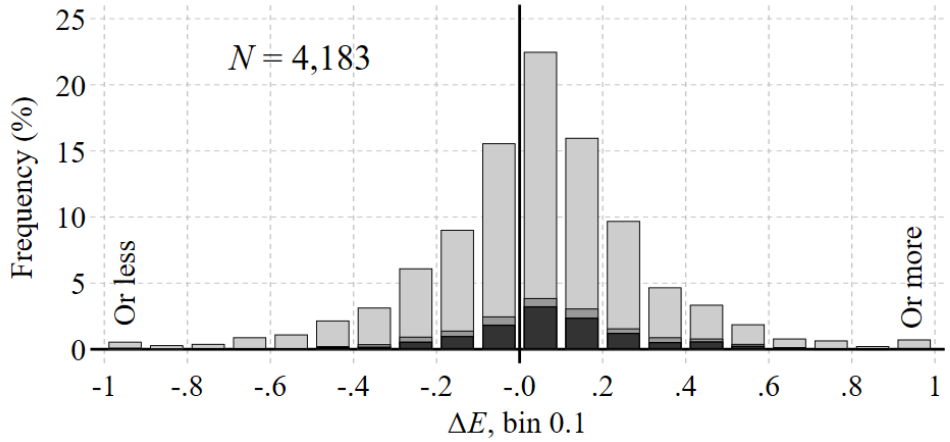
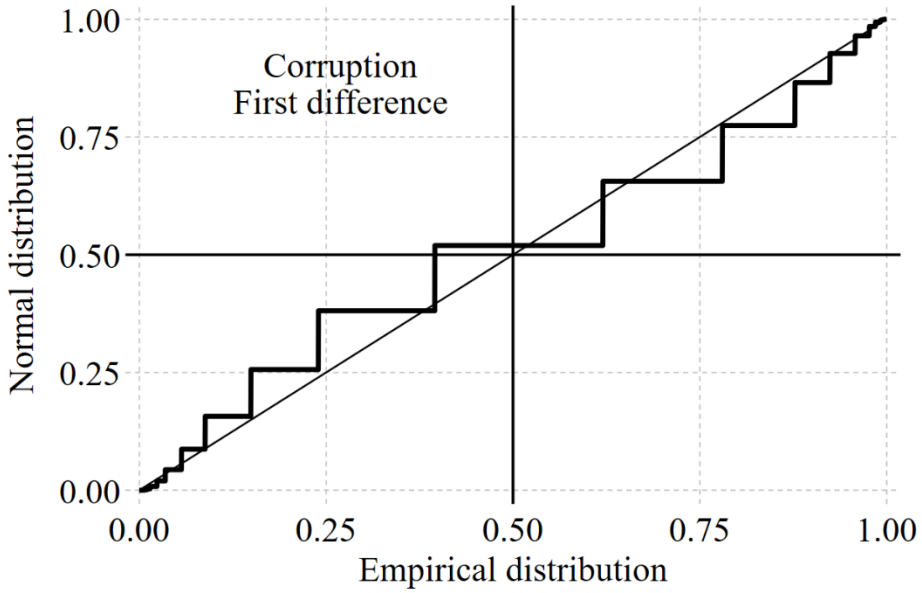


Figure 6b for ΔT is symmetrical and looking almost normal. Figure 6c showing the probit diagram is almost normal as well. But as mentioned the Shapiro-Wilks test rejects normality. It is interesting that the western countries have the same distribution as everybody else for the first differences.

Figure 6c. Probit diagram for ΔT, same data as Figure 6b



5.2 The measurement error for the corruption index

The TI-index is made as an average for 13 primary indices of corruption, after a calibration to the same scale. For the typical *T*-observation 6.8 primary indices are available, they scatter substantially as indicated by the std in row 2 of Table 7. Transparency International provides a table of std_n where n is the number of primary indices used for each *T* for 15 years and 166 countries. Table 7 is a summary of that table.

Table 7. Statistics for the average *T,* 2012-2026, *N* = 2,491

	Col 1 Variable	Col 2 Mean	Col 3 Std_r	Col 4 Min	Col 5 Max
Row 1	*T*	5.70	1.92	0.8	9.2
Row 2	Std_n	2.78	1.52	0.37	12.81
Row 3	n	6.79	1.83	3	10
Row 4	Se	1.15	0.81	0.15	7.40

n is the number of primary indices used to calculate each *T*. The two std's differ as follows: Row 2 is the std_n of the n = 3-10 primary indices. Column 3 is the std_r of the 2,491 observations in each row.

Std_n is a measure of the uncertainty of each value of the *T* index. $Std_n/T = 1.52/2.78 = 0.55$, so the measurement uncertainty is 55% of the *T* score. Fortunately, the main pattern in *T* is fairly stable. If *T* for country A has been above 2 points larger than *T* for country B for 16 years the Std_n falls by $\sqrt{16} = 4$ which is 1.52/4 = 0.38, so the difference of 2 points is highly significant.

The data behind Table 7 is used in Table 8 to estimate if the uncertainty std_n depends upon n, *T* and time (years). The dependence of n is strong as the uncertainty falls by almost 0.4 if n increases by 1. The dependence of T is small and rather unclear, while the dependence of time is negative, but rather small. Thus, the corruption index gets a little better every year.

Table 8. Regression explaining the std_n from row 2 in Table 7. *N* = 2,491

Relation	n (t)	*T* (t)	Year (t)	constant (t)	R^2 adj
(1)	-0.371 (-25)	-0.047 (-3.4)	-0.066 (-10)	138.9 (10)	0.250
(2)	-0.386 (-26)			5.398 (52)	0.217
(3)		0.010 (0.6)		2.719 (28)	0.000
(4)			-0.093 (-13)	190.6 (12)	0.060
(5)	-0.395 (-27)	-0.051 (-3.6)		5.750 (40)	0.220

The relation are estimated by OLS regression.

Figure 7 study if linearity of relation (2) $std_n(n)$ and (3) $std_n(T)$. The strong relation (2) is almost perfectly linear, while the weak relation (2) is highly non-linear, but in a strange way that will not be explained at present. The curve on Figure 7b may explain the instability of the regression to *T* in Table 8.

Figure 7. Analyzing the linearity of relation (2) and (3) in Table 8

Figure 7a. Relation 2, $Std_n(n)$

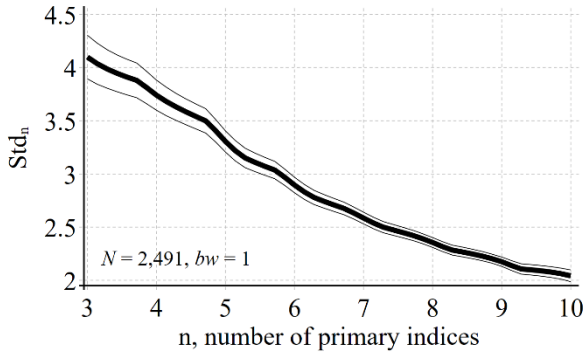
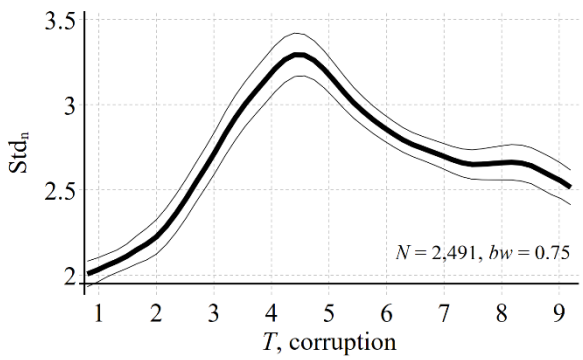


Figure 7b. Relation 3 $Std_n(T)$



6. Conclusion

This paper makes four points

(i) Institutional indices have different statistical structures. It is important to recognize this when relations containing an index are proposed and estimated. Annual models containing a democracy index should explicitly recognize that it changes in jumps separated by long spells of constancy.

(ii) Even when political decisions are important for the development of an institution, they do have a strong long-run endogenous element. However, the political decisions matter in the sense that they give stochastic lags in the short run.

(iii) Institutional indices have large measurement errors – such as 10%. The grand pattern in the indices is strong and robust, but the short-run relations are rather uncertain.

(iv) The indices have no natural scale, so indices that claim to measure the same may have different scales, which deviate from linearity in different ways.

With all these problems, the indices are still necessary in the analysis of many important matters.

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