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Corruption and religion

Adding to the economic model

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Abstract: The cross-country pattern of corruption in the 100 countries covered by the index of corruption perceptions from Transparency International is explained by a mixed economic-cultural model:The economic model uses the level of real income per capita and the rate of inflation. The cultural model uses a set of 11 variables for the shares of religions in each country, and the Herfindahl index for religious diversity. The economic model accounts for the larger part of the variance, but religions prove to have some additional explanatory power. However, it is concentrated in the divide within Christianity. The least corrupt are Protestants and Anglicans, while Catholics, and other »Pre-Reform« Christians, deviate to the other side much like all other religions do.

Key words: Corruption, economic transition, religion Jel: K49, O11, P50

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I. INTRODUCTION

The key idea of this article is to analyze the impact of culture on corruption, by using religion as a proxy for culture. It is done by adding a total of 11 religion variables to a static cross-country economic corruption model discussed in Section II. It is shown that several of the religions have significant effects on the level of corruption. The effect of *religious diversity* is analyzed by a Herfindahl index calculated on the religion shares.

The literature (see Section III) suggests that corruption should be explained by economic and cultural factors. New data on corruption have recently started a literature using operational *corruption functions* to study the »grand« cross-country pattern of corruption. Most of the grand patterns can actually be explained by the economic model presented through sizable residuals remain to be explained by culture. Unfortunately culture is a nebulous concept defying quantification, but reasonably good statistics exist for the cross-country pattern of religion, which may be seen as (one of) the pillar(s) of culture.

The dependent variable is the 2000-posting (covering 1999) of the κ-index from *Transparency International* (see net-sources). It aggregates cross-country polls measuring *perception*s *of corruption* (mainly by business people) from a total of 17 sources. The latest posting has increased the coverage to 100 countries.[1)] The index takes values from 0 »very corrupt« to 10 »very clean«. It is thus scaled reversely of the way the index is used in casual discussion.[2)] When corruption increases, the κ-index decreases. The standard deviation of the polls for each country is also given. It is typically a little larger than 1. The large pattern is highly significant, but differences between countries have to be larger than 1 to be significant.[3)]

The κ-data started only five years ago with much fewer countries, so only bits and pieces of time- series are available. However, the available evidence shows that the levels of corruption change very slowly only. When connected with economic data they therefore have to be in levels or averaged over a decade or more (see *Table 1*). The fraction of people belonging to each religion changes very slowly too. We are thus forced to disregard the time dimension and stick to a pure cross-section (ie, cross- country) analysis at present.

I want to stress that the article is no treatise on the sociology of religion, neither does it deal with theology. The purpose is to find factors causing differences in the level of corruption. It is interesting to speculate on the reasons why the religions have the effects found, but religions differ in many and subtle ways, so it is hard to point to the relevant ones. Also, the reader should be warned that no policy conclusions will be made.

Section II gives the set-up of the study and surveys previous findings. Section III is a brief survey of the literature. The data for the cross-country distribution of religions are discussed in Section IV, and documented in an Appendix (see netsources). The statistical analysis follows in Sections V to VII, where V presents methods, while the univariate results are discussed in VI, and VII brings some multivariate results. The results are summarized in Section VIII.

II. FINDING AN ANALYZABLE PIECE OF A COMPLEX PICTURE

The relations between economic development, culture, religion and corruption are surely complex, involving »grand historical dynamics« far exceeding the possibilities of »normal« empirical research. It might be fool-hearted even to try such a pedestrian approach. The purpose of Subsection 1 is to argue that a piece of the grand pattern can be isolated and submitted to the standard »hard« tools of analysis. Subsection 2 presents the economic model used, while 3 briefly considers how religious diversity might matter.

1. Set-up of the analysis

Figure 1 is a picture of the likely relations between the concepts studied. The picture is drawn in two colors: Black is used for the operationalized and analyzed parts, while grey is used for the excluded parts. The boxes are connected by arrows indicating (possible) causal links:

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Figure 1
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(1a) The »simple« *direct* link from religion to corruption. It is the main link analyzed below.

(1b) Other aspects of culture might influence corruption as well. An attempt to analyze all of (1) - that is (1a) & (1b) jointly - is discussed in Subsection 2.

(2) The economic link is covered by the economic model discussed in Subsection 2.

(3) The *Weber-link* is discussed in III.4. It is a causal link where »grand dynamics« (see below) is heavily involved, and it generates an *indirect* link from religion to corruption via the economy. The indirect link is much harder to estimate than the direct one, even when the indirect link might be the strongest in the long run.

(4a) The counter causality link from corruption to the economy. It is assumed to work via the growth rate. As discussed in Subsections 2 and 3, it has proven weak and fragile. However, to the extent it exists, it gives a bias in our relations, causing the economic model to be too good.

(4b) The counter causality link from corruption to religion is assumed to be weak too, except perhaps as a part of the »grand dynamics«.

(5) In the longer run the economic transition from a poor stagnant LDC to a rich modern DC changes »everything« such as the levels of education and family patterns. This has deep impacts on religion as well.[4)] Once more, this is a field where »grand dynamics« are involved.

The list of links distinguishes between »simple« links that can be analyzed in a static cross-country analysis and »grand dynamics« links. They are parts of interrelated historical processes, where »everything« influences everything else over centuries. Such links have the following characteristics: (i) They

are important in the long run, but (ii) give small or unstable short-run coefficients. (iii) They are clouded in much simultaneity and confluence. The »grand dynamics« is covered by one »catchall« variable the GDP-level, y. It is a simple solution to a complex problem, and y proves to be by far the most powerful variable in the estimates.[5)]

2. An empirical corruption model (operationalized in V.1)

Table 1 shows a basic model explaining the corruption index κ_i. The model was developed in Paldam (2000). It consists of an economic and a cultural submodel.

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Table 1
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The *economic submodel*: $\kappa_i = []_e = \alpha_1 y_i + \alpha_2 p_i$. It uses two variables: Real GDP per capita, y_i, and the inflation rate, p_i. These variables proved strong and robust in the previous study, where a set of additional variables was also tried: The growth rate, the economic freedom index, the Gini coefficient and the Gastil index for democracy. Each of the additional variables has an interesting story to tell, but proves to give unstable coefficients and to add little explanatory power. The model chosen has remarkable explanatory power ($R^2 = 0.71$) in column (1) of *Table 6.* The diagnostic tests indicate only one problem: The residuals are nonlinear as discussed in Subsection V.3.

y_i, represents the *economic transition* from a poor stagnant LDC to a rich DC. In the big process, corruption falls dramatically, but as the transition normally takes several centuries, this is a slow process.

p_i, inflation is one of the best indicators of economic mismanagement and chaos. Such problems are rather demoralizing, causing corruption to rise. The effect is often quite strong, even in the medium term. However, the size of the effect is less robust than the one of y.

The *cultural submodel*: $\kappa_i = []_c = \beta_0 + \beta_1 r^j_i$, where r^j_i is the share of religion j in the population in each country i. The model is developed in Section V.

Paldam (2000) uses an alternative cultural submodel $\kappa_i = []_c = \beta_1 D^{WE}_i + \beta_2 D^{LA}_i + \beta_3 D^{OC}_i + \beta_4 D^{A}_i + \beta_5 D^{O}_i$. This model also has considerable explanatory power ($R^2 = 0.42$), but when included together with the economic model it does not add much ($\Delta R^2 = 0.07$). These cultural variables are rather basic, but they tell an interesting story. It appears that countries within the same cultural area have relatively less variation in their GDP-levels (as defined by the y-variable) than in their corruption levels.

The present study thus reduces the economic submodel to two variables (y_i and p_i) and the cultural submodel is replaced by a religion submodel.

3 Religious diversity: Competition or collusion?

The data are defined in Section IV. They give the share $0 < r_{ij} < 1$ of each religion (j) in the countries (i). The series $h_i = \sum_j (r_{ji}^2)$ is the *Herfindahl index* for religious diversity in the country. The index is a number $0 < h_i < 1$, where h_i is close to 1 if one religion dominates.

The h-variable permits an analysis of the following question: Are countries with much religious diversity (low h's) more corrupt (κ low) or less corrupt (κ high) than more homogenous ones? Ie, is the effect $\eta = \partial\kappa_i/\partial h_i$ positive or negative? On the face of it both signs appear possible as already discussed by David Hume and Adam Smith (see Griswold, 1999: 266-280), though on different terms:[6)]

Adam Smith's theory of good competition ($\eta < 0$): Competition makes the individual religions behave as well as possible. So there will be less corruption the more the diversity. The closer to monopoly, the more likely is collusion and corruption.

David Hume's theory of dynamic group collusion ($\eta > 0$): Groups (religions) collude and try to help insiders at the expense of outsiders, also by corrupt means. Corruption is contagious, and this leads to other types of corruption as well.

No study appears to have been made of this question. Section V.5 shows that the data speak in support of Adam Smith.

III. NOTES ON THE LITERATURE

During the last decade corruption data have become available, but the bulk of the literature is still theoretical. Subsection 1 introduces the theoretical literature, while 2 and 3 look at the new empirical research. Subsection 4 considers the Weber link.

The literature on corruption is large. New readers may start with the 1000 pages of readings put together by Heidenheimer, Johnson & LeVine (1989). Recent surveys are Bardham (1997), Mbaku (1998) and Jain (2001). Much material is also found in four new books: Heywood (1997), Elliot (1997), Jain (1998) and Rose-Ackerman (1999). The following concentrates on the empirically oriented literature.

1. From theory to the κ-index

At least a dozen definitions of corruptions have been used. Even when they differ the key feature seems always to be: *Corruption is illegal private gains made by an agent at the expense of the principal, when the agent deals with a third party.*[7)]

The bulk of the literature is anecdotal and theoretical. It uses three approaches: One starts from the Public Choice model of non-benevolent bureaucracy (see Shleifer & Vishny, 1993, 1999). The second uses the law-and-economics framework (see Rose-Ackerman, 1978, 1999). The third relates to the theory of organization (see Klitgaard, 1988).[8)] This literature builds on more or less explicit case studies. However, some research - as Alam (1998) - makes so systematic use of »anecdotes« as to illustrate the saying that »the plural of anecdote is data«.[9)]

During the last decade survey-data for many countries of the level of corruption have appeared.

These data have the country as the unit of registration. The κ-index is a compilation and calibration of the main surveys. Corruption levels change slowly, and it will take some time before systematic time-series evidence is available, so the dynamics of the pattern is still largely outside the realm of empirical analysis. The new data have already been used in two types of analyses - surveyed by Lambsdorff (1998) and Jain (2001) - covering the two causal directions:

2. The effects of corruption on other variables: Does corruption reduce growth?

This literature concentrates on the effect of corruption on the real growth rate. The pioneering study is Mauro (1995). He studies the effect of corruption on growth via the investment channel. The investment-growth-link is known to be strong and robust, but investments are notoriously hard to predict in a time-series framework.

However, Borner et al (1995), Mauro (1995), Keefer & Knack (1995, 1998) and IBRD (1997) have shown that socio-political variables constructed from polls predict the cross-country pattern of investment reasonably well. Key variables in these models are measures of: (1) the security of property rights, (2) the predictability and transparency of government regulation, (3) the level of corruption, and (4) the reliability of the legal system. Their power is approximately in the order given.

Corruption is probably not the strongest member of the group. Predictable corruption with moderate rates appears a fairly harmless phenomenon, as regards investment.[10)] However, large and arbitrary corruption is a serious problem. This tallies well with the finding, when the reduced form estimate of the effect of corruption on growth is analyzed, it is found to be small, but fragile.

3. The effect of other variables on corruption: the corruption function

This is the *corruption-function approach* used at present. Here the literature is meager. Most studies are partial only: Ades & di Tella (1995, 1996) and IBRD (1997), look at the effects on corruption of measures for the contestability of markets. These measures prove to be negatively correlated to the level of corruption. It reduces corruption if the market is open for foreign competition, and if contracts are made more transparent. These findings all suggest a positive connection between the rent-seeking potential in the economy and the level of corruption. Mauro (1997) looks at the effect of different types of public spending on corruption, and finds a number of minor effects.

Only a couple of studies try a more comprehensive approach: Apart from my own study, already discussed, I have found only two - both very new. Husted (1999) uses a mixture of economic and cultural variables. The cultural variables are taken from Hofstede's (1984) classification of cultures. He (also) finds a strong effect of the GDP-level. And, some of the cultural traits become significant: notably »power distance«, »masculinity« and »uncertainty avoidance«. These findings are both interesting and puzzling, as it is unclear how operational and exogenous the variables are. Clearly a major effort is needed before these matters are well understood.

Finally, the study by Treisman (2000) is doing some of the same as my two studies, but with another set of variables. However, two of the variables also included are the same: The GDP per capita and the share of the population with Protestant religion. For these two variables much the same results as mine are reached.[11)]

4. The Weber link from religion to the economy

The connection from religion to economic development has been discussed in a small literature started by Max Weber (1905-6). The ideas were further developed in Tawney (1926). Since then they have kept reappearing, and recently Deepak Lal (1998) has tried to develop a more general theory covering the growth potential of all big cultures and religions.

The main idea is that certain religions - notably the more puritan strands of Protestantism - place moral value in thrift, honesty and saving, condemning idleness and consumption. Such attitudes are obviously good for investment and growth. It has been demonstrated that groups with these attitudes have often been over-represented in regions where growth process starts, and in the first wave of entrepreneurs. Contrarily it is sometimes stated that to refrain from action is a virtue in Hinduism and Buddhism.

The causal link (3) on *Figure 1* is termed the Weber link. It is included in link (2). To fully untangle (3) from (2) demands very long data series, but clear signs that (3) are important are found. The empirical analysis concentrates on link (1a).

The Weber literature has remained unintegrated in mainstream growth theory, due to its inoperational character. The points are plausible, and illustrated by many stories and anecdotes, but little systematic evidence of the usual type is provided, and no obvious policy conclusions emerge. So a large gap remains between Weber's theory and standard growth theory. This article cannot bridge the gap, though perhaps it will be reduced a mite.

IV. THE DATA SET FOR RELIGION (r) AND RELIGIOUS DIVERSITY (h)

Much data exist on religion allowing the construction of religion variables, which are operational relative to the models analyzed. Subsections 1 and 2 show the construction of the **r**-matrix. The minimum information criteria necessary for a religion to be included is discussed in 1, while 2 looks at the resulting 11 J-religions. The **r**-matrix is given in an Appendix (see netsources). Finally, Subsection 3 takes a first look at the structure of the data found.

1. The religion variable and the demand for information

More than 1000 *religions, denominations and sects* probably exist in the world. Our main source is Barrett (1982). It has data for 16 main groups of religions, and many detailed notes. Some countries have broken up in the meantime. The data have therefore been supplemented with new, but less detailed, information from Encyclopedia Britannica and Hunter (1996). The first **r**-matrix had16

columns. Most columns covered groups of religions. However, to be useful in a statistical analysis the matrix has to be reduced to even fewer religions.

The resulting groups are termed J-religions after the index j = 1, ..., 11, used for religion. The J serves as a reminder that »something has been done« to the data. The **r**-matrix gives the shares of 11 J-religions, and the **h**-vector is the Herfindahl index for religious diversity.[12)] To tally with the κ-index the unit of registration is a country. China and Mauritius are thus equally important information-wise.

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Table 2
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To be *statistically useable* a religion (or group of religions) should contain so much information that the relations can be meaningfully tested. That is, the religion should be *large* in some countries, and it should be *broadly* distributed over more countries. These principles lead to three information criteria listed in *Table 2*: $(k_1, k_2, k_3) = (2, 5, 0.1)$.

Data series which do not fulfil the criteria will be termed »thin«. Even thin data can produce significant coefficients, but then one should be cautious with the interpretation. That is, the criteria are not taken as absolute, but rather as warning lights. Their values were chosen after some experiments. These criteria rule out the great majority of religions. They merge all »tribal« religions to one, and rule out sects that are widespread, but have remained relatively small in all countries.

2. A simple operational classification leading to 11 J-religions

The criteria reduce the number of religions to 11 in four groups:

A: Monotheistic religions originating in the Middle East. That is, Judaism (where all information criteria fail), Christianity and Islam. These religions have the great advantage (relative to this study) that they are exclusive. They demand that their members belong to no other religion.

B: Polytheistic religions originating on the Indian Subcontinent. That is Hinduism and (partly) Buddhism. These religions have a propensity to mix, but they are still reasonably exclusive.

C: Systems of belief originating in the Far East. That is Confucianism, Shintoism, etc. and (partly) Buddhism. These systems may be seen as a mixture of old folk religions and philosophy. So they are inclusive. It is common to belong to several at the same time, in a relaxed way.

D: In addition some belong to tribal religions, to the residual group or are atheists.[13)]

Thanks to their mixing and inclusive character groups B and C are difficult to handle statistically. Note that Buddhism exists in several forms - some belonging to group B and some to group C. However, Buddhism is treated as one religion.

Christianity is the largest and most widespread religion in the data. However, Christians are divided in many denominations and sects. Our solution is to treat Christianity as one »meta-religion«, divided into two large groups, which are further subdivided in four J-religions as listed in *Table 3*.

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Table 3
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Islam is less divided, even when the Sunni and Shia denominations are different, and a number of small new sects exist. However, the data fail to permit a full separation of Sunni and Shia Muslims, and most of the new sects of Islam are treated as »new syncretist« religions. They have been placed in the residual group. So Islam is one religion only.

Hinduism (including Shiks and Jains) provided a statistical problem, as the data contained only two countries (India and Mauritius) with a large r^j_i-value and a couple with 2-10%. Other countries with large shares of Hindus (as Nepal and Guyana) are not covered by the κ-index. So, in spite of the fact that about 800 mill people belong to the Hindu religion, it did not pass the information criteria. It was analyzed anyhow, but the coefficient proved highly variable.

Data are more adequate for Buddhism. Also, there are enough data for tribal religions - mainly in Africa - to produce a data series. Finally, the indigenous religions of China, Japan and Korea have been merged into one (inclusive) Oriental religion. That leaves a column of Atheists and a residual column, making all rows sum to 1.

3. A first look at the data for the 11 J-religions

This gives a total of 11 columns in the **r**-matrix: 1 Old Christian, 2 Catholic, 3 Anglican (thin), 4 Protestant, 5 Muslim, 6 Hindu (thin), 7 Buddhism (agg), 8 Oriental (agg), 9 Tribal (agg, thin), 10 Atheists and 11 Residual (agg). The remarks (thin, agg) in the brackets indicate that the series are thin as defined in *Table 4*, or suffers from serious aggregation problems, as mentioned. The 11 r's add to 1, in every row. The 11 groups are thus the *J-religions* - most are, in fact, groups of religions. The **r**-matrix and the **h**-vector reached is given in the Appendix (see netsources). *Table 4* gives a few statistics summarizing the religion data.

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Table 4
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The Weber link is illustrated by row (5) of the table. It gives the *relative income* of the group members (under the assumption of the note to the table). The differences are large, ie, while Protestants have 4.1 times the average income, Hindus have 0.3 times the average, etc. The main problem for the Weber interpretation is that the relations must have looked rather differently only a few centuries ago. Note that even when the r's change very slowly, the data contain changes that may be caused by the reverse causality. It is well known that tribal religions disappear, when countries grow richer.

Table 4 shows that 74 of the 100 countries have a majority J-religion, so religious concentration is high. This causes the average value of the Herfindahl index to be as high as 0.60.

V. MODELS, TECHNIQUES AND MAIN REGRESSIONS

The present section presents the main model estimated and documents the compressed results of 55 regressions. Further, it presents a simple graphical technique - termed the SR-graph - that is used for presenting the main results in Section VI.

1. The three operational models

Table 5 gives three closely related models. To understand their logic the reader should consult *Figure 1* above. It is important to repeat the warning from Section II.1. Some of the arrows included - notably (3) - represent grand dynamics. The static data available are hopelessly inadequate to allow an estimate of such arrows. So, I will concentrate on two of the arrows only: (1a) and (2).

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Table 5
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The estimate of M1 is made to allow us an indication of the importance of the omitted arrows. This estimate thus gives the maximum impact of religion possible. It »summarizes« all links from religion to corruption, both the direct one (1a) and the indirect *grand dynamics* arrow from religion to the economy (3) and onto corruption (2). It even catches some of the reverse causality in (4) and (5). It is thus difficult to interpret.

By including an explicit economic submodel for arrow (2), the indirect effect of religion (3) is excluded, and hereby the principal grand dynamics relation. The two estimates concentrating on (1a) and (2) are M2 and M3 - they both exclude (3) and (5) and (4b) as well. Arrow (4a) might give a bias in the estimate of (2), but for reasons discussed at length in Paldam (2000) it is assumed that this bias is negligible. The reader will see that the estimates of M2 and M3 give results that are rather similar, while the estimates of M2 give rather different coefficients to religion in many cases. This is taken to indicate that arrow (3) is, in fact, important, but it is no more than an indication.

The long run consists of aggregated short runs. Therefore, the signs of δ_1 and γ_4 on the one hand and β_1 on the other hand should be the same. And as β_1 gives an indication of the long run it should be larger (numerically) than the short-run effects.

M2 and M3 are two estimates of the same model. It is estimated in one stage in M2 and in two stages in M3, which estimate the minimum religious/cultural effects, after the economic model has explained all it can. The hardheaded economist can here see what he cannot disregard. In the mixed model the two explanations are competing. A comparison of the two estimates gives an indication of the collinearity of the economic and religion variables.

2. Fifty-five regressions

Tables 6 to *8* list the main results of a total of 55 regressions. It should be mentioned that everything

was also run on the 85 observations of the κ-index for 1998. All results stressed were the same, but for reasons of space the 1998 results are not presented. The tables have 5 rows and 19 columns. The top row contains numbers and headlines. The next three rows give estimates of three models - M1 to M3. The three R^2-scores given are for models M1 and for models M2 & M3, which contain exactly the same explanatory variables. Finally, »ΔR^2 (rel M2)« shows the marginal effect of the religious variables - that is the R^2 of regression M2 of the said column minus the R^2 score of the economic terms of the model, ie, the model given as column (1) in *Table 6.*

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Table 6
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The next two sections discuss the results. Before we proceed, it is reassuring to note that the two economic variables are significant and stable throughout. They provide the bulk of the explanation while most of the religions seem to have no effect on corruption. However, Protestantism and Anglicanism generate significant coefficients.

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Table 7
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Most diagnostic tests point to no problems, and they have thus been omitted. But one test is consistently problematic: the Reset-test for functional form. The next section deals with this problem.

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Table 8
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3. The curvature problem

Tables 6 to *10* and Paldam (2000) show that the strongest and most robust explanatory variable in all variants of our models is y (log GDP per capita). *Figure 2* shows the scatter-plot for the y-variable at the horizontal axis, and the κ-index at the vertical axis. A strong connection appears.

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Figure 2
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It is also clear why the Reset-test detects a non-linearity. The average curve through the points bends upward due to the *block* of observations lying closely together (in the grey box) at the extreme top-right end of the figure. This block is formed by North-West European countries, which are all rich

and honest. It will be termed the »NW-block«.

If a NW-European dummy is included, the slope to y falls from about 1.5 to 1.2. All other coefficients stay much the same, and the Reset-test shows that the problem has disappeared. Most countries in the NW-block are Protestant, so the NW-dummy is correlated with the $r^{Protestant}$-series. However, there are also Protestants outside the NW-block. Consequently, the inclusion of the $r^{Protestant}$-series reduces the problem, but it does not make it disappear fully. Two of the three poorest countries may also deviate on *Figure 2* as discussed in Section VI.3.

4. Generating the SR-graphs - ie, the shaded residual graph

The residuals from the economic model (column (1) in *Table 6*) are shown on *Figure 3.* The points above the model line (representing the model prediction at each y) show countries with below average corruption (the κ-index is »too big«), and vice versa. The NW-block is in a grey box - once more it is a distinct group.

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Figure 3
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Figure 3 is used for calculating the *SR-graph* for each J-religion. It is made by shading the residuals in different intensity from white to black. The color indicates the density of the J-religion in the country. The SR-graphs are drawn to allow the reader to see - with the naked eye - both the Weber effect and the corruption effect of the J-religion. The effects appear as a skewness in the shading:

A **Weber effect** appears in the left-to-right (horizontal) dimension. If most of the shading is to the right, it indicates that the adherents of the J-religion are relatively wealthy, and vice versa.

A **corruption effect** appears in the upward-downward (vertical) dimension. If most of the shading is above the model line, the adherents of the J-religion are relatively honest, and vice versa.

A dozen SR-graphs have been calculated. *Figures 4* to *7* are specimens used to illustrate the most interesting results reached in the statistical analysis.

VI. UNIVARIATE RESULTS FOR THE RELIGIONS

After these preliminaries it is time to look at the results. Subsection 1 considers the effects of Christianity, while 2 turns to Islam. The case of Tribal religion is discussed in 3, and the Asian J-religions are considered in 4. The effect of religious diversity is analyzed in Subsection 5.

1. Christianity: the big divide

Column (2) in *Table 6* analyzes the effect of Christianity. All three coefficients to religion in the table

show a positive effect of Christianity on corruption. M1 indicates that it might matter in the long run, but (M2) and (M3) show that it is modest and insignificant. Christians are thus less corrupt than non-Christians, but not significantly so. This is a dull result.

However, when the Christians are divided into 4 groups in *Table 7*, the result is dramatic. The table shows that »Reform-Christians« (Protestants and Anglicans) are about 3 points less corrupt than Pre-Reform Christians (Catholics and »Old« Christians) at the same level of economic development. The data for two of the groups are thin: »Old« fails to obtain significance, while Anglican produces unreasonably large coefficients (see below). However, when added to the other denomination with the same sign - as done in columns (10) and (13) - the significance of the coefficient increases.

Both the estimate of about -0.6 to Pre-Reform Christianity and (especially) the estimate of +2½ to Reform Christianity are significant. As they have different signs the gap between the two is even more significant. In other experiments reported below the gap decreases a little, but it is always highly significant. The corruption gap between the two groups can thus be assessed to be around 3 points on the κ-scale. As the κ-index has a range from 1 to 10 for the 100 countries such a difference is so large as to be barely believable.

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Figure 4
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Notice that while it is dubious if there are long-run effects of Pre-Reform Christianity, the effects of Reform Christianity may be much larger in the long than in the short, as should be the case.

Figures 4 and *5* show the SR-graphs for the two groups. Part of the reason why *Figure 4* shows such a significant picture is the NW-block in the upper right side of the graph. But, even without that block nearly all points are above the line. This graph should be confronted with *Figure 5* showing the Pre-Reform Christians, ie, the Catholics and Old Christians. The difference between the two types of Christians is clearly visible on the graphs. It should also be added that the Protestantism in columns (11) and (13) shows some collinearity with the y-variable, indicating that the indirect link is of some importance here.

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Figure 5
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The results thus confirm that Max Weber was right in pointing to the importance of Protestant »ethics«. One of the key purposes of the Reformation (almost 500 years ago) was precisely to fight the corruption (broadly defined) of the Catholic Church. Historians have pointed to other - more complex - reasons as well, but the moral stand against corruption was surely important.

It is thus arguable that reverse causality entered into the Reformation process. It was the more »moralist« countries, who chose the various »Reformist« denominations, while those more »tolerant« remained with their old denominations. However, this happened long ago. In the meantime there have

been many changes within all denominations - including »moral reforms« also within the Catholic Church. So it is amazing that such a large gap in »ethics« still remains.

2. Islam

Column 3 in *Table 6* and *Figure 6* look at the results for Islam. Both skewnesses are present. Muslims are poorer and more corrupt than non-Muslims in our data, but the second effect is insignificant. Columns (2) and (3) of *Table 6* compare Christians and Muslims. For model M1 the difference is highly significant indicating the well-known relative economic success of the Christians during the last 400 years. But even in the short-run estimates of (M2) and (M3) the difference becomes just significant.

However, note that the coefficients to Islam in models (M2) and (M3) are much like the ones of the Pre-Reform Christians. We thus find that Muslims and, eg, Catholics are equally corrupt given the same economic situation.

- - - - - -
Figure 6
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The country sample does not include any of the rich Muslim oil countries from around the »Gulf«. It is easy to guess how they would have affected the results, if data had been available. They got rich from »windfall« gains not from going through the big process of the economic transition. It is consequently a reasonable hypothesis that they have kept the level of corruption of much poorer countries. Casual observation appears to confirm this hypothesis. As a result they would probably have negative residuals - maybe below the bottom line of the SR-graph. The non-inclusion of these countries must therefore give an upward bias in the coefficients to Islam.[14)]

3. Tribal religion: virtue in the »original state«?

It is interesting to consider the group of Tribal religions. Here the negative coefficient in model M1 points to the well-known fact that people leave the tribal religions when they become richer - it is hence likely to be a reverse causality effect. However, the coefficients to tribal religion in the models (M2) and (M3) are positive. If we recognize that the most frequent alternatives to tribal religion are Islam and Catholicism the coefficient to tribal religion is even significantly different to the positive side. Both points are easy to see on *Figure 7.* The tribal religions are numerous and different, so the coefficient says little about any one of those.

- - - - - -
Figure 7
- - - - - -

However, the significant effect of the rise of corruption as people change out of tribal religion

gives an interesting comment to an old discussion illustrated on *Figure 8.* It has been suggested in the tradition going back to J.-J. Rousseau that people were nice and honest in the »good old days« before the start of the transition process. Economists have a tradition for rather believing in the »Hobbes view« that the original state was one of anarchy, as is also sketched on the figure. The Rousseau view sees development as a process destroying stable poor *traditional society* (and tribal religion) turning it into something of a »mess«, before it creates a new stable (rich and growing) *modern society*. Thus corruption may increase in the beginning of the process, so that the corruption transition has an ∪-shaped form. Corruption first rises, as per the top dotted line starting from the Rousseau view on the figure. Then it falls as per the full grey »transition path« estimated by the economic model.

- - - - - -
Figure 8
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One may further argue that the κ-index available for the nations of today lack observations allowing an estimate of the first part of the ∪-shaped transition curve, where κ falls (corruption rises). The large and stable positive coefficient to y (GDP per capita) indicates that κ raises (corruption falls) when countries go from the »mess« to become rich.[15)] In this perspective one may see the positive coefficient to Tribal religion as an indication that the first part of the transition is negative. The loss of the original tribal religions is indeed associated with a rise in corruption.

4. The remaining groups: Hinduism, Buddhism, Oriental, Atheists and the Residual

The coefficients for the three South and East Asian religions are negative, but nearly all coefficients are far from significance. The lonely significant coefficient occurs for Hinduism, where data are thin.

Some experiments were made with a further grouping of the three Asiatic religions. This is done in columns (14), (15) & (16) of *Table 8.* The results are similar.

The last J-religions are the Atheists and the Residual group. They are relatively uncorrupt, but the positive coefficients are insignificant. However, the members of each of these groups are very different, so it would have been puzzling if the data for these J-religions had produced significant coefficients.

5. The effect of religious concentration/diversity: the Herfindahl index

The Herfindahl index (h) for religious diversity has much the same range as the r^j-series, so it has been treated in the same way, even when it is a different variable conceptually.

Column (19) in *Table 8* shows what happens. The coefficient (to h) is negative, but remains insignificant. Later in *Tables 9* and *10* significant coefficients (to h) appear - and the size of the coefficient remains stable throughout. The coefficient to the h-index was consistently significant when

the same regressions were run for the 1998 posting of the κ-index, and the size of the coefficients were the same. So in my judgement one should take the coefficient of religious diversity to be negative. In assessing the size of the effect it should be noted that the h-index calculated depends upon the grouping of the religions chosen.

This is in accordance with the insight of Adam Smith: $\eta = \partial\kappa_i/\partial h_i < 0$, so a country with great religious diversity (low h) has less corruption (high κ) than a country with a monopoly religion. It is often argued that religious homogeneity is a great advantage for a country, as religious diversity may lead to political and social instability and even civil war, but as regards corruption diversity is probably an advantage.

VII. MULTIVARIATE RESULTS

Three groups of variables have been analyzed: (i) economic variables, (ii) religion variables, and (iii) the Herfindahl index for religious diversity. Four large groups of religions are significantly different: (1) Reform Christians), (2) Pre-Reform Christians (and Islam, (3) the three Asian religions combined, and (4) Tribal religion. These groups will be used in this Section. All religions sum to 1 per definition, so they cannot all be included together with a constant, as has been done for each of them. The least significant religions are the ones with corruption closest to the average, such as (2) and (3) - in this section an attempt is made to see if they become significant in multiple regressions. The two subsections report on two sets of experiments: Subsection1 deals with experiments with combinations of the three groups of variables, while 2 covers experiments with different combinations of the individual variables, notably the religion variables.

1. Experiments with the three groups of variables

Table 9 reports estimates of all combinations of the three groups of variables. The first two columns repeat regressions already given. The third column - termed Variant 1 - shows the full model, and then follows other combinations of the groups.

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Table 9
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The economic variables - especially y - give the bulk of the explanatory power. The Reform Christians are significant as well, but the other groups remain insignificant both in *Table 9* and *10*.

The Weber link predicts that the religion variables and economic variables should have some collinearity. Some examples showing that this is the case have already appeared in Section VI - notably with the Reform Christians. When the economic variables are deleted and the Weber link has to work alone in Variants 3 and 4 the explanatory power of the model drops dramatically. In addition, it should be noted that all coefficients to the religion variables change significantly when the corresponding

models with and without the economic variables are included. The only variable keeping its sign is the one to Reform Christians as per Weber's theory.

2. Experiments with individual variables

Table 10 starts out from Variant 1 in *Table 9*, by deleting the least significant variables, then Islam is added to the Pre-Reform Christians - as previously suggested.

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Table 10
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The difference between the Pre-Reformed Christians (and Muslims) and the Reform Christians stays remarkably constant around 2¾ in Variants 1, 2, 4, 6 & 7, and the difference is significant at a high level, even when the coefficient to the largest group is often insignificant. The results confirm that the Pre-Reform Christians, the Muslims and the Asian Religions are similar as regards the impact on corruption, while Reform Christianity has a significant and stable effect.

Note finally that the Herfindahl index has a stable coefficient in *Tables 9* and *10*, and most of the estimates obtain significance around the 5% level.

VIII. CONCLUSION

The analysis started from an economic model of corruption. It says that poor countries have a high level of corruption. As they pass through the economic transition to become rich, corruption drops dramatically. Also, the model shows that high inflation increases corruption. Thus modeled, the »economy« explains most of the variation ($R^2 = 0.71$) in the corruption index.

The purpose of the analysis was to show if cultural factors as formed by religious differences can explain the corruption index. The explanation can be either *direct* in addition to the economy or *indirect* through the economy.

The direct effect is the additional effect of religion once the economy is accounted for. It was found to add about 0.09 points (ie, R^2 increased from 0.71 to 0.80). Two groups of religions decrease corruption - Reform Christianity and Tribal religion - while the other religions increase corruption in a similar way. The big divide in the data was thus within Christianity, where a large and highly significant gap appeared between Reform and Pre-Reform denominations. The Reform Christians are Protestants and Anglicans, while the Pre-Reform Christians are Catholics, Orthodox and other »Old« churches. Islam can be added to the Pre-Reform group with no change in the coefficient.

The indirect effect is also termed the Weber link. It is the effect of the religions on economic development. It is already included in the economic model. Clear signs of this mechanism was found, but it is difficult to estimate from static cross-section data, as it has developed via historical processes. If corruption was an important factor explaining growth, the indirect effect would be a long-run conse-

quence of the direct effect. Some evidence suggests a growth link, but it is weak. However, the clearest positive indirect effects were found precisely for the Reform Christians, so perhaps low corruption does contribute to growth in the long run.

The most problematic aspect of the importance of the big Christian divide for corruption is that a historical perspective suggests a strange type of reverse causality. The Reformation almost half a millennium ago was a reaction of the North-west Europeans to the moral decay of the Catholic Church at that time. In such a perspective the very existence of the Reform Christians becomes an effect of the different tolerance to corruption of North-west Europeans and other Europeans. However, these attitudes have also spread to African countries that have been christened by missionaries from the two sides of the divide.

Another result was that religious diversity reduces corruption, as predicted by Adam Smith (1776). This was interpreted as an example of the virtue of competition.

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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>

Transparency International Internet Center for Corruption Research. Source for Corruption Index. Addresses: <http://www.gwdg.de/~uwvw/icr.htm> or <http:/www.transparency.de>

Martin Paldam homepage <http://www.martin.paldam.dk>. Links to Paldam (2000) and the data Appendix.

Notes:

1. For 99 countries the 1999 value is used, but for Bangladesh only the observation for 1996 is available. It should also be mentioned that everything was run also for the 85 countries of the 1998 index with similar results.
2. The reversity of the scaling is confusing, but I would have added confusion by redefining the index. The data used are as published by Transparency International.
3. The average is normally calculated from 5 observations giving a standard error of $5^{-½} = 0.44$.
4. Theocratic political systems disappear, »pagan superstition« vanishes, while agnosticism and atheism become more widespread. Part of the change is hidden in the statistics. Compare the groups of Parisians and »indigenous« farmers in Guatemala. Most members of both groups are classified as Catholics. If asked, they will agree, so in an important sense it is true; but the »religions« of the two groups are surely rather different.
5. Also, it is a cautious approach: It rather over than underestimates the influence of the grand dynamics, and it rather under than overestimates the effects of religion.
6. See Book V Article III in Smith (1776). I have found no later discussions though relevant arguments have been made (see Klitgaard (1988, 62-74) and Rose-Ackerman (1999, 130-137)) supporting both sides.
7. Often corruption is seen as a phenomenon of the public sector only. Our definition shows why this is so. The public sector is the one where the principal is most distant - even vague.
8. Klitgaard (1990) also describes kleptocracy, see also the essays on Zaïre by Naipaul (1980) and Harden (1992).
9. The idea of Alam (working with Pakistan) is to collect stories on corruption systematically from newspapers. It is a much underrated source by social scientists - especially economists.
10. Here the reference is often to the Oriental high-growth countries, which are also moderately corrupt. It is sometimes claimed that they have an especially »benign« form of corruption, but is seems not to be the case.
11. Treisman's long and interesting study concentrates on institutional variables, and builds upon several studies of la Porta, Lopez-de-Silana, Shleifer and Vishny, see, eg, theirs (1997).
12. Note that the **h**-vector is calculated from the **r**-matrix. The **r**-matrix is reached after a grouping of the religions. With less grouping lower h-values would emerge. That is, while the h's calculated make sense relatively, they underestimate the diversity in many countries.
13. The division line between the main religion and atheism is highly susceptible to politics. The fraction of devout Catholics is probably similar in Uruguay, Argentina and Chile, but vastly more atheists are reported in Uruguay, for well-known historical reasons. In the same way Sweden report more atheists than Norway and Denmark. The old communist countries also report large shares of atheists.
14. It is also a data problem that Indonesia has only a Muslim share of 0.43. This is because Barrett (1982) classify another 0.36 as »New Religionists«. They are put in the Residual group. Barrett's notes and other sources term them mostly Muslims, but I have preferred to stick to the source.
15. It is easy to expand and develop the argument in this subsection and refer to much literature on duality models, social transformation, etc. However, the argument is left as a sketch only - the evidence of a significant coefficient to Tribal religion is suggestive and interesting, but it can hardly carry the weight of a major construction.