DEPARTMENT OF ECONOMICS

Working Paper

THE BIG PATTERN OF CORRUPTION.
ECONOMICS, CULTURE AND
THE SEESAW DYNAMICS

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Working Paper No. 1999-11
Centre for Dynamic Modelling in Economics

ISSN 1396-2426

UNIVERSITY OF AARHUS • DENMARK

CENTRE FOR DYNAMIC MODELLING IN ECONOMICS
DEPARTMENT OF ECONOMICS - UNIVERSITY OF AARHUS - DK - 8000 AARHUS C - DENMARK
☎ +45 89 42 11 33 - TELEFAX +45 86 13 63 34

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SCHOOL OF ECONOMICS AND MANAGEMENT - UNIVERSITY OF AARHUS - BUILDING 350
8000 AARHUS C - DENMARK ☎ +45 89 42 11 33 - TELEFAX +45 86 13 63 34

27/5-1999

The big pattern of corruption

Economics, culture and the seesaw dynamics

Martin Paldam, Department of Economics, Aarhus University, Denmark.[1)]

Abstract: The 1998 corruption index from Transparency International is explained by two types of cross-country models: The economic model uses the level and growth of real income per capita, the rate of inflation and the amount of economic freedom. The cultural model uses a set of dummies for cultural areas and the level of democracy. It is demonstrated that both models work and have a strong interaction. The strongest factor reducing corruption is the transition from poor to rich. The (relative) difference between GDP-levels within the same cultural area is smaller than the (relative) difference between the levels of corruption, so the interaction points to something entirely different from culture: the inherent seesaw dynamics of corruption.

Key words: Corruption, economic transition, dynamics of cross sections Jel: K49, O11, P50

From casual observation and historical reading, it is known that corruption varies greatly over time and across countries, but how the »large« cross-country pattern of corruption really looks has been difficult to explore till now. Most observers probably suspect that the large pattern is related to the *transition* from a poor, stagnating traditional society to a rich developed, »liberal« democracy, but it has often been suggested that a »cultural« factor is also involved.

Observations from some of the most well-known countries allow further suggestions. Historians as Hofsteadter (1948) claim that corruption in the US grew till about a century ago, and then turned to fall steadily ever since, partly as predicted by the transition hypothesis. It appears that corruption in Russia has gone from bad to worse in the last decade, where the country has gone through a collapse and a chaotic system change. So perhaps economic chaos causes corruption.

For a decade the NGO »Transparency International« associated with Göttingen University has collected an index of *perceptions of corruption* - the κ-index (see netsources). The latest issue (covering 1998) has increased the number of countries by 30 to reach a total of 85. The κ-index is based upon a systematic collection of national polls which are aggregated and scaled to a comparable common scale, from 0 »highly corrupt« to 10 »highly clean«. The scale thus gives high scores to low corruption and low scores to high corruption.

1. This paper started as a comment to Levin and Satarov (1999), but then it grew by its own, and now the connection is tenuous. However, I am grateful to Mark Levin for providing a take-off point, and to Jakob de Haan, Susan Rose-Ackerman and Heng-fu Zou for discussions at various stages of the work. Thanks also goes to my students, who have been guinea-pigs for the ideas. Trine Mønsted has been research assistant on the project.

The index is problematic as discussed in a whole set of papers available from the two Internet Sites dealing with corruption (see references). No doubt the κ-index can (and will) be improved. However, the scores given for the countries I know appear reasonable. Clearly a serious effort has been made. Also, a measure of the measurement error is given. It is large relative to many of the country differences one would like to discuss, but small relative to the cross-country pattern analyzed.[2)] And the κ-index already tells a story.[3)]

The empirical analysis puts heavy demands on the number of countries in the sample, so this article only looks at the κ-index for 1998. No attempt will be made to estimate the dynamics. However, some time has been spent looking at the *mini-time-series* for the 50 countries where several observations are available. Most of the mini-time-series are stable. Only a couple of cases are available where a dynamic story can be told.

To allow the reader to see the pattern in the data, they are shown in six figures in the Appendix. The figures all have the κ-index on the horizontal axis - the reader will note that it shows big variation, going from 1.4 to 10. The appendix also defines the data used, and refer to sources. Only easily available and commonly used series have been used.

Section I lists six simple hypotheses suggested by the literature and the graphs of the appendix. The graphs and the estimates imply dynamic interactions between the hypotheses. These interactions will be discussed in Section II. The statistical analysis in Section III proves the points made in Sections I and II. Finally, Section IV summarizes the findings.

I Two theories and six hypotheses

The two basic theories suggested by the literature are the economic theory and the cultural theory - neither has been fully worked out.[4)] The economic theory says that corruption can be explained by the level of economic development and the economic »system« of the country. This view sees corruption as an endogenous product of economic factors, though perhaps with some feedback loops. The cultural theory sees corruption as a product of culture and politics. In this theory corruption is exogenous to the economy, though it may impact upon the economy.

I.1 The corruption function

We analyze corruption graphically - in the appendix - and by a simple exploratory statistical framework in Section III. The main statistical tool is a one-equation *corruption function* of the following type:

2. There are few previous cross-country studies. The first is Mauro (1995). It uses another data set and finds a strong positive effect of non-corruption on growth. The present article looks at the reverse causal relation. Mauro's result is reproduced (as listed in Table 3), but the relation between growth and corruption proves fragile.
3. In most cases about 5 polls are used - but the number varies between 3 and 12. The standard deviations of the polls are given in addition to the average. In most cases they are about 1 point, making the »large pattern« in the data rather credible, but providing a clear warning about taking differences within 1½ point too seriously.
4. The standard reference being, of course, Rose-Ackerman (1978), while a new survey is found in Mbaku (1998).

$$\kappa_i = c + [a_1x_{1i} + a_2x_{2i} + ...]_e + [b_1C_{1i} + b_2C_{2i} + ...]_c + u_i \quad (1)$$

Here i is the country index, the u-term is the residual, and the a's, b's and c are coefficients to be estimated. The $[]_e$-bracket contains the effects of economic x-variables. Correspondingly the $[]_c$-bracket contains the effects of the cultural and political C-variables. In due time other papers will come to work with more refined corruption equations than (1), but it must surely be the starting point.

It is easy to work with (1) and many series are available on a comparative basis, so three »families of variation experiments« around (1) have been made:

i. *Different x'es and C's.* The main experiments made will be presented.[5] The next subsections list the main variables chosen and the reasons for the choice.

ii. *Non-linearity of model.* Some of the appendix-graphs and many of the reset-tests calculated suggest that the economic part of the model should be non-linear. However, when the standard transformations were made, the main results did not change. And, when the cultural part is added, all signs of non-linearity disappear. Consequently only a couple of the (many) non-linear estimates made are presented.

iii. *Time-periods.* The κ-index is quite stable over time in the mini-time-series available for about 50 countries. Corruption changes slowly. The explanatory data must therefore have longer time units than the year. Most of the variables have consequently been averaged over 5, 10 and 15 years as will be explained. These averages produce much the same results, but there is a pattern, as will be mentioned.

I.2 Four economic hypotheses: $[]_e = a_1y_i + a_2g_i + a_3p_i + a_4\phi_i$

The four economic variables are: (1) The *GDP-level*, y, defined as the log to GDP per capita (using PPP data). (2) The *growth rate*, g, for the real GDP per capita (using standard data). (3) The *inflation rate*, p, defined as the log to the inflation rate. (4) The *regulation-index*, ϕ, defined as the index for »economic freedom«. These variables are all shown on the vertical axis of the Appendix figures, where the sources are also given. Each variable points to a main idea.

The transition hypothesis suggests a link between the κ-index and the GDP-level (y): Corruption is seen as a characteristic of »traditional« societies that disappears when they go through the transition to become »rich modern« societies. However, traditional societies differ more than modern DCs do, so the level of corruption should be more different at low GDP-levels than at the high GDP-level end of the transition (this is barely visible on the Appendix-graphs).[6]

Figures A1a & A1b show the log to GDP per capita, y on the vertical axis. The two figures use two definitions of the GDP-level. The first measures GDP in actual prices (the »Atlas-method«), while

5. The article analyzes 5 quantitative variables and 6 binary dummies. Many experiments were made with these 11 explanatory variables to examine the robustness aspect as suggested by Levine & Renelt (1992).

6. Two additional hypotheses will not be analyzed, as the data do not really permit a thorough analysis: (i) It is likely that some low-corruption traditional societies experienced rising corruption in the beginning of the transition. (ii) Some very resource-rich countries became rich without going through the whole of the transition process. They are likely to keep traditional patterns of corruption, along with other traditional patterns.

the second uses the more satisfactory PPP-values (the »Penn-Tables«). As usual there is little difference, but - as it should - the PPP-picture is slightly clearer. This was confirmed by the statistical testing. The PPP GDP-levels are therefore used as y from now.

Table 1 lists four dimensions (there are many more) of the complex transition process. The first two are reasonably clear and much researched. The last two are less known and more unclear: the starting point is more diverse, and the path to the »goal« is more variable. However, when countries manage to get through the transition, they always obtain the traits listed.

Table 1. Four parts of the big transition

	Stable traditional	LDCs on the way	Stable modern DC
Economic	Poor, stagnating. Large primary sector	High, but unstable growth. Industrial sector share grows	Rich, moderate growth. Small primary sector
Demographic	High birth & mortality rates	Mortality rate down & then birth rate	Both rates low
Political	Theocratic & hereditary systems	Unstable: often one party or military, but also periods with democracy	Democracy
Corruption	High, differ between countries	High and variable, but falling	Low

A strong connection appears on Figures A1a & b as suggested. It appears logical that there should be a corruption-transition. Rich countries are efficient countries. Transactions therefore have to be fast and transparent. Corruption is a set of »additional« factors making transactions inefficient, slow and murky. This basic insight can be expressed in many ways: Seen from the demand side (the households), the transition-hypothesis claims that »honesty« is a »good« with a high income elasticity like democracy. Seen from the supply side (the firms), the hypothesis claims that »honesty« is a time saving devise that becomes more and more necessary as countries grow rich and complex.

The transition hypothesis argues for a positive causal link from y to κ: Honesty rises with GDP.

The production factor hypotheses: The supply side idea just mentioned suggests that honesty is a factor of production, increasing the growth rate. Figure A2 shows the growth rate for GDP per capita, g, at the vertical axis. Also here is an apparent connection, though it is less strong than on the two previous figures. Note this link has the reverse causality of the one assumed by equation (1). The growth hypothesis is thus a positive signed link from κ to g.

However, growth impacts upon the GDP-level (that is y) in the longer run - so a dynamic model is clearly needed, but it can be meaningfully estimated only when long time series for the κ-index become available. To keep the analysis within the empirically possible, the simple one-equation exploratory framework is preferable. So there is likely to be a counter-causality bias. To control for that bias, g is used as a right-hand variable.

The idea that economic chaos is demoralizing. The more chaotic the economy is, the lower should the κ-index consequently be. Economic chaos occurs when policies fail, and the economy is subjected to large chocks. The best indication that things are amiss is probably high inflation. The rate

of inflation, p, is therefore used as a proxy for economic chaos.

One aspect of the chaos is that high inflation is known to cause large and - seen from the point of view of the ordinary citizen - largely arbitrary redistributions of wealth. This is likely to cause a rapid deterioration of »public morale«. Figure A3 has (the log) to inflation on the vertical axis. The graph shows a clear connection. The chaos hypothesis is thus a negative connection from p to κ.

Corruption is closely related to rent seeking (see Mbaku, 1998). The potential for rent seeking is a function of the amount of regulation in the economy. So a clear connection should appear between the κ-index and the available measures for the amount of regulation. The most comprehensive attempt to construct such a measure is ϕ - the »economic freedom« index (see Gwartney & Lawson, 1998).[7)] It has been compiled for almost the same countries as the κ-index. The ϕ-index is averaged over 15 year. Heavily regulated countries get low scores and vice versa.

It is interesting to study the connection between the two indices.[8)] As mentioned in the introduction there is evidence that sometimes deregulation (where ϕ becomes high) causes an increase in corruption (κ becomes low). However, the rent-seeking hypothesis predicts a positive connection between economic regulation (low ϕ's) and corruption (low κ's). So the main hypothesis is a positive causality from the ϕ to κ.

Figure A4 shows a weak connection between the two indices, so maybe there are opposing causal links working in the data. However, the main connection is positive confirming the main idea.

I.3 Two cultural hypotheses: $[]_c = b_1 D^{WE}{}_i + b_2 D^{LA}{}_i + b_3 D^{OC}{}_i + b_4 D^{A}{}_i + b_5 D^{O}{}_i + b_6 \gamma_i$

Only two cultural hypotheses are considered. The first sees corruption as a cultural phenomenon that follows the main cultural divisions. It is sometimes expressed as *cultural determinism*, where corruption is taken to be so deeply embedded in certain cultures as to be unchangeable. The second hypothesis relates corruption to democracy - strictly speaking this is a political theory.

The cultural idea: Table 2 gives a basic classification into 5 main *cultural areas*. They correspond to 6 cultural dummy-variables - D^{WE}, D^{LA}, D^{OC}, D^{A}, D^{O}, D^{R} - one for each cultural area and a residual group. These variables can be taken as fully exogenous. The groups are used in the pattern-scheme on the markers shown on the appendix figures.

The grouping listed in the table is not unproblematic. Two more groups would have been included, if there had been enough observations to permit a statistical analysis. However, they contain only 2 countries from the Indian and 4 countries from the Arab cultural area. Also, there are data from some countries (as Israel or Mauritius) which could have been included in several groups. They have been put

7. Inflation is one of the components included in the economic freedom index. To reduce the confluence to the p-series the economic freedom index was purged of the inflation component, and the models including ϕ was recalculated using the »purged« ϕ-index. However, the results change so little that it is better to bring the results using the standard series.

8. A recent study, (de Haan & Sturm, 1999) shows that even when the connection between the level of GDP per capita, y, and the ϕ-index is positive, the connection is not robust. However, a strong, robust, connection was found between changes in ϕ and the real growth rate.

in the residual group. The WE (West Europe) group includes USA, Canada, Australia and New Zealand. So it would be logical to include Spain and Portugal in the LA (Latin American) group. However, Spain and Portugal are now more integrated in Europe than in Latin America. Consequently Spain & Portugal were put in the residual group not to blur the distinction between the WE and the LA groups.

Table 2. The cultural groups

No	Var.	Name and description of group
19	D^{WE}	WE. Old OECD-countries of West European type. Includes Australia, New Zealand, USA, Canada, but not Greece, Spain, Portugal (as discussed in text) and no oriental country.
16	D^{LA}	LA. Latin American countries.
12	D^{OC}	OC. Old »communist« countries - from East European to Central Asia - now in transition.
14	D^{A}	A. African. Countries from South of Sahara Africa including South Africa.
11	D^{O}	O. Orient. Countries from the »Chinese« cultural sphere, including the old OECD-country Japan.
13	D^{R}	R. A residual no-group of 13 countries including South European new OECD-countries, India, etc.

Note: The variables are dummies with the value 1, if a country belongs to the group, else they are 0. A list of the countries in each group is given in the Appendix.

Several other classification schemes were considered, but they were too correlated with the simple cultural-area classification scheme chosen. This, eg, applies to religion, which is often seen as a key to the cultural dimension. Also, I decided against using the more complex classification scheme of Hofstede (1984), as it appeared to contain an element of endogeneity that would need a more comprehensive model structure.

The democracy idea. The relation between corruption and democracy has often been discussed. The Gastil-index, γ_i, (from Freedom House, see reference) for democracy is used to analyze this question - it is averaged over 15 years. It gives a number between 1 (full democracy) and 7 (no democracy) for the level of democracy of all countries included in the κ-index except Hong Kong. It is easy to advance reasons why the coefficient b_6 to γ_i in the corruption equation should be either positive or negative (see Wintrobe (1998) and Rose-Ackerman (1999) for discussions). Perhaps the most common theory is the *nice* one: Democracy (low γ) increases transparency. Hereby it *reduces* corruption (high κ).[9)] It is a negative causal link from democracy to corruption.

The political transition is a somewhat messy affair needing a few comments: The transition is from the many different types of stable traditional political systems to stable democracy as listed in Table 1. However, the democratic transition normally takes place late and after several false starts: many countries become democracies one time after the other until democracy finally takes root. Figure A5 shows the relation between democracy (γ) and corruption (κ). As argued it shows much variation, but it has a dominating block along the democracy axes at the bottom right-hand side of the graph. Here the transitions in both the κ and the γ variable have led to low-corruption democracies.

9. The reverse hypothesis is that dictatorship is likely to concentrate the group of the corrupt, and hence the amount extorted. Also, some dictators desire power only, (see Wintrobe, 1998)

The basic picture may thus be due the common factor of the GDP-level, explaining *both* the κ- and γ-indices. However, there might also be several interactions at work. Low corruption may make democracy easier, and vice versa. These complications will be further discussed below.

I.4 A summary of expected effects

The discussion till now is summarized in Table 3. More variables and complexities could easily have been introduced, but it is already a problem to keep the analysis within bounds. Already with these variables complex problems of interpretation will emerge.

Table 3. Variables and main causal structure assumed

Variable	Definition	Causality	Expected sign	Probable problems
y	Ln GNP per capita	$y \Rightarrow \kappa$	plus	loop via g, maybe bias
g	Growth rate of GNP per capita	$\kappa \Rightarrow g$	plus	loop via y, not treated
p	Inflation rate	$p \Rightarrow \kappa$	minus	clear
ϕ	Index for economic regulation	$\phi \Rightarrow \kappa$	plus	alternative link
D's	Five dummies for cultural areas	$D \Rightarrow \kappa$	different	clear
γ	Gastil index for democracy	$\gamma \Rightarrow \kappa$	minus	alternative theories

The original »backward« scaling for the three indices - κ, ϕ and γ - is kept: The corruption index, κ, goes from 0 to 10. It measures »honesty«, so that the most corrupt countries have the lowest score. The regulation index, ϕ, also goes from 0 to 10. It measures »economic freedom«, so the least regulated countries have the highest score. Finally the democracy index, γ, is a »dictatorship score« from 1 to 7, where the most democratic countries get the lowest score.

II Interaction and dynamics of the economic transition and cultural theories

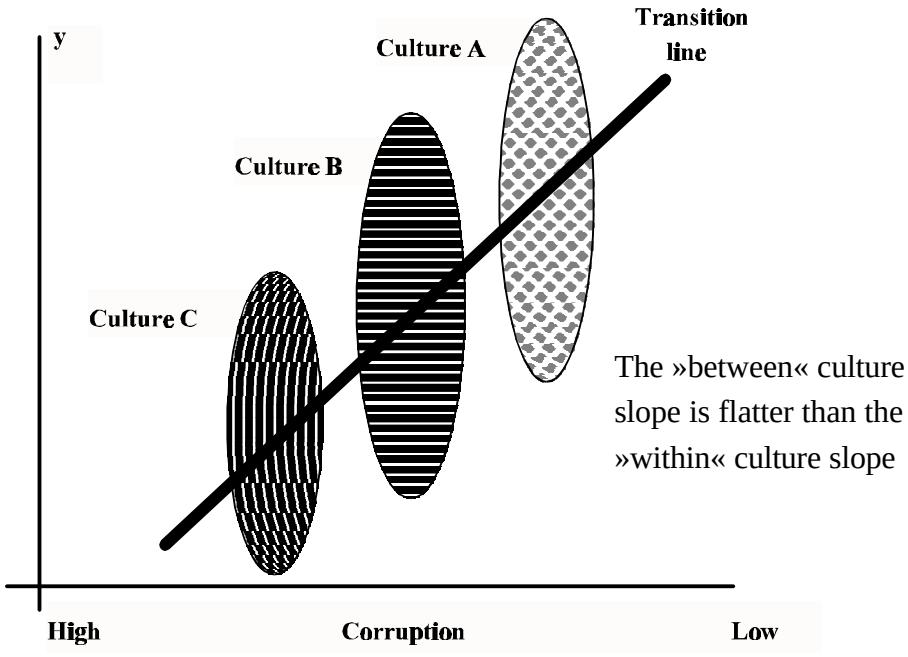
Appendix-figures A1a & b show a clear *transition line* with a highly significant positive slope. This line gives the slope *between* the cultures. However, the figures also show different slopes (to y) *within* each cultural area, when considered in isolation. These observations are confirmed by the statistical analysis later on. The difference of the between-slope and the within-slopes suggest that the economic and cultural factors interact.

Subsection II.1 considers two alternative interaction hypotheses. Subsection II.2 discusses the seesaw hypothesis implied by the data. Finally II.3 contains a few speculations on the dynamics.

II.1 Alternative interactions: The cultural versus the seesaw dynamics

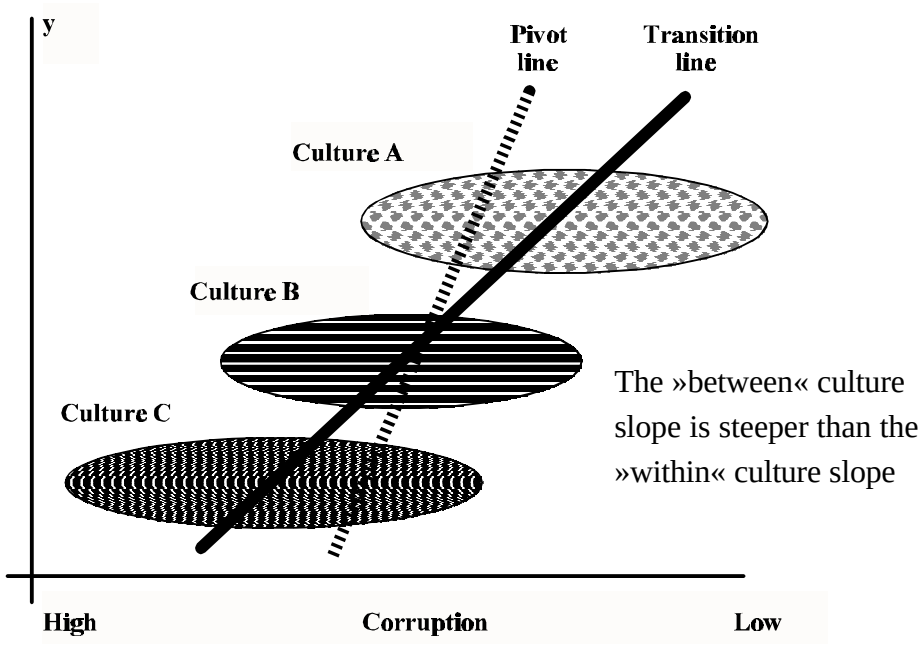
In principle, the economic transition and culture can interact in two ways: causing either the picture of Figure 1 or Figure 2. That is, the within-slope might be steeper than the between-slope as drawn on Figure 1, or the within-slope might be flatter than the between-slope as shown on Figure 2.

Figure 1. The interaction picture according to the cultural theory



The cultural theory suggests that culture has a strong influence on the level of corruption. Imagine that a country gets ahead or lag behind - in GDP-level - of other countries within its cultural area. The theory here predicts that it will still have much the same level of corruption as the other countries in the area. The cultural theory hence suggests a picture as Figure 1.

Figure 2. An alternative: the seesaw dynamics



Note: The pivot line is discussed in subsection II.3

However, a look at Figures A1a and b rather suggests that the picture looks as Figure 2. The tests done in Section III will confirm that impression. So an *anti-cultural* picture appears, much against the ideas commonly found in the literature. An explanation is surely needed.

The first simple deduction from Figure 2 is that it shows that culture influences the GDP-level *more* than it influences the level of corruption. However, since there is a strong underlying transition pattern, corruption must have *an inherent tendency to tip either way in a seesaw way*. In other words, countries tend to become either too corrupt or too clean for their GDP level and culture. The case of the two neighboring countries Argentina and Chile come to mind. They have almost the same GDP-level and similar cultures. It is surprising that their κ-scores are as different as 3.0 and 6.8 respectively.

A *seesaw model* hence needs to be constructed. Fortunately this is an easy job.[10)]

II.2 The seesaw model

The model builds upon four points (A) to (D) given in Table 4. Most of the mechanisms are self-explanatory, so only a few comments to each of the four points are needed to put the model together.

Table 4. Four mechanisms

	Mechanism	High corruption ⇦ ⇦ ⇦	⇨ ⇨ ⇨ Low corruption
A	Incidence	Wages down will chase out honest	Labor markets clears for honest
B	Punishment	Everybody cannot be punished	Some can be punished
C	Advertisement	Flaunting R advertizes »business«	Flaunting R alerts police
D	Welfare	R can be enjoyed without fear	R must be consumed in secret

Note: R is the proceeds from corruption.

(A) If everybody is honest, the labor market generates an »equilibrium« salary allowing people to »live« at some standard »norm« of the society. However, if some are corrupt, they will create an extra demand for the jobs with a high corruption potential, thereby competing down their salaries - and vice versa for the jobs with no such potential.[11)] The relatively low salaries for the high-potential jobs will then drive away the honest. So the corrupt will get the high-potential jobs, while the honest concentrate in jobs without such potentials. This will surely increase corruption.

(B) Everybody cannot be punished, so with high corruption it is a low-risk activity, and vice versa. (C) To run a corruption »business« it is important to advertize to the customers. This can be done more effectively the lower the risk of punishment. In very corrupt societies one sees civil servants, with a negligible salary, being men above town, driving fine new Mercedes. This is not only welfare enhancing

10. The name of the mechanism is new, but it is built from old, well known parts. The model was used already in various versions in Andvik & Moene (1990) and Paldam (1990), who both refer back to predecessors.

11. It is easy to formalize this into a simple sorting model with two types of job, where one has a corruption potential and the other has none. One equilibrium with the same wage occurs if all are honest. Given there are two types of workers - the corrupt and the uncorrupt - who are indistinguishable for the employer, a new equilibrium will emerge as discussed in the text.

in itself (D) for these civil servants. It also advertises their business.

Conversely, in a low-corruption environment, (D) consumption of the proceeds of corruption as well as the advertisement of the business must take place with great care, while fearing it might attract the attention (C) of others, and then eventually the police (B).

The relative income hypothesis adds a powerful mechanism. When the corrupt lives very well, it acts as a spur for the uncorrupt to join the club. And, in a low-corrupt society everybody develops a similar lifestyle, so it is not easy to use the proceeds of the corruption.

The arrows in the top boxes indicate that the pattern is dynamic. There must thus be *a pivot*. If corruption is above the pivot, the seesaw swings toward still more corruption. If it is below the pivot, the seesaw swings the other way. It is well known that countries - or individual sectors within a country - that has turned bad, have a hard time turning honest. Though, once a bad sector gets over the pivot, it will converge to honesty.

There is hence a whole set of mutually enforcing mechanisms driving countries away from the central path given by the transition model. The seesaw has an inherent tendency either to tip toward more corruption or less corruption.

II.3 Some speculation on the dynamics

The analysis till now is rather data-near; and it is backed up by the statistical analysis of Section III. The analysis has reached two mechanisms: An »underlying« transition path of corruption and the seesaw dynamics away from the line. These two mechanisms must interact. It is worth to move a little ahead of the testable and speculate about the interaction. Two main questions will be discussed:

(Q1) What is the location of the pivots on which the seesaws turn? It is not likely that the pivots are the same in the different sectors of the economy, and even the national average might vary across countries - perhaps as drawn on Figure 2. It appears likely that there is some dependency of the GDP-level,[12] but the pivot line is probably steeper than the transition line. Also evidence will be presented that the pivot line is not to the extreme right on the figure.

(Q2) How is the long-run dynamics of such a system? It is easy to see a mechanism working in both causal directions:

The dynamics *from transition to corruption*: When countries become richer, the underlying corruption level becomes lower. It therefore becomes increasingly likely that the pivot of the seesaw is passed in one and another sector of the society. On Figure 2 the oval culture-areas are drawn with most of the area to the left of the pivot-line for poor countries, and with most of the area to the right of the pivot line for the rich countries. The inherent dynamics therefore becomes more and more helpful for getting rid of corruption as countries grow richer. By this mechanism the transition causes a reduction in the corruption.

The dynamics *from corruption to transition*: As honesty is a factor of production, it is likely that the relatively honest countries grow faster, and hence make a faster transition.[13] By this mechanism a

12. Short-run risk reduction is at a greater premium in LDCs than DCs. The temptation of corruption is thus higher in LDCs.

13. The estimates of the effect of growth on corruption reported below are not robust.

reduction in corruption leads to a faster transition. If this mechanism stood alone, the absence of corruption in the DCs would be a result of a self-selection process.

There is no reason why both mechanisms cannot work at the same time. The transition of corruption is a small integral part of the complex simultaneous process of the grand economic transition. This should be kept in mind when the corruption fraction of the process is estimated.

III Testing the suggestions and ideas

Subsections III.1 and III.2 cover the pure economic model and the pure cultural model. The results are clear and easy to interpret. The mixed model is then analyzed in III.3. Here the results are a great deal more difficult to deal with thanks to the interaction discussed in the preceding section. Subsection III.4 discusses the interaction between inflation and culture, and finally III.5 sums up the (largely) negative findings as regards the culture model.

The explanatory data use a period of 15 years for the growth rate, the regulation index and the Gastil-index, but only 5 years for inflation. These choices are marginally better than other combinations of the time periods. But the basic pattern found is robust to all choices from 5 to 15 years.

III.1 The pure economic model: $\kappa_i = c + a_1 y_i + a_2 g_i + a_3 p_i + a_4 N_i$

Tables 5 & 6 show a set of regressions for the economic model. The regressions all generate significant coefficients, and when one variable is inserted at a time, everything goes as predicted in Table 3. The effects have the right signs and they are all significant.

Table 5. Estimates of economy model: $\kappa_i = c + a_1 y_i + a_2 g_i + a_3 p_i + a_4 \phi_i + u_i$

	Reg 1	Reg 2	Reg 3	Reg 4	Reg 5
	One variable at the time				Full model
	y, GDP	g, growth	p, inflation	ϕ, regulation	
Constant	-12.28 (8.7)	4.69 (17.3)	7.39 (17.6)	1.59 (1.8)	-7.53 (3.8)
GDP	1.97 (12.2)				1.76 (8.6)
Growth		0.26 (2.6)			-0.16 (2.3)
Inflation			-0.93 (6.7)		-0.58 (3.8)
Regulation				0.72 (3.8)	-0.26 (1.7)
N	83	83	82	79	77
R^2	0.65	0.08	0.36	0.16	0.70
Reset	22.4*	2.2	37.9*	0.0	17.5*

Note: The numbers in brackets are the t-ratios. A * at the reset test points to problems.

Note the individual R^2 of the four variables: The GDP-level obtains 0.65, inflation scores 0.36, the regulation index gets 0.16, and the growth rate only 0.08. Growth explains little of the variation in corruption. It can hence generate only a small counter-causality bias in the coefficient to the GDP-level.

Table 6. More estimates of economy model: $\kappa_i = c + a_1 y_i + a_2 g_i + a_3 p_i + a_4 \phi_i + u_i$

	Reg 6	Reg 7	Reg 8	Reg 9	Reg 10	Reg 11	Reg 12
	Estimates of various combinations of the economic variables						
Constant	-12.49 (8.3)	-8.79 (4.8)	-12.22 (8.1)	7.73 (14.1)	6.24 (5.3)	7.18 (5.2)	-8.58 (4.7)
GDP	2.00 (11.4)	1.67 (8.9)	1.97 (10.0)				1.70 (9.2)
Growth	-0.03 (0.4)			-0.09 (0.9)		-0.10 (1.0)	-0.14 (2.0)
Inflation		-0.33 (2.7)		-1.02 (6.0)	-0.89 (5.2)	-1.03 (5.1)	-0.46 (3.4)
Regulation			-0.01 (0.1)		0.21 (1.1)	0.11 (0.5)	
N	83	82	79	82	78	77	82
R^2	0.65	0.68	0.64	0.37	0.38	0.38	0.70
Reset	23.4*	20.3*	26.6*	38.6*	29.9*	33.4*	17.7*

Note: see Table 5.

When several right-hand variables, where each is significant, are included together, there is always a happy possibility. They may explain different parts of the left-hand variable, so that their explanatory power is cumulative. No such luck occurred in our case. Tables 5 and 6 show that the economic variables have strong collinearity. When all four are included in Reg 5, the R^2-score rises by 0.05 only compared to the Reg 1, where the y-variable is used alone.

The coefficient that stays most constant when the other variables are included is the coefficient to y, the GDP-level. It has the bulk of the explanatory power, and it »knocks out« both the growth rate and the regulation index, when they are included together. The coefficients to both of these variables turn signs and tend to become insignificant. Also, y cuts the effect of inflation to half, even when the coefficient is still significant. The dominating variable in the pattern is thus y.

Table 7. Comparing the linear and two non-linear estimations of the economic model

	Reg 5	Reg 13	Reg 14
	Linear	Log (κ)	Exp (κ)
Constant	-7.52 (3.8)	-6.11 (2.8)	-9.49 (1.9)
GDP	1.76 (8.6)	1.95 (8.5)	1.93 (3.8)
Growth	-0.16 (2.3)	-0.13 (1.6)	-0.37 (2.0)
Inflation	-0.58 (3.8)	-0.51 (3.0)	-1.14 (3.0)
Regulation	-0.26 (1.7)	-0.37 (2.1)	-0.47 (1.2)
N	77	77	77
R^2	0.70	0.66	0.37
Reset	17.5*	5.1(*)	20.7*

Note: Reg 5 is repeated from Table 5 for easy reference. The coefficients to Reg 13 and to Reg 14 are scaled by 5 and 0.001 respectively.

The main statistical problem with the models in Table 5 and 6 is that the reset tests indicate problems with the functional form.[14)] Especially when y is used as regressor, there appears to be some extra curvature in the data. This is also visible to the naked eye when Figures A1a & b are considered. It looks as if the non-linearity is due to the NW-group of countries clustering together at the upper right-hand *corner* of the two graphs. This »corner-observation« should be kept in mind. In the meantime Table 7 shows what happens when the κ-index is transformed - to change the curvature - before the regression is run (note that the coefficients are scaled to be easily comparable).

The pattern in the coefficients is exactly the same in the three models of Table 7. The reset test suggests that the logarithmic form is the best, but neither form is fully satisfactory. However, statistically satisfactory results are reached in the next section, where a dummy that takes care of the »corner-observations« is included.

The underlying transition from a high to a low level of corruption when y rises, is by far the strongest economic effect in our data. The only other variable that keeps its significance and its sign throughout the experiments is inflation.

III.2 The pure cultural model: $\theta_i = b_1 D^{WE}_i + b_2 D^{LA}_i + b_3 D^{OC}_i + b_4 D^{A}_i + b_5 D^{O}_i + b_6 \zeta_i$

Table 8 gives the estimates of the pure cultural model. There is no real difference between Reg 15 and Reg 16 in the table, but the reader may find one of the two easier to understand.

Table 8. Estimates of the cultural model:

$\kappa_i = c + b_0 D^R + b_1 D^{WE}_i + b_2 D^{LA}_i + b_3 D^{OC}_i + b_4 D^{A}_i + b_5 D^{O}_i + b_6 \gamma_i$

	Reg 15	Reg 16	Reg 17	Reg 18
Constant	5.87 (11.3)		4.52 (11.1)	7.44 (18.8)
Residual		5.86 (11.3)		
West Europe	2.9 (5.4)	8.77 (26.2)	3.79 (7.2)	
L America	-1.24 (2.4)	4.63 (9.8)	-1.14 (2.1)	
Old Comm	-0.58 (1.1)	5.29 (9.3)	-0.79 (1.3)	
Africa	-0.22 (0.4)	5.65 (8.3)	-1.06 (1.9)	
Orient	0.44 (0.7)	6.31 (9.6)	-0.12 (0.2)	
Democracy	-0.46 (3.8)	-0.46 (3.8)		-0.87 (7.6)
N	84	84	84	84
R^2	0.70	(0.94)	0.65	0.41
Reset	0.0	0.0	0.0	14.4*

Note: The dummies plus the residual culture add to 1. The residual culture or the constant must be deleted. The R^2-score is calculated differently in Reg 16, where the constant is »hidden« as a tie.

The pattern reported in the table is quite significant, though some of the cultural groups are »average«

14. The usual battery of additional tests pointed to no other problem.

ones, so that they produce coefficients which do not differ from the constant. Note also that the cultural dummies remove any signs of curvature from the data. The reset tests are almost zero, when these dummies are included.

The two most significant cultural areas are the West European area that has a positive coefficient and the Latin American area that has a negative coefficient. The pattern in the cultural area dummies will be further discussed in Subsection III.5 after the economic model has been included.

Note also the highly significantly negative coefficient to democracy. On the face of it, it appears that the more democracy, the less corruption. This is surely a happy result, so it is important to study if it goes away in estimates of the mixed model.

III.3 The mixed model: $\theta_i = c + []_e + []_c + y[]_c$

Tables 9 and 10 show estimates of the whole model. The interaction of the economic and cultural terms is studied in two ways giving much the same result:

(i) By adding the two models together and estimate $\kappa_i = c + []_e + []_c$. This is done in Table 9.

(ii) By further adding the multiplicative interaction between the coefficients and estimate $\kappa_i = c + []_e + []_c + y[]_c$. This is done in Table 10. Note that the $y[]_c$-term expands equation (1).

Table 9. Estimates of the mixed model:

$\kappa_i = c + a_1 y_i + a_2 g_i + a_3 p_i + a_4 \phi_i + b_1 D^{WE}{}_i + b_2 D^{LA}{}_i + b_3 D^{OC}{}_i + b_4 D^{A}{}_i + b_5 D^{O}{}_i + b_6 \gamma_i$

	Reg 5	Reg 15	Reg 19	Reg 20	Reg 21	Reg 22	Reg 23
	The full models			Some variants			
	Economic	Cultural	Mixed				
Constant	-7.53 (3.8)	5.86 (11.3)	-6.45 (2.0)	-7.69 (2.9)	5.70 (4.1)	-7.40 (2.6)	-10.55 (4.3)
GDP level	1.76 (8.6)		1.34 (4.1)	1.45 (5.1)		1.41 (4.7)	1.81 (7.3)
Growth	-0.16 (2.3)		-0.00 (0.0)	-0.01 (0.1)	0.09 (0.9)		
Inflation	-0.58 (3.8)		-0.14 (0.8)	-0.14 (0.8)	-0.21 (1.1)		
Regulation	-0.26 (1.7)		-0.01 (0.0)	0.00 (0.0)	0.09 (0.4)		
West Europe		2.90 (5.4)	1.70 (2.8)	1.75 (2.9)	2.62 (4.2)	1.80 (3.2)	
L America		-1.24 (2.4)	-0.64 (1.1)	-0.61 (1.1)	-0.87 (1.4)	-0.81 (1.7)	
Old Com		-0.58 (1.1)	0.03 (0.0)	0.04 (0.1)	0.29 (0.4)	-0.21 (0.4)	
Africa		-0.22 (0.4)	0.74 (1.2)	0.67 (1.1)	-0.08 (0.1)	0.75 (1.3)	
Orient		0.44 (0.7)	-0.35 (0.5)	-0.48 (0.7)	-0.16 (0.2)	-0.28 (0.5)	
Democracy		-0.46 (3.8)	-0.10 (0.7)		-0.39 (2.7)	-0.10 (0.7)	–0.12 (0.8)
N	77	84	77	77	77	77	82
R^2	0.70	0.70	0.77	0.76	0.71	0.76	0.64
Reset	17.2*	0.0	0.9	1.7	0.9	0.2	22.0*

Reg 25 estimate the 5 individual slopes within the cultures separately as -0.61 (WE), 1.20 (LA), 1.68 (OC), 1.45 (A) and 2.27 (O), with an average of 1.20. For the WE-group the estimate is based upon 18 observations, but for some of the other groups there is only 9-10 observations in the group. Furthermore the data have considerable measurement problems, so it is no wonder that the five slopes differ considerably.

Table 10. Controlling for multiplicative interaction

$$\kappa_i = c + (a_1 y_i \text{ or}) + b_1 D^{WE}{}_i + b_2 D^{LA}{}_i + b_3 D^{OC}{}_i + b_4 D^{A}{}_i + b_5 D^{O}{}_i + d_1 y_i D^{WE}{}_i + d_2 y_i D^{LA}{}_i + d_3 y_i D^{OC}{}_i + d_4 y_i D^{A}{}_i + d_5 y_i D^{O}{}_i$$

		Reg 1	Reg 24	Reg 25
		GDP alone	Additive	Within
	Constant	-12.28 (8.7)	-9.81 (4.4)	4.51 (12.5)
GDP-level	y	1.97 (12.2)	1.60 (6.7)	
Culture area	D^{WE}		1.72 (3.2)	9.87 (0.6)
dummies	D^{LA}		-0.74 (1.6)	-11.22 (2.0)
	D^{OC}		-0.33 (0.7)	-14.86 (1.5)
	D^{A}		0.82 (1.5)	-11.91 (2.9)
	D^{O}		-0.28 (0.5)	-20.18 (4.2)
Interaction:	yD^{WE}			-0.61 (0.4)
GDP-level	yD^{LA}			1.20 (1.8)
times culture	yD^{OC}			1.68 (1.5)
area	yD^{A}			1.45 (2.7)
	yD^{O}			2.27 (4.3)
	N	83	83	83
	R^2	0.65	0.77	0.74
	Reset	23.4	0.6	4.8

The pattern in the results is clearest in Table 10: The »between« slope to y is 2.0 in Reg 1, where no regard is taken of culture. When the culture-dummies are included in Reg 24, the slope falls to 1.6. The five individual »within« culture slopes in Reg 25 have an average of 1.2. It is still lower. When the best of the other variables (inflation and democracy) are added all three slopes fall a little, but keeps the same pattern. This confirms that the »anti-cultural« pattern (of Figure 2) is superior to the cultural pattern (of Figure 1). As discussed it suggests that corruption has the inherent dynamic property of a seesaw.

It is interesting that the relatively well determined »within« slope for the West European group even becomes zero (it is negative but far from significant). This would seem to suggest that most of the WE-culture group is to the left of the pivot, converging to high honesty. However, the other slopes give no indications as to the location of the pivot line. The pivot-line drawn on Figure 2 is therefore based on

precariously thin evidence only.

Note that the strong variables keep »knocking out« the weaker ones in the confluent data set. As the cultural dummies enter into the general collinearity, both inflation and democracy are reduced to insignificance. The following subsection looks at the interaction between culture and inflation. The nice coefficient to democracy (in Table 8) is another victim to the GDP-level. With the GDP in the model in (Regs 19, 22 and 23), democracy has no more a significant coefficient, even when the sign remains negative. It is therefore dubious if democracy *in itself* reduces corruption.

III.4 The culture-inflation interaction

It is interesting that the coefficient to inflation is »knocked out« by the culture dummies - even if it remains negative. The reduction of the coefficient is mainly an effect of the negative coefficient to the Latin American cultural dummy. In general, inflation is a variable that follows the »cultural pattern« more than it follows the pattern of corruption.

Casual observation and studies as Blomström & Meller (1991) and Lal & Myint (1996) show a considerable »cultural« element in the choice of economic system. A country is likely to have the same economic system as other countries within its cultural area.[15)] It is also known that some economic systems are more inflationary than others. Further, the more inflationary systems have relatively heavy regulatory policies. There is thus likely to be a complex interaction between the cultural area dummies on the one hand and the economic regulation index, ϕ, the inflation, p and the κ-index on the other hand.

Therefore it can be concluded that the countries of some cultures have chosen regulatory policy regimes making them more inflationary and more corrupt. They become more corrupt both as the regime has a greater rent-seeking potential and as the regime generates more inflation. The effect of inflation on corruption is thus *negative* (increasing corruption), but *not robust*.

III.5 The effect of culture?

The effect of the cultural areas once the transition is included is seen from the block of cultural dummies in Table 9 and 10. It is especially interesting to compare the cultural model (Reg 15) and the mixed model (Reg 19).

There is a considerable change in the size and significance of the culture-coefficients when the economic variables (notably y) is taken into consideration. The only significant variable left in the mixed model is the »Western Europe« dummy. Furthermore Reg 25 shows that the »within« slope in the WE-group is zero. This might be interpreted as the *corner outcome* in the seesaw-dynamics. Once a country gets above a certain level of development, the seesaw dynamics takes all sectors to low corruption.

Note that this *corner outcome* explains the *corner observation* above that in its turn was used to explain the non-linearity of the corruption function (1) that the reset test has kept pointing to.

In the mixed model (Reg 19) it still appears that Latin America is relatively corrupt, but here the

15. Two related Import Substitution Industrialization policy-regimes have dominated two of the cultural areas: »Cepalism« dominated Latin America from the 1930s to the 1980s, and »African Socialism« dominated in Africa from the late 1960s to the late 1980s. Furthermore, it is notable that nearly all members of the »Old Communist« group have been changing their economic system in the 1990s.

interaction between culture, inflation and regulation (just discussed) might work to produce precisely that result. In this connection it should be mentioned that Spain and Portugal (in the residual group), which have chosen the WE-economic system have both got almost WE-levels of corruption.

The »old communist« countries are also negative outliers corruption-wise. The deviation is probably caused by the (often) chaotic process of transition from socialism and the ensuing high inflation. However, the negative deviation becomes negligible when the low GDP-level of these countries is included in the explanation.

Finally, note that the remaining two groups even change signs from the purely cultural to the mixed model. This shows that Africa has high corruption *only* due to poverty - not for cultural reasons. The oriental countries are now rather a little more corrupt than they should be at their present level of development. However, one may argue that since they became rich quickly, they have not had the time to adjust the corruption level.[16)]

When these findings and arguments are contemplated, it appears that little of the »cultural explanation of corruption« is left. There are probably still cultural factors to be found when the more detailed pattern of corruption is analyzed, but the present article looks at the big pattern only.

IV Conclusions

This article has tried to explain the large pattern in the corruption index from Transparency International. It turned out to be amazingly simple to reach an $R^2 = 0.77$ using a simple one-equation (reduced form) corruption equation. The conclusion will first bring a small summary of the results and then look at a few policy implications.

IV.1 Summary of results

The above statistical tests have produced two strong and four tentative conclusions. It is well known from the literature that it is hard to find really robust coefficients in cross-country regressions, so also the tentative conclusions will be listed - in order of strength:

(1) By far the most important determinant of corruption turned out to be real GDP per capita. Into the complex transition from a poor traditional country to a wealthy liberal democracy also comes a dramatic reduction in the level of corruption. The corruption transition is not placed at a precise location along the transition path, but follows an *underlying transition-trend toward less corruption*.

(2) A strong cultural factor enters into the transition, making countries with the same »basic culture« cluster along the transition path. However, *countries are more similar in GDP-level than in the level of corruption within the same cultural area*. Culture is thus an inferior explanation of the level of corruption relative to the GDP-level. The main reason why the path from high to low corruption is complex is the *seesaw dynamics in corruption around the transition-trend*: countries tend to have either

16. From casual observation it appears that the process of adjustment is going on. The populations in countries as Japan and South Korea seem to react rather strongly to the »good old ways« of large-scale mutual gift giving that has characterized the relation between politics and business in these countries.

too much or too little corruption relative to the transition trend.

This brings us to the more tentative conclusions. Two are still reasonably strong and probably parts of the same interaction-pattern:

(3) Inflation has a large and negative effect on corruption. However, inflation is partly a consequence of the economic system of countries, and countries within the same cultural area tend to have similar economic systems. Inflation affects the level of corruption with a relative short time horizon - such as 5-10 years.

(4) Countries with many regulations - little »economic freedom« - have a large potential for rent seeking. They also tend to have high corruption. The effect is sometimes found to be quite high, but it proves rather fragile. This effect may interact with the inflation variable.

The last two conclusions are even more tentative:

(5) Democracy seems to have a positive effect on corruption, but there is strong interaction with the patterns of transition for both variables, so the independent effect of democracy is dubious.

(6) There is a tendency for low corruption to lead to higher growth, but the effect is small and not robust. Honesty is thus found to be a weak and dubious factor of production.

IV.2 Some policy implications

Three policy conclusions seem to spring from this analysis - the first two are »big« conclusions:

One is long-run conclusion that economic growth, by increasing the speed of transition, also cures the social ill of corruption. This is surely a very long run perspective, and not very useful to the reforming politician.

However, an additional »big« conclusion that is more helpful was also found. The »cultural determinism« view of corruption seems to be false.[17)] There is a large variance in corruption within the same cultural area. This variance has been ascribed to the inherent seesaw dynamics of corruption.

This brings us to the third conclusion: It is a »here and now« conclusion: The seesaw pattern found in the corruption suggests that corruption has pivots. A small push to reduce corruption (in a sector or a whole country) is unlikely to push corruption over the pivot. Such mediocre efforts are likely to have transitory effects only. However, by a sufficiently big push the level of corruption may cross the pivot, and then it will fall by itself.

17. This view is reflected in statements such as: In »Latin America« or »Africa« nothing can be done about corruption. Corruption is so deeply integrated into the culture as to be almost a »law of nature«.

Printed references:

Andvik, J.C., & Moene, K.O., 1990. *How Corruption may Corrupt. Journal of Economic Behavior and Organization* 13: 63-76.

Blomström, M., & Mellor, P., eds, 1991. *Diverging Paths. A Century of Scandinavian and Latin American Development*. John Hopkins University Press (for the Interamerican Development Bank.

Borner, S., & Paldam, eds., 1998. *The Political Dimension of Economic Growth*. Macmillan for the IEA: London.

Brunetti, A., 1998. Political Variables in Growth Regressions. Cpt 6 in Borner & Paldam (1998)

China Aktuell, Monatszeitschrift, Institut für Asienskunde, Hamburg. (Source for data for Taiwan)

de Haan, J., & Sturm, J.-E. 1999. *On the relationship between economic freedom and economic growth*. (Pt working paper) Department of Economics, University of Groningen. Paper for conference on Economic Performance, Economic Policy and Political Culture in Rotterdam

Freedom House (Annual). Freedom in the World (Yearbook). Freedom House: NY. Source of the Gastil-index. It is available from <http://www.freedomhouse.org>

Gwartney, J., Lawson, R., 1997, 1999. *Economic Freedom of the World (and update)*. The Fraser Institute: Vancouver: British Colombia. Data are available from <http://www.fraserinstitute.ca/econ.htm>

Hofstaedter, R., 1948. *The American Political Tradition & the Men Who Made It*. Knopf: NY (many reprints)

Hofstede, G., 1984. *Culture's Consequences - International Differences in Work–Related Values*. Saga: London

IBRD data, 1997, 1999. *World Bank Atlas* and *World Development Indicators* (CD-Rom)

Lal, D., & Myint, H., 1996. *The Political Economy of Poverty, Equity, and Growth. A Comparative Study*. Clarendon Press, Oxford UP: Oxford

Levin, M., & Satarov, G., 1999. Russia and Corruption. Paper for conference on Economic Performance, Economic Policy and Political Culture in Rotterdam

Levine, R., & Renelt, D.D., 1992. A Sensitivity Analysis of Cross-Country Growth Regressions. *American Economic Review* 73: 31-43

Mauro, P., 1995. Corruption and Growth. *Quarterly Journal of Economics* 106: 681-712

Mbaku, J.M., 1998. Corruption and Rent-Seeking. Cpt 10 in Borner & Paldam (1998)

OECD, Main Economic Indicators (CD-Rom)

Paldam, M., 1990. Korruption og økonomisk udvikling. *Økonomi & Politik*, 63 (3): 3-20

Rose-Ackerman, S., 1978. *Corruption: A Study in Political Economy*. Academic Press: NY

Rose-Ackerman, S., 1999. *Political Corruption and Democracy*. Invited lecture, 1999 Annual Meeting of the European Public Choice Society, Lisbon, Portugal. (Based on book manus: Corruption and Government: Causes, Consequences, and Reform. Forthcoming)

Wintrobe, R., The Political Economy of Dictatorship. Cambridge UP: Cambridge UK

Netsources: (see also Gwartney & Lawson and Freedom House)

IBRD Anti-corruption knowledge resource center. Much information available including *An Annotated Bibliography*. No date, but frequently updated. Address: <http://www.worldbank.org/html/extdr/anticorruption>

Internet Center for Corruption Research. A Joint Initiative of Göttingen University and Transparency International. Source for Corruption Index. Address: <http://www.gwdg.de/~uwvw/icr.htm> or <http:/www.transparency.de>

Appendix: A Look at the Data

The source to the Corruption Index is Transparency International (se netsources). On the 6 graphs it is always the horizontal axes. It goes from 0 »highly corrupt« to 10 »highly clean«.

Figure A1a & b compare corruption with 1995 GDP per capita by two definitions: The standard measure, using the official exchange rate (Atlas method) and the PPP-conversion rate (PPP-method). The sources are the IBRD Data (World Development Indicators CD-Room and The World Bank Atlas).

Figure A1a. Corruption and the level of GDP per capita (Atlas method)

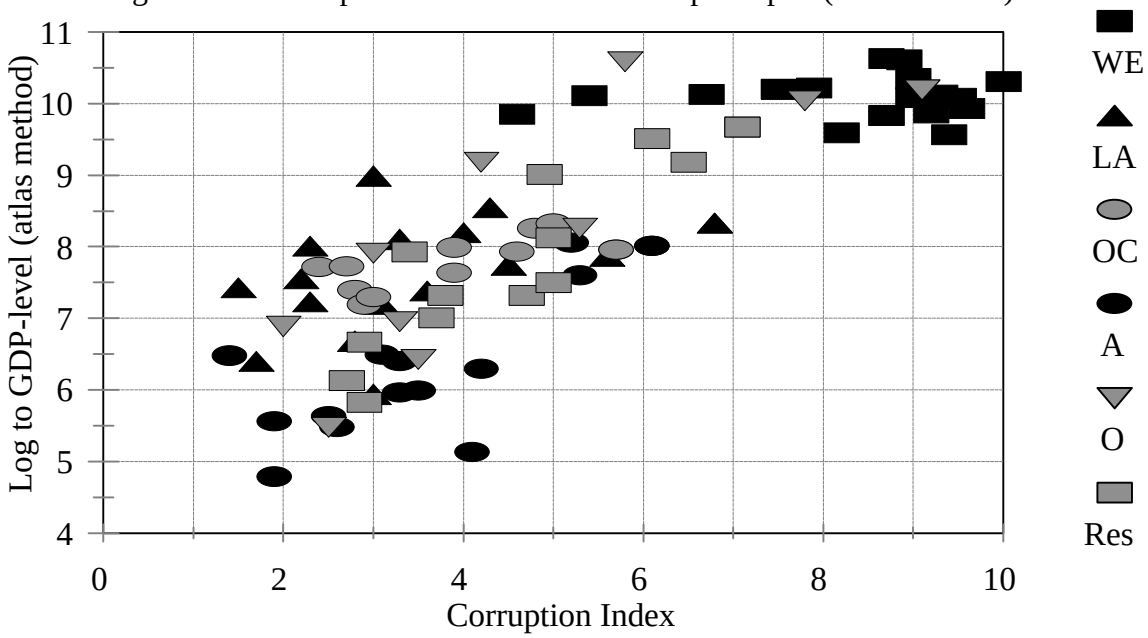
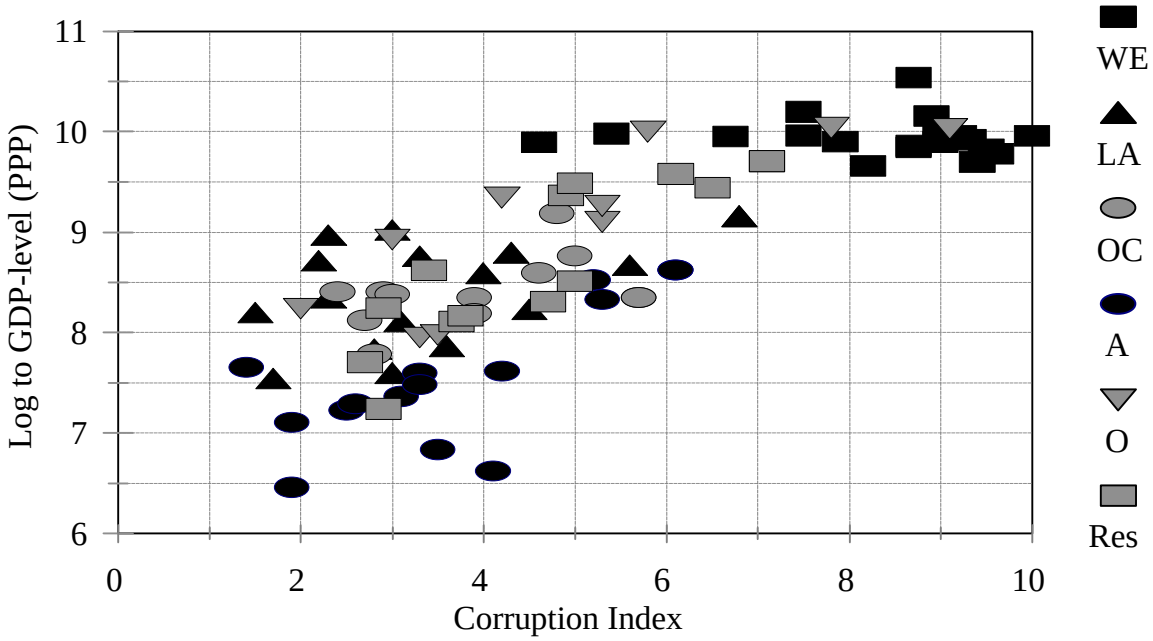


Figure A1b. Corruption and the level of GDP per capita (PPP method)



The two figures are very similar, but the scatter around the central (transition) line is clearer in the PPP-series, as expected. In the main text only the PPP-figures for the GDP-level are used.

Tables A2 and A3 compares the corruption index with the average real growth rate per capita for 1981-95 and the log to the average annual rise in consumer prices 1991-95. The latter rate is termed the inflation rate. Both economic series are from the IBRD World Development Indicators.

Figure A2. Corruption and the real growth rate

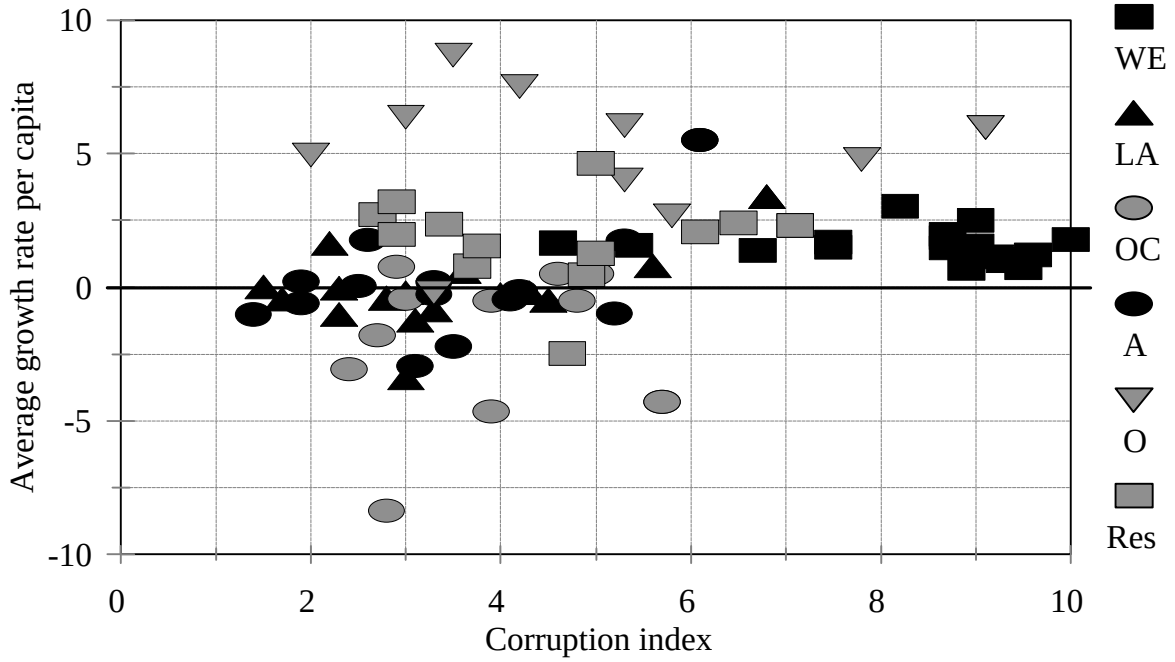
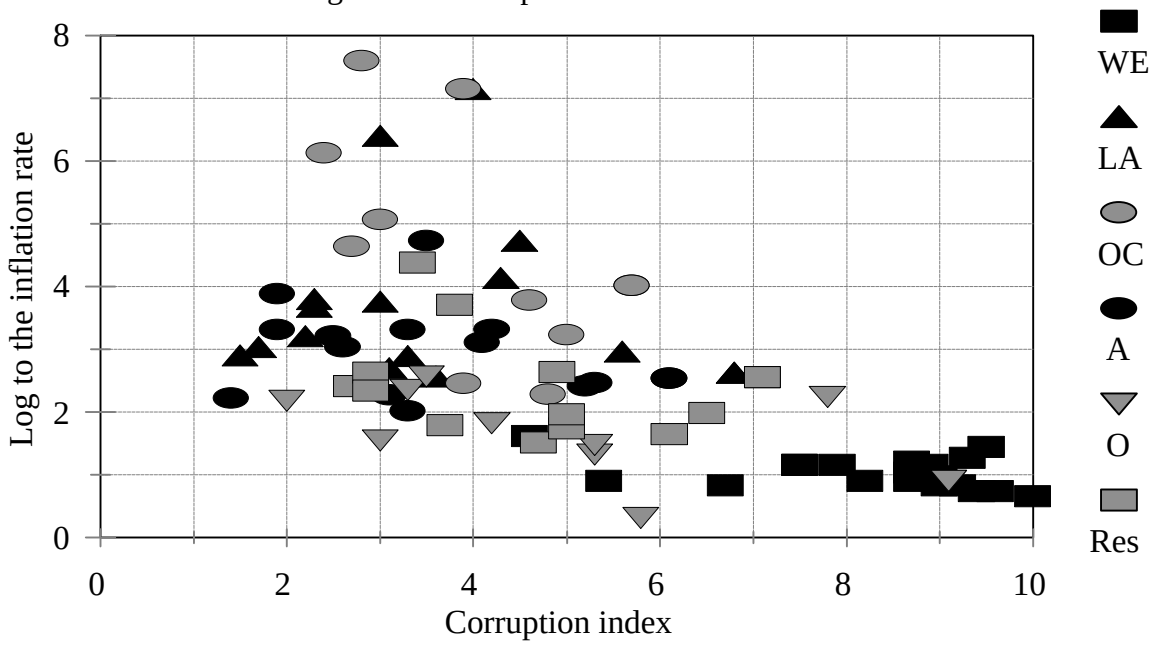


Figure A3. Corruption and the inflation rate



The next two figures compare the corruption index to two other indices:

(A4) The economic freedom index, from Gwartney & Lawson (1998). The index goes from 0 for »no economic freedom« and 10 for »full economic freedom under the law«. (A5) The Gastil Index from

Freedom House (see references). It measures civil liberties. It goes from 1 for »full democracy« to 7 for no civil liberties. For both indices the average 1981-95 is used.

Figure A4. Corruption and the economic freedom index

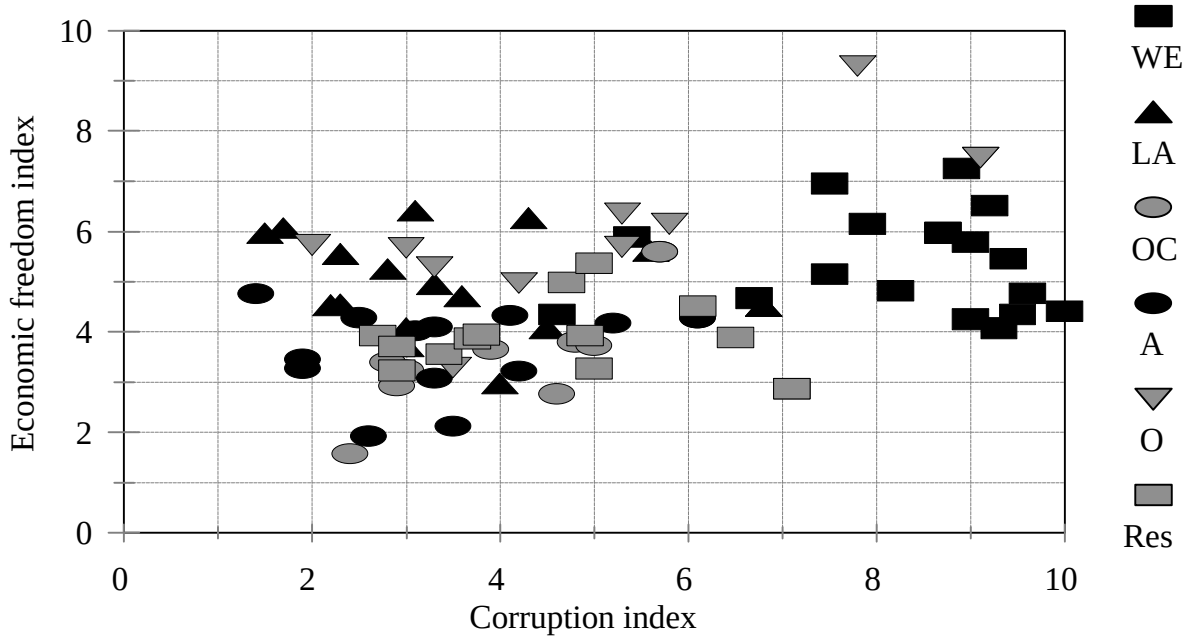
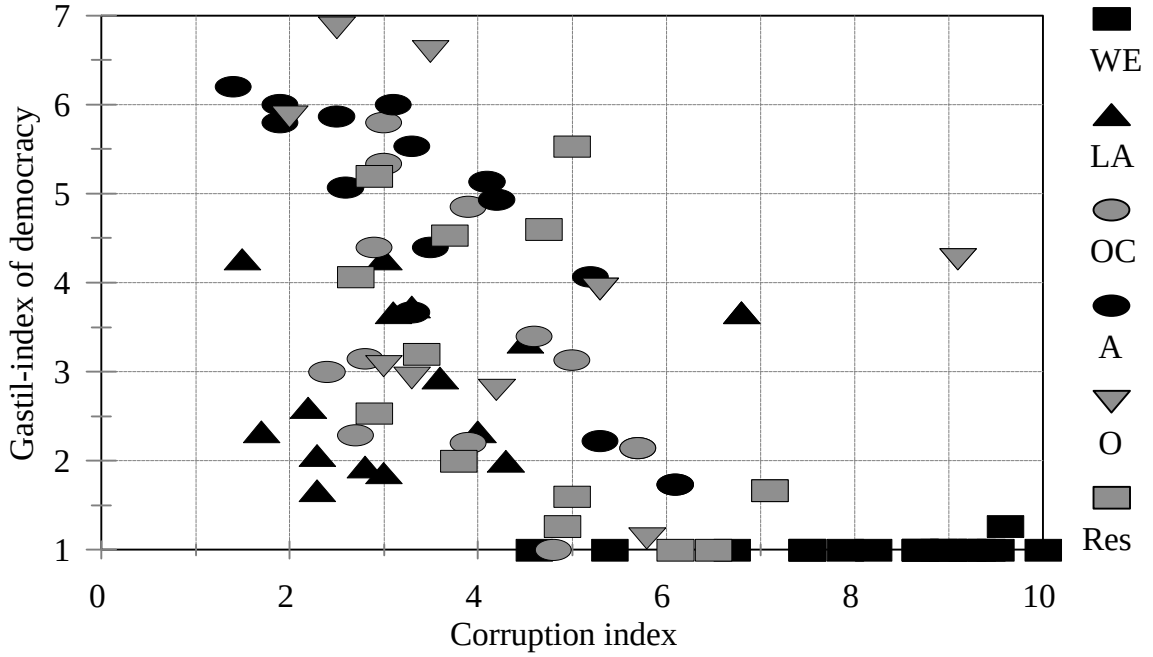


Figure A5. Corruption and the Gastil-index for Democracy



Finally the countries of the five culture groups and the residual groups are listed. A (*) indicates that data are missing for one or more of the variables used:

NW-Group: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Iceland, Ireland, Italy, Luxembourg (*), Netherlands, New Zealand, Norway, Sweden, Switzerland, United

Kingdom, United States.

LA-group: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Paraguay, Peru, Uruguay, Venezuela.

OC-group: Belarus (*), Bulgaria (*), Czech Republic, Estonia, Hungary, Latvia (*), Poland, Romania, Russia, Slovak Republic, Ukraine, Yugoslavia (*)

A-group: Botswana, Cameroon, Ghana, Ivory Coast, Kenya, Malawi, Namibia (*), Nigeria, Senegal, South Africa, Tanzania, Uganda, Zambia, Zimbabwe

O-group: China, Hong Kong (*), Indonesia, Japan, Malaysia, Philippines, Singapore, South Korea, Taiwan,[1)] Thailand, Vietnam (*)

Res-group: Jamaica, Mauritius, Egypt, Greece, India, Israel, Jordan, Morocco, Pakistan, Portugal, Spain, Tunisia, Turkey.

1. The data for Taiwan are from: China Aktuell, Monatszeitschhrift, Institut für Asien-kunde, Hamburg.

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