10. The Transition of Corruption

The corruption index, *T*, has a scale, where *T* rises when corruption falls. It aggregates polled measures of perceptions of corruption/honesty. Chapter 2.2 found that the *T*-index, income (*y*), the Polity index (*P*) and the Fraser index (*F*) have one strong positive common factor. Thus, the four variables are confluent, and it is difficult to untangle the effect of each variable. As both *P* and *F* have a transition, it is no surprise that *T* has one as well. Corruption is an *embedded tradition* that is difficult to change, the *T*-transition happens relatively late, and it is influenced by the prior transitions in *P* and *F*. We are dealing with a strong, but fuzzy relation with substantial lags. The *T*-index is negatively correlated to the first differences to income (*g*), Polity (*dP*) and Fraser (*dF*). This is a strong *J*-curve effect, which lasts no less than a dozen years.

The ten sections of Chapter 10 proceed as follows: First, the index is discussed (s1), and the robust transition curve is estimated (s2). Then comes a short literature survey (s3), and a correlation analysis (s4). The causality tests show that the main direction of causality is from income to corruption (s5). It is demonstrated that institutions have an independent role in explaining corruption (s6-7). Finally, four examples show that economic and institutional uncertainty and crisis generate excess corruption.

Table 1. Variables used in Chapter 10

Variable	Definition and source.
	Transparency's Corruption perception *T*-index.
Source	Transparency International: https://www.transparency.org/.
T	The *T*-index [0, 10] for corruption to honesty. It rises when corruption falls.
Θ^T	The deviation of the *T*-index from the transition path: $\Theta^T = T - \Pi^T$.
$\Pi^T(y)$	*Transition of Corruption*. Estimated by the kernel $K^T(y, bw)$ that has a positive slope.
	Variables from other chapters
P, *dP*	Polity index and its first difference from Chapter 4. (a)
F, *dF*	Fraser index and its first difference from Chapter 9. (a)

Note (a): The two first difference variables, *dP* and *dF*, are defined as the average numerical change.

Table 2. Descriptive data for the Transparency corruption index, *T*

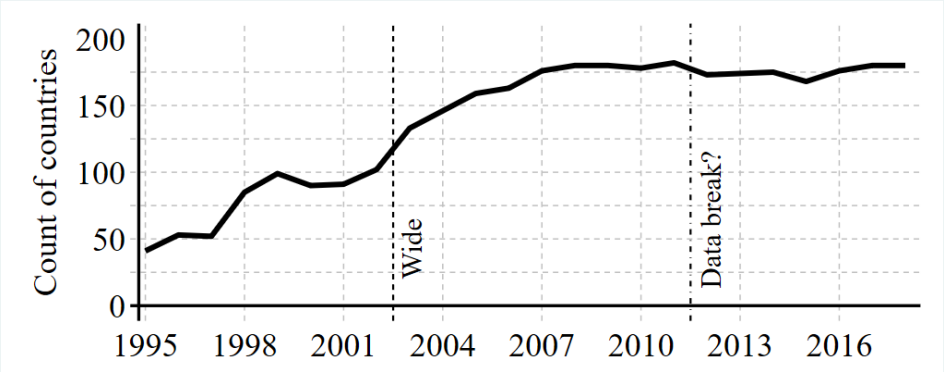
	Main	OPEC	All	Average	Std	Min	Max
All 1995-2016	2,730	247	2,977	4.4	2.2	10.0	0.4
Country averages	173	15	188	4.1	2.0	9.4	1.0

The data are for countries and years having an income observation in the Maddison project database

10.1 The corruption perception index from Transparency International

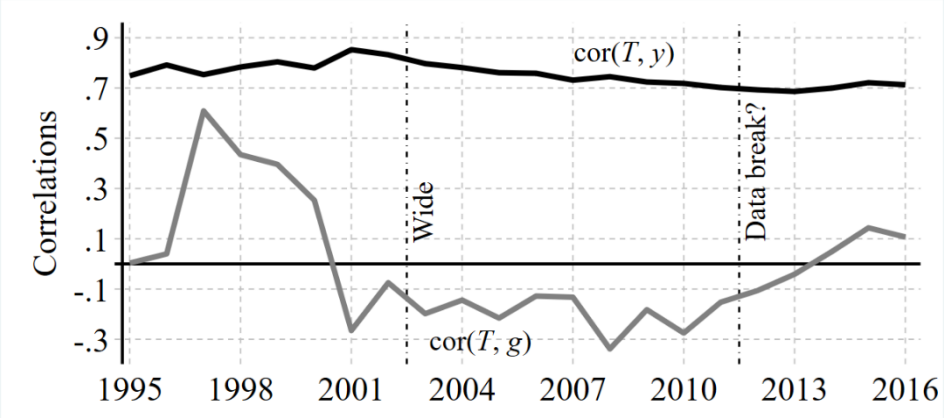
The corruption index uses a scale that rises with honesty, so that it becomes a goal for countries to increase the index. As shown by Figure 1, it started in 1995 with 41 countries – since 2007 it has been around 175, and there are data for 188 countries, but most have gaps in the series. Table 2 gives some descriptive data.

Figure 1. The number of countries included in the *T*-index per year 1995-2018



The transparency index aggregate data from many primary data by a double process explained in Lambsdorff (2007). First, the data are calibrated to the same scale, and then an average is calculated. Thus, it is difficult to interpret the first difference in the series, and also the method has changed, notably in 2012; see Gründler and Potrafke (2019).

Figure 2. Looking for data-breaks in two annual cross-country correlations



Wide indicates that the data cover countries at all income levels. The wide data cover only 13 years of observations. The two graphs on Figure 2 are the annual correlations of the corruption index to income and growth.

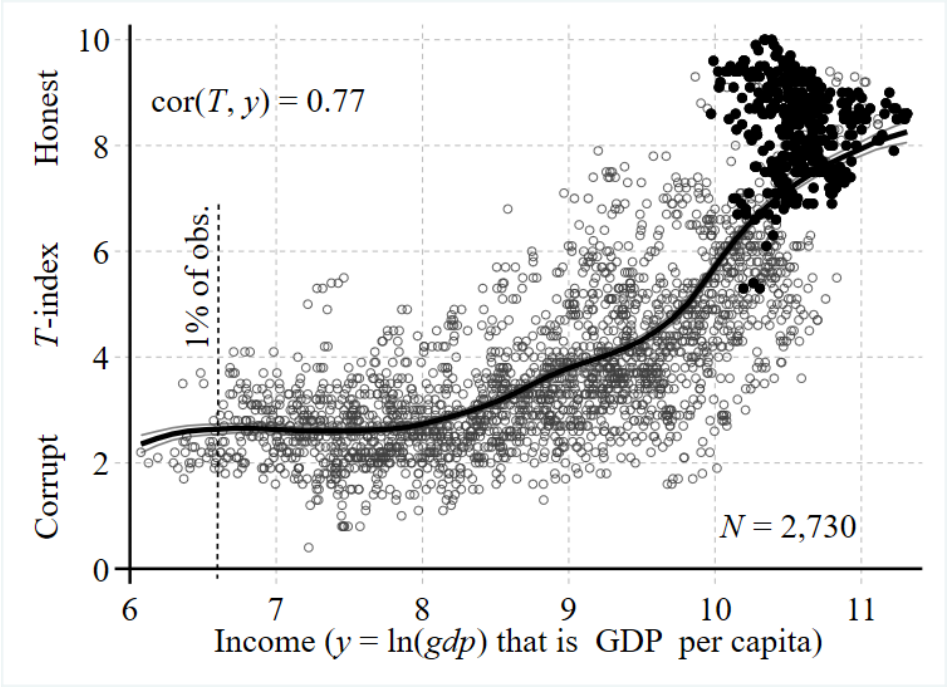
Figure 2 shows the path of the two relevant correlations. (i) The top line for cor(*T*, *y*) is stable at a level just above 0.7. (ii) The lower line for cor(*T*, *g*) is quite variable. It is positive

before 2001, where the range of the data was small, but even after 2003 the results are not fully stable. (iii) There is no break in 2011/12, so for the present study the data revision does not matter. The cor(T, g)-line suggests that the corruption data have measurement problems, but sections 2-7 are based on cross-country averages over $N > 100$, so the error should be divided by $\sqrt{N} > 10$.

10.2 The transition curve and its robustness

It has been known for long that *development* is the strongest explanation of the cross-country levels of perceived corruption/honesty – high income and modern institutions go together with honesty.[1] The available historical narrative provides the same story. A couple of centuries ago, when the present developed countries were poor, they were corrupt just as countries at the same level of income today.[2] Thus, both the cross-country and the long-run relation of development and honesty are positive.

Figure 3. Corruption-income scatter for Main sample, with the kernel $K^T(y, 0.3)$



$K^T(y, 0.3)$ is the kernel with $bw = 0.3$, and 95% confidence intervals, $N = 2{,}730$. The vertical dotted line shows that the leftmost 10% of the curve is supported by 1% of the observations only. The kernel rises from 2.5 to 8.5, when income increases from 6.5 to 11, thus the slope is 6/4.5 = 1.33. The kernel is used to calculate $\Theta^T = T - \Pi$. The black circles are from the Old West: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Iceland, Ireland, Luxembourg, Netherlands, New Zealand, Norway, Sweden, Switzerland, UK and USA.

[1] The income effect on the cross-country pattern of corruption is known since Treisman (2000) and Paldam (2002), who also found a weakly negative effect of growth. These results are confirmed by the meta-study by Ugur (2016).
[2] The 20 authors of Kroeze *et al.* (2018) cover the historical evidence in the literature that is listed over 42 pages.

Figure 3 reports the (T, y)-scatter and the kernel $T = K^T(y, 0.3)$ for the Main sample (where T is the corruption index, y is income, and 0.3 is the bandwidth). The graph highlights two observations: (i) The kernel estimate $K^T(y, 0.3)$ shows a transition curve that has all 6 properties listed in Table 2.2, so it qualifies as a beautiful transition curve. It moves from a corruption level at about 2½ in poor countries to a level close to 9 in wealthy countries. It diverges from the low level at an income of about $y \approx 8$, but the rise is slow before $y \approx 9.5$.[3]

(ii) The black circles are for the oldest developed countries. They have a corruption level close to 9. These countries have adjusted to the wealth. This suggests that when countries join the group of HICs, they will gradually move to the same level.

Figure 4 reports 15 additional kernel curves showing the robustness of the basic path. Figure 4a shows the robustness of the kernel curve to the bandwidth, *bw*. As usual, the kernel is a bit wobbly for small bandwidths and becomes more and more linear (and flat) for large bandwidths, but the basic form is robust. Figure 4b reports that the curve is stable over time – though it does move marginally to the right. Figure 4c shows that the transition curve has the same form in the Main sample and the *OPEC* countries. As the *OPEC* countries are relatively wealthy at each level of development, the *K*-curve shifts to the right for these countries.

Figure 4d is more complex, as it reports the informal beauty test for causality discussed in Chapter 2.7. It compares the transition curve, $T = \Pi^T(y) \approx K^T(y, 0.3)$, which assumes causality from y to T with the reverse $y = \Lambda^y(T) \approx K^y(T, 0.3)$, which assumes causality from T to y. While $K^T(y, 0.3)$ looks as predicted by the transition theory, $K^y(T, 0.3)$ is difficult to explain, and it has bends that are not expected from the sand theory (discussed in the next section).

Figure 4. Analyzing the robustness of the kernel-curve, $K^T(y, bw)$, from Figure 1

Figure 4a. Six bandwidths, *bw*

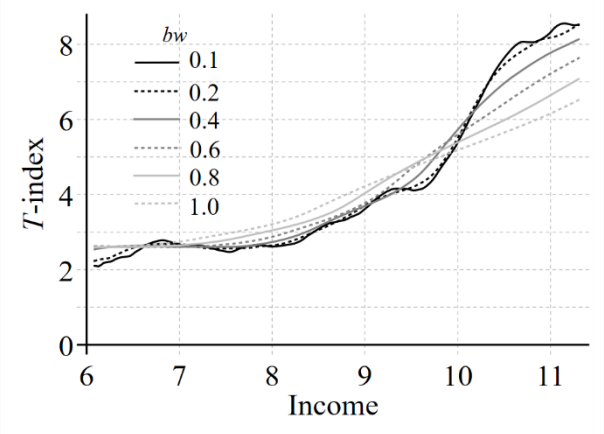
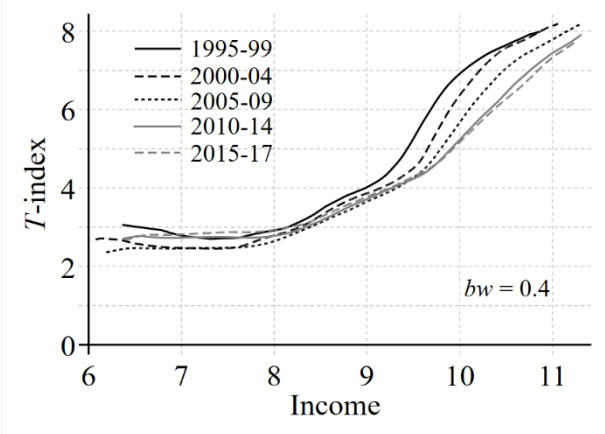


Figure 4b. Five periods



[3] The value for income 8 equals $ 3,000 as Kenya, and 9½ equals $ 13,500 as Brazil in 2016.

Figure 4c. Main vs OPEC sample

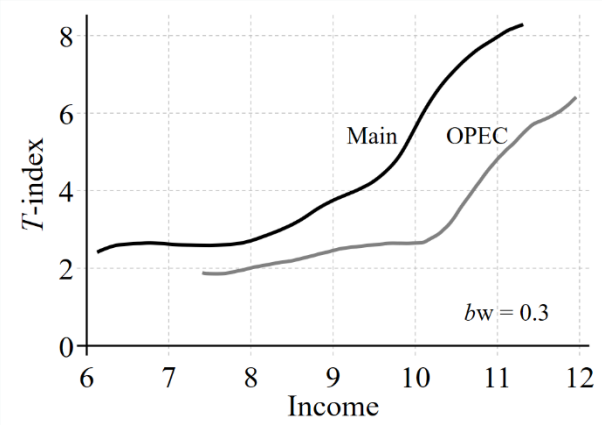
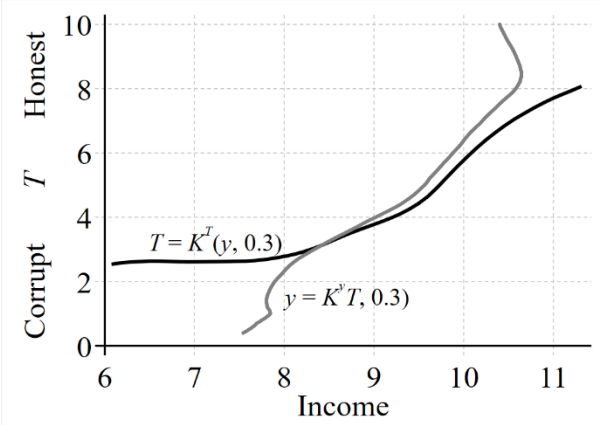


Figure 4d. The transition kernel and its reverse



Figures 2a, 2b and 2d are on the data of the Main sample.

10.3 The literature on corruption and development (continued in section 6)

Scattered corruption data started in the 1980s, and the *T*-index was started in 1995. The old literature before that was theory based on anecdotal evidence.[4] After data became available, a new literature emerged. Two large books survey these literatures and republish the main papers: Heidenheimer *et al.* (1989) for the old literature, and Dutta and Aidt (2016) for the new.

The first question in the old literature is how to delimit corruption from other types of fraud and rent seeking. A number of definitions have been proposed. The paper uses Transparency's definition: *Corruption is the abuse of entrusted power for private gain*. This definition implies a principal agent framework, with an agent who deals with a third party. Corruption occurs when the agent colludes with the third party to defraud the principal. The longest chains of agents and sub-agents exist in the public sector. Hence, it is particularly prone to corruption.

The first question in the new literature is the quality of the measurement: Aidt (2003) gives a survey of the early measurement discussion; see also Gutmann and Paldam (2020) for a comparison of four corruption indices. While they differ as to the order of many country pairs, they all show a similar transition pattern.

The transition pattern can be explained from both the demand and the supply side: *The demand theory* sees honesty as an intangible good with a positive income elasticity. It speaks for this theory that it can be extended to a whole family of intangibles, such as democracy, generalized trust and various cultural goods. They are 'nice' to have, but not really necessary, so

4. The old literature suffered from politeness. Though it was widely known, it was considered impolite to mention that the level of corruption is higher in poor countries. Consequently, most papers in Heidenheimer dealt with the USA, and the 1,776 pages of volume 1 of the Handbook of Development (Chenery and Srinivasan 1988-89) did not mention corruption. This changed after data appeared, as seen already from the title of Dutta and Aidt (2016).

the demand for these goods increases when income rises. Most poor countries are weak on honesty and democracy, and have few art museums. The consumption of other intangibles, such as religion, decreases when income rises. Thus, intangibles may have both positive and negative income elasticities. Such goods are poorly measured, not sold on the market, and their prices are difficult to impute. Thus, the parallel to goods is a bit of a construct – it is, at best, a rather fuzzy relation. In this theory the causality is: $y \Rightarrow T$.

The supply theory sees corruption as an *inefficiency* in all transactions. It has to be hidden from the principal, and this takes time and effort. In poor countries, many deals involve a lengthy process of haggling, where some part may be a secret part of the deal. In modern mass production, such inefficiency is squeezed out. Corruption may change to be a fixed commission or a tip that appears on invoices. Hence, it ceases to be corruption. This is, once again a rather fuzzy relation, which might be interpreted as a causal relation: $y \Rightarrow T$. However, the transaction theory may also be interpreted as saying that corruption is an extra cost that delays development. Thus, a reduction in corruption may increase development.

The demand and the transaction theories see corruption as a social ill that vanishes over time as countries develop, but the transition theory may also provide a double argument to fight corruption. It is not only a social ill in itself, but also *sand* in the machine of development. Many authors, notably Lambsdorff (2007), stress this theory and provide some evidence. The key argument is that corruption is an extra cost of transactions and thus production. This should give a positive correlation of T and growth, contrary to the evidence that cor(T, g) < 0.

Given the evidence, it is possible that corruption works as *grease* in the machine, increasing efficiency. Thus, in a growth perspective corruption is either sand or grease in the machine.[5] In other words, a briber may see the bribe as a cost or as a cost-saving device. Especially as regards public regulations, it is easy to come up with examples supporting either view. The examples hinge upon externalities:

Many regulations improve welfare, so corruption reduces the improvement. Examples are compulsory inoculation programs to eradicate epidemic diseases,[6] or regulations reducing air pollution, etc. Even if corruption allows both individuals in the transaction a short-run welfare improvement by circumventing the regulation, this has (large) negative externalities disregarded by the individual.

Other regulations harm welfare, so corruption limits the harm: It is easy to mention

5. The sand theory is, as mentioned, much more popular. The grease theory goes back to Leff (1964).
6. The author once visited a vaccination clinic in the 'African bush' that gave a choice of either a vaccination and the WHO-stamp in your vaccination booklet, or just the stamp. The latter was cheaper and less painful.

regulations that mainly serve to produce rents to politically influential groups. This, e.g., applies to most tariffs. Also, in many less-developed countries it is a problem that the time and effort needed to obtain legal property rights to a business are far too large; see de Soto (2000).

Grease-cases certainly exist, but they often have dynamic side effects that may change the conclusion: Perhaps the risk of corruption has made it necessary to have several layers of expensive controls that slow down the administration, so it is corruption that turns corruption into grease! A further aspect of the story is that the regulators may slow down administrative processes precisely to extract bribes. To understand such cases needs a complex model, where the solution is fragile depending upon the case-dependent details of the model. [7]

Several researchers have tried to estimate reduced form models, with both grease terms and sand terms. Normally they both become significant, but they are hard to sort out; see Méon and Sekkat (2005) and Méon and Weil (2010) for somewhat different results.

Many papers, starting perhaps with Andvig and Moene (1990), argue that corruption is dynamic: Corrupt countries tend to become more so, and honest countries become more so as well. Thus, corruption has a high and a low equilibrium. Paldam (2002) gives an overview of some mechanisms having this 'seesaw' dynamics:

(i) It is impossible to punish everybody if they are all corrupt, but if few are corrupt, they can be punished. (ii) The corrupt needs to announce his business, and it is typically done by conspicuous consumption – driving a Mercedes Benz is the classical method in poor countries. With low corruption, such advertisement announces a criminal. (iii) Jobs have different potential for corruption, and the jobs with the highest potential see wages competed down, so that the honest seek other jobs. Thus, the corrupt and the honest sort themselves out in jobs by high and low potential for corruption – this increases corruption.

This suggests that corruption is stuck at rather low *T*-values in most countries, as seen below, but once it starts to fall, the rise in the *T*-values is quite large. This helps explaining why the transition of corruption happens late in the process of development; see section 6.

10.4 Correlations and the Θ^T-index for corruption net of the transition

Table 3 shows the correlations between the levels of the four variables: the corruption index *T*, income *y*, and the two system variables *P* (Polity) and *F* (Fraser). The left-hand panel is for the Main sample, and the right-hand panel is for the OPEC sample. The three first variables (T, y

7. As the negative effect of growth on corruption is small, it is possible that it can be turned to become positive by effective policies to combat corruption, as discussed in many papers. In October 2020, Google Scholar gave 120,000 hits to 'anti-corruption policies'.

and F) have similar correlations in the Main and the OPEC sample, while the correlations to the *P*-index have opposite signs and similar numerical sizes in the samples. As expected from the factor analysis in Table 2.2, a strongly confluent pattern appears. The correlations of corruption and the three other level variables (y, *F* and *P*) add to two, so crudely stated the three 'explanations' of the *T*-index explain the same twice.

Table 3. Correlation for all observations between level variables

		Main sample, avr. *N* = 2,830				OPEC sample, avr. *N* = 254			
		Income	*F*-index	*P*-index	Growth	Income	*F*-index	*P*-index	Growth
(1)	*T*, Corruption	**0.774**	**0.726**	**0.450**	**−0.092**	**0.790**	**0.740**	**-0.488**	−0.046
(2)	*y*, income	-	**0.738**	**0.441**	0.022	-	**0.629**	**-0.542**	0.026
(3)	*F*, Fraser		-	**0.461**	0.024		-	**-0.289**	−0.016
(4)	*P*, Polity			-	−0.031			-	−0.016

Each correlation is for all overlapping observations available between 1995 and 2016. This makes *N* vary by 15%. A consistent sample is about 30% smaller, and gives much the same results. Estimates are bolded if they are significantly different from zero at the 5% level. The gray columns show the correlations between the four level variables and the first difference variable growth.

The column of correlations of the four level variables and growth gives results that are more modest. The only significant result is that cor(*T*, *g*) is negative. [8] The correlation between growth and income is insignificant and positive as in the literature on absolute convergence.

Table 4. Correlations for country averages between level variables and first differences

Correlations	*Level variables*			*First difference variables*		
N = 144	*y*, income	*F*, Fraser	*P*, Polity	*g*, growth	*dF*, dif *F*	*dP*, dif *P*
T, corruption	**0.75**	**0.74**	**0.41**	–0.10	**–0.48**	**–0.48**
Θ^T, net of transition	–0.05	**0.39**	**0.40**	–0.03	**–0.25**	**–0.17**

See Table 3. Data are Main sample for 2000-16. The two dif-variables are the average numerical change.

The first row in Table 4 shows that the correlations to the *T*-index are almost the same if calculated for the country averages as for all observations. The right hand panel shows the correlation between the corruption index and the first difference variables. They are all negative and two of them are even significant.

The analysis until now has shown much confluence. To reduce the confluence, the Θ^T-

[8] The same contradiction appears when the L2FE estimation model (with a lagged endogenous variable and two fixed effects) discussed in Chapter 2.3 is estimated for $T = T(y)$. The short-run results are too small to be consistent with the long-run results from a pure cross-country estimate; see Paldam (2020).

index of relative corruption is defined as the T-index net of the transition, i.e., the Θ^T-index is: *:*

(1) $\Theta^T_{it} = T_{it} - K^T(y_{it}, 0.3)$ where $K^T(y_{it}, 0.3)$ is the estimate of $\Pi^T(y)$ from Figure 3

Θ^T is negative if the country has 'too' much corruption ('too' little honesty), and it is positive if the country has 'too' little corruption ('too' much honesty) at its level of development.

Table 4 shows what happens when the T-index is replaced by the Θ^T-index: The income effect disappears, as it should; the correlation to the Polity index remains almost the same; but the correlation to the Fraser index falls to half. The fall is due to reduction in confluence. The problematic correlation to growth also falls to become insignificant, but it is still negative, so the contradiction becomes weaker, but it remains. The right hand panel of the table deals with the relation between corruption and the first difference in the three variables. The correlations to the Θ^T-index are always smaller, but the correlations to dF and dP remain significant.

The average number of observations for T and Θ^T per country is 18.1. Thus, a t-ratio can be calculated for each country to test if the Θ^T s are above or below the transition curve.

Figure 5a shows the frequency distribution of the 166 t-ratios. The white bars for t's in the interval [−2, 2] are the countries that do not deviate significantly from the transition path. The dark gray bars are significant – they are 64% of the countries. Thus, most countries deviate systematically over several decades from the long-run path. They are either too corrupt or too honest. Section 7 gives some examples of such countries, and shows that they are explained by economic and political instability.

Figure 5. Frequency distribution for the t-ratios and slopes for Θ^Ts of 166 countries

Figure 5a. Histogram of t-ratios

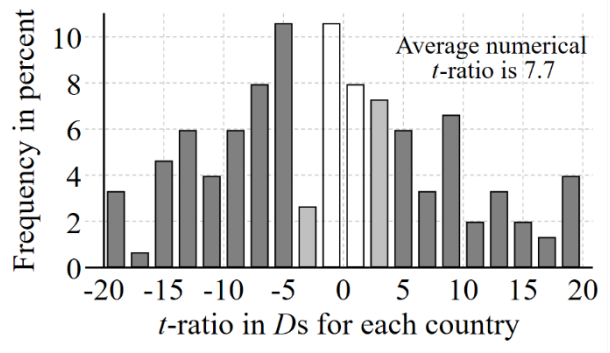
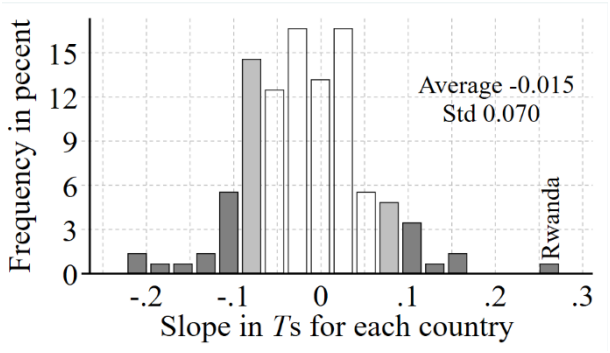


Figure 5b. Histogram of slopes



Empty bars are for assessed insignificant observations, and light gray are for mixed significant and insignificant. For the t-ratios the problem needing assessments is the autocorrelation in the series. For the slopes the significance does not only depend on the size but also on the variation. The t-ratios are truncated at $\pm$ 20. At the negative end, the three extreme countries are Taiwan, North Korea and Paraguay. At the positive end, the four truncated are New Zealand, Cape Verde, Sweden and Denmark.

Figure 6b looks at the slopes in the *T*-index for the countries. Few of these slopes are significant, which tallies well with the high t-ratios of the Θ^Ts. Thus, both parts of Figure 5 show that corruption is a variable with much inertia, and so has institutions as discussed.

Another possibility for explaining the inertia of corruption is culture, which is a soft concept where measurement is difficult, and much is discussed by way of examples. A typical example is the difference of corruption in the North Western Europe with Anglo-Germanic culture, and Southern Europe with Latin-Mediterranean culture. The paper argues that the difference is caused by the fact that Northern Europe became wealthy first, but culture may play a role too. It has also been suggested that culture can be proxied by religion, as analyzed by Paldam (2001), who found that countries with Protestant Christianity do stick out as relatively honest, but the Protestant countries seem to be the only ones that differ. Neither Catholics nor Muslims differ when income is controlled for.

10.5 Two more causality tests (see Chapter 2.7-8)

Chapter 2 presented three causality tests. The first was the informal beauty-test that was applied in Figure 5d. The two remaining tests are the correlogram-test and the TSIV-test using the DP-instruments. They are run in the present section.

Figure 6. Correlogram between growth, *g*, and corruption, *T* and Θ^T

Figure 6a. Growth and the *T*-index

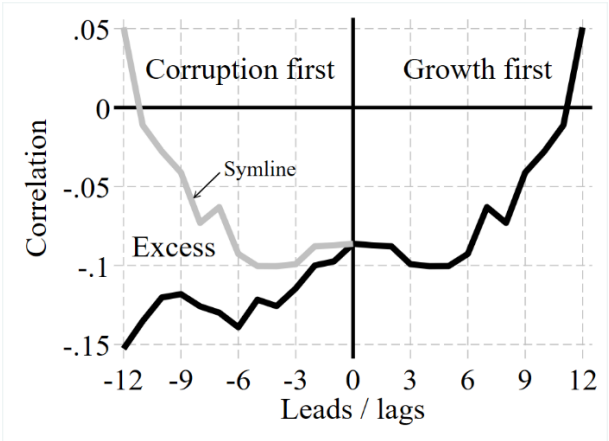
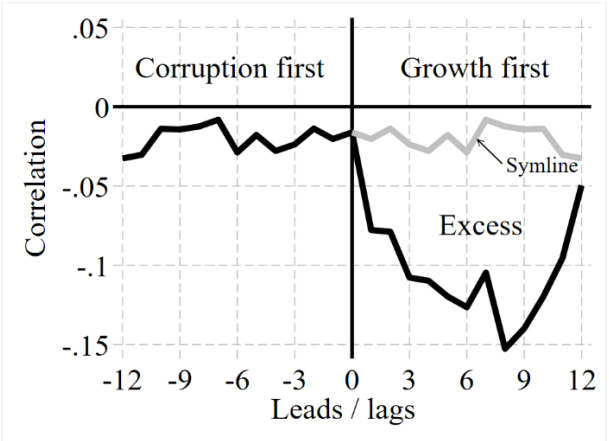


Figure 6b. Growth and the Θ^T-index



The unlagged correlation is made on N = 2,783 observations, and for each lag to either side about 160 observations are lost. The two curves are for all countries, with more than 6 observations. I assess that the 5% level of significance is about ±0.09; see Chapter 2.4.

Figure 6 reports the correlogram tests. The correlograms are calculated independently for each country, with enough data. The figure shows the averages. The intersections with the

vertical axis for no leads or lags for the T-index are the correlations from Table 3. The left-hand side of the graphs shows the effect of corruption on growth, while the right-hand side of the graphs shows the effect of growth on corruption.

Figure 6a contains a strong the trend due to the transition that is almost linear– it is difficult to interpret. The trend disappears on Figure 6b, which uses the Θ^T-data. Thus, the trend of Figure 6a is due to the transition. Figure 6b is much easier to interpret. At the left-hand side, there is no significance, but the right-hand side looks precisely as it should when it shows causality. It lasts about 12 years before it disappears. Thus, the contradiction between the short- and the long-run is temporary.

The formal DP causality-test for the long run is reported in Table 5. Here the results are clear. The causality from *y* to *T* is highly significant, and the tests are all as wanted (except the last Sargant test). However, the TSIV estimates of the income effect are larger than the OLS estimates – sometimes even significantly so. In addition, the CD-tests show that the instruments work in the reverse as well. They are not as strong as in the main direction, but still acceptable. Thus, the three causality tests show that the main direction of causality is from income to corruption both in the short and the long run, but there is some simultaneity in the relation.

Table 5. The DP-test for long-run causality from income to the *T*-index

	Dependent variable: *T*	Main model	Robustness of model to instrument variation			
	Estimate	(1)	(2)	(3)	(4)	(5)
	No. Of countries	101	106	101	101	142
			OLS estimates			
(1)	Income, *y*	**1.31**	**1.41**	**1.31**	**1.31**	**1.26**
	t-ratio	(13.3)	(14.3)	(13.3)	(13.3)	(13.2)
(2)	Centered R^2	0.64	0.66	0.64	0.64	0.55
			IV estimates: *y* is instrumented			
(3)	Income, *y*	**1.51**	**1.60**	**1.48**	**1.37**	**1.25**
	t-ratio	(10.0)	(11.5)	(9.8)	(9.8)	(9.2)
(4)	Instruments	*biofpc, geofpc*	*bioavg, geoavg*	*animals, plants*	*axis, size, climate*	*coast, maleco*
(5)	First stage partial R^2	0.44	0.52	0.44	0.50	0.50
(6)	CD F-statistic	**39.03**	**55.05**	**39.05**	**32.06**	**45.32**
	CD critical value	19.93	19.93	19.93	22.30	22.30
(7)	Sargan test	**0.23**	**2.49**	**1.09**	**3.09**	13.06
	p-value	0.63	0.11	0.30	0.21	0.00
		Hausman test for parameter consistency of OLS and IV estimates				
(8)	C-statistic	***3.34***	4.03	**2.18**	**0.34**	**0.03**
	p-value	0.07	0.04	0.14	0.56	0.86
(9)		Check for reverse causality (3 works but all are smaller)				
	CD F-statistic	**29.58**	**41.62**	**27.64**	17.89	20.40

The observations are averages of 2005-2010. All estimates include a constant (not reported).

10.6. Institutional explanations: theory and empirics

Both political and economic institutions should impact on corruption. Already in Chapter 2.2 it was demonstrated that the *T*, *P* and *F* indices are confluent, but there are likely to be more than the common transition. The Θ^T-index is corruption net of the transition – it should eliminate confluence.

Corruption and political institutions: It is likely that democracy and honesty reinforce each other. When civil servants are honest, people are more likely to trust elections, and hence the elected politicians. Thus, the correlation of the *T*-series and the *P* and Θ^T-indices, is likely to be more than spurious.

Corruption and economic institutions: The Fraser index was announced as a measure of the freedom to run a private business. Thus, *F* is linked to corruption in another way: Corruption is often used to evade public regulations, and high values of the Fraser index indicate that few such restrictions exist.

The first difference variables *dP* and *dF* are measures of institutional instability/uncertainty as demonstrated in Chapter 13. There is a parallel to the effect of poverty. Uncertainty is another hardship that is likely to increase corruption. Unfortunately, also instability has the problem of confluence. As already shown in Table 4, the level variables have a strong positive correlation to corruption, while the first difference variables have a negative (but smaller) correlation to corruption.

The *F* index started as an annual index in 2000. Therefore, this section works with *the overlapping sample* (with *N* = 1,965) that covers the 17 years from 2000 to 2016 and 131 non-OPEC countries.

Table 6 is not meant as an estimate of a model, but as an attempt to sort out the confluence. It reports 14 regressions. The seven (T)-regressions explain the corruption index by the variables in the leftmost column; for example, regression (T4) is $T_i = a + bP_i + cF_i + u_i$, where *a*, *b* and *c* are the estimated coefficients reported. The seven (Θ^T)-regressions are the same, except that *T* is replaced by Θ^T, the corruption net of the transition.

Two of the variables give fairly stable estimates, though they are not always significant. The first is *P*, the polity index, which gives a small positive effect on corruption by both *T* and Θ^T. Democracy does increase honesty, but not much. The second is growth, which is always negative. The betas for both variables are about 0.15. The coefficients on the remaining five variables change substantially. The purpose of the table is to study the pattern in the changes.

Table 6. Seven OLS regressions explaining T and Θ^T

	Explaining T-index, corruption						Explaining Θ^T-index, net corruption					
	(T1)						(Θ^T1)					
	Coef.	t-ratio	beta				Coef.	t-ratio	beta			
y, income	**1.33**	(14.9)	0.80				0.11	(1.5)	0.13			
Constant	**-7.55**	(-9.4)					-0.99	(-1.5)				
R^2	0.63						0.02					
	(T2)			(T3)			(Θ^T2)			(Θ^T3)		
	Coef.	t-ratio	beta	Coef.	t-ratio	beta	Coef.	t-ratio	beta	Coef.	t-ratio	beta
y, income	**0.88**	(7.0)	0.53				**-0.29**	(-2.8)	-0.34			
P, Polity	0.03	(1.5)	0.09	**0.06**	(2.5)	0.17	0.03	(1.7)	0.16	0.02	(1.1)	0.10
F, Fraser	**0.72**	(3.9)	0.30	**1.57**	(9.7)	0.65	**0.64**	(4.4)	0.54	**0.37**	(3.3)	0.31
Constant	**-8.61**	(-9.2)		**-6.63**	(-6.4)		**-1.95**	(-2.6)		**-2.59**	(-3.6)	
R^2	0.69			0.57			0.19			0.14		
	(T4)			(T5)			(Θ^T4)			(Θ^T5)		
	Coef.	t-ratio	beta	Coef.	t-ratio	beta	Coef.	t-ratio	beta	Coef.	t-ratio	beta
y, income	**1.21**	(10.6)	0.72				-0.04	(-0.5)	-0.05			
g, growth	**-0.11**	(-2.1)	-0.12	**-0.17**	(-2.4)	-0.18	-0.06	(-1.5)	-0.13	-0.06	(-1.5)	-0.13
dP, dif *P*	-0.46	(-1.4)	-0.09	**-2.13**	(-5.3)	-0.40	***-0.49***	(-1.8)	-0.19	***-0.43***	(-1.8)	-0.16
dF, dif *F*	-1.90	(-1.1)	-0.07	**-9.57**	(-4.5)	-0.34	**-2.73**	(-2.0)	-0.19	**-2.46**	(-2.0)	-0.18
Constant	**-5.72**	(-4.7)		**6.80**	(15.7)		1.11	(1.1)		**0.67**	(2.6)	
R^2	0.65			0.34			0.08			0.08		
	(T6)			(T7)			(Θ^T6)			(Θ^T7)		
	Coef.	t-ratio	beta	Coef.	t-ratio	beta	Coef.	t-ratio	beta	Coef.	t-ratio	beta
y, income	**0.84**	(6.4)	0.50				**-0.34**	(-3.2)	-0.41			
P, Polity	0.02	(1.0)	0.06	***0.05***	(1.9)	0.13	0.02	(1.4)	0.13	0.01	(0.8)	0.07
F, Fraser	**0.86**	(4.2)	0.36	**1.49**	(7.4)	0.62	**0.65**	(4.0)	0.55	**0.40**	(2.7)	0.33
g, growth	**-0.13**	(-2.7)	-0.14	**-0.17**	(-3.1)	-0.18	**-0.08**	(-2.0)	-0.16	-0.06	(-1.5)	-0.13
dP, dif *P*	-0.20	(-0.7)	-0.04	**-0.76**	(-2.2)	-0.14	-0.29	(-1.2)	-0.11	-0.07	(-0.3)	-0.02
dF, dif *F*	0.78	(0.5)	0.03	-0.65	(-0.3)	-0.02	-0.66	(-0.5)	-0.05	-0.07	(-0.1)	-0.01
Constant	**-8.72**	(-6.1)		**-5.20**	(-3.4)		-1.09	(-0.9)		**-2.53**	(-2.3)	
R^2	0.70			0.61			0.22			0.15		

All regressions are calculated for a consistent sample of 131 non-OPEC countries. The explanatory variables have different scales. To make the effects comparable, the standard estimates are supplemented with beta coefficients, for normalized series. The first difference variables are dif *P* and dif *F*.

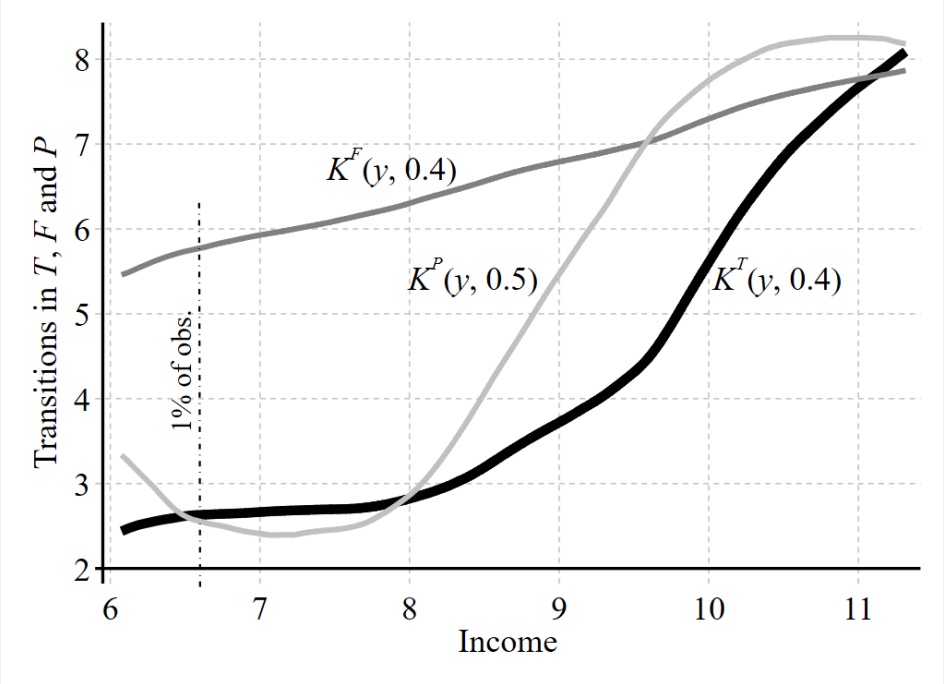
Income and the Fraser-index have high collinearity to income when explaining *T*. The betas sum to 0.83 in equation (T2), while beta for *T* alone is 0.80 in (T1). Thus, the two variables explain almost the same, but income is better alone in (T1) than Fraser alone in (T3). From the corresponding Θ^T-estimates, it is clear that the confluence is generated by the transition as expected from section 2.3. The two first difference variables *dP* and *dF* are always negative when significant, and mostly also when insignificant. Thus, institutional instability increases corruption in the short run, as does growth. However, also the *dP* and notably the *dF* variable have a great deal of collinearity with the level variables. In the last section of the table with both

the levels and the dif-variables, only one coefficient to *dP* is significant – it happens when income *y* is omitted.

I interpret the positive effect on corruption of the two institutional variables and the negative effect of the instability of the same two institutional variables as follows: A transition is a process of system change. The changes are mainly to the better, so in the longer run corruption decreases. However, the changes are also instability, so in the short run they increase corruption. This is a story of short-run costs versus long-run gains. It points back to the positive effect of income and the negative effect of growth from section 3. If part of the transition is caused by the transitions in the institutional variables, it reinforces the idea that the main direction of causality is from development to corruption, not the other way around.

This corroborates the finding from Figure 3 that the old wealthy countries of the North West stuck out as unusually honest. This is an effect of time on the internal dynamics of corruption. Once countries become honest, they get gradually more honest over time.

Figure 7. Comparing three transition curves in Main sample: K^T, K^P and K^F



Estimated for N = 1,965 for the years 2000-16. F is the Fraser index (Figure 9.5), P is the Polity index (Figure 4.4), and T is the corruption index (Figure 3). The confidence intervals for K^P and K^T overlap below 8.2.

10.7 Figure 7 comparing three transitions: Π^T, Π^P and Π^F

Chapter 4 analyzed the Democratic Transition, $\Pi^P \approx K^P(y, 0.3)$, and Chapter 9 analyzed the Transition in the Economic System, $\Pi^F \approx KF(y, 0.3)$. Figure 7 compares these transitions with

the Transition of Corruption $\Pi^T \approx K^T(y, 0.3)$. The figure is estimated on the overlapping data for 2000-16. Even when the data is shorter, the three curves are virtually unchanged.

The K^T-curve and the K^P-curve have similar paths, but the K^T-curve is one full log-point of income later than the K^P-curve. This is a difference in GDP per capita of 2.7 times, which is growth in 20-50 years. Thus, first the political system becomes more democratic, and after several decades corruption falls. The K^F-curve is less clear. It has a positive slope throughout, and the confidence intervals (not shown) are narrow, so it does represent a systematic change.

The K^F-curve looks as a typical (log-linear) income curve. This explains the high collinearity of F and y. However, given that the F-curve is interpreted as a transition curve, it is clear that it starts to rise well before the K^T-curve. Thus, it can explain the K^T-curve, and support the conclusion that the Transition of Corruption is late and due to transitions in other variables, notably institutions.

10.8 Six examples illustrating the effect of instability on corruption

Instead of long series, six examples are provided. The first three are for country pairs on three continents, where each pair has many similarities and a clear difference in the levels of stability and corruption. Table 7 gives the data for the country pairs shown in Figures 7 to 10, while Figure 10 looks at three countries with spectacular crises. The four figures are drawn for the Θ^T-data, so the transition curve is horizontal at $\Theta^T = 0$ per definition.

Table 7. The institutional variables for three country pairs

	Argentina	Chile	Latvia	Estonia	Côte d'Ivoire	Ghana
P	8.12	9.65	8.00	9.00	1.88	7.29
Z^P	0	0	0	0	0.16	0.02
V^P	1.00	0.52	0.43	0.46	0.27	1.12
F	5.78	7.75	7.55	7.80	5.73	6.53
V^F	0.26	0.07	0.13	0.08	0.11	0.15
Start	1995	1995	1998	1998	1998	1998

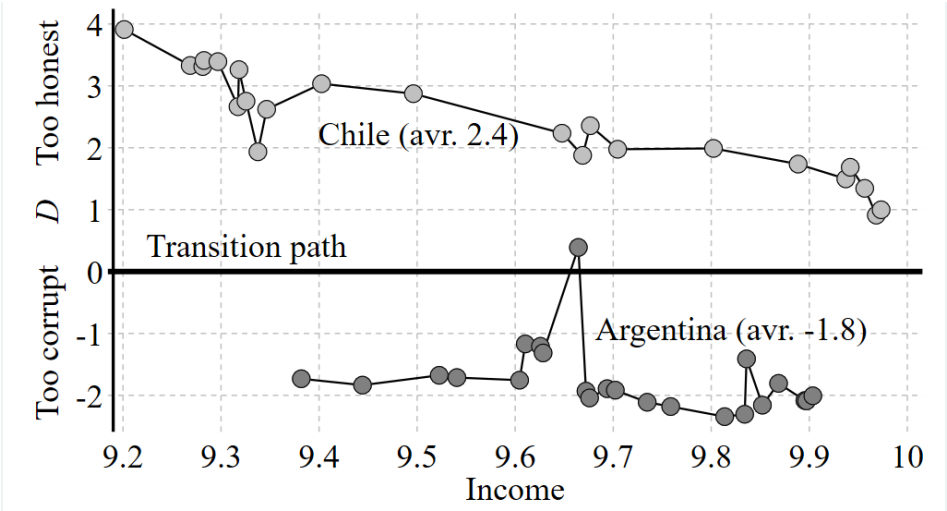
The period ends in 2017. The values are averages for the periods. The most corrupt of the pair is first and shaded.

Argentina and Chile. The two neighboring countries on the Southern Cone are both Spanish ex-colonies, with much the same immigration history, language, religion, etc. They are also at the same income level, though Chile has grown much faster.

Still, the level of corruption differs by 4.2 points. The two institutional indices show that Argentina has had less democracy and economic freedom. Argentina has also had much more

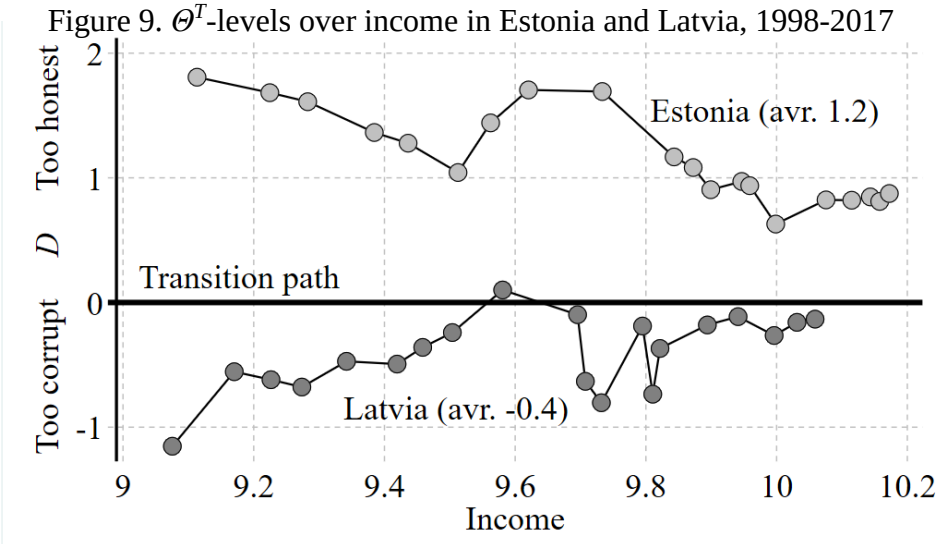
volatility both in the political and economic system – and the differences started long before the indices. Thus, it fits our story perfectly well. It is difficult to explain why the two countries had such a different history, but once things started going awry in Argentina, there was an amazing lack of brakes

Figure 8. Θ^T-levels over income in Argentina and Chile, 1995-2017



Estonia and Latvia. The two Baltic countries Estonia and Latvia have had much the same history – at least since 1795 when they both were integrated into Russia as provinces. They were independent from 1918 to 1940, when Russian rule returned. After the brief German occupation, they returned to Russian rule until liberation in 1990/91.

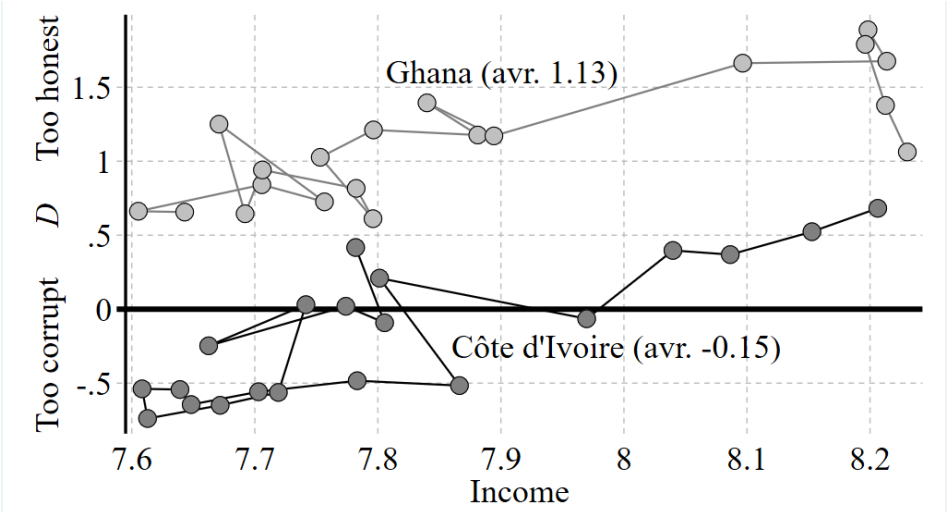
Figure 9. Θ^T-levels over income in Estonia and Latvia, 1998-2017



In spite of this common history, and a similar income level and population size, the two countries have a difference of 1.6 points in the level of corruption. The level of the institutional variables are higher in Estonia, while there is no difference in the instability variables, but perhaps it is not so much the actual instability that counts as the potential one: Latvia is a much more divided country, both as regards ethnicity and religion. This gives some uncertainty.

Côte d'Ivoire and Ghana are (also) neighbors, at roughly the same size and income level, but they differ as to colonial history, languages and ethnicity. The *T*-index differs by 1.3 points. As regards the institutional variables, there has been a dramatic shift: In the 1970s Ghana was a much more unstable country, but now it is the other way round. The level of the institutional indices is (much) higher in Ghana, while the volatility variables give a more unclear picture. The Z^P-variable is 0.26 in Côte d'Ivoire. It reflects that the country has had about 5 years of civil war in the period. That the difference in the level of corruption is not larger is probably due to the previous period, where Ghana fared badly. Note also that the two low-income African countries have had a more volatile economic development than the middle-income countries of the previous pairs.

Figure 10. Θ^T-levels over income in Côte d'Ivoire and Ghana, 1998-2017

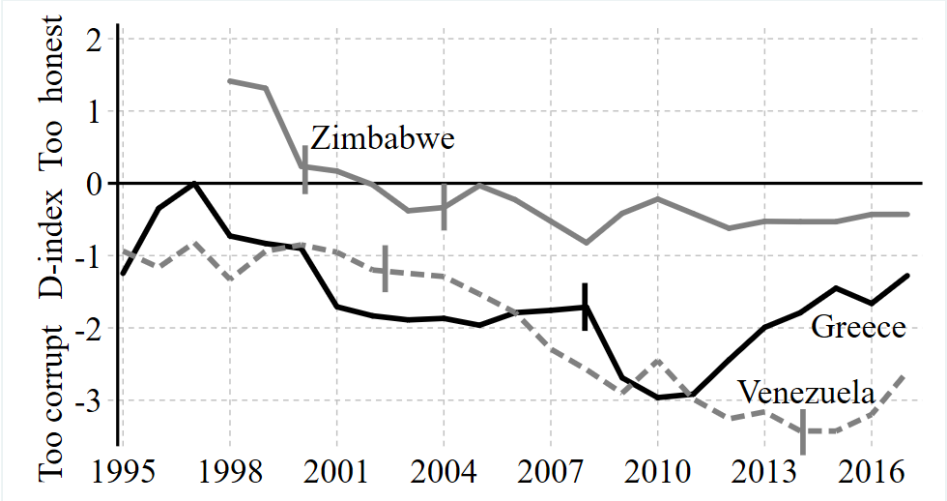


Three crises: Greece, Venezuela and Zimbabwe. Figure 11 shows the development in the Θ^T-index in three countries (on different continents) that have experienced very big economic crises: Greece, Venezuela and Zimbabwe. Their Θ^T-indices are depicted with time on the horizontal axis. Note that as the Θ^T-index is used, the curves does not reflect differences in corruption, but in corruption relative to other countries at the same income level.

The crises in the three countries were preceded by at least a decade of inconsistent

economic policies that sober observers soon found irresponsible. At some stage, the policies caused galloping debt, balance-of-payment deficit and increasing inflation, and finally a large fall in the *gdp*. This sequence led to a fall in the Θ^T-index in all three cases where the index turned negative. The small vertical lines indicate main events.

Figure 11. The story of the Θ^T-index in three crisis-countries



Greece became relatively corrupt around 2000, maybe as the Greeks became cynical as regards the policies pursued. Corruption further increased, but temporarily only, during the full scale crisis 2008-13. However, Greece remains a relatively corrupt country.

Venezuela has fared rather poorly for a long time in spite (or because) of its oil wealth. This led to the political victory of the populist Hugo Chaves, who was president 1999-2013. Maybe 2002 was the turning year where his policies became unsustainable. The economic balance in Venezuela gradually worsened, and corruption that was already too high increased by further two points. After the death of Chaves, power went to his vice-president Nicolás Maduro, who continued his policies with catastrophic results. The upturn in the last two years of the Θ^T-index is due to the large fall in the income level. The *T*-index remains constant at 1.7-1.8, making Venezuela the most corrupt country in Latin America.

Zimbabwe was known as a relatively honest country until the rapid socialization program was started in 2000, but then corruption increased by about 2 points. During the dramatic debacle of the economy, corruption remained rather trendless.

When this evidence is summarized, it is clear that an economic crisis increases corruption, but the timing is not so clear. It probably depends upon the extent to which people understand what is going on.

10.9 Conclusions

This chapter has shown a strong transition in the level of corruption as measured by Transparency International's *T*-index. Poor countries are rather corrupt, but they become honest as they grow wealthy. The change is a complex process that interacts with institutions. They also have transitions, so the relations examined contain a great deal of collinearity. When the transition path is deducted from the *T*-index – to give the Θ^T-index – it greatly reduces the collinearity, and allows an identification of the substantial genuine effect of institutions.

The Transition of Corruption happens relatively late in the development process. The lateness argues that the transition, and hence *T*, is caused by development and not the other way around. This is also confirmed by the three causality tests reported in sections 2 and 5.

A main reason for the late transition is that development creates many changes that inevitably give uncertainty, which causes setbacks in the corruption index. Such setbacks are temporary, and when institutions stabilize and countries become stable, wealthy, liberal democracies, honesty comes to dominate. Thanks to the short-run reverses and the internal dynamics of corruption, the process takes time.