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Four pairs of relations to *s*tate capture

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This note compares pairs of kernel regressions between two variables, where one is *SC*, state capture and the other is either *EF*, economic freedom, *T*, corruption, *V,* democracy, or *y*, income.

The SC index measures state capture.[2] It covers 172 countries for the 25 years since 1997, every third year until 2021. Thus, there are 9 x 172 = 1,548 *SC* data. The OPEC group of 18 countries are deleted at present, but they are analyzed elsewhere. Most of the corresponding data are also available for *EF*, *T*, *V*, and *y.* Thus, the sample used has 1,051 observations. It covers 137 countries and five variables, see Table 1.

The kernel regression that explains *x* by *y* is written $x = \Phi(y, bw)$, where *bw* is the bandwidth. Φ is a smooth function of *bw*, so it is normally easy to find the best *bw*, and the program (lpoly in stata) starts by a good estimate of the best *bw*. Kernel regressions require large datasets. So, the panels are unified by stacking. The $(SC, EF, T, V. y)_{it}$ panel becomes the $(SC, EF, T, V. y)_{j,}$ vector, where *j* is the product of *i* and *t*, where the elements are in no particular order.

Table 1. Variables and their sources

Variable	Source
SC, State capture	From Natural Resource Governance Institute https://governanceactionhub.or
EF, Economic Freedom	From the Fraser Institute https://www.fraserinstitute.org
T, Corruption	From the TI index of Transparency international, T = 10 - TI https://www.transparency.org/en/cpi/2024
V, Democracy	The polyarchy index from the V-Dem project https://v-dem.net/
y, Income (ln gdp)	Ln gdp that is real GDP per capita. from the Maddison Project https://www.ggdc.net/maddison/maddison-project/home.htm

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[2] Also known as political capitalism or crony capitalism. It is from D. Kaufmann (2024) *State Capture Matters: Considerations and empirics toward a worldwide measure*. Posted: https://governanceactionhub.org/explorations/local-global-coordination-for-impact/state-capture-index/.

Kernels order the elements in the data vector by the explanatory variable. Thus, $x = \Phi(y, bw)$ and $y = \Phi(x, bw)$ are differently ordered and provide curves that look different – sometimes amazingly so. Kernel pairs may provide causal evidence. If one of the two kernel curves looks as predicted by a theory, it is evidence for that theory and hence for the causality it implies. It is strong evidence if the reverse kernel does not look like anything predicted by a theory. Iit is also possible that both curves in the pair look equally good. Hence, they suggest simultaneity.

Table 2. Descriptive statistics for the five variables. All have $N = 1{,}051$

Variable	Mean	Std. dev.	Min	Max	Range
SC	44.22	24.77	2.43	94.32	91.88
EF	6.74	1.11	3.04	9.23	6.19
T	5.49	2.14	0.10	8.80	8.70
V	0.59	0.25	0.08	0.92	0.85
y	9.15	1.20	6.08	11.37	5.29

Table 3. Correlation of the variables

	Pearson correlations					Spearman correlations				
	SC	*EF*	*T*	*V*	*y*	*SC*	*EF*	*T*	*V*	*y*
SC	1					1				
EF	-0.70	1				-0.72	1			
T	0.84	-0.77	1			0.87	-0.80	1		
V	-0.84	0.66	-0.67	1		-0.86	0.70	-0.73	1	
y	-0.68	0.76	-0.77	0.62	1	-0.72	0.81	-0.82	0.67	1

Tables 2 and 3 give some descriptive statistics that are used as we go along. Note that the two sets of correlations – Pearson and Spearman – are fairly similar. Thus, the distributions of the variables will be disregarded from now.

Finally, it should be mentioned that the four institutional indices are compiled in two different ways. The state capture and the corruption index are relative due to annual calibrations. Thus, they have no international trends. The economic freedom and democracy indices are absolute measures that have trends. Income has trends as well. This should influence the correlations, but it is not easy to compensate the correlations for that difference in construction.

Kernels provide no R^2-scores, but a graph. We measure how much they explain of the range of the data from Table 2, compared with the range of the curve as shown by the vertical arrow at the right-hand side of the graph. The relation of the two is reported as “ratio”.

1. The (*SC*, *EF*) pair for state capture and economic freedom

Figure 1a.
State capture explaining economic freedom.
Ratio: 2.8/6.2 = 0.45

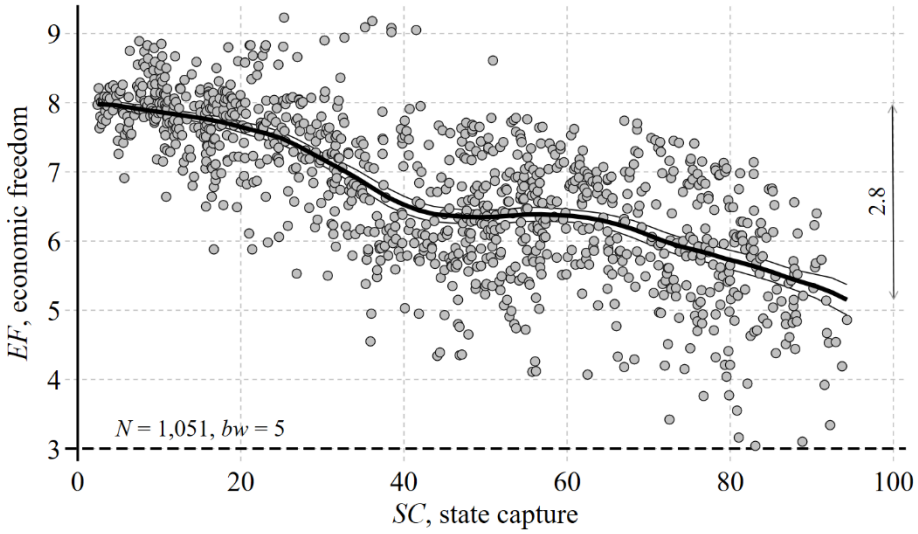
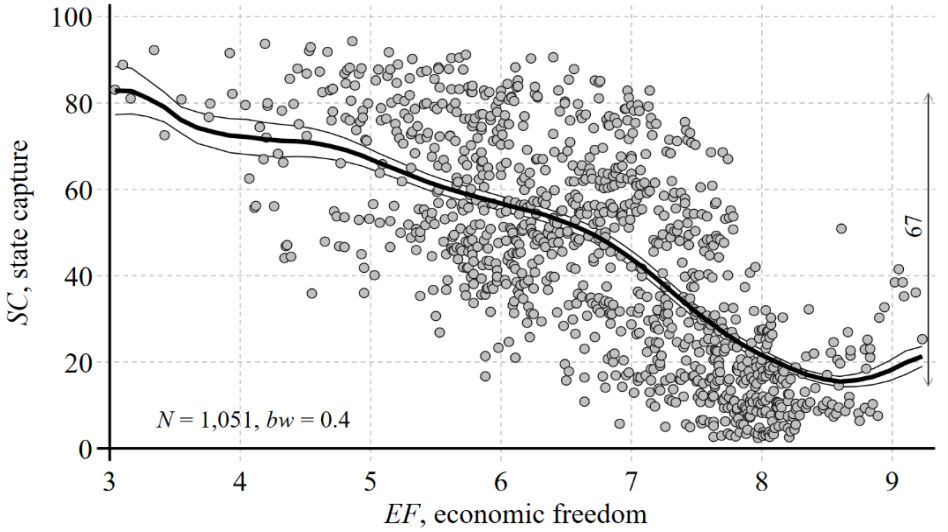


Figure 1b.
Economic freedom explaining state capture.
Ratio: 67/92 = 0.73



The two indices have a correlation of -0.70, which is due to the long run as it is a between-countries correlation.

Figure 1a shows that SC explains 45% of the range by a fairly linear curve. However economic freedom explains 73% of the range of SC, by an interesting curve with two bends. This argues that economic freedom better explains political capitalism than vice versa.

2. The (*SC*, *T*) pair for state capture and corruption

Figure 2a.
State capture explaining corruption.
Ratio: 6.3/8.7 = 0.72

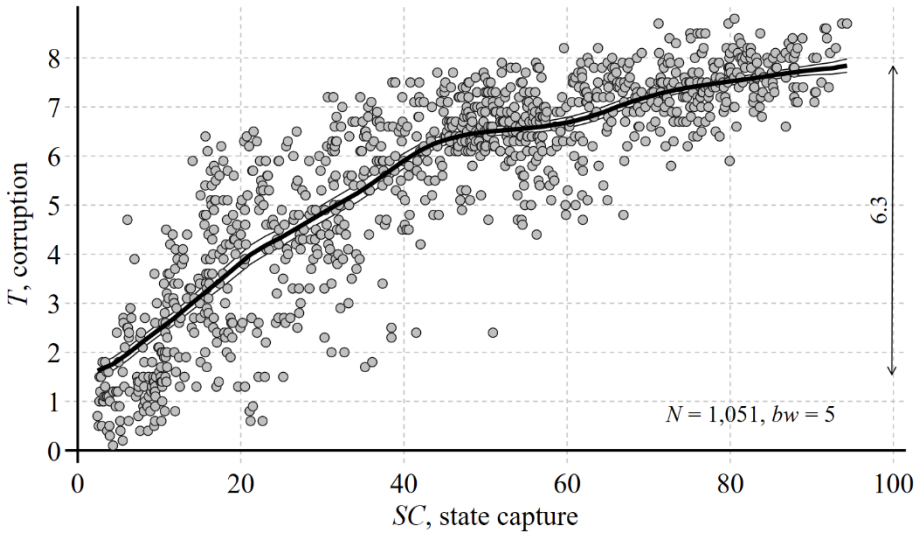
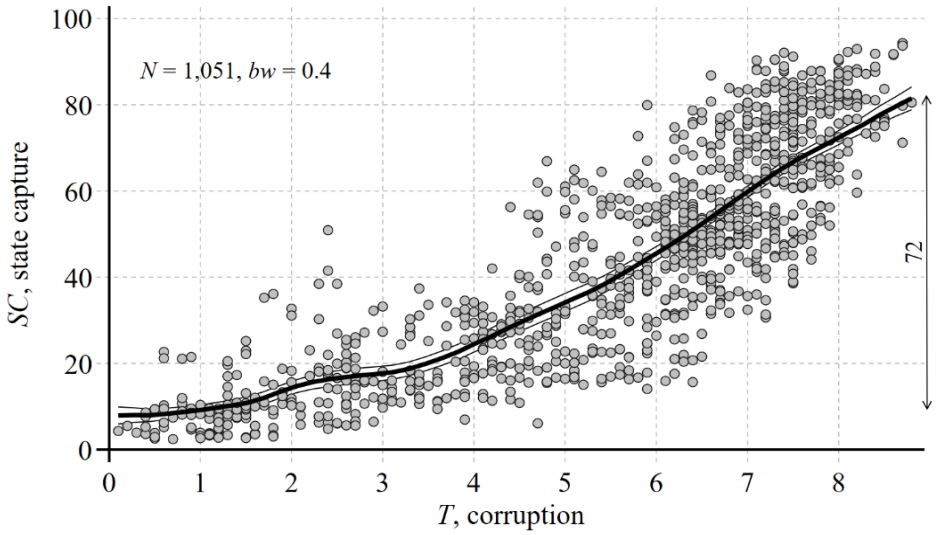


Figure 2b.
Corruption explaining state capture
Ratio 72/92 = 0.78



Corruption is $T = 10 - TI$, where *TI* is Transparency Internationals corruption index, which measures honesty. The two the *SC* and *T* indices have a correlation of 0.84, which is mainly due to the long run as it is a between-countries correlation.

Here the two curves look very similar though, of course, they bend the opposite way. Also, they explain almost the same fraction of the range. This indicates simultaneity.

3. The (*SC*, *V*) pair for state capture and democracy

Figure 3a.
State capture explaining democracy
Ratio: 0.66/0.85 = 0.78

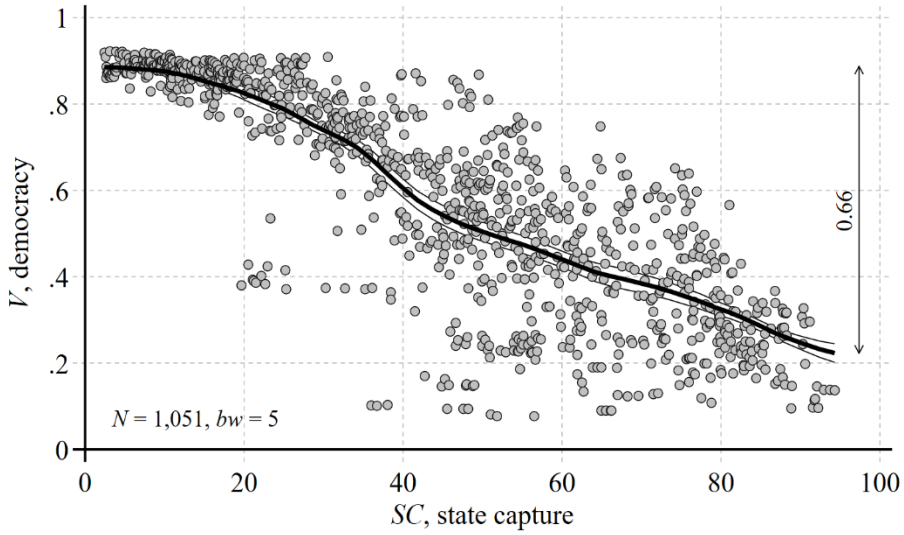
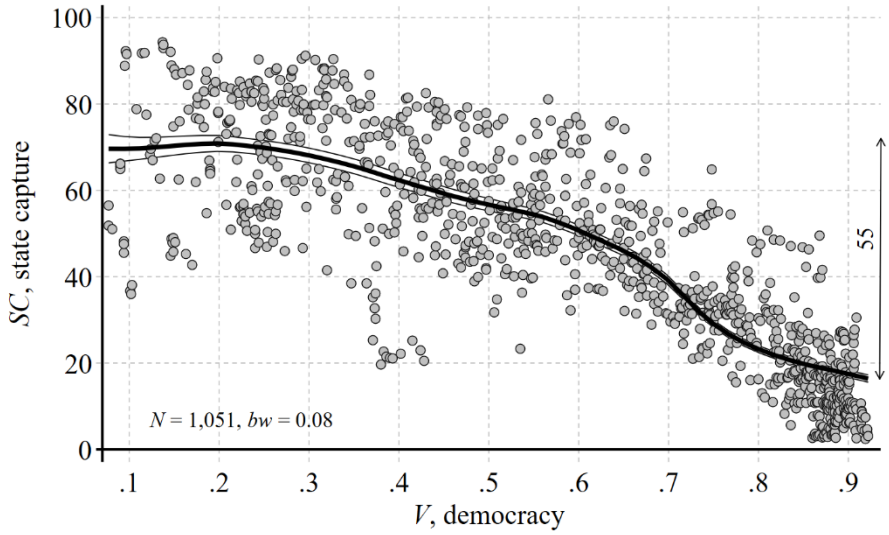


Figure 3b.
Democracy explaining state capture
Ratio: 55/92 = 0.60



Democracy is the polyarchy index from the V-Dem project. The two indices have a correlation of -0.84, of which about half is a within country correlation, which takes place in less than 25 years.

Here the story is much the same as in section 2, so once again it points to simultaneity, but there is some indication that the main direction of causality is from state capture to democracy.

4. The (*SC*, *y*) pair for state capture and income

Figure 4a.
State capture explaining income.
Ratio: 2.6/5.3 = 0.49

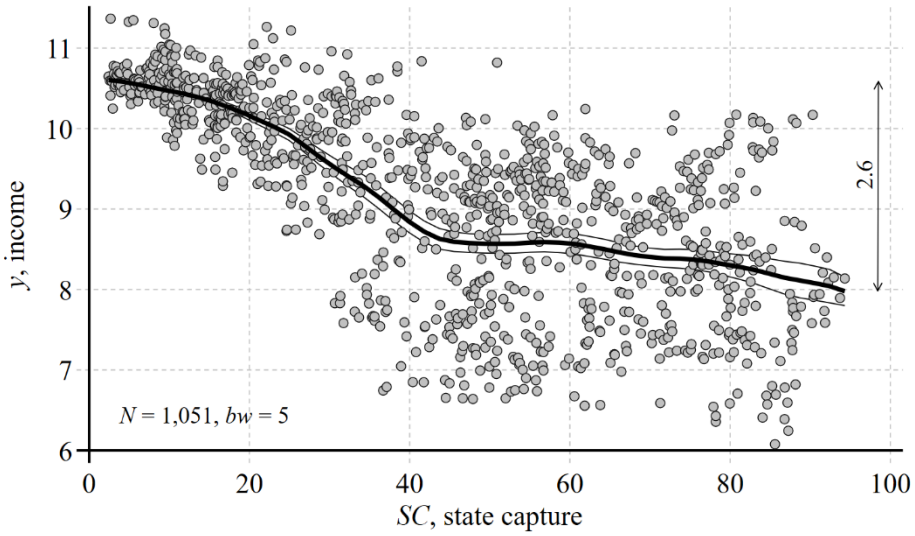


Figure 4b.
Income explaining state capture.
Ratio: 56/92 = 0.61

Income is the natural logarithm to the real GDP/GNI per capita from the Maddison Project. The two indices have a correlation of -0.68, which is mainly due to the long run.

Figure 4b explains a more of the range than Figure a4, but the main difference is that Figure 4b looks like a typical transition curve as demonstrated in MP (2021, 2024) and MP and JS (2026). Also, *EF*, *T* and *V* have very similar transition curves as shown in MP and JS (2026).

5. Conclusion

The variables are four institutional indices and income. The four indices are compiled by four independent NGOs with headquarters in different countries. Institutional indices have substantial measurement uncertainties such as 10%. Nevertheless, they have correlations that in average is about 0.75 numerically. Most of the correlation is explained by the cross-country variation.

MP and JS (2026) show that all four institutional series have strong and very similar transitions where Figure 4b is an example. This gives the institutional series a strong underlying confluence. It argues that the main causal direction is from income to state capture.

The analysis shows that state capture and corruption have a strong and simultaneous connection. The connection is due to the cross-country pattern. State capture and democracy are also mainly simultaneous, though there are signs that the causality from state capture is strongest. Here, the short run (within 25 years) connection is half on the correlation.

Finally, state capture and economic freedom are two alternative types of capitalism that should add to 100% so the correlation should be -1 per definition. The reason it is only -0.7 is measurement uncertainty as discussed in MP and JS (2026).

References: (MP is Martin Paldam, JS is Jamel Saadaoui

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