# Why is the world short of democracy?

# A cross-country analysis of barriers to representative government

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**Abstract:**

*This study first uses a set of graphs and tables to present the pattern of democracy in the world, using the Gastil Index. Then a statistical analysis is conducted by two techniques: Regression techniques are used to analyze the effect on democracy of a handful of variables. It shows that poverty, Communism and the Muslim culture are the main barriers to democracy. It then uses Bayesian probability methods to make explicit the concept of the "risk" of countries being undemocratic. The analysis focuses on the dynamics of the income effect and of the democratic deficit of the Muslim countries to see if it is stationary or transitory. It is unstable, so it may be transitory, but it has been rising.*

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# 1. Introduction

A topic which increasingly preoccupies politicians, policy makers, and academics is the constellation of factors which determine the degree to which a country is democratic. Many theories and ideas purporting to explain the distribution of democracy among the countries of the world are in circulation. These theories may have important political consequences: for example, theories about the need to democratize the Middle East – and the means of achieving this – appear to have been causal to the US war in Iraq. The following analysis tries to demonstrate that a few factors can explain a great deal of the variation in the extent of democracy in the world's countries:

We demonstrate that the level of national income provides the most important factor explaining inter-country variations in the degree of democracy with the consequence that low income is the most important barrier to democracy. When countries go through the *Grand Transition* from being a poor LDC (Less Developed Country) to becoming a wealthy DC (Developed Country) they undergo a *democratic transition*. We thus explain most of the strong correlation observed between the level of income and the degree of democracy as a causal relation from income to democracy.

The literature also provides evidence that more democratic political structures leads to higher growth, and thus eventually to a high income level. Section 2 compares the typical quantitative findings with the pattern in the data that have to be explained. It concludes that most of the observed positive relation between democracy and income is due to high levels of income being conducive to the development of democratic institutions rather than to democratic institutions being conducive to income growth.

However, even after allowing for the effects of inter-country variations in income on the distribution of the degree of democracy across countries, there remains a powerful cultural explanation for why some countries are more democratic than others. This is that a number of the world's countries are *Muslim* in the sense that they have a Muslim majority and adopt Islam as their official religion. In this paper we study the dynamics of the relation between being a Muslim country and the degree of democracy.

As is well known, communism and democracy make uneasy bedfellows. However, the dissolution of Yugoslavia, the USSR, and the Russian empire have caused many, often new, countries to seek and to embrace a change in the economic and political systems that they were forced to adopt under communism. We show that countries going through the *Small*

*Transition* – from a socialist to a market economy – quickly converge to the level of democracy they would have had without socialism.

At present we use the Gastil index, which is the democracy index that is most often used by economists,[1] notably in studies explaining growth. However, all results in the paper generalize to the Polity index (see Jensen and Paldam 2005) and to the Vanhanen index.[2] The statistical analysis uses two techniques: One is standard regression analysis. The second is the Bayesian probability theory, which concentrates on the concept of an (absolute) *democratic deficit* for a country group, and of a (relative) *democratic gap* between country groups.

Section 2 takes a look the data, and introduces the literature. It is argued that the strong correlation between income and democracy must to at least 80% due to causality from income to democracy. Section 3 gives regression results, concentrating on the effects of income. Section 4 looks at the risk of being democratically deprived concentrating on the effects of the Muslim culture. This section also contains a small survey of ideas that have been presented of why Muslim countries are less democratic. Finally, Section 5 gives some concluding remarks.

## 2. Main patterns in the data and theories

The two main data sets used are the *Gastil index* of democracy from Freedom House and the *gdp* data from Maddison (2003).

The Gastil index, $\gamma_{it}$, where $i$ and $t$ are indices for country and time, is available from 1972.[3] It takes the values between 1 and 7, where 1 is *full democracy* and 7 is *full dictatorship*. Appendix Table A1 shows $\gamma$ for 171 countries in 1972 and in 2004.

GDP per capita is termed, *gdp*, and our income measure is $y_{it} = ln\ gdp_{it}$.

The gdp-data set excludes some small countries, covered by the Gastil index. Also some countries have changed – notable due to the Small Transition. For most purposes we use an

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1. Some examples are: Pacala et al (2003) use γ to show that increasing democracy led to a reduction of pollution emission. Paldam (2002) use γ to study the cross-country pattern of corruption, while Bjørnskov (2003) use γ to explain cross-country evidence on social capital and life satisfaction.
2. The results for the Vanhanen data set are from in a MA thesis in Danish (Aarhus University, June 2006) by Meliha Mestrebasic.
3. Freedom House has published an annual report since about 1950, covering all countries, on the state of political freedom. It is evaluated using a list of questions derived from the Universal Declaration of Human Rights. The items are aggregated to two integers: One for *Political Rights* and the other for *Civil Liberties*. They are highly correlated, and we use the average that has 13 possible values: 1, 1½,…, 7. The index was developed by Raymond Gastil, who has now left the NGO.

*unbalanced sample* with a break in 1990: It has 135 countries before and 154 after the break. These data contains a *balanced sample* of 134 countries that is used, e.g. in Figure 1.

### 2.1 The strong correlation of income and democracy

Figure 1 plots the average $\gamma$-score computed over 1972-2005 for the 134 countries of the balanced sample against initial income, i.e. income in 1971 – the figure also shows two regression lines: *others* (with a significant negative slope) and *Muslim* (with an insignificant positive slope).[4]

Figure 1. Average democracy score 1972-2005 and income 1971
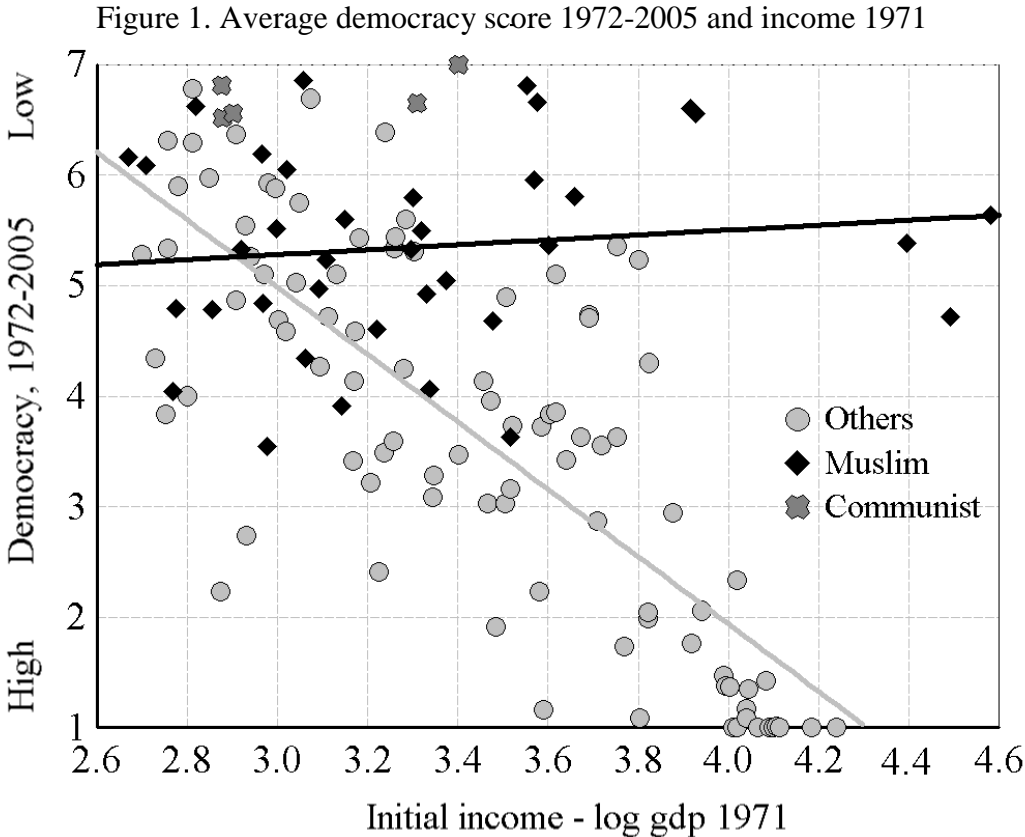


The figure shows a highly significant negative correlation where higher income is associated with more democracy. The figure is drawn to suggest that income "explains" the level of democracy. That is, we use initial income at the horizontal axis. The next two subsections will argue that this is a reasonable suggestion, based on the literature.

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4. We have generated a set of such figure for other time periods such as 1972-88 and 1995-2005 to see how much the small transition matters. They all look rather similar.

*2.2   Theory: Income ➜ democracy: The democratic transition*

The literature about the causal link from income to democracy agrees that is a level effect. The Grand Transition of a country involves an increase of production by 30-40 times, and this changes everything, from the family structure to the structure of the economy, urbanization increases, corruption vanishes, etc.

The democratic transition works through many channels: Democracy is demanded by everybody, but it is a luxury demand that, at low income, is dominated by more pressing needs. A high production requires education and international techniques and trade. With a highly educated and internationally oriented population, the demand for democracy further increases.[5] Also, the central controls to uphold dictatorship become more expensive relatively when production becomes more complex, and the share of the tertiary sector grows.

The idea of a democratic transition originates from Lipset (1959). The subsequent discussion is surveyed in Lipset (1994) and Przeworski. All studies analyzing the relation – except Acemoglu *et al* (2005), discussed in Section 3.2 – find that the relation is strong and significant. In Section 3 we estimate a family of models of the democratic transition and show that they account fully for the pattern shown on Figure 1.

*2.3   Theory: Democracy ➜ growth ➜ income: Can it explain the pattern observed?*

The literature about the reverse causality is much larger. It studies the relation from democracy to growth. If monotonous, this connection will in due time generate a relation between democracy and the level of income. The Barro (1991) model (see Barro and Sala-i-Martin, 2004; 528-529) concludes that the degree of democracy is a minor variable explaining growth. It only works in a convex version, with a peak in the middle. Consequently, it will never generate a relation between the level variables as shown.

No less than 90 studies of this relation are covered by the new meta study by Doucouliagos and Ulubasoglu (2006), which concludes that most studies reject the convex form, and that the simple linear reduced form gives an insignificant coefficient. However, several links via intermediate variables are significant, so there must be a small effect. Also, Sturm and Haan (2005) find a robust, but small, effect on growth.[6] We conclude that a reasonable assess-

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5. The importance of the role of openness has recently been explored by López-Córdova and Meissner (2005).
6. Sturm and Haan classify a total of 59 variables according to their impact on growth using robust regressions as well as extreme bounds. Their results are broadly consistent with the results of the robustness analysis reported in Barro and Sala-i-Martin (2004). The Gastil index is borderline robust, but it is not among the 10 variables with the largest impact. The average annual growth (in the gdp) is about 1.6% of which 1.2-1.4 can be explained, so it is clear that the impact of 1 Gastil point must be below 0.1 percentage points.

ment based on the literature is that the effect of a fall of 1 point on the Gastil index is at most an increase in growth of 0.1 percentage points.

From this assessment we can calculate the effect on the levels of incomes of the differences in the level of democracy we know existed 200 years ago. The Madisson data allow us to assess that the ratio of the highest to the lowest decile of income in 1700 and 1820 was around 3. This fractile ratio has increased to 40 in 2000. Thus this measure of income dispersion has increased about 13 times in the last 200 years.

The Polity democracy index, builds on less primary data, but it goes back to 1800 for a few countries. It tell us that the democracy level were much more similar in the 19$^{th}$ than in the 20$^{th}$ century, so when converted to Gastil points,[7] very few countries have differed by as much as 3 Gastil points in average over the last 200 years. A difference of 3 Gastil points over two centuries generates differences in income levels of 3 $x$ 0.1 = 0.3% per year or $1.003^{200} \approx$ 1.8. It thus explains at most 1.8/13 = 14% of the income differences that has developed since then. Consequently, the literature suggests that the correlation shown on Figure 1 must, to at least 85%, be due to the democratic transition. Thus, we shall treat the causality from the level of democracy to income as a (small) bias in the relation from income to democracy.

Table 1. Average value of variables

| Countries covered | Number of countries | gdp for 2001 | | Average $\gamma$-score for | |
|---|---|---|---|---|---|
| | | y | log y | All years | Last 10 years |
| Africa, SS | 43 | 1727 | 3.10 | 5.26 | 4.60 |
| Latin American | 22 | 5753 | 3.72 | 3.24 | 2.86 |
| Orient | 16 | 8549 | 3.69 | 5.02 | 4.70 |
| Of which Tigers | 4 | 20865 | 4.31 | 3.39 | 2.63 |
| West | 25 | 24301 | 4.38 | 1.30 | 1.17 |
| Others | 50 | 5536 | 3.63 | 4.42 | 3.58 |
| Muslim | 43 | 5080 | 3.47 | 5.51 | 5.50 |
| Of which Arab | 16 | 8869 | 3.79 | 5.65 | 5.83 |
| Communist | 5 | 2252 | 3.31 | 6.71 | 6.80 |
| Transition (ex comm.) | 28 | 6364 | 3.71 | (5.11) | 3.59 |
| Oil countries | 20 | 9886 | 3.86 | 4.99 | 4.99 |
| All countries | 171 | 7947 | 3.63 | 4.21 | 3.72 |

Note: All averages are unweighted. Gdp per capita is termed gdp. The average for the transition countries 5.11 is in brackets as it makes little sense given the large difference between the score at the start and the end – this also affects 8 points on Figure 1.

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7. The two indices are highly correlated, though independently compiled. Polity-points, $P$, are converted to Gastil-points, $\gamma$, by the formula: $\gamma = 4 - 0.3P$, see Jensen and Paldam (2005).

## 2.4 Some additional cross country observations

Figure 1 allows three additional observations: (1) All countries with "full" democracy are in the high end of the income scale. (2) While Muslim countries are similar to other countries with low income, there is no tendency that they become more democratic with rising income. (3) The five countries with communist governments throughout are very undemocratic. The figure suggests further explanations. The black diamonds to the right are the three small oil countries, UAE, Qatar and Kuwait. Saudi Arabia and Bahrain are also important in the picture for the Muslim countries, so the relation has to be controlled for oil wealth.

Table 1 shows the distribution of the average of the variables analyzed. For now we only consider the two last columns showing averages for the $\gamma$-index. (5) The average score is 4.21 for all 32 years, and 3.72 for the last 10 years. It is close to the middle of the scale (4 points) from no to full democracy. (6) The Western countries are relatively democratic, as expected. Also, the Latin American group and the Asian Tigers appear as relatively democratic. (7) Several groups have low scores; but once they are controlled for income, only two groups remain significant Communist and Muslim countries, where the core group of Arab countries is (even) less democratic than the average.

Figure 2. The development of the $\gamma$s for the four main income groups of countries
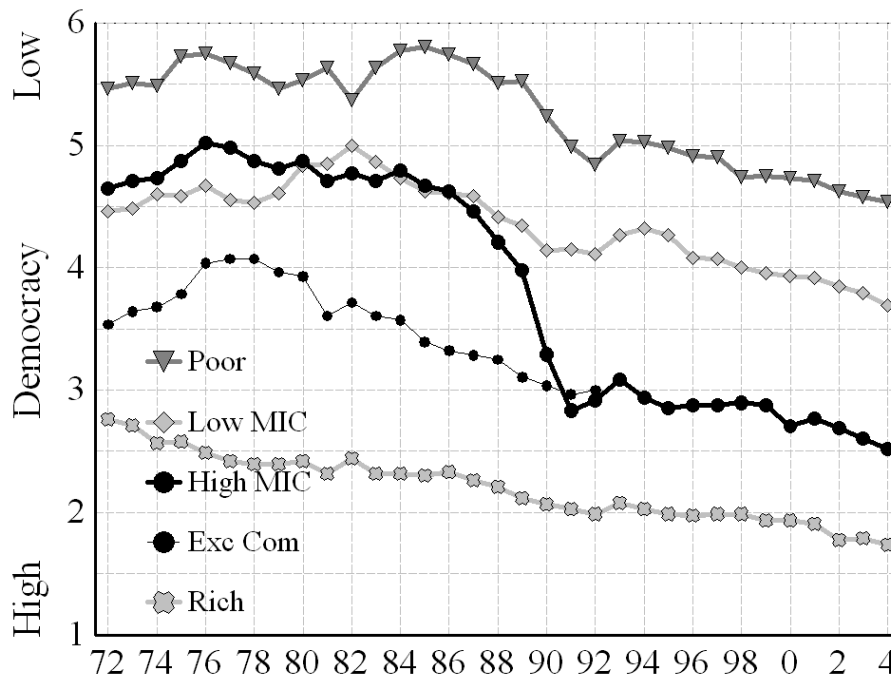


Note: The four groups of countries follow the World Bank classification in *low income* (*Poor*), l*ower and higher middle income* (*low MIC* and *High MIC*) and *high income* (*Rich*). The High MIC group contains many of the Communist countries which are now in transition. These countries have been deleted in the *Exc Com* line.

*2.5    The development from 1972 to 2004*

The development from 1972 to 2004 of the average *γ*'s for the 4 income groups of countries in the World Bank classification (see note to figure) is shown in Figure 2. All 4 curves have a (significant) negative slope indicating increasing democracy in the world in the period. The increase for the average country is about 0.028 points a year or 0.9 point on the scale over the 33 years. This can be "explained" by the increase in gdp as will be shown in Section 3.

The relative positions of the four curves also support the idea that the *Grand Transition* leads to a democratic transition, as the *γ*-level for the four income groups differs precisely as predicted by the law. The only deviation from the picture is the curve for the *High MIC* group that intersects with the *Low MIC* group before 1990. This is due to the transition of 10 (Ex) Communist countries in the *High MIC* group. The *Exc Com* line shows how the curve changes when the 10 countries are excluded. If the remaining 18 transition countries are excluded from the other groups, the changes are far smaller.



Figure 3. Democracy and the transition group of countries
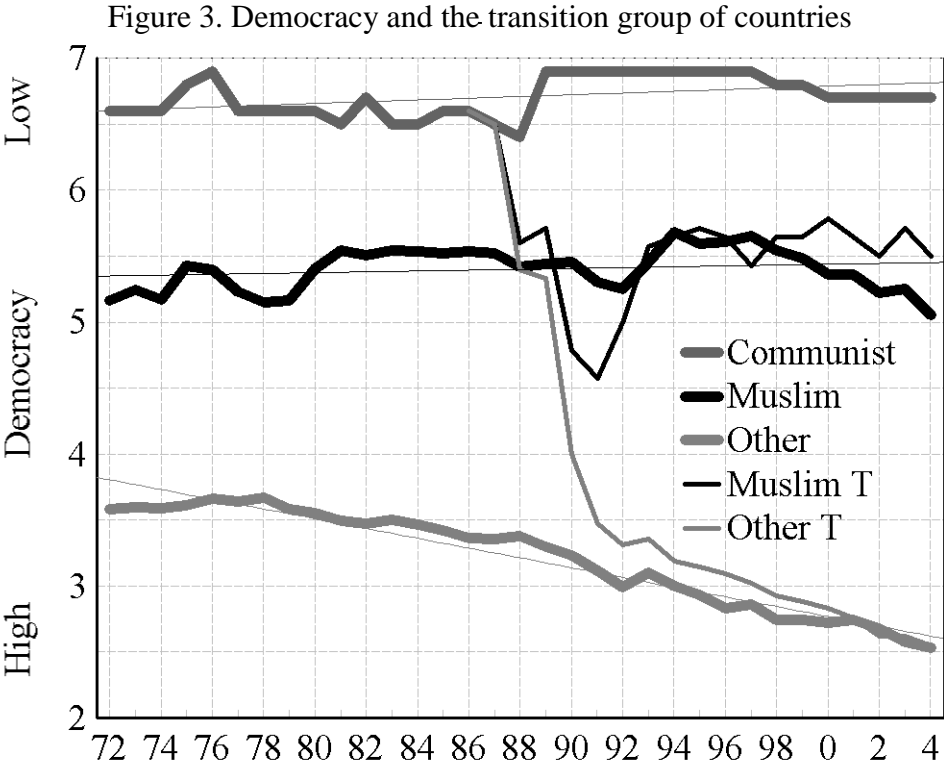
Note:  The 28 countries of the transition group are marked with T – They are not included in the three groups.

*2.6    The Small Transition: Choosing a new political system*

The data include 14 countries with a Communist government from 1972 to 1988. Several of these countries broke up in the early 1990s to form 33 countries. Five still have a Communist regime. The remaining 28 countries form the *Transition* group. For these countries the big political change came in the form of a sudden collapse of the old political system in 1988-90 and concomitant loss of centralized control in the countries of Eastern Europe and the erstwhile countries of the USSR. The development of the new political order in these countries thus has the character of a fine historical experiment.

Figure 3 has 3 *fat* lines for *Communist*, *Muslim* and *Other* countries. When the thin straight lines shown are fitted through these points the slopes are positively significant for *Communist*, positively insignificant for *Muslim* and negative and (numerically) much larger for *Other*.[8] The figure thus shows the growing Muslim gap, which is exclusively due to the democratization in the non-Muslim world, while the level of dictatorship is unchanged in the Muslim world.

Figure 3 further has two thinner lines showing that the 28 transition (T) countries quickly converge to the position at which they might have been without the previous Communist regimes. The *Muslim T* group[9] had a short "democratic spring" from 1990 to 1992, and then they moved to the typical Muslim level of dictatorship (around 5.5). The *Other T* group has shown a year-on-year improvement in democratization, and they are now at the same level as all *Other* countries. The last Communist countries have remained at low levels of democracy.

*2.7    An alternative approach to the development over time*

The United Nations classifies countries depending on their HDI, *Human Development Index*, as: High HDI; medium HDI; and low HDI. We use a similar approach to classify countries depending upon the value of their $\gamma$, as: *Highly democratic* ($\gamma < 3$); *moderately democratic* ($3 \leq \gamma < 6$); and *undemocratic* ($\gamma \geq 6$).[10] Table A1 in the Appendix shows the classification of countries for the start (1972) and end (2004) years of our sample.

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8. The slopes for the 3 regression lines shown are 0.007 (2.5), 0.003 (1.1) and -0.037 (-21.6), for *Communist*, *Muslim* and *Other,* respectively. Brackets give t-rations.
9. The Muslim group consists of Albania and six states of the erstwhile Soviet Union: Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan. The Other group consists of Mongolia and the Christian countries of Eastern Europe and Caucasus.
10. Freedom House use a similar classification.

Table 2. The world's *Democratic Deficit*: 1972-2004. Two percentages:

DD1 *undemocratic* and DD2 *not highly democratic*

| Year | DD1 | DD2 | Year | DD1 | DD2 | Year | DD1 | DD2 |
|------|-----|-----|------|-----|-----|------|-----|-----|
| 1972 | 42.7 | 73.1 | 1983 | 39.2 | 74.9 | 1994 | 24.6 | 65.5 |
| 1973 | 41.5 | 72.5 | 1984 | 39.2 | 73.7 | 1995 | 24.6 | 65.5 |
| 1974 | 40.4 | 73.7 | 1985 | 39.2 | 71.9 | 1996 | 24.0 | 63.7 |
| 1975 | 41.5 | 76.0 | 1986 | 38.0 | 71.9 | 1997 | 24.6 | 63.2 |
| 1976 | 43.3 | 76.0 | 1987 | 36.8 | 71.3 | 1998 | 20.5 | 59.6 |
| 1977 | 36.3 | 74.3 | 1988 | 31.0 | 70.8 | 1999 | 18.7 | 60.8 |
| 1978 | 37.4 | 74.3 | 1989 | 27.5 | 70.8 | 2000 | 17.5 | 59.1 |
| 1979 | 37.4 | 73.7 | 1990 | 19.3 | 68.4 | 2001 | 18.1 | 59.6 |
| 1980 | 39.8 | 74.3 | 1991 | 16.4 | 62.6 | 2002 | 15.8 | 57.3 |
| 1981 | 39.2 | 74.9 | 1992 | 18.7 | 63.7 | 2003 | 16.4 | 57.9 |
| 1982 | 37.4 | 70.2 | 1993 | 24.0 | 67.3 | 2004 | 14.0 | 57.9 |

We define the world's *democratic deficit* in two ways. DD1 is the fraction of *undemocratic* countries, and DD2 is the fraction of countries which are *not highly democratic*. The number of countries in the three democracy categories in 1972 were 46 (*high*), 52 (*moderate*), and 73 (*undemocratic*), so that DD1 = 73/172 ≈ 42.7% and DD2 = (171-46)/171 ≈ 73.1%. Table 2 shows how these fractions decrease.[11]

## 3. The democratic transition and the effect of some other variables

When we want to model and estimate the effect of a set of variables − notably income − on the level of democracy, as given by the $\gamma$-index, three main problems are immediately evident:

(i) The *adjustment* problem: Political systems have the property of stepwise stability, so $\gamma$ is a variable with much *inertia*. When we estimate models, where $\gamma$ is explained by other variables, it is a problem if $\gamma$ adjusts to the changes in these variables within the time horizon, of $T$ years, considered.

(ii) The *variable choice* problem: Many variables may in principle explain $\gamma$, and as we are studying the dynamic effect of variables this will soon exceed the space of an article. At present, we concentrate on the five explanatory variables found to be the most powerful ones in Paldam (2005). They are listed in Table 3.

(iii) As mentioned, we need to correct the regressions for simultaneity. In view of the literature discussed in 2.3 this is likely to give a small bias only. It is estimated in Section 3.5.

Table 3. Models and variables used

| Models with different time horizon $T = t,...,t+T$ | Eq. | | Estimated for |
|---|---|---|---|
| $\gamma_{i(t)}^T = \alpha^{T*} + \beta^{T*} y_{i(t)-1} + \lambda_1^{T*} Mus_i + \lambda_2^{T*} Com_i + \lambda_3^{T*} Oil_i + u_{2(t)i}$ | (1) | Static | $T = 1, ...,16, 32$ |
| $\gamma_{i(t)}^T = \alpha^T + \delta^T \gamma_{i(t)-1} + \beta^T y_{i(t)-1} + \lambda_1^T Mus_i + \lambda_2^T Com_i + \lambda_3^T Oil_i + u_{it}^3$ | (2) | Dynamic | $T = 1, ...,16, 32$ |
| $z^\infty = z^T /(1-\delta^T)$, for $z^T = \alpha^T, \beta^T, \lambda_1^T, \lambda_2^T, \lambda_3^T$ | (3) | Steady states of coefficients in (2) | |
| $P(t-t_0) = \delta^{t-t_0}$, where $\delta \approx (\delta^T)^{1/T}$ | (4) | Adjustment path for democracy | |
| $\gamma_{it}^T$ | Gastil index, averaged over T years starting in t | $Mus$ | binary dummy for Muslim country |
| $\gamma_{it-1}$ | initial Gastil index used as adjustment term in (3) | $Com$ | binary dummy for Communist country |
| $y_{it-1}, y_{i-1}$ | initial income, ln to $gdp$ with one lag | $Oil$ | binary dummy for major oil exporter |
| $gdp$ | GDP per capita | $u_{it}$ | Residuals |

Note: Both (1) and (2) can be estimated as cross-county without $t$, and as a panel with 33/$T$ periods of $T$ years. (3) and (4) are calculated from (2). The adjustment path in (4) is to a permanent rise of income at $t = t_0$. Countries are *Mus,* if they have a clear Muslim majority and a Muslim government. Countries are *Com*, if they are a one party state ruled by a Communist Party, and *Oil* is used for countries belonging to OPEC during the period (or part of the period).

### 3.1 Two models and four equations

The equations and variables of Table 3 are used to handle these problems. It is difficult to correct the regressions for all possible problems at the same time.[12] We therefore use a family of models – listed in Table 3 – which are likely to span the area of reasonable estimates so that we can be confident that the true results are within the (small) range of the estimates.

We use either cross country or the unbalanced panel over all 33 years in the estimates, working with a static (1) and a dynamic (2) version of the same equation. The difference is the adjustment term, $\delta^T \gamma_{it-1}$, for the initial level of democracy. The cross-country estimates represent *long-run differences* – i.e. the GT-pattern – and *country heterogeneity*, of which we control for a few of the systematic differences between groups of countries. However, (2) use the dynamics over the 33 years to estimate steady state states that also allow for full adjustment to income in the average country. We have estimated both equations (1) and (2) as cross sections and as panels for $T = 1, ..., 11$ and 16. The results are bulky, but they have a clear pattern, which will be illustrated by typical results. More results are given in Paldam (2006).

*Equation (1)* is the static version, where the political system only adjusts within the period $T$. It thus catches the *long run pattern* in development to the extent that the Grand Transition view is true, and the *short run* effects of income within $T$. Thus, we use the

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11. Note that we have kept the number of countries constant by including the members of unions that have broken up (USSR, Yugoslavia and Czechoslovakia) as "countries" in 1972 to make the comparison reasonable.
12. A background note (Paldam 2006) reestimates the equations with fixed effects, and corrects for heteroscedasticity and for the semi qualitative nature of the data (by Tobit regression). The results are basically the same.

estimates for $T = 1$ to study the path of adjustment for the coefficients. The 33 estimates are given in appendix Table A2.

*Equation (2)* is the dynamic version, which contains the adjustment term. It estimates the adjustment of democracy to income changes in the average country. The estimates from (2) have the advantage that it can be used to calculate the two key properties of the dynamics of adjustment. *Equation (3)* gives the steady state values of the effects on the variables in the average country of an income change. *Equation (4)* gives the path of adjustment of the level of democracy to a permanent income rise.

We take it to be a strong result confirming the theory of the democratic transition, if the long run estimates from (1), $\beta^*$, and the implied steady state values, $\beta^\infty$ from (2) are similar.


## 3.2 *The estimates of the income effects and the choice of time period T*

We first consider the *static estimates*, i.e. model (1), giving the range of $\beta^{T*}$ for different $T$s. Table A2 give 33 estimates of $\beta^{1*}$. The variation over time of the 33 estimates is discussed in Section 3.7. The average of these values of the effect of income is $\beta^{1*} = -1.10$. Table 4 gives results for two period for $T = 16$, and for the two period panels for two versions of the model. They are all very close, especially for income, where all 6 estimates are about $\beta^{16*} = -1.1$, as was also the result reached in Table A2, and the results are also very similar for the other $T$s tried. Consequently, the GT-estimate is robust to $T$ and it is $\beta^* = -1.1$.


<p align="center">Table 4. Model (1), for $T = 16$. Cross-country and panel estimates</p>

| | Period 1 1973-88 | Period 2 1989-04 | Both as panel | Period 1 1973-88 | Period 2 1989-04 | Both as panel | Average of line |
|---|---|---|---|---|---|---|---|
| *Initial y* | **-1.13** | **-1.06** | **-1.10** | **-1.22** | **-0.95** | **-1.08** | -1.09 |
| t-ratio | (-9.3) | (-9.8) | (-13.6) | (-11.9) | (-10.9) | (-16.2) | |
| *Mus* | | | | **0.81** | **1.47** | **1.15** | 1.14 |
| t-ratio | | | | (3.2) | (6.6) | (6.8) | |
| *Oil* | | | | **1.55** | **1.33** | **1.41** | 1.43 |
| t-ratio | | | | (4.6) | (4.69 | (6.4) | |
| *Com* | | | | **2.47** | **3.02** | **2.63** | 2.71 |
| t-ratio | | | | (7.2) | (5.8) | (9.2) | |
| *Period 1* | **13.32** | | **13.02** | **13.38** | | **12.16** | 12.97 |
| t-ratio | (13.7) | | (20.0) | (16.3) | | (22.5) | |
| *Period 2* | | **12.43** | **12.69** | | **10.83** | **11.99** | 11.99 |
| t-ratio | | (14.0) | (19.0) | | (15.1) | (21.7) | |
| $R^2$ adjusted | 0.37 | 0.36 | 0.38 | 0.60 | 0.63 | 0.62 | |
| N | 149 | 168 | 317 | 149 | 168 | 317 | |

Note: Coefficients that are significant at the 5% level are bolded.

Next we turn to the *dynamic estimates*, i.e. to model (2). The estimation is more fragile, as problems occur if $T$ is too large or too small. If $T$ is large, income fluctuates between the initial value used as regressor and the end of $T$. Hence for too large $T$s the relation becomes imprecise. If $T$ is too small, the inertia in the $\gamma$-series causes the coefficient $\delta^T$ to the initial $\gamma$-index to get so close to 1 that nothing is left to explain for the other variables,[13] and their coefficients vanish as $T$ goes to zero. We have found that many of the cross-country results for $T < 8$ give nonsensical results. However, for the panel estimates the number of observations, $N$, in the regression is the average number of countries (143) times the number of periods in the panel, 33/T. Consequently, as $T$ falls, $N$ rises strongly and reaches 4728 for $T$ = 1. This allows us to obtain panel estimates also for small $T$s.

Figure 4. Panel estimates of the short and long run effect of income, $\beta^T$ and $\beta^\infty$, and the adjustment coefficient, $\delta^T$ shown as $(1 - \delta^T)$
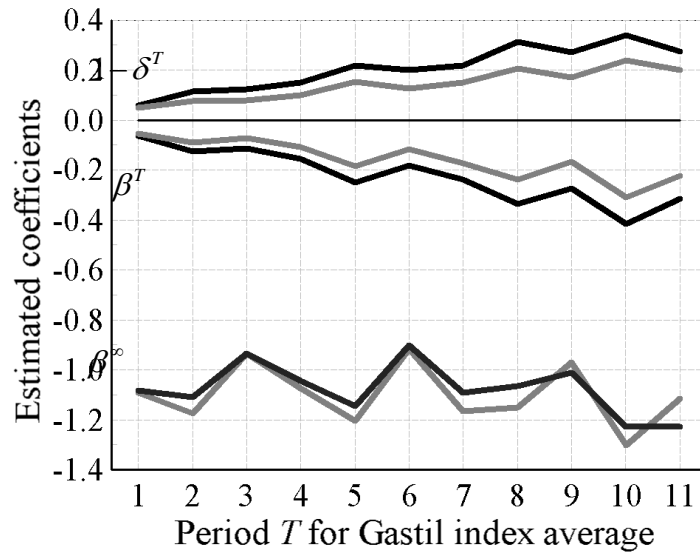


Note:  The gray curves are for the model with the controls *Mus*, *Com* and *Oil*. The black curves are for the model with no controls. All 20 estimates have fixed effects for time. The estimates for $T$ = 1 uses $N$ = 4728 observations. As $T$ increases, N falls till $N$ = 424 for $T$ = 11.

Figure 4 shows the panel estimates for model (2) of $\delta^T$, $\beta^T$ and $\beta^\infty$ for $T$ = 1,…, 11. All estimates depicted on the figure are significant well above the 1% level. Even when the

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13. Paldam (2006) calculates the correlations $r^T = r(\gamma_{it-1}, \gamma_{it}^T)$ for a range of $T$s for 154 countries. $r^1 = 0.96$. As $T$ grows, $r$ falls slowly, $r^8 = 0.85$. First $r^{16} < 0.8$. When $r$ is too close to 1, the relation comes close to a unit root and can only be made with a lot of observations giving high precision.

estimate of $\delta^1$ is close to 1, and $\beta^1$ is close to 0, they are sufficiently precise to give estimates of $\beta^\infty$. We note that all $\beta^{T\infty}$ fluctuate around −1.1. For larger $T$s, the estimate increases marginally.

Table 5. Model (2), with adjustment and steady state calculations, for $T = 16$

| | Period 1 1973-88 | Period 2 1989-04 | Both as panel | Period 1 1973-88 | Period 2 1989-04 | Both as panel | Average of line |
|---|---|---|---|---|---|---|---|
| *Initial γ* | **0.72** | **0.57** | **0.65** | **0.61** | **0.41** | **0.49** | 0.57 |
| t-ratio | (17.2) | (9.9) | (17.9) | (12.8) | (8.1) | (13.8) | |
| *Initial y* | **-0.42** | **-0.41** | **-0.40** | **-0.55** | **-0.50** | **-0.54** | -0.47 |
| t-ratio | (-5.2) | (-3.8) | (-5.9) | (-6.2) | (-5.5) | (-8.3) | |
| *Mus* | | | | **0.53** | **1.18** | **0.85** | 0.85 |
| t-ratio | | | | (3.0) | (6.1) | (6.3) | |
| *Oil* | | | | 0.45 | **0.94** | **0.74** | 0.71 |
| t-ratio | | | | (1.8) | (3.7) | (4.1) | |
| *Com* | | | | **0.93** | **2.35** | **1.50** | 1.59 |
| t-ratio | | | | (3.5) | (5.2) | (6.3) | |
| *Period 1* | **4.55** | | **4.72** | **5.76** | | **6.06** | 5.27 |
| t-ratio | (6.0) | | (7.3) | (7.0) | | (9.9) | |
| *Period 2* | | **4.62** | **4.24** | | **5.61** | **5.70** | 5.04 |
| t-ratio | | (4.4) | (6.4) | | (6.3) | (9.0) | |
| R$^2$ adjusted | 0.79 | 0.60 | 0.69 | 0.82 | 0.75 | 0.77 | |
| N | 149 | 168 | 317 | 149 | 168 | 317 | |
| Implied steady state effects from model (3): $z^\infty = z^{16}/(1-\beta^{16})$ | | | | | | | |
| *Income* | -1.53 | -0.96 | -1.15 | -1.39 | -0.84 | -1.07 | -1.16 |
| *Mus* | | | | 1.34 | 1.98 | 1.68 | 1.67 |
| *Oil* | | | | 1.16 | 1.57 | 1.45 | 1.39 |
| *Com* | | | | 2.38 | 3.96 | 2.94 | 3.09 |
| *Period 1* | 16.44 | | 13.42 | 14.67 | | 11.92 | 14.11 |
| *Period 2* | | 10.82 | 12.04 | | 9.44 | 11.21 | 10.88 |

The adjustment term reduces country heterogeneity greatly in the regressions. It can be further reduced by adding fixed effects for countries. However, this brings the regressions closer to the unit root and causes the estimates to frequently vanish (or crash). Even the very stable

coefficient to income vanishes if small *Ts* are combined with fixed effects for countries. However, for $T > 12$ the usual results remain also with fixed effects for countries, as documented in Paldam (2006).

The estimates of Acemoglu *et al* (2005) are – as they point out – the first which show that the effect of income in relations of type (2) is weak.[14] Their analysis uses $T = 5$, and fixed effects for time and countries. It is in accordance with our results that it makes the effects of income vanish, but in view of the above analysis this is not a hard blow to the findings that income is a strong causal factor explaining democracy.

The summary of results in Table 6 conclude that the long run effect of income is $-1.15 \pm 0.1$. It is a robust finding, and, as both the literature survey and section 3.5 below show that the counter causality can at most cause a small fall in this estimate, so we conclude: The true long run effect of income is $-1.1$. In Section 3.3 we show that this means that the democratic transition neatly explains the main pattern shown on Figure 1.

Table 6. Comparison of results from Table A2 and Tables 4 and 5

| Column | 1 | 2 | 3 | 4 | 5 | Assessment: |
|---|---|---|---|---|---|---|
| Refer Table 3 | Eq. (1) | Eq. (2) | Eq. (3a) | Eq. (3b) | Eq. (2) | Best long- |
| From | Table A2 | Table 4 | Table 5 | Table 5 | (a) | run estimate |
| *T* | 1 | 16 | 16 | $\infty$ | 32 | |
| Constant | 12.3 | 12.5 | 5.2 | 12.4 | 9.4 | |
| Income | -1.1 | -1.1 | -0.5 | -1.2 | -1.6 | $-1.15 \pm 0.1$ |
| Muslim | 1.1 | 1.1 | 0.9 | 1.7 | 1.7 | 1.7 growing (b) |
| Oil | 1.4 | 1.4 | 0.7 | 1.4 | 1.4 | 1.4 (b) |
| Communist | 2.7 | 2.7 | 1.6 | 3.1 | 3.0 | 3.0, lower 1985-90 |

Notes: (a) From Paldam (2005). (b) some multicollinearity.

### 3.3 Other results: The three binary variables

Most results in Tables A2, 4 and 5 are significant and give a clear picture summarized in Table 6. We have already discussed the effect of income. We now turn to the effects of the three binary variables. For most countries they are constant, but neither is constant for all countries. Most changes are in 1990. However, the effects of these changes are too few to allow powerful estimates of the dynamics, as do the estimates of the effects of income.

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14. The results of Acemoglu et al (2005) fit into a larger picture as Daron Acemoglu and his group is arguing the *Primacy of Institutions* view, which contrasts to the *Grand Transition* view. The relation between the views is discussed in Paldam and Gundlach (2006).

Not unexpectedly, *Com* gives about 3 Gastil points. This effect may be due to socialism as such, i.e. of state ownership, or historical circumstances. No data set exists for the degree of state ownership, though one of the items in the Fraser Index is close. Our assessment is that the results for *Com* generalize, but this is a longer story which is not to be included.

Finally there is the *Muslim/Oil* complex. Both variables are nearly always significant, but do have some multicollinarity. The coefficient to *Oil* is very stable, but the coefficient to *Muslim* increases in size over time as appears likely from Figure 3.

We may see oil wealth as a way of becoming rich without going through the Grand Transition, though it is clear that great changes do occur in the societies that are hit by great oil wealth. Also, we note that the 4 Oil countries in Latin America (Venezuela, Ecuador, Mexico and Trinidad and Tobago) are as democratic as they should be given their income.

### 3.4 The long path of adjustment

The 28 estimates of $\delta = \delta^1 = (\delta^T)^{1/T}$ given on Figure 4 and in Table 5 allow us to calculate the adjustment speed to a jump in income. The average and standard deviation of the 28 estimates is $\delta \approx 0.965$ (0.011). This implies the adjustment paths shown on Figure 5.[15] Obviously, even as small differences as 0.011 do give a large effect on an exponential process over 100 years. We also know that a large arbitrary element enters into political reform processes, so the fairly broad intervals between the 5 curves drawn on Figure 5 also represent a fact of the real world – not just estimation problems.

Figure 5. The adjustment of democracy to a permanent rise in income



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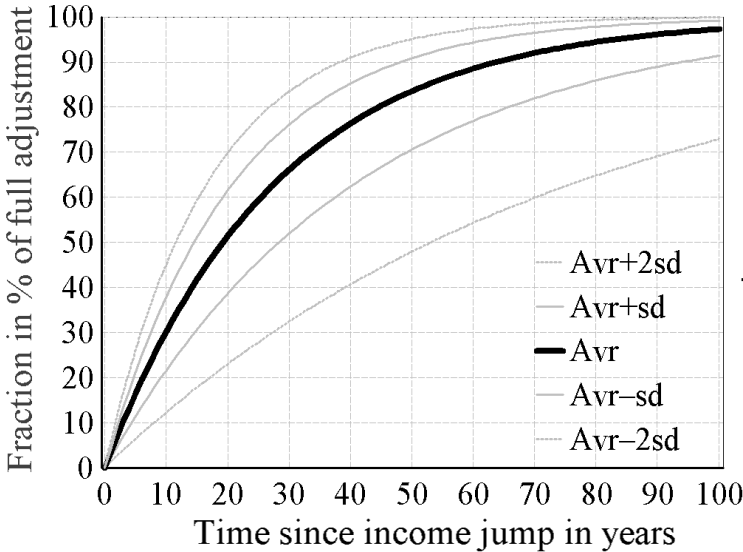
15. The curves on Figure 5 can be used to simulate the political effects of *periods* of rapid or slow growth.

16

It is clear that the estimates do show much slower adjustments than normally found in economic models. The mean finding is that it takes no less than 20 years for half of the adjustment to have happened; and for 90% to have taken place, we have to consider more than half a century. This is important to keep in mind, and it neatly explains the much delayed democratic reforms caused by the extraordinarily rapid growth of the Asian Tigers.

*3.5    Using the results to explain the pattern on Figures 1 and 2*
It is a key result for income is thus that we find the same result in the cross country regressions (1) giving the GT-long run estimates, and for the steady state results calculated from the dynamic estimates (2) for the average country. This result explains the pattern found on Figures 1 and 2:

Figure 1 suggests that the Grand Transition gives a fall in the $\gamma$-index of about 4 points. We know from Maddison (2001) that it increases income by about 40 times. Consequently, the Gastil index should fall by $-1.1 \cdot \ln 40 = -4$ points, very much as it does.

Figure 2 shows that the Gastil index fell by almost 1 point from 1972 to 2004, where World income per capita grew by 67%. This should give a fall of $-1.1 \cdot \ln 1.67 = 0.6$ points in the period. This is less than the fall shown on Figure 2; but income growth was faster in the previous 20 years, so some of the fall is a late adjustment to that rise, as predicted by Figure 5.

Table 7. The simultaneity bias

| See Table 5 | OLS | 2SLS[a] |
|---|---|---|
| Initial $\gamma$ | **0.41** | **0.43** |
| t-ratio | (8.1) | (8.2) |
| Initial $y$ | **-0.50** | **-0.43** |
| t-ratio | (-5.5) | (-4.2) |
| *Mus* | **1.18** | **1.19** |
| t-ratio | (6.1) | (6.2) |
| *Oil* | **0.94** | **0.88** |
| t-ratio | (3.7) | (3.5) |
| *Com* | **2.35** | **2.35** |
| t-ratio | (5.2) | (5.2) |
| Period 2 | **5.61** | **4.88** |
| t-ratio | (6.3) | (4.9) |
| $R^2$ adjusted | 0.75 | 0.74 |
| N | 168 | 168 |

Note a: The variables of period 1 are used as instruments for $y_{-1}$.

## 3.6 Checking for counter causality

The estimates in the preceding section may suffer from a counter-causality bias. The bias is reduced by using initial gdp, but due to the inertia in the series, there may be some simultaneity left. Table 7 gives a standard two-stage least square estimate of the model for period 2 – using the variables of period 1 as instruments for $y_{it-1}$.[16] For easy comparison we repeat the appropriate column from Table 5. The coefficients move as predicted, but the bias is insignificant, as also predicted from the literature cited at the start of Section 2.

## 3.7 The movements in the coefficients from annual cross section estimates

Table A2 in the Appendix gives cross-country estimates of the effects for every year. Figures 6 and 7 show the way two of these coefficients move over time. The break in the two curves is due to the change in the number of countries during the transition from Socialism. The curves are surrounded by a confidence interval of approx. 95%.

The coefficient *Income* moves a little, but not systematically. We have argued that the coefficient on income should be somewhat unstable due to slow adjustments.

Figure 6. The one period estimates of the coefficient on income from Table A2



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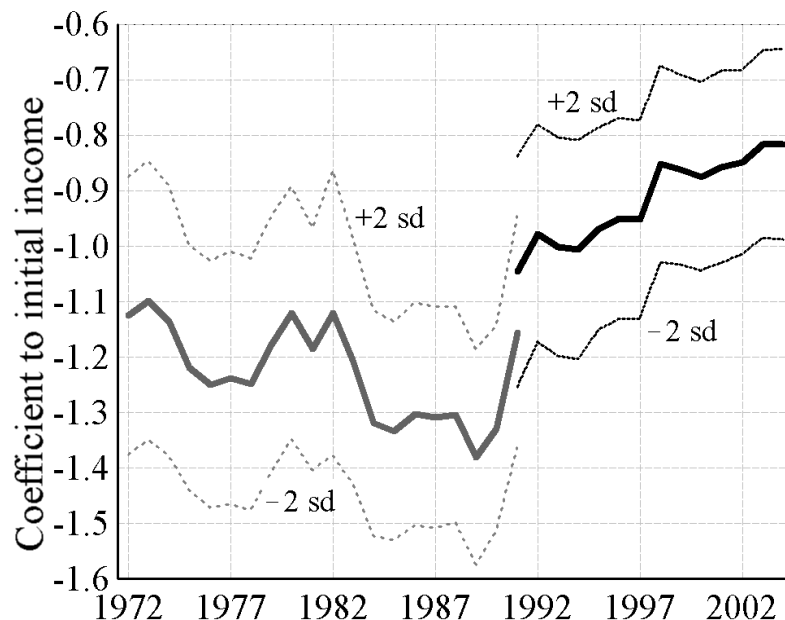
16. When $y_{t-1}$ is used to explain $\gamma_t^T$ the average lag is $1 + 16/2 = 9$ years. Hence, the simultaneity bias is likely to be small. When an additional lag of 16 years is used for the instruments (that is $y_{t-2}$ and $\gamma_{t-2}$), it is hard to imagine that any simultaneity bias remains.

Figure 7. The one period estimates of the coefficient on *Muslim* from Table A2
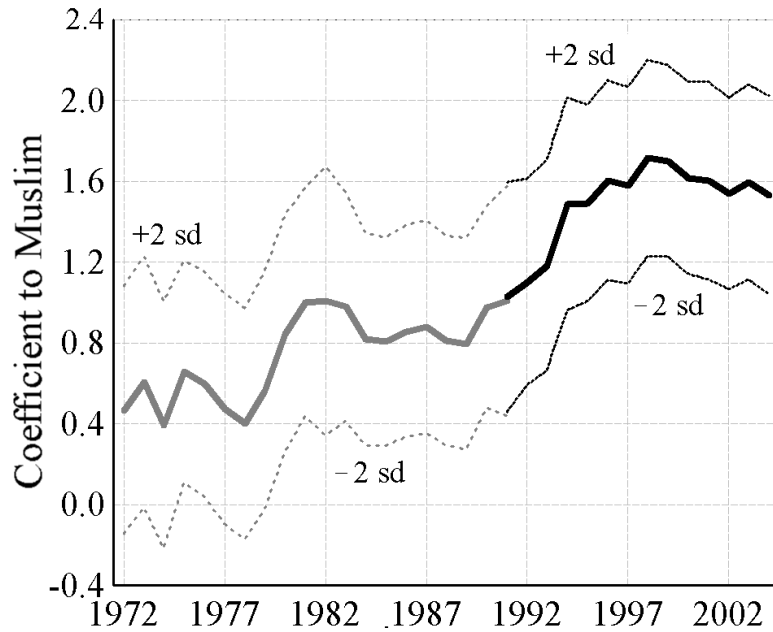


It is much more interesting that the coefficient on Muslim moves so much. Figure 3 shows that the movements in the Muslim gap are caused by movements in the other variables – this probably generates the dynamics. The upward trend in the effect of Muslim culture on the $\gamma$-score is significant. It looks as if it may have peaked in 1998, but the downturn is not significant.

## 4. The risk calculations and some explanations of the Muslim gap

We now return to the calculations from 2.6 above and give them into a Bayesian interpretation. We shall here look at the risk of being undemocratic

*4.1   The risk of being undemocratic*

Let $M$ and $\bar{M}$ denote, respectively, the events that a country is, is not, a Muslim country, and let $U$ and $\bar{U}$ denote, respectively, the events that a country is, is not, *undemocratic*. Then, the probability that a country is /is *not undemocratic*, given that it is a Muslim country, is:

$$P(U|M) = \frac{P(M|U)P(U)}{P(M)} \quad \text{and} \quad P(\bar{U}|M) = \frac{P(M|\bar{U})P(\bar{U})}{P(M)} \quad (1)$$

We can now define the six probability ratios of Table 8. Using these ratios, it is easy to calculate the relevant probabilities:

Table 8. Six definitions, for the probability ratios of "undemocratic" and "Muslim"

| Risk ratios | | Odds ratios | | Bayes' Factors: Increases in the risk | |
| --- | --- | --- | --- | --- | --- |
| Undemocratic if Muslim | Muslim if undemocratic | Undemocratic | Inverse | Muslim if undemocratic | Inverse |
| $\rho = \dfrac{P(U\mid M)}{P(\bar{U}\mid M)}$ | $\sigma = \dfrac{P(U\mid M)}{P(U\mid \bar{M})}$ | $\omega_U = \dfrac{P(U)}{1-P(U)}$ | $\omega_M = \dfrac{P(M)}{1-P(M)}$ | $\beta_M = \dfrac{P(M\mid U)}{P(M\mid \bar{U})}$ | $\lambda_M = \dfrac{P(M\mid U)}{P(\bar{M}\mid U)}$ |

The risk ratio $\rho$ is the risk of being undemocratic for a Muslim country:

$$\rho = \frac{P(U\mid M)}{P(\bar{U}\mid M)} = \frac{P(M\mid U)}{P(M\mid \bar{U})}\frac{P(U)}{P(\bar{U})} = \beta_M \omega_U \quad (2)$$

which is the relevant Bayes' Factor times the odds ratio, where the Bayes' Factor provides a measure of whether the data (the religion of the country) have increased or decreased the odds of the null hypothesis ($U$: the country is undemocratic) against the alternative hypothesis ($\bar{U}$: the country is not undemocratic): $\beta_M > 1$, signifies that the odds of being undemocratic, relative to not being undemocratic, increase if the country is Muslim; $\beta_M < 1$, signifies that the odds decrease (see Matthews, 2000).

An alternative view of the risk of a Muslim country being undemocratic is provided by posing the following question: given two countries – one Muslim, the other not – what is the ratio of their probabilities (as shown in Figure 6) of being undemocratic? In order to answer this question, the relevant "risk ratio" $\sigma$: given two different "pieces" of information – one country is Muslim, the other is not – what is the ratio of probabilities that the null hypothesis, that the country is undemocratic, is true? This ratio may be evaluated as:

$$\sigma = \frac{P(U\mid M)}{P(U\mid \bar{M})} = \frac{P(M\mid U)P(U)}{P(M)} \times \frac{P(\bar{M})}{P(\bar{M}\mid U)P(U)} = \frac{P(M\mid U)}{P(\bar{M}\mid U)} \times \frac{1-P(M)}{P(M)} = \lambda_M \omega_M \quad (3)$$

where $\lambda_M$ is the inverse Bayes' Factor applied to countries which are undemocratic. Intuitively, the inverse Bayes' Factor is the odds-ratio of the null hypothesis being true (a country is undemocratic) under one set of data (the country is Muslim), against it being true under a complementary set of data (the country is not Muslim). If $\lambda_M > 1 (<1)$ then, given that a country is undemocratic, it is more (less) likely to be Muslim than non-Muslim.

## 4.2 Conditional probabilities

The upper panel of Table 9 shows, for Muslim countries, the values of the Risk Ratio and the Bayes' Factor, and the lower panel shows the values of the "inverse" Risk Ratio and the "inverse" Bayes' Factor for four years: 1972, 1980, 1990, and 2004. The upper panel shows that in 1972 57 percent of the Muslim countries which were undemocratic ($P(U|M) = 0.57$), the remaining 43 percent being highly/moderately democratic $P(\bar{U}|M) = 0.43$). This yielded a Risk Ratio of 1.33: the chance of a Muslim country being undemocratic was one-third higher than the chance of it being highly/moderately democratic.

Table 9. Risk Ratio and Bayes' Factor, and Inverse Risk Ratio
and Inverse Bayes' Factor. Calculations for Muslim Countries

| Probabilities | Calculation: | 1972 | 1980 | 1990 | 2004 |
|---|---|---|---|---|---|
| Undemocratic, Muslim | $P(U|M)$ | 0.48 | 0.47 | 0.31 | 0.31 |
| HM democratic, Muslim | $P(\bar{U}|M)$ | 0.52 | 0.53 | 0.69 | 0.69 |
| Risk ratio | $\rho = P(U|M)/P(\bar{U}|M)$ | 1.33 | 1.22 | 0.45 | 0.45 |
| Odds Ratio | $P(U)/(1-P(U))$ | 0.75 | 0.66 | 0.24 | 0.20 |
| Bayes' Factor | $\beta_M = P(M|U)/P(M|\bar{U})$ | 1.77 | 1.85 | 1.88 | 2.30 |
| Undemocratic, Muslim | $P(U|M)$ | 0.57 | 0.55 | 0.31 | 0.31 |
| Democratic non-Muslim | $P(U|\bar{M})$ | 0.38 | 0.35 | 0.16 | 0.12 |
| Inverse risk ratio | $\sigma = P(U|M)/(P(U)|\bar{M})$ | 1.50 | 1.57 | 1.94 | 2.58 |
| Inverse odds ratio | $\omega_M = P(M)/(1-P(M))$ | 0.33 | 0.33 | 0.33 | 0.33 |
| Inverse Bayes' factor | $\lambda_M = P(M|U)/P(\bar{M}|U)$ | 0.50 | 0.52 | 0.64 | 0.85 |

Note: See Table 5 and text. The abbreviation "HM" means "highly and moderately".

The risk ratio is compared to the odds ratio – which is the ratio of the number of undemocratic to highly/moderately democratic countries – to arrive at the Bayes' Factor. If the Bayes' Factor (the risk ratio divided by the odds ratio) was greater than 1, then a country which was undemocratic was more likely to be Muslim than one which was highly/moderately democratic.[17] The upper panel of Table 9 shows that the Bayes' Factor was not only greater than 1, but also increased over the period 1972-2004. The risk of a Muslim country being undemocratic fell over 1972-2004 to the extent that, by 2004, the chance of a Muslim country being undemocratic was less than half the chance of it being highly/moderately democratic (Risk Ratio = 0.45). But, and this is the important point, the supply of undemocratic countries

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17. Conversely, if the Bayes' factor was less than 1, then a country which was highly/moderately democratic was more likely to be Muslim than one which was undemocratic.

shrank even faster so that, by 2004, only 20 percent of countries in the world were undemocratic (Odds Ratio = 0.20). The consequence was that in 2004, a country which was undemocratic was more than twice as likely to be Muslim as one which was highly/moderately democratic (Bayes' Factor = 2.3).

The lower panel of Table 9 shows that, in 1972, the chance of a Muslim country being undemocratic was 50 percent higher than the chance of a non-Muslim country (inverse Risk Ratio=1.5). Furthermore, the inverse Risk Ratio increased over 1972-2004 so that by 2004, the chance of a Muslim country being undemocratic was nearly three times the chance of a non-Muslim country (inverse Risk Ratio = 2.58).

However, the greater chance of a Muslim country, compared to a non-Muslim country, being undemocratic has to be set against the fact that Muslim countries constituted a minority of the world's countries: the Inverse Odds Ratio shows that the ratio of Muslim to non-Muslim countries was 0.33. Consequently, given that a country was undemocratic, it was less likely to be Muslim than non-Muslim, i.e. the inverse Bayes' factor was less than unity. However, the inverse Bayes' factor was rising over time so that by 2004, even though only a third of the world's countries were Muslim, the chance of an undemocratic country being Muslim was 85 percent of the chance of an undemocratic country being non-Muslim.

*4.3   Explaining the gap: Some observations*

The analysis shows that a significant gap has emerged between the level of democracy in the Muslim World and the rest of the World. It is an old gap, but it has grown, and it is now larger than ever before – see Jensen & Paldam (2005) for a perspective of the full 20th century. The growth of the gap is due to the democratic transition in the non-Muslim countries, which we ascribed to economic growth. Wealth also increases in the Muslim World (almost as the average country), but here it does not generate democracy. This explanation suggests that the gap will continue growing – that is, the small decrease that has occurred since 1998 may not be a sign of a kink.

This begs the question of why Muslim countries are seemingly immune to the democratic transition happening elsewhere. We are able to dig one step deeper and still be on an empirical basis by looking at the relevant tables of the World Value Surveys.[18] Two points should be noted: (a) The items measuring people's democratic values show little difference between people in Muslim and other countries. (b) However, the items dealing with secularization, i.e.

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18. See Inglehart *et al* (2004). Especially F034, F063, F064 and F102 are relevant.

the relation between the state and religion, show that Muslims differ from most others in the sense that Muslims reject secularization and demand a religious factor in politics.

Comparing the traditions of two big Middle Eastern monotheistic religions, it is perhaps also pertinent that Christianity during its first three centuries was a religion for people who were far from political power. On the contrary, Islam was (almost) from the start the religion of a state and the driving force behind one of the fastest and most successful processes of empire building known in history.

### 4.4    *Explaining the gap: More radical theories*

Many authors studying the history and culture of the Muslim world have discussed the gap. A well-known contribution is Lewis (2002), who observes that a process of cultural and political dynamism started in the West with the Renaissance (half a millennium ago). It has gradually spread – as a *quest for modernization* – to the rest of the world, but even if it has often been introduced in the Muslim world, it has failed to sing deep roots. In the terminology of economics, the spread of modernism has the character of a "club" effect, where countries in the club are influenced by each other, but not by outside countries.

Others are more radical: Kedourie (1992) argues that "the idea of representation, of elections, of popular suffrage, of political institutions being regulated by laws laid down by a parliamentary assembly, of these laws being guarded and upheld by an independent judiciary, the ideas of secularity of the state….all of these are profoundly alien to the Muslim political tradition" (p. 5).

Zakaria (2003) qualifies this by claiming that a lack of democracy among Muslim countries is not a Muslim problem, but rather an Arab problem:[19] Several Muslim countries – most notably Bangladesh, Indonesia, Malaysia, Mali and Turkey – are democracies, but (in 2003) none of the 22 countries in the Arab League have elected governments.[20] He gives several reasons for this. First, he notes that the enlightened dictator, and the heroic leader, enjoys a revered place in Arab political discourse (Barakat, 1993; Korany, 1994). Second, Western countries tolerate the dictatorships of Arab strongmen because the alternative to such pro-Western dictatorships is held to be even worse: Anti-western, Muslim fundamentalism.[21] Third, Israel and the Palestinian cause have become the great obsessions of the Arab world,

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19. Our analysis (and Paldam, 2005a) shows that it is a *general* Muslim problem; but it is (even) stronger for the Arab countries than for the other Muslim countries.
20. However, the partially independent Palestine has recently had a democratic election that was won by the Islamist movement Hamas, which is now in government.
21. Such as Hizbollah (Lebanon), the Islamic Front (Algeria), the Muslim Brotherhood (Egypt).

deflecting the attention of its population from the defects of their own society to a preoccupation with the injustice suffered by the Palestinian in 1948, and the endless spiral of violence since then.

Thus, many reasons have been suggested why Muslim and especially Arab countries are characterized by unusually authoritarian governments.

# 5. Conclusions

This paper had three purposes. First, we have compared the main pattern in the data with the predictions from the literature concentrating on the link between income and democracy. The survey concluded that the results reported in the literature suggested that the causal link from democracy to the level of income is quite weak.

The second purpose was to "explain" the level of democracy by 5 variables: The initial level of income, religion, oil, Communism, and the initial level of democracy. It identified three main barriers to democracy: Poverty, Communism and Muslim culture. It was demonstrated that the effect of income was sufficiently large to explain the democratization that has taken place, but then, of course, we come to explain the collapse of Communism in most of its former range as being due to pressures generated by rising incomes.

It was demonstrated that the concept of a (endogenous) democratic transition did explain the main pattern in the data. We reached the same result both in a cross country setting and in a dynamic panel estimate. The later estimates showed that the level of democracy adjusted slowly to rising income.

The third purpose of the paper was to use the methods of Bayesian probability analysis to make explicit the concept of the "risk" of countries being undemocratic. Here, we used the distinction between Muslim and non-Muslim countries to show that, by 2004, a country which was undemocratic was more than twice as likely to be Muslim than one which was highly/moderately democratic. Using a complementary concept of risk, we were also able to show that by 2004, even though only a third of the world's countries were Muslim, the chance of an undemocratic country being Muslim was 85 percent of the chance of an undemocratic country being non-Muslim.

We also examined the dynamics of the gap between the level of democracy in *Muslim* and Other countries. It was found to be large but not stationary. This gives the hope that it may start to fall, but now it appears to be widening.

## Acknowledgements

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# Appendix: Some tables

Table A1. The Gastil score 1972 and 2004 for democracy

| Highly 1972 | | | Highly 2004 | | | Moderately 1972 | | | Moderately 2004 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| No | Country | G. | No | Country | G. | No | Country | G. | No | Country | G. |
| 1 | Australia | 1 | 1 | Australia | 1 | 87 | Ethiopia | 5.5 | 87 | Bosnia & | 3.5 |
| 2 | Austria | 1 | 2 | Austria | 1 | 88 | Iran | 5.5 | 88 | Fiji | 3.5 |
| 3 | Barbados | 1 | 3 | Bahamas | 1 | 89 | Korea, S. | 5.5 | 89 | Georgia | 3.5 |
| 4 | Belgium | 1 | 4 | Barbados | 1 | 90 | Lesotho | 5.5 | 90 | Indonesia | 3.5 |
| 5 | Canada | 1 | 5 | Belgium | 1 | 91 | Nepal | 5.5 | 91 | Moldova | 3.5 |
| 6 | Costa Rica | 1 | 6 | Canada | 1 | 92 | Portugal | 5.5 | 92 | Mozambique | 3.5 |
| 7 | Denmark | 1 | 7 | Cape Verde | 1 | 93 | Qatar | 5.5 | 93 | Sierra Leone | 3.5 |
| 8 | Germany | 1 | 8 | Chile | 1 | 94 | Spain | 5.5 | 94 | Tanzania | 3.5 |
| 9 | Iceland | 1 | 9 | Costa Rica | 1 | 95 | Taiwan | 5.5 | 95 | Ukraine | 3.5 |
| 10 | Netherlands | 1 | 10 | Cyprus, G. | 1 | 96 | Tunisia | 5.5 | 96 | Venezuela | 3.5 |
| 11 | New Zealand | 1 | 11 | Czech R. | 1 | 97 | Yemen | 5.5 | 97 | Bangladesh | 4 |
| 12 | Norway | 1 | 12 | Denmark | 1 | 98 | Zimbabwe | 5.5 | 98 | Colombia | 4 |
| 13 | Sweden | 1 | 13 | Dominican R. | 1 | **Undemocratic 1972** | | | 99 | Comoros | 4 |
| 14 | Switzerland | 1 | 14 | Estonia | 1 | 99 | Algeria | 6 | 100 | Gambia, The | 4 |
| 15 | U.K. | 1 | 15 | Finland | 1 | 100 | Angola | 6 | 101 | Guatemala | 4 |
| 16 | U.S.A. | 1 | 16 | France | 1 | 101 | (Armenia) | 6 | 102 | Guinea-Bissau | 4 |
| 17 | Bahamas | 1.5 | 17 | Germany | 1 | 102 | (Azerbaijan) | 6 | 103 | Malawi | 4 |
| 18 | Chile | 1.5 | 18 | Hungary | 1 | 103 | (Belarus) | 6 | 104 | Malaysia | 4 |
| 19 | France | 1.5 | 19 | Iceland | 1 | 104 | Benin | 6 | 105 | Nigeria | 4 |
| 20 | Ireland | 1.5 | 20 | Ireland | 1 | 105 | (Bosnia &) | 6 | 106 | Tonga | 4 |
| 21 | Italy | 1.5 | 21 | Italy | 1 | 106 | Cote d'Ivorie | 6 | 107 | Zambia | 4 |
| 22 | Jamaica | 1.5 | 22 | Luxembourg | 1 | 107 | (Croatia) | 6 | 108 | Armenia | 4.5 |
| 23 | Japan | 1.5 | 23 | Malta | 1 | 108 | Egypt | 6 | 109 | Burkina Faso | 4.5 |
| 24 | Luxembourg | 1.5 | 24 | Mauritius | 1 | 109 | Equatorial G. | 6 | 110 | Congo (B) | 4.5 |
| 25 | Malta | 1.5 | 25 | Nauru | 1 | 110 | (Estonia) | 6 | 111 | Gabon | 4.5 |
| 26 | Colombia | 2 | 26 | Netherlands | 1 | 111 | Gabon | 6 | 112 | Jordan | 4.5 |
| 27 | Fiji | 2 | 27 | New Zealand | 1 | 112 | (Georgia) | 6 | 113 | Kuwait | 4.5 |
| 28 | Finland | 2 | 28 | Norway | 1 | 113 | Ghana | 6 | 114 | Liberia | 4.5 |
| 29 | Gambia, The | 2 | 29 | Poland | 1 | 114 | Greece | 6 | 115 | Morocco | 4.5 |
| 30 | Guyana | 2 | 30 | Portugal | 1 | 115 | Guinea-Bissau | 6 | 116 | Singapore | 4.5 |
| 31 | Lebanon | 2 | 31 | Slovakia | 1 | 116 | Hungary | 6 | 117 | Uganda | 4.5 |
| 32 | Nauru | 2 | 32 | Slovenia | 1 | 117 | Jordan | 6 | 118 | Bahrain | 5 |
| 33 | Suriname | 2 | 33 | Spain | 1 | 118 | (Kazakhstan) | 6 | 119 | Burundi | 5 |
| 34 | Venezuela | 2 | 34 | Sweden | 1 | 119 | (Kyrgyzstan) | 6 | 120 | Djibuti | 5 |
| 35 | Cyprus, G | 2.5 | 35 | Switzerland | 1 | 120 | (Latvia) | 6 | 121 | Ethiopia | 5 |
| 36 | Dominican R. | 2.5 | 36 | U.K. | 1 | 121 | Liberia | 6 | 122 | Nepal | 5 |
| 37 | El Salvador | 2.5 | 37 | Uruguay | 1 | 122 | (Lithuania) | 6 | 123 | Yemen | 5 |
| 38 | Guatemala | 2.5 | 38 | U.S.A. | 1 | 123 | (Macedonia) | 6 | 124 | Afghanistan | 5.5 |
| 39 | India | 2.5 | 39 | Bulgaria | 1.5 | 124 | Mauritania | 6 | 125 | Algeria | 5.5 |
| 40 | Israel | 2.5 | 40 | Greece | 1.5 | 125 | (Moldova) | 6 | 126 | Angola | 5.5 |

| # | Country | Score | # | Country | Score | # | Country | Score | # | Country | Score |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 41 | Malaysia | 2.5 | 41 | Grenada | 1.5 | 126 | Mozambique | 6 | 127 | Azerbaijan | 5.5 |
| 42 | Maldives | 2.5 | 42 | Japan | 1.5 | 127 | Myanmar | 6 | 128 | Bhutan | 5.5 |
| 43 | Mauritius | 2.5 | 43 | Korea, S | 1.5 | 128 | Niger | 6 | 129 | Brunei | 5.5 |
| 44 | New Guinea | 2.5 | 44 | Latvia | 1.5 | 129 | Peru | 6 | 130 | Cambodia | 5.5 |
| 45 | Sri Lanka | 2.5 | 45 | Panama | 1.5 | 130 | Poland | 6 | 131 | CAR | 5.5 |
| 46 | Trinidad & | 2.5 | 46 | South Africa | 1.5 | 131 | Russia | 6 | 132 | Chad | 5.5 |
| | **Moderately 1972** | | 47 | Suriname | 1.5 | 132 | Saudi Arabia | 6 | 133 | Egypt | 5.5 |
| 47 | Bangladesh | 3 | 48 | Taiwan | 1.5 | 133 | Senegal | 6 | 134 | Guinea | 5.5 |
| 48 | Grenada | 3 | 49 | Croatia | 2 | 134 | Serbia & | 6 | 135 | Kazakhstan | 5.5 |
| 49 | Samoa | 3 | 50 | Argentina | 2 | 135 | (Slovenia) | 6 | 136 | Kyrgyzstan | 5.5 |
| 50 | Swaziland | 3 | 51 | Benin | 2 | 136 | Sudan | 6 | 137 | Lebanon | 5.5 |
| 51 | Tonga | 3 | 52 | Botswana | 2 | 137 | (Tajikistan) | 6 | 138 | Maldives | 5.5 |
| 52 | Botswana | 3.5 | 53 | Ghana | 2 | 138 | Tanzania | 6 | 139 | Mauritania | 5.5 |
| 53 | Burkino Faso | 3.5 | 54 | Guyana | 2 | 139 | Thailand | 6 | 140 | Oman | 5.5 |
| 54 | Comoros | 3.5 | 55 | Israel | 2 | 140 | Togo | 6 | 141 | Pakistan | 5.5 |
| 55 | Djibouti | 3.5 | 56 | Lithuania | 2 | 141 | (Turkmenistan) | 6 | 142 | Quatar | 5.5 |
| 56 | Nicaragua | 3.5 | 57 | Mali | 2 | 142 | (Ukraine) | 6 | 143 | Russia | 5.5 |
| 57 | Turkey | 3.5 | 58 | Mexico | 2 | 143 | U.A.E. | 6 | 144 | Rwanda | 5.5 |
| 58 | Uruguay | 3.5 | 59 | Mongolia | 2 | 144 | (Uzbekistan) | 6 | 145 | Tajikistan | 5.5 |
| 59 | Bhutan | 4 | 60 | Samoa | 2 | 145 | Chad | 6.5 | 146 | Togo | 5.5 |
| 60 | Kuwait | 4 | 61 | Sao Tome & | 2 | 146 | Congo (K) | 6.5 | 147 | Tunisia | 5.5 |
| 61 | Madagascar | 4 | 62 | Brazil | 2.5 | 147 | Haiti | 6.5 | | **Undemocratic 2004** | |
| 62 | Mexico | 4 | 63 | El Salvador | 2.5 | 148 | Libya | 6.5 | 148 | Cameroon | 6 |
| 63 | Pakistan | 4 | 64 | India | 2.5 | 149 | Malawi | 6.5 | 149 | Congo (K) | 6 |
| 64 | Afghanistan | 4.5 | 65 | Jamaica | 2.5 | 150 | Mali | 6.5 | 150 | Cote d'Ivoire | 6 |
| 65 | Argentina | 4.5 | 66 | Lesotho | 2.5 | 151 | Oman | 6.5 | 151 | Iran | 6 |
| 66 | Bolivia | 4.5 | 67 | Peru | 2.5 | 152 | Panama | 6.5 | 152 | Iraq | 6 |
| 67 | Kenya | 4.5 | 68 | Philippines | 2.5 | 153 | Romania | 6.5 | 153 | Swaziland | 6 |
| 68 | Morocco | 4.5 | 69 | Romania | 2.5 | 154 | Rwanda | 6.5 | 154 | U.A.E. | 6 |
| 69 | Sierra Leone | 4.5 | 70 | Serbia & | 2.5 | 155 | Somalia | 6.5 | 155 | Belarus | 6.5 |
| 70 | South Africa | 4.5 | 71 | Senegal | 2.5 | 156 | Albania | 7 | 156 | China | 6.5 |
| 71 | Brazil | 5 | 72 | Thailand | 2.5 | 157 | Bulgaria | 7 | 157 | Equatorial G. | 6.5 |
| 72 | Cameroon | 5 | | **Moderately 2004** | | 158 | Burundi | 7 | 158 | Haiti | 6.5 |
| 73 | Cape Verde | 5 | 73 | Albania | 3 | 159 | C.A.R. | 7 | 159 | Laos | 6.5 |
| 74 | Ecuador | 5 | 74 | Bolivia | 3 | 160 | China | 7 | 160 | Somalia | 6.5 |
| 75 | Honduras | 5 | 75 | Ecuador | 3 | 161 | Congo (B) | 7 | 161 | Uzbekistan | 6.5 |
| 76 | Indonesia | 5 | 76 | Honduras | 3 | 162 | Cuba | 7 | 162 | Vietnam | 6.5 |
| 77 | Laos | 5 | 77 | Kenya | 3 | 163 | Czech R. | 7 | 163 | Zimbabwe | 6.5 |
| 78 | Nigeria | 5 | 78 | Macedonia | 3 | 164 | Guinea | 7 | 164 | Cuba | 7 |
| 79 | Paraguay | 5 | 79 | Madagascar | 3 | 165 | Iraq | 7 | 165 | Korea, N | 7 |
| 80 | Philippines | 5 | 80 | Nicaragua | 3 | 166 | Korea, N | 7 | 166 | Libya | 7 |
| 81 | Sao Tome & | 5 | 81 | Niger | 3 | 167 | Mongolia | 7 | 167 | Myanmar | 7 |
| 82 | Singapore | 5 | 82 | P. New Guinea | 3 | 168 | (Slovakia) | 7 | 168 | Saudi Arabia | 7 |
| 83 | Zambia | 5 | 83 | Paraguay | 3 | 169 | Syria | 7 | 169 | Sudan | 7 |
| 84 | Bahrain | 5.5 | 84 | Sri Lanka | 3 | 170 | Uganda | 7 | 170 | Syria | 7 |
| 85 | Brunei | 5.5 | 85 | Trinidad & | 3.5 | 171 | Vietnam | 7 | 171 | Turkmenistan | 7 |
| 86 | Cambodia | 5.5 | 86 | Turkey | 3.5 | | | | | | |

Note: The countries in brackets in 1972 were not independent, but members of three larger entities: The Soviet Union, Yugoslavia and Czechoslovakia. We have given all members of each union the same score.

Table A2. Model (1) estimated as a cross section for each year, t = 1972, …, 2004

| Year | Const | | Ln $y_{-1}$ | | Muslim | | Oil | | Communist | | $R^2$ adj | N |
|------|-------|------|-------|------|------|------|------|------|------|------|------|-----|
| 1972 | **12.64** | (12.7) | **-1.13** | (-9.0) | 0.47 | (1.5) | **1.80** | (4.4) | **2.53** | (6.1) | 0.47 | 149 |
| 1973 | **12.48** | (12.5) | **-1.10** | (-8.8) | **0.60** | (2.0) | **1.52** | (3.7) | **2.52** | (6.0) | 0.46 | 149 |
| 1974 | **12.78** | (13.1) | **-1.13** | (-9.3) | 0.39 | (1.3) | **1.66** | (4.1) | **2.57** | (6.2) | 0.48 | 149 |
| 1975 | **13.53** | (15.3) | **-1.22** | (-11.1) | **0.66** | (2.4) | **1.66** | (4.5) | **2.55** | (6.9) | 0.57 | 149 |
| 1976 | **13.81** | (15.4) | **-1.25** | (-11.2) | **0.60** | (2.1) | **1.63** | (4.4) | **2.57** | (6.8) | 0.57 | 149 |
| 1977 | **13.73** | (15.0) | **-1.24** | (-10.9) | 0.47 | (1.7) | **1.71** | (4.5) | **2.38** | (6.1) | 0.54 | 149 |
| 1978 | **13.83** | (15.1) | **-1.25** | (-11.0) | 0.40 | (1.4) | **1.69** | (4.4) | **2.36** | (6.1) | 0.54 | 149 |
| 1979 | **13.21** | (14.1) | **-1.18** | (-10.2) | 0.56 | (1.9) | **1.44** | (3.7) | **2.44** | (6.1) | 0.52 | 149 |
| 1980 | **12.79** | (13.8) | **-1.12** | (-9.8) | **0.84** | (2.9) | **1.25** | (3.2) | **2.41** | (6.1) | 0.52 | 149 |
| 1981 | **13.28** | (14.9) | **-1.19** | (-10.9) | **1.00** | (3.5) | **1.19** | (3.2) | **2.43** | (6.4) | 0.57 | 149 |
| 1982 | **12.54** | (11.9) | **-1.12** | (-8.7) | **1.01** | (3.0) | **1.27** | (2.9) | **2.73** | (6.1) | 0.48 | 149 |
| 1983 | **13.48** | (15.0) | **-1.21** | (-11.0) | **0.98** | (3.5) | **1.11** | (3.0) | **2.47** | (6.5) | 0.57 | 149 |
| 1984 | **14.33** | (17.3) | **-1.32** | (-13.0) | **0.82** | (3.1) | **1.52** | (4.5) | **2.58** | (7.3) | 0.64 | 149 |
| 1985 | **14.41** | (17.9) | **-1.33** | (-13.5) | **0.81** | (3.1) | **1.58** | (4.7) | **2.64** | (7.6) | 0.66 | 149 |
| 1986 | **14.12** | (17.2) | **-1.30** | (-13.0) | **0.86** | (3.3) | **1.60** | (4.7) | **2.70** | (7.6) | 0.65 | 149 |
| 1987 | **14.15** | (17.3) | **-1.31** | (-13.1) | **0.88** | (3.3) | **1.45** | (4.3) | **2.60** | (7.3) | 0.65 | 149 |
| 1988 | **14.09** | (17.7) | **-1.30** | (-13.4) | **0.81** | (3.1) | **1.36** | (4.1) | **2.50** | (7.2) | 0.65 | 149 |
| 1989 | **14.65** | (18.4) | **-1.38** | (-14.2) | **0.79** | (3.0) | **1.52** | (4.6) | **2.49** | (7.1) | 0.67 | 149 |
| 1990 | **14.12** | (18.6) | **-1.33** | (-14.4) | **0.98** | (3.9) | **1.52** | (4.8) | **1.42** | (4.2) | 0.67 | 149 |
| 1991 | **12.62** | (14.7) | **-1.16** | (-11.1) | **1.01** | (3.5) | **1.29** | (3.6) | **1.05** | (2.8) | 0.55 | 149 |
| 1991 | **11.86** | (14.5) | **-1.05** | (-10.7) | **1.03** | (4.0) | **1.14** | (3.5) | **2.84** | (4.8) | 0.56 | 168 |
| 1992 | **11.17** | (13.6) | **-0.98** | (-9.9) | **1.10** | (4.2) | **1.31** | (3.9) | **3.01** | (5.0) | 0.55 | 168 |
| 1993 | **11.45** | (14.0) | **-1.00** | (-10.1) | **1.18** | (4.5) | **1.54** | (4.5) | **2.88** | (4.7) | 0.56 | 168 |
| 1994 | **11.38** | (15.1) | **-1.01** | (-11.1) | **1.49** | (6.1) | **1.51** | (4.8) | **2.99** | (5.3) | 0.63 | 168 |
| 1995 | **11.02** | (14.7) | **-0.97** | (-10.7) | **1.49** | (6.0) | **1.49** | (4.7) | **3.05** | (5.3) | 0.62 | 168 |
| 1996 | **10.81** | (14.6) | **-0.95** | (-10.7) | **1.60** | (6.6) | **1.37** | (4.4) | **3.13** | (5.5) | 0.63 | 168 |
| 1997 | **10.83** | (14.7) | **-0.95** | (-10.8) | **1.58** | (6.5) | **1.47** | (4.7) | **3.12** | (5.5) | 0.63 | 168 |
| 1998 | **9.94** | (13.9) | **-0.85** | (-10.0) | **1.71** | (7.2) | **1.33** | (4.4) | **3.19** | (5.8) | 0.64 | 168 |
| 1999 | **10.03** | (14.1) | **-0.86** | (-10.2) | **1.70** | (7.2) | **1.24** | (4.1) | **3.19** | (5.8) | 0.63 | 168 |
| 2000 | **10.13** | (13.9) | **-0.88** | (-10.1) | **1.62** | (6.6) | **1.27** | (4.1) | **3.11** | (5.5) | 0.61 | 168 |
| 2001 | **10.01** | (14.3) | **-0.86** | (-10.3) | **1.60** | (6.8) | **1.30** | (4.3) | **3.14** | (5.7) | 0.62 | 168 |
| 2002 | **9.86** | (13.8) | **-0.85** | (-10.0) | **1.54** | (6.4) | **1.38** | (4.4) | **3.24** | (5.8) | 0.61 | 168 |
| 2003 | **9.56** | (13.1) | **-0.82** | (-9.5) | **1.59** | (6.5) | **1.27** | (4.0) | **3.31** | (5.8) | 0.61 | 168 |
| 2004 | **9.53** | (12.7) | **-0.82** | (-9.2) | **1.53** | (6.0) | **1.35** | (4.1) | **3.37** | (5.7) | 0.58 | 168 |
| Avr. | **12.30** | **14.8** | **-1.10** | **-10.9** | **1.05** | **4.1** | **1.43** | **4.2** | **2.69** | **6.0** | **0.58** | |
| t-ratio | (7.5) | (8.7) | (-6.4) | (-7.2) | (2.5) | (2.2) | (8.3) | (8.0) | (5.6) | (6.1) | (9.9) | |

Note: All coefficients with p-values below 0.05 are bolded. The t-ratios in the last line of the Table are calculated for the column above. Model and variables defined in Table 3. We have run all regressions as ordered logit as well. The results are virtually the same.