An Empirical Contribution to the Debate on Corruption, Democracy and Environmental Policy

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Summary

Both theoretical and empirical studies have shown that democracy and corruption have substantial influence on environmental policy. In this paper, we empirically analyse whether both democracy and corruption are equally important determinants. When these variables are jointly included as explanatory variables, we find that corruption stands out as an important determinant of environmental policies, while democracy has a very limited impact. Further on, we discuss our results in the context of the Environmental Kuznets Curve literature. We argue that institutional disarray that plagues developing countries will make it problematic for them to have increasing environmental policy stringency combined with increasing incomes. Finally, and more optimistically, when we consider our results in the context of institutions and growth, we conclude that there is a possibility of reaching a double dividend. Reductions in corruption would induce both higher growth rates and stricter environmental policies. Thus, institutional improvement is an extremely valuable step in achieving sustainable development.

Keywords: Corruption, Democracy, Development, Environmental policy, Institutions

JEL Classification: H40, D73, Q56, Q58

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1. INTRODUCTION

The role of democracy in bringing welfare to the people has a long history as a subject for analysis. Plato argued on the deficits of democracy in The Republic, and John Stuart Mill (1859) reflected extensively on masses' governments and welfare. The rise of environmental concerns directed attention to a specific link between democracy and welfare, that is, the role of democracy in societies' dealing with environmental issues. A first wave of literature – in the late 1960s and 1970s – was sceptical about the virtues of democracies with respect to environmental protection because of the link between democracy, market economies, and individual freedom (e.g. Ehrlich, 1968, Hardin 1968, Heilbroner, 1974). But, following the poor environmental performance of Soviet economies and dictatorships established in Latin America, Asia and Africa, a new strand of literature has been calling for democracy as a way to promote both economic and environmental welfare (e.g. McCloskey, 1983, Payne, 1995).

More recently, literature's interest has shifted from democracy to the effects of corruption on environmental quality (Lopez and Mitra 2000, Fredriksson and Millimet 2001, Damania *et al.* 2003). This interest followed the evident pillage of natural resources that took place in developing countries dominated by corrupt regimes. It also fits the increasing awareness of the negative effects of corruption on the economy and on the production and provision of public goods. Thanks to the increasing availability of indexes of institutional qualities over the last decades (both indexes for democracy and for corruption), there are now several empirical studies on the effects of democracy and corruption on environmental policy commitment and resource conservation. In general, these studies conclude that democracy is a significant positive and corruption a significant negative determinant of environmental protection.

A problem with these studies is, however, that they focus on either democracy or corruption, and they do not test whether one of the two variables is more important as compared to the other. This is problematic since the two variables are highly correlated and, therefore, the individual estimation of their effects easily overemphasises the importance of each variable. In technical terms, the coefficients suffer from an overestimation bias. In this paper, we will test whether empirical evidence supports both democracy and corruption to be fundamental determinants of environmental policy when these two institutional variables are used simultaneously as explanatory variables. Alternatively, we may conclude that one of the two variables is the main

channel through which environmental policies are affected, while the other variable is of secondary importance.

While most of the literature has been concerned with actual resource use – such as deforestation rates, ambient concentration of pollutants, and soil erosion – our focus is on political commitment to the environment. This slightly different scope, compared to the mainstream literature, has two advantages. First, actual resource use and environmental quality levels are affected by several factors such as climate conditions that are outside the control of policy-makers. These outside causes are important but difficult to control for econometrically. By studying the link from institutional indexes to environmental policies, we expect to be less vulnerable to external disturbances. Second, the actual levels for environmental variables are often sluggish in adjustment to policies. They are affected by a history of development and present concerns for the environment will only have an effect on future resource levels. Focusing on environmental commitment as an intermediate variable can reveal more direct impacts of contemporary institutional quality.

The paper proceeds as follows. In Section 2 we present the data sets used in the analysis. Section 3 presents a review of theoretical and empirical findings in previous studies on democracy, corruption and environmental protection and compares them with our empirical findings. Section 4 discusses our results in the context of the literature on economic development and the environment, and Section 5 concludes.

2. THE DATA

Tests of the interaction among institutions, economic development and public policies advanced when, since the early 1970's, the Freedom House indexes of political freedoms and civil liberties[1] and the indicators from Business Environmental Risk Intelligence first appeared. Data on institutions are obtained from sources that are used by companies to evaluate investment opportunities in foreign countries and cover aspects of the economic milieu that are considered important by the economic agents that make use of them: risk of expropriation, definition of property rights, contract enforceability, infrastructure quality, working of markets, bureaucratic efficiency, political and institutional stability, repudiation of contracts by government, and so forth. Another source of data on institutional settings are those dataset gathered by international

[1] These are also known as the Gastil-indexes after Raymond Gastil who developed them.

institutions and policy advisors. For this paper, we use data on corruption perception, available since 1995, gathered by Transparency International.[2] An increase in the corruption index has the intuitive meaning of an increase in corruption[3]. There are data, provided by Transparency International, for the earlier period 1980-1985, but these data are restricted to 41 countries. We have augmented the sample including 13 countries on which corruption data started to be available in 1997 and 1998[4]. As we expected, the correlation between the sets of 1980-1985, 1997 and the 1998 corruption perception indexes, is very high (about 85%). Furthermore, when we regressed the available data from 1980-1985 on the data from the 1997, and the 1998 samples, the constant and the coefficient are within the 95% confidence interval of 0 and 1, respectively. This finding confirms that the values of the corruption perception index from more recent surveys can be used, as an addition to the older set of indexes, without further transformation. We checked robustness of our statistical results with respect to the sample, and results are only slightly changed when we use the sample restricted to the older data. For the regressions where we used the environmental regulatory regime index, which refers to the year 2001, as a dependent variable, the corruption perception index refers to the year 1998.

Our proxy for democracy levels is from the dataset Polity IV, produced by ICSR of the University of Maryland (Jaggers and Gurr, 1995). In our main analysis, we averaged the annual values over the period 1980-85 to assure a coherent framework when we use the corruption variable that refers to the same period. When we used the environmental regulatory regime index as a dependent variable, we averaged the democracy variable over the period 1986-95. Some authors, while running cross-country regressions, prefer the use of dummy variables for democracy that indicate low, medium, or high democracy (e.g. Hauge and Ellingsen, 1998 and Neumayer, 2002). The use of dummies reduces however the variability of the democracy index and, therefore, reduces the statistical significance of its coefficient. Not to reduce the significance of the democracy variable at an early stage of our analysis, we prefer the use of the continuous variable.

As a test for robustness, we also use another index of democracy. Thus, we will check if our results depend on the definition of the democracy measure we have chosen. While the Polity IV

[2] The data are available at http://www.transparency.org/

[3] That is, we subtracted the original value of the index, as provided by Transparency International, from 10.

[4] Specifically, we used data of the corruption perception index 1997 for Uruguay, the index 1998 for Ghana, Iceland, Jamaica, Morocco, Malawi, Paraguay, Senegal, Tunisia, Tanzania, Zambia and Zimbabwe and the 1980-85 for the rest of the sample.

dataset accounts for institutionalised democracy and is made up by experts' evaluations, the index of democracy, developed by Vanhanen (2000), scores countries according to elections results and participation.[5] The index of democracy is made by the multiplication of two factors: one accounts for the level of competition at elections and the other to the level of turnout. Thus, democracies are countries where competition among political parties is high and a large share of the electorate is active. We note that this index is, methodologically and conceptually, very different from the one used in the main analysis, and thus we consider it proper for a robustness analysis. The index has been averaged over two periods of time consistently with the other democracy index.

The data on environmental policy stringency we used are based on the reports that were self-compiled by individual countries prior to the UN Earth Summit that took place in Rio in 1992. Dasgupta *et al.* (1995) first developed an index of environmental policy stringency based on the questionnaires collected by the UN Environmental Program. Their country sample included 31 countries randomly chosen among the ones that participated in the conference. Eliste and Fredriksson (2002), using the same methodology, compiled the index for another 31 countries (also randomly selected). Together, these two sets make a sample of 62 countries with which it is possible to perform cross-country analysis. The index ranges from 1 to 250, with a lower value implying a less stringent policy. These data reflect several aspects of agricultural environmental policy: from policy formulation, to its implementation, to general awareness in the public of environmental issues. Their base year is 1990. The reports were completed by the governments, representatives of the business sector and of Non- Governmental Organizations (NGOs) of the countries concerned. The presence of NGOs in the process should warrant objectiveness in the surveys and avoid complacency typical of governmental self-reporting. Also an index of industry stringency of environmental regulations is available, but only for 31 countries. The index for agriculture and the one for industry have a Pearson correlation of 0.96. As the indexes as so highly correlated, we can consider the agriculture one (which is available for a larger sample) as an indicator of overall environmental protection.

Another index quantifying the stringency of environmental policies is the "environmental regulatory regime index" compiled by Esty and Porter (2002) on the base of the Environmental Sustainability Index[6], and the *Global Competitiveness Report 2001-2002* annual survey of

[5] The data are available at http://www.svt.ntnu.no/iss/data/vanhanen/

[6] The Environmental sustainability index is a joint project of the World Economic Forum, The Yale Center for Environmental Law and Policy, and the Columbia University Center for International Earth Science Information Network. See www.ciesin.columbia.edu/indicators/ESI/

business and government leaders. The index includes the stringency of environmental pollution standards, sophistication of regulatory structure, quality of the environmental information available, extent of subsidization of natural resources, strictness of enforcement and quality of environmental institutions. Esty and Porter (2002) have shown that the index they compiled is a statistically significant predictor of pollution levels (the authors used it as an explanatory variable for urban particulate concentration, urban SO_2 concentration, and energy usage). We will make use of this index, as an alternative to the environmental protection stringency index as to check the robustness of our results. It must be noted though, that countries for which the environmental regulatory regime index is available tend to be more democratic than the world average.[7] The presence of fewer autocracies in the sample could imply a sample bias. This bias could be explained by the fact that it is more difficult to collect data needed to construct the index in dictatorships and, as a result, we would expect the democracy variable to have less explanatory power in this sample. Therefore, the results of the democracy variables, when the environmental regulatory regime index is used as a dependent variable, should be interpreted with caution.

The data on income are from the commonly used Summer and Heston database, specifically the Penn World Table 6.1 (income levels are adjusted taking into consideration purchasing power parity).[8] The urbanization variable (i.e. the percentage of the population living in urban areas) is from the Global Development Network Growth Database of the World Bank.[9] The schooling variable measures the average years of schooling in the population over 25 in the year 1985 and 1995. Data are from the International Data on Educational Attainment (Barro and Lee)[10].

3. THEORETICAL HYPOTHESES AND THEIR EMPIRICAL TESTING

Two different strands of literature have addressed the impact of democracy and corruption on environmental policy. These strands seem to have proceeded in parallel, independently. As a

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[7] The mean of the democracy variable (when scaled 0-10) for the years 1986-1995 is 7.07, 7.83 and 7.51 for the complete sample, for the countries for which the environmental regulatory regime index is available and for the countries for which the environmental policy stringency index is available, respectively. The standard deviations of the same democracy variable (in the same order) are: 3.09, 2.69 and 3.10. Therefore, the sample for which the environmental regulatory regime index has been compiled appears to have a higher mean value of the democracy variable and reduced variance. This could explain why, in the regression that have the environmental regulatory regime index as a dependent variable, the democracy variable tends to be non significant.

[8] Available at http://pwt.econ.upenn.edu/

[9] Available at http://www.worldbank.org/research/growth/GDNdata.htm

[10] Available at http://www.cid.harvard.edu/ciddata/ciddata.html

result, it is possible that each strand of literature have been overemphasising, theoretically and empirically, the importance of each separate variable.

The effects of democracy on societies' welfare have been the subject of philosophical debates for centuries. More recently, conservationist authors writing in the 1960s and 1970s have frequently called for a Hobbesian approach to environmental issues. To them, freedom needed to be constrained for the conservation of common goods in general, and of the environment specifically (Elrich, 1968, Hardin, 1968 and Heilbroner, 1974). The literature changed its view in the 1980s, after which most of the papers highlighted positive effects of democracy. This shift was possibly prompted by mounting evidence of the poor environmental performance that characterised the Soviet block and the dictatorships of Latin America, Africa and Asia. Figure 1 portrays the relation between democracy and environmental policy in our sample. It clearly shows that, indeed, democracy is positively correlated with environmental policy stringency. After 1980, the common argument in favour of democracy connects democracy with citizens' freedom, the availability of information on environmental degradation and the ability to protest against it. Moreover, it stresses responsiveness of democracies to citizens' requests, the propensity of democracies to engage in international cooperation, and the coincidence of markets, as economic systems, with democracies (e.g. McCloskey, 1983 and Payne, 1995).[11]

As for the theory on democracy and environmental policy, an influential paper has been published by McGuire and Olson (1996). They analyse optimal behavior of an autocrat in providing public goods. In their model, an increase in the size of the elite would bring about a more efficient solution with higher levels of public goods. The size of the ruling class, which could be considered a measure of democracy, would positively affect the provision of public goods such as environmental quality. Deacon (1999) presents an adaptation of McGuire and Olson's model and provides empirical results that support the interpretation of environmental quality as a public good, and that support a positive effect of democracy on environmental quality. Torras and Boyce (1998) also find evidence of the positive effect democracy has on the environmental quality when they estimate the Environmental Kuznets Curve (EKC) for sulfur dioxide, smoke, heavy particles, dissolved oxygen, fecal coliform, availability of safe water, and sanitation. Harbaugh *et al.* (2002) confirm the results when they include a democracy index in

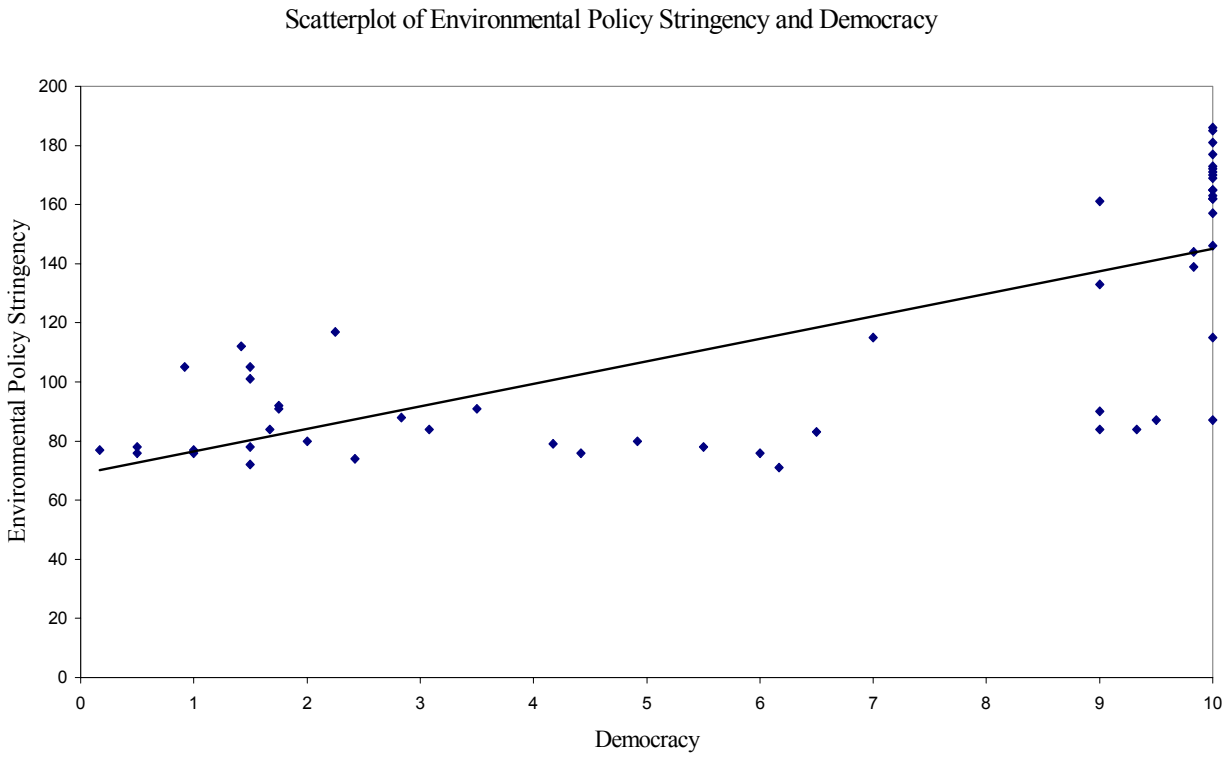
[11] Other authors claim that both market oriented democracy and autocracies cannot solve in a satisfactory manner environmental issues (see Dryzek, 1987).

their estimate of the EKC; they find a consistent negative relation between sulfur dioxide and democracy levels.

Others have studied the link from democracy to environmental policy, instead of targeting the environmental variables themselves. Congleton (1992) estimated the positive effect of democracy on the probability of signing the global convention on the reduction of emissions of ozone depleting substances.[12] Neumayer (2002) presents statistical evidence of the positive effect of democracy on the degree of environmental commitment of countries. He uses the probability of signing multilateral environmental agreements, participating in environmental intergovernmental organizations, the amount of countries' area under protection, the presence of national councils on sustainable development, and the availability of environmentally relevant information as measures for environmental commitment.

[12] The analysis studied the probability that countries signed the agreement by 1985 or 1987. Since most of the countries, democracies as well as non-democracies, have signed the convention nowadays, the results seems less valid if not to indicate the probability that democracies are faster to tackle environmental issues if compared to autocracies.

FIGURE 1. Scatter plot of the index of environmental policy stringency (vertical axis) and the

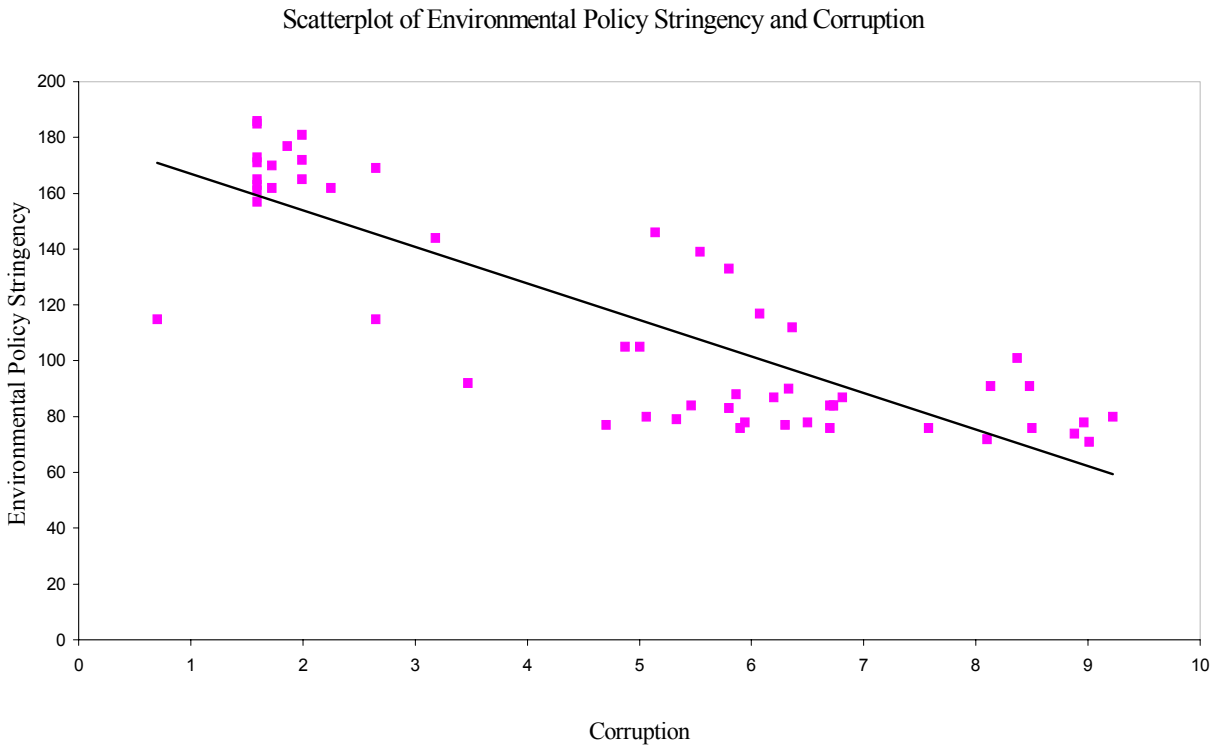


democracy index (horizontal axis).

On corruption and environmental policy, a large quantity of reports have been published that study the effect of corruption on environmental policy implementation. Carter (1997) studies the effects of crime and corruption on waste management and related health risks in the state of New York. The World Bank's (1999) report on corruption and forestry emphasises the detrimental influence of corruption on forests' management and conservation. Robbins (2000) introduces a theoretical framework for the analysis of corruption and then uses it to study the enforcement of protection for a natural reserve in Rajastan, India. Robbins finds that the lack of enforcement is fuelled by corruption among foresters and that such leads to substantial habitat destruction. FIGURE 2 presents a scatter plot showing the negative correlation between the environmental protection index and corruption levels for our data.

Lopez and Mitra (2000) argued, in a theoretical paper, that corruption and environmental policy stringency are characterised by a monotonic (negative) relationship. They present two models in which the government is considered an agent that has a utility function with two components: the probability of being re-elected, and the direct transfers received by the lobbies of interest groups. The lobby transfers measure the level of corruption. Their results show that, in a

Nash equilibrium game or a non-cooperative Stackelberg model with the representative firm as a leader, corruption leads to a sub-optimal level of environmental protection. When possible, the firms will bribe the government to tolerate overexploitation of the natural resource. Fredriksson and Millimet (2001) elaborate on this result, but claim that there is a non-monotonic correlation between corruption levels and environmental protection. After a certain threshold of corruption, a further increase in corruption would yield an increase in the stringency of environmental policy. This result depends on assumptions about the bureaucrats and their constant number, which would imply that an increase in the number of corrupted bureaucrats decreases the face value of each bribe and, therefore, reduces the effects of corruption.[13] Damania (2002) shows that environmental regulations are ineffective with highly corrupted bureaucrats. He makes the case for a complete deregulation if there is no possibility to reduce corruption.



[13] Fredriksson and Millimetet supported their finding with econometric data at state level for the USA, using as a proxy for corruption the number of civil servants on trial for crimes related to bribery as a share of the public employees. Such a proxy has the obvious shortcoming that it can be the case that it reflects judiciary efficiency and that trials come after crimes have been committed. Therefore, judiciary initiatives can be a symptom of an anticorruption campaign. Therefore, an increase in trials and sentences for corruption can coincide with an actual decrease of corrupted behaviours.

FIGURE 2. Scatterplot of the index of environmental policy stringency (vertical axis) and the corruption index (horizontal axis).

In short, both theoretical and empirical research support the conclusion that institutional settings affect the way policy makers respond to environmental concerns, and that corruption and democracy are two important variables in the process. However, both strands of literature potentially suffer from the problem of biased coefficients because of omitted variable.[14] In our sample, the correlation between the corruption and democracy variable is –0.68, statistically significant at 1%; thus a high level of democracy corresponds a low level of corruption. In case one of the two variables is the actual cause of loose environmental policies, a statistical analysis with the other variable as independent variable can easily produce a significant coefficient for that variable. It is worthwhile noticing that there is a lack of evidence of a causal relationship between these two variables. That is, contemporary levels of democracy seem not to affect corruption levels and vice-versa (Treisman, 2000). Therefore, even though correlated, these variables can be considered exogenous in the analysis. Furthermore, while many institutional quality variables tend to be related conceptually and statistically without exceptions (e.g. rule of the law and lack of corruption), there are a number of countries that show high levels of corruption but are democracies and there are autocracies with low corruption levels. An example of the former is Italy, which has a history of 50 years of democracy and unusually high levels of corruption for its development stage. An example of the latter is Singapore, which is not a liberal democracy but has very little corruption. [15]

For our statistical analysis, we estimate, with ordinary least squared, on a cross-section of countries the following equation:

$$EPS^i=\alpha_0+\alpha_1 \ln(Y_{80}^i)+\alpha_2 Corr^i+\alpha_3 Demo^i+\alpha_4 Z^i+\varepsilon^i, \quad (1)$$

[14] More technically, if the real relation among three variables is given by $y=\beta_1+\beta_2 X_2+\beta_3 X_3+u$, the two independent variables are correlated (so that $X_3=\gamma_1+\gamma_2 X_2+\varepsilon$) and we omit variable X_3; then in a regression we will find $y=\beta_1+\beta_3\gamma_1+(\beta_2+\beta_3\gamma_2)X_2+\varepsilon+u$. Therefore, the estimation bias of the coefficient of the included variable X_2 will be equal to $\beta_3\gamma_2$.

[15] The democracy score of Singapore in 2001 (from Polity IV) was 4 and the corruption perception index was 0.8 (both indexes are on a 0-10 scale). In the same year Italy had a democracy score of 10 and a corruption score of 4.8.

where the superscript *i* denotes each country in the sample, *EPS* is the Environmental Protection Stringency Index, Y_{80} is income per capita, *Corr* is the Corruption Perception Index that refers to the period 1980-85, *Demo* is the index of democracy and also refers to the period 1980-85. Finally, *Z* is a vector of control variables that are used to check the robustness of our findings. Before discussing the findings, we note that institutional indexes are difficult to estimate with a high degree of precision and that their coefficients will presumably suffer a downward bias due to measurement error.

The results of the regressions of equation (1) are reported in Table 1. The results are reported in standardised form for ease of interpretation: the coefficients can be interpreted in standard deviation terms. In other words, a coefficient of one implies that one standard deviation of the independent variable is associated with a one standard deviation of the dependent variable. When we will use dependent variables that have different scale (i.e. the environmental protection stringency index and the environmental regulatory regime index) the standardised form makes the coefficients more easily comparable. The first two columns take into consideration the two institutional variables separately and produce the standard findings. Both variables seem to have a great influence on the environmental policy stringency index: democracy a positive influence and corruption a negative one. In column entry (1), the democracy index has a positive coefficient of 0.34, significant at the 1% level. A one standard deviation increase in the democracy variable induces an increase in the environmental protection index by approximately one third of its standard deviation. In column entry (2), the corruption index has a coefficient equal to –0.56 and is statistically significant at a 1% level of confidence. We find that an increase of one standard deviation in the corruption index reduces the environmental protection index by more than half its standard deviation. Though both variables are, individually, significant and contribute substantially to the environmental policy stringency, when compared to each other, corruption seems to be the most powerful explanatory variable. Also, the adjusted R^2 increases from 0.69 to 0.76 when going from the first to the second column entry.

In regression (3), both variables are included jointly, and we see that the value of both the coefficients decreases (in absolute value) and the statistical significance of the coefficient on democracy is reduced to a 5% level[16]. This result again confirms the corruption index as the variable with higher explanatory power.

[16] As a method to check for the possibility of clustering independent variables (maintaining their explanatory power) and discovering possible composed variables, we have tried to use the principal component method

Subsequently, we carried out a series of robustness checks. First, a series of control variables have been added to the list of the regressors in order to check for the robustness of the coefficients of the independent variables. The first control variable is the percentage of the population living in urban areas. Urbanization rates have been found to influence corruption (Hill, 2003) and could also reflect different attitudes towards the environment.[17] We find, in regression (4), that the inclusion of the urbanization variable further decreases the size and statistical significance of the democracy variable (now it is equal to 0.12). At the same time, the coefficient of corruption still retains economic and statistical significance. Moreover, we find that urbanization is a significant determinant of environmental policy stringency and has a negative effect. That is, for given income, democracy, and corruption levels, the more the people live in urban areas the less stringent environmental policy tends to be. This result, on the effect of urbanization, is not very strong, as it is sensitive to the inclusion of additional control variables and in the following regressions its coefficient tends to decrease in size and significance.

The second control variable we added is schooling, reported in column entry (5). We find the coefficient of the democracy variable to remain insignificant. There is a decrease in the absolute value of the corruption coefficient to –0.44, though it remains significant at 1% confidence level. The schooling variable itself is highly significant. A one standard deviation increase in schooling increases environmental policy stringency by approximately a third of one standard deviation. This is what we expected on theoretical grounds as improved education leads to an increased awareness of environmental problems, such as health problems related to pollution. Last, we notice that the coefficient on the income variable drops to 5%. There is an obvious multicollinearity and causality problem between schooling and income and it appears difficult to single out the effects of education from the effects of income.[18] Another control variable added to the list but not reported in the table, has been the share of the population employed in agriculture. We found the coefficient of the agriculture variable to have almost no effect on the other coefficients and the coefficient for agriculture itself was insignificant both statistically and in magnitude (this result would hold even omitting the urbanization variable).

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adding other institutional quality indexes. The results did not allow for any meaningful grouping of these variables and confirmed our impression on the independent role played by the corruption variable.

[17] Urbanization rates are typically included in EKC estimations. In our analysis, the coefficient on the urbanization variable can be interpreted as reflecting differences in preferences and in political influence of urban and non-urban citizens.

[18] As some authors have argued that corruption levels affect public investment in education (e.g. Mauro, 1998, Pellegrini and Gerlagh, 2004) the inclusion of the schooling variable can be considered an extreme test for the significance of the corruption coefficient.

In the last step, of adding control variables, regional dummies have been included. These regional dummies have been found significant in many recent empirical analyses. Adding them to our analysis makes sure that our results are not driven by geographical factors or by a particular group of countries (e.g. see Rodriguez and Rodrik, 2000). In regression (6), after the inclusion of regional dummy variables[19], the magnitude of the democracy variable is further decreased and remains non-significant. At the same time, the corruption coefficient is robust to the inclusion of regional dummies. The regional dummies for Latin America and for OECD countries are the only significant ones (at 5% and 10% level of significance, respectively), which would indicate that there are some characteristics of Latin American countries and OECD that are affecting their level of environmental protection, and that are omitted from our model.

Furthermore, in the literature it is sometimes suggested that the effect of corruption on environmental policy is non-monotonic (Fredriksson and Millimet, 2001). In order to check for non-linearities, we have carried out the simple regression from equation (2), omitting the democracy index and the control variables, but including the corruption variable at three powers. The results (not reported in the table) provide no evidence for a non-monotonic relation. The coefficients for the first and the second power are both insignificant, and the one at the third power is significant just at 10%.

Another robustness check we performed was an analysis of the outliers. The environmental policy stringency index of Turkey and Iceland lays outside the 2 standard deviations of the residual bound from their predicted values. To be sure our results are not driven just by these two cases we repeated the analysis excluding them from the sample. We found that the exclusion of these two countries would slightly strengthen our conclusions as repeating regression (6) we find that the coefficient of democracy remains insignificant and equals 0.068. At the same time, the coefficient of the corruption index remains significant at 1% level and equals –0.33.

As a third robustness check, we tested the robustness of our results with respect to the specification of the democracy variable, we use a measure of democracy that is rather different in its concept: the index of democracy, developed by Vanhanen (2000). The results (reported in he Appendix) with this different democracy variable confirm the findings presented above. When the democracy index is used individually (as in regression (2)) it appears to be a fundamental determinant of environmental policy. An increase of one standard deviation in the index of

[19] The other regional dummies (Sub-Saharan Africa and South Asia) that where found not to be significant are omitted).

democracy would increase the environmental protection index by more than half a standard deviation. After the inclusion of the corruption index (as in regression (3)), the importance of democracy is markedly decreased. The effects of democracy disappear both statistically and in magnitude once other variables are included. At the same time, size and statistical significance of corruption's index coefficients are only slightly affected by the change in the measure of democracy. In regression (14), analogue to regression (6), it is equal to –0.33.

Finally, the results presented above were confirmed also by the fourth robustness check: the use of the environmental regulatory regime index, replacing the environmental policy stringency index as a dependent variable. The environmental regime index was created by Esty and Porter (2002) ten years after the environmental policy stringency index was compiled. As noted in Section 2, the methodology used for building the two indexes is very different and we consider such a different dependent variable as a strong test of our results. Moreover, Esty and Porter (2002) have shown that the index they created is a significant determinant of environmental quality. Once the environmental regulatory regime index is used as a dependent variable, we find that corruption and income have by themselves the most of the explanatory power. While the democracy variable has a positive simple correlation with the environmental regulatory regime index, the inclusion of income as a control variable makes its coefficient to fall below zero and to be statistically non-significant.

TABLE 1. *Results from statistical analysis as in equation* (1).

Independent Variables	(1) *EPS*	(2) *EPS*	(3) *EPS*	(4) *EPS*	(5) *EPS*	(6) *EPS*
LnY_{1980}	0.56*** (5.23)	0.38*** (3.67)	0.29*** (2.75)	0.64*** (4.32)	0.42** (2.62)	0.20 (1.34)
Democracy	0.34*** (3.19)		0.19** (2.01)	0.12 (1.28)	0.13 (1.44)	0.10 (1.16)
Corruption		–0.56*** (–5.50)	–0.49*** (–4.66)	–0.53*** (–5.39)	–0.44*** (–4.59)	–0.31*** (–3.59)
Urbanization				–0.38*** (–3.13)	–0.38*** (–3.46)	–0.20* (–1.86)
Schooling					0.34*** (3.17)	0.32*** (3.44)
Dummy for Latin America						–0.13* (–1.68)
Dummy for OECD						0.25** (2.16)
Adjusted R^2	0.69	0.76	0.77	0.81	0.84	0.88
Number of cases	54	54	54	54	51	51

OLS estimation with the *Environmental Policy Stringency Index* as dependent variable. Coefficients are standardised. Superscripts *, **, *** correspond to a 10, 5, 1% of significance, respectively. *t*-statistics are in parenthesis under the coefficients.

In summary, our results suggest that institutional settings are important determinants of environmental policy stringency. But, we find no robust support for a significant effect of democracy, while we find robust evidence for a substantial effect of corruption on environmental stringency. It seems likely that previous empirical works have been overemphasising the role of democracy for environmental policies and for environmental quality because of the omission of a corruption index as a control variable. In other words, our estimates suggest that increasing democracy levels have to be matched with reduced corruption to induce stricter environmental policy and that democracy *per se* will be insufficient.

3.1. THE CASE FOR DEMOCRACY TO INTERACT WITH INCOME

Though the regressions presented above did not suggest a significant role for democracy, a further examination revealed a potential interaction between democracy and income. Specifically, we checked whether there could be an interaction among our institutional variables and income levels. The theory underlying such empirical analysis is that higher income races demand for stricter environmental protection, and only then require responsive (democratic or non-corrupt) policy makers. Another, complementary, explanation is that democratic polities may demand (and obtain) increases in environmental protection only when their income riches high levels and their more basic needs are fulfilled. If environmental policy depends on the interaction between income levels and institutional variables, introducing interaction terms should reveal this, by producing sizable and statistically significant coefficients.

Indeed, in our analysis, we found some (weak) evidence for an interaction effect between income and democracy. That is, environmental policies tend to be stricter at high-income levels when the country is a well-established democracy, or stated otherwise, the effect of democracy more positive for higher income levels. The results of the analysis are presented in Table 2. Caution is needed though, because in contrast with the main results presented above, the result of the interaction variable is not confirmed by our robustness analysis. In regression (7) the interaction term is significant at 5%. The use of the index of democracy (as an alternative to the democracy variable from the Polity IV dataset), in column entry (8), produces statistically non-significant coefficients. Also the use of the environmental regulatory index, as a dependent variable, weakly confirms the existence of an interaction between democracy and income levels, but only when the democracy variable is from the Polity IV dataset. In regression (10), where the environmental regulatory regime index is used as a dependent variable, the interaction term is significant at 10%. Furthermore, as variables have been standardised to a zero mean, the negative coefficient for democracy suggests that an increase in democracy negatively affects the environmental policy stringency for a country with average income level. Only when income is above one standard deviation of the average income, democracy starts to have a positive effect.

TABLE 2. *Results from statistical analysis as in equation* (1).

Independent variables:	*EPS* (7)	*EPS* (8)	*ERRI* (9)	*ERRI* (10)
lnY	0.06	0.20	0.12	0.07
	(0.35)	(1.44)	(0.43)	(0.39)
Democracy	–1.35*		–0.52	
	(1.98)		(0.65)	
Index of Democracy		–1.01		–2.01*
		(1.02)		(1.92)
Corruption	–0.23**	–0.29***	–0.61***	–0.58***
	(2.57)	(3.52)	(5.42)	(5.17)
Urbanization	–0.18*	–0.27***	0.09	0.10
	(1.73)	(2.74)	(0.94)	(1.01)
Schooling	0.28***	0.31***	–0.07	–0.03
	(3.01)	(3.42)	(0.60)	(0.28)
Dummy for Latin America	–0.13*	–0.09	–0.13	–0.12
	(1.84)	(1.26)	(1.37)	(1.47)
Dummy for OECD	0.13	0.16	–0.01	–0.07
	(1.02)	(1.34)	(0.09)	(0.60)
Democracy x *lnY*	1.72**		0.59	
	(2.15)		(0.59)	
Index of Democracy x *lnY*		1.27		2.20*
		(1.22)		(1.91)
N	51	51	53	52
Adjusted R^2	0.89	0.89	0.82	0.83

OLS estimation with the *Environmental Policy Stringency Index* as dependent variable. Coefficients are standardised. Superscripts *, **, *** correspond to a 10, 5, 1% of significance, respectively. t statistics are in parenthesis under the coefficients.

Thus, we find the interaction term between democracy and income statistically significant at 5 % in just in one of four possible specifications of our econometric model (and in the robustness checks with the same time frame and additional variables). As such we do not find the evidence as particularly compelling for the case of an interaction among democracy and income and we report the tentative evidence as it stands mainly as a possible qualification of our main results about the limited influence of democracy as a determinant of environmental policy stringency.

4. IMPLICATIONS FOR THE ENVIRONMENTAL KUZNETS CURVE

In this section we interpret our results in the context of the literature on economic development and the environment, and emphasise how our findings relate to the EKC and the leapfrogging hypothesis (i.e. the possibility that developing countries could tunnel through the EKC). At the end of this section, while referring to the literature on institutions and economic development, we will address the issue of sustainable development.

Several authors have argued that currently developed countries first experienced a decrease in environmental quality, due to increased production and increased pollution levels, but then experienced an improvement of several indicators of ambient quality as their income further increased (e.g. Grossman and Krueger, 1995). In the later stage of development, cleaner production techniques and the decrease in the share of polluting goods allowed for a decrease in pollution while there was an increase in the scale of the economy. Hopefully, currently developing countries will follow a similar path and show increasing environmental quality hand in hand with increasing income levels. Even more optimistically, some authors hope that developing countries will "leapfrog" the pollution intensive part of their development path, i.e. they will tunnel through the EKC. According to this strand of literature, developing countries may benefit from experiences in developed countries, both in terms of clean technologies developed, but also in terms of effective and efficient environmental policies. Moreover, developing countries may step over the stage of "command and control" policies and go directly to more sophisticated and more efficient regulations (e.g. Perkins, 2003).

Our estimates of the effects of income on environmental policy confirm the positive effect of higher income for environmental protection. But as a qualification of this hopeful perspective, let us first note that, even assuming that the EKC pattern can be reproduced in developing countries in a similar manner as in currently developed countries, still developing countries will face declining environmental quality for several decades. Cole and Neumayer (2004) estimate that, on basis of optimistic forecasts on both economic growth and the effects of income levels on the environment, for a number of pollutants, ambient concentrations will continue to increase for the next century in many developing countries.[20] Adding to the problem is the global shift in comparative advantages. Developed countries achieve cleaner production technologies but also

[20] It must be noted that the turning points of the EKC used for the analysis of Cole and Neumayer (2004) are deemed to be overly optimistic given the most recent studies (e.g. Harbaugh *et al.* 2002, Stern, 2003), which made use of more complete dataset and improved estimation techniques if compared to the benchmark works of Grossman and Kreguer (1995) and to the more recent work of Cole (2003).

move their production structure to sectors associated with lower pollution levels, thus developing countries will find their comparative advantage to shift to the more polluting production sectors.

The most important objection to the copying of past EKC's to the future of present developing countries we find in the effects of institutions on environmental policies, studied in this paper. Our results portray a somewhat pessimistic perspective on the future environmental quality in developing countries. One of the explanations for the EKC is an assumed institutions' policy response in reaction to increasing scarcity of the environmental goods and shifting preferences of the people (Grossman and Krueger, 1995). Since lower quality institutions typically plague developing countries,[21] in these countries we expect less of a policy response to changing preferences. Therefore, even when reaching similar income levels as the currently developed countries, developing countries can be expected to have laxer environmental policy. From this point of view, there is reason to believe that for developing countries the EKC's apex shifts to the right and will move upward, and will not resemble the developed countries' EKC. In this perspective, tunnelling through the EKC seems improbable. The policy response towards efficient and effective environmental regulation is dubious in countries affected by chronic corruption (Damania 2002).

We can also turn towards a more optimistic perspective, using the same empirical results of the previous section. Improving a country's institutional quality may render a double dividend when it will be beneficial for environmental quality, as well as for economic growth, thus improving societal welfare two times. Barro (1996) argues that for low levels of democracy an increase in democracy will foster economic development. At the same time, evidence strongly suggests that corruption has negative effects on economic development (Mauro, 1995; Mo, 2001). When a decrease in corruption levels leads to cumulating high growth rates, environmental policy will improve through both the direct channel (analysed in this study) and the indirect income channel. Moreover, the positive interaction effect of democracy and income on environmental stringency found in Section 3.1 suggests that the two channels will further strengthen each other. Our results therefore support the emphasis that has been put on improving the institutional infrastructures of developing countries (e.g. Meier, 2001), stressing the fact that such institutional improvement could be functional not only to economic growth, but also to undertaking a sustainable growth path.

[21] In our sample the average value of the corruption index was 7.14 for countries with income below 2,000 USD in 1980, and 1.66 for the countries with income above 20,000 USD.

Also, let us recognize that countries can learn from each other when developing environmental policies. Whether, for a certain country, economic growth can be decoupled from environmental pressure, will also depend on the availability and price of new technologies, and on the role played by international actors in shaping national environmental policies. Clean production techniques adopted in developed countries diffuse and are available for developing countries. Also, international organization such as the IMF and the World Bank now recognize the environment as an issue of development and increasing pressure is put on governments to act domestically and to sign international environmental agreements.[22] The attention is also visible in trade agreements such as the North America Free Trade Agreement that pays attention to environmental legislation. The European Union provides a remarkable example of the importance that the international arena has for domestic environmental policies. It sets ambient quality standards for member countries and, more or less, forces its recent new members to take a shortcut for the EKC.

5. CONCLUSIONS

Our analysis, in line with previous literature, shows statistically significant and sizeable coefficients when democracy and corruption are considered individually as explanatory variables for environmental policy stringency; negative for corruption and positive for democracy. Contributing to the literature, we have shown that the inclusion of corruption and democracy together diminishes the significance and importance of the democracy variable. The further inclusion of additional control variables renders the democracy variable statistically insignificant and the magnitude of the coefficient is markedly further decreased. We deduct from our results that a large part of the positive effect of democracy on environmental protection, as it is found in most of the previous studies, is due to the correlation between high levels of democracy and less corruption.

Though, caution is warranted, since democracy and corruption are highly correlated; there may be a problem of multicollinearity, which may have decreased the statistical significance of democracy's coefficient. We also must recognise the possible existence of a causal link from democracy to corruption that could give further scope for democracy to influence environmental

[22] Data from the Environmental Treaties and Resource Indicators (available at http://sedac.ciesin.columbia.edu/entri) confirm an increasing trend in the number of environmental treaties over time: 70 in the decade 1960-70, 94 in the decade 1970-80, 89 in the decade 1980-90 and 110 for 1990-2000.

policy indirectly. Thus, if democracy were a determinant of corruption, part of its effect on environmental policy would be taken up by the corruption variable. Treisman (2000) estimated the effect of democracy on corruption. While he found that current levels of democracy do not affect corruption, a long exposure to democracy (more than 40 years) predicts lower corruption. Thus, our results would hold well in a short-medium time framework, but democracy would gain importance in a long time horizon. In summary, we find no evidence of a sizeable and significant positive effect of democracy on environmental policy, other than possibly through corruption or through some other independent variables considered in the analysis (e.g. schooling).

Our results do not present and optimistic perspective on environmental policies in developing countries. Developing countries typically suffer from lower levels of institutional qualities, which tend to persist over time; this is also considered as one of their major impediment to economic growth. Given the low institutional quality, these countries will have less stringent environmental policies than the developed countries had when they had a similar income level. The evidence presented here suggests that an increase in institutions soundness might provide a double dividend of higher income growth rates and higher levels of environmental protection. In other words, improvement in the institutional environments would be, especially for developing countries, the prime objective towards a sustainable development growth path.

APPENDIX

In Table 3, as a sensitivity test, we reproduce the main results using alternative indexes for the stringency of the environmental policy and for the level of democracy. With the respect of the former, we use the environmental regulatory regime index as an alternative to the environmental policy stringency index. With the respect of the latter, we use the index of democracy instead of the democracy variable (for a detailed description of the indexes see above at Section 2).

Regressions (1)-(4) are as in equation (1) above. Regressions (5)-(8) are as in the following equation:

$$ERRI^i=\beta_0+\beta_1 \ln(Y_{90}^i)+\beta_2 Corr^i+\beta_3 Demo^i+\beta_4 Z^i+\varepsilon^i, \quad (2)$$

where, *ERRI* is the environmental regulatory regime index, Y_{90} is income in 1990, *Corr* is the corruption perception index in 1998, *Demo* is the democracy index averaged for 1986-1995 and Z is a vector of control variables (referring to the year 1995).

Using these alternative variables, we confirm that corruption is an important determinant of environmental policies: there are consistently sizeable and statistically significant negative coefficients on the corruption variable in the various specifications. At the same time, we find limited support for the effect of democracy on environmental policies. In some specifications – when the environmental regulatory regime index is used as a dependent variable and corruption as an additional independent variable- the two democracy indexes assume even a negative coefficient (which is never significant).

TABLE 3. *Results from statistical analysis as in equation (1) and (2).*

Independent Variables	(11) *EPS*	(12) *EPS*	(13) *EPS*	(14) *EPS*	(15) *ERRI*	(16) *ERRI*	(17) *ERRI*	(18) *ERRI*	(19) *ERRI*
LnY	0.41***	0.38***	0.21**	0.28*	0.85***	0.26***	0.31***	0.82***	0.29**
	(3.80)	(3.67)	(2.01)	(1.99)	(8.54)	(2.88)	(3.15)	(6.62)	(2.53)
Democracy					–0.07		–0.09		
					(0.66)		(1.26)		
Index of Democracy	0.52***		0.35***	0.15				0.02	–0.03
	(4.81)		(3.52)	(1.46)				(0.12)	(0.30)
Corruption		–0.56***	–0.43***	–0.33***		–0.69***	–0.70***		–0.68***
		(5.50)	(4.29)	(4.19)		(7.76)	(7.84)		(7.21)
Urbanization				–0.26**					
				(2.65)					
Schooling				0.32***					
				(3.57)					
Dummy for Latin America				–0.10					
				(1.48)					
Dummy for OECD				0.18					
				(1.52)					
Dummy for South Asia				0.10*					
				(1.82)					
Adjusted R^2	0.74	0.76	0.81	0.89	0.64	0.83	0.83	0.68	0.83
Number of cases	54	54	54	54	60	60	60	58	58

OLS estimation, Regressions (1)-(4) have the environmental protection stringency as a dependent variable, Regressions (5)-(8) have the environmental regulatory regime index as a dependent variable. Coefficients are standardised. Superscripts *, **, *** correspond to a 10, 5, 1% of significance, respectively. t statistics are in parenthesis under the coefficients.

6. REFERENCES

Barro, R. J. Democracy and growth. *Journal of Economic Growth* 1:1-31 1996.

Carter, T. S. The Failure of Environmental Regulation in New York – The Role of Co-Optation, Corruption and a Co-Operative Enforcement Approach. *Crime Law and Social Change* 26 (1): 27-52 1997.

Cole M. A. Development, trade, and the environment: how robust is the environmental Kuznets curve? *Environment and Development Economics* 8: 557–580. 2003.

Cole, M. A., and E. Neumayer Economic Growth and the Environment in Developing Countries: What are the Implications of the Environmental Kuznets Curve? in Peter Dauvergne (ed.): *International Handbook of Environmental Politics*. Cheltenham and Northampton: Edward Elgar Publishing 2004 (forthcoming).

Congleton, R. D. Political-Institutions and Pollution-Control. *Review of Economics and Statistics* 74 (3): 412-421 Aug 1992.

Damania R., P. G. Fredriksson, J. A. List. Trade Liberalization, Corruption, and Environmental Policy Formation: Theory and Evidence. *Journal of Environmental Economics and Management* 46 (3): 490-512 Nov 2003.

Damania, R. Environmental Controls with Corrupt Bureaucrats. *Environment and Development Economics* 7: 407-427 Part 3 Jul 2002.

Dasgupta, S.; A. Mody, S. Roy and D. Wheeler. Environmental Regulation and Development: A Cross-Country Empirical Analysis. *Policy Research Working Paper*. The World Bank. 1448, April 1995.

Deacon, R. T. Dictatorship, Democracy, and the Provision of Public Goods. Manuscript. 1999.

Dryzek, J. *Rational Ecology*. London: Blackwell 1987.

Ehrlich, P. R. *The Population Bomb*. New York: Ballantine Books 1968.

Eliste, P. and P. G. Fredriksson. Environmental Regulations, Transfers, And Trade: Theory And Evidence. *Journal of Environmental Economics And Management* 43 (2): 234-250 Mar 2002.

Esty, D. C. and M. Porter. Ranking National Environmental Regulation and Performance: A Leading Indicator of Future Competitiveness? In Porter, Michael E., Jeffrey Sachs and

Klaus Schwab (eds.) *The Global Competitiveness Report 2001-2002*. New York. Oxford University Press. 2002.

Grossman, G. M. and A. B. Krueger. Economic-Growth and the Environment *Quarterly Journal of Economics* 110 (2): 353-377 May 1995.

Harbaugh, W. T., A. Levinson and D. M. Wilson. Reexamining the Empirical Evidence For An Environmental Kuznets Curve *Review of Economics and Statistics* 84 (3): 541-551 Aug 2002.

Hardin, G. The tragedy of the commons *Science* 162 1243 –8 1968.

Hauge, W. and T. Ellingsen. Beyond Environmental Scarcity: Causal Pathways To Conflict. *Journal of Peace Research* 35 (3): 299-317 May 1998.

Heilbroner, R. L. An Inquiry into the Human Prospect. New York: W. W. Norton. 1974.

Hill, K. Q. Democratization and Corruption: Systematic Evidence From the American States. *American Politics Research* 31 (6): 613-631. 2003.

Jaggers, K. and T. R. Gurr. Tracking Democracy 3rd-Wave with the Polity-III Data. *Journal of Peace Research* 32 (4): 469-482 Nov 1995.

Lopez, R. and S. Mitra. Corruption, Pollution, and the Kuznets Environment Curve. *Journal of Environmental Economics and Management* 40 (2): 137-150 Sep 2000.

Mauro, P. Corruption and the Composition of Government Expenditure. *Journal of Public Economics*. 69: 263–279. 1998.

Mauro, P. Corruption and Growth. Quarterly Journal of Economics 110 (3): 681-712 Aug 1995.

McCloskey, H. J. Ecological Ethics and Politics. Totowa, N. J.: Rowman and Littlefield. 1983.

McGuire, M. C. and M. Olson. The Economics of Autocracy and Majority Rule: The Invisible Hand and the Use of Force *Journal of Economic Literature* 34 (1): 72-96 Mar 1996.

Meier, G. M. "The Old Generation of Development Economics and the New" in G.M. Meier and J.E. Stiglitz (eds.). *Frontiers of Development Economics*. Oxford. Oxford University Press. pp.13-50. 2001.

Mill, J. S. *On Liberty* New York: Viking Press. 1982 (1859).

Mo, P. H. Corruption and economic growth. *Journal of Comparative Economics* 29 (1): 66-79 Mar 2001.

Neumayer, E. Do Democracies Exhibit Stronger International Environmental Commitment? A Cross-Country Analysis. *Journal of Peace Research* 39 (2): 139-164 Mar 2002.

Fredriksson, P. G. and D. L. Millimet Bureaucratic Corruption and Environmental Policy: Theory and Evidence From the United States. Manuscript, 2001.

Pellegrini, L. and R. Gerlagh. Corruption's Effect on Growth and its Transmission Channels. *Kyklos*, 57 (3), 2004.

Perkins, R. Environmental Leapfrogging in Developing Countries: A Critical Assessment and Reconstruction. *Natural Resources Forum* 27 (3): 177-188 Aug 2003.

Plato. *The Republic*, translated by Desmond Lee, London: Penguin, 1987.

Payne, R. A. Freedom and the Environment. *Journal of Democracy*. 6 (3) pp. 41-55 1995.

Robbins, P. The Rotten Institution: Corruption in Natural Resource Management. *Political Geography* 19 (4): 423-443 2000.

Stern, D. I. The Rise and Fall of the Environmental Kuznets Curve. Manuscript, 2003.

Torras, M. and J. K. Boyce. Income, Inequality, and Pollution: A Reassessment of the Environmental Kuznets Curve. *Ecological Economics* 25 (2): 147-160 May 1998.

Treisman, D. The Causes of Corruption: A Cross-National Study. *Journal of Public Economics*, 76 (3) June. 399-457. 2000

Vanhanen, T. A New Dataset for Mesuring Democracy, 1810-1998. *Journal of Peace Research*. 37 (2): 251-265 2000.

World Bank. Corrupt and Illegal Activities in the Forestry Sector: Current understandings, and implications for World Bank Forest Policy. Debra J. Callister *Forest Policy Implementation Review and Strategy Development: Analytical Studies* May 1999.

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