Indices of Social Development

– Research Applications

Roberto Foa
Harvard University[1]

The Indices of Social Development combine over 200 variables from 25 sources, providing the most comprehensive database showing the variation of social institutions – understood as the informal norms and behaviors that pattern social interaction – across countries and over time. Based on these sources, progress on five areas, civic activism, clubs and associations, interpersonal safety and trust, intergroup cohesion, and gender equity, is reported from 1995 to the present. This paper demonstrates the applicability of the indices in contributing to outstanding research questions in the development literature, including the determinants of economic growth, quality of governance, and the causes of violent conflict.

[1] foa@fas.harvard.edu. Department of Government, Harvard University, 1737 Cambridge Street, Cambridge, MA 02138, USA.

In recent decades, there has been a steady current of country-specific studies examining the effects of social institutions, understood as the informal norms that pattern human interaction, upon economic and political outcomes. Among the myriad issues that have been addressed within the 'social capital' literature, notable examples include the finding by political scientists that countries and regions with greater associational life, trust and inter-group cohesion tend to have better public service delivery, financial accountability, and adherence to democratic norms (Putnam et al. 1993, Knack 2002, Coffe and Geys 2005); the finding by psychologists that engagement in community activities has a significant association with measures of health and educational attainment (Berkman and Syme 1979, Coleman 1988, Helliwell 2003); and the finding by economists of a robust association between social institutions and economic wellbeing in the form of both household income and aggregate economic growth (Knack and Keefer 1997, Zak and Knack 2001, Narayan and Pritchett 1999, Grootaert 2001, Tabellini 2005, Knowles and Weatherston 2007).

However despite the positive results found in successive regional and local studies, there have been relatively few attempts to test the impact of social institutions at the country comparative level. Few reliable, globally representative data sources exist that would serve as a basis for comparing social norms and practices, while survey data for social trust and community engagement are often fragmented across disparate regional samples. Commonly used proxy and instrumental variables, such as ethnic fractionalization or the proportion belonging to a hierarchical religious tradition, may be only weakly reliable or valid as measures of social institutions, whereas direct behavioral items taken from representative national surveys, such as social trust or civic norms, often cover only a limited sample of countries.

The Indices of Social Development respond to this shortfall by combining a large number of indicators from multiple sources, in order to generate better aggregate measures of social institutions and maximize efficient use of data for country-comparative testing (World Bank 2008). By generating composite indices it is possible to estimate scores for a much wider number of countries than otherwise possible, and minimize the level of error in the estimates as the addition of successive indicators reduces random variation. The indices of social development provide social institutional estimates for 192 societies, a far greater number than previously the case, and are reported together with margins of error, reporting the level of confidence in a particular country score.

This paper offers a tentative application of the indices to the ongoing research questions of development economics. The empirical links between social institutions, such as civic society development or cohesive relations between ethnic groups, and development outcomes, such as good governance and

economic growth, are tested and preliminary results are discussed. Sections I and II, respectively, examine the contribution of the indices to the study of the determinants of economic growth and the quality of governance. Sections III and IV examine the impact of social institutions upon the quality of environmental resource management and natural disaster responsiveness, and section V examines the link between measures of latent tensions, mapped by the indices of social development, and the outbreak of actual instances of violent conflict. Finally, section VI concludes by offering a discussion of the contexts in which the indices can be applied, appropriate research questions, and contexts in which other research methods might be appropriate.

Contents

I. The Determinants of Economic Growth

Understanding the determinants of economic growth remains perhaps the central, indeed, the defining question of development economics (Meier 2007). Theories of the long-run determinants of economic growth have generally focused on the role of specialization and international trade, capital accumulation, including human capital, and the economic behavior incentivized by different forms of formal and informal institutions (Acemoglu, Johnson and Robinson 2004).

The Indices of Social Development can help with the third of these areas, that is, the impact of the formal and informal institutions which pattern economic behavior. Empirical studies in the field of institutional economics begin from a paper by Hall and Jones in 1999, which argued that the long-run growth of an economy depends upon its level of 'social infrastructure' - the norms, precedents, and cultural expectations that accumulate over the course of a country's history and help sustain capital accumulation. Because institutions distort or protect the pattern of economic incentives, depending upon whether they protect property rights, encourage work, and reduce transaction costs, they pattern the likelihood of entrepreneurs to save, invest, and innovate in new methods of production. Formal institutions (courts that protect property rights and enforce the rule of law) and informal institutions (social trust, cohesion, and voluntary activity) are therefore the only long-run determinants of sustained capital accumulation, that is, economic growth (North 1991, Hall and Jones 1999).

Since Hall and Jones (1999), this relationship between social institutions and growth has been empirically tested across a wide range of studies within the econometric literature (Helliwell and Putnam 1995, Zak and Knack 2001, Beugelsdijk et al. 2004). However, in part owing to absence of applicable data, empirical applications of the institutional approach have tended to focus on the role of formal institutions of governance (e.g. Acemoglu and Robinson 2001), while economists defending the role of informal institutions have tended to deploy a more historical or narrative approach (e.g. Landes 1999). The indices of social development, by contrast, allow us to test the role of informal institutions for economic growth using an expanded sample of countries.

This we do here. Following the existing growth economics literature, we apply two forms of econometric analysis in investigating the relationship between institutions and growth. First, *proximate determinants models* examine the variables that appear in the aggregate production function, such as physical and human capital per worker, and can be investigated through time-series models using the rate of economic growth as the dependent variable. Second, *deep determinants models* search for variables that explain differences in the proximate

determinants, for example geography, trade, or institutional quality, and can be studied through cross-sectional models using instrumentation of present institutional quality, for example via historical legacies of state development or colonial legacy (Rodrik 2002).

Among the most widely cited proximate determinants approach examining the relationship between social institutions and growth is that of Knack and Keefer (1997), who show a strong positive effect of social trust across a sample of 27 countries. This result can be replicated using the Indices of Social Development, which make possible testing based upon a much enlarged sample of countries. As the dependent variable, the models take the average annual rate of economic growth from 1990 to 1999, and as independent variables, the levels of primary and secondary school enrolment in 1990, the price level of investment goods, real GDP per capita in 1990, a dummy variable for whether the country is a former Eastern bloc regime undergoing transition, and each of the five social institutional variables, estimated around a base year of 1990. By including such controls, we fulfill the requirement, suggested by Levine and Renelt (1992), that commonly identified determinants always be included in growth regressions to ensure robust coefficients. The model specification is the same as that of Knack and Keefer (1997), except that the dependent variable covers the decade of the 1990s rather than that of the 1980s, and that a dummy variable has been included to take account of the transition process in former Eastern bloc economies during this period.

Table 1. Proximate Determinants of Growth, 1990-9

	Model 1	Model 2	Model 3	Model 4
Price level of investment goods, 1990	0.006 (0.009)	-0.006 (0.005)	0.004 (0.009)	-0.006 (0.005)
Real GDP per capita, 1990	-0.081 (0.066)	-0.044 (0.048)	-0.090 (0.077)	-0.047 (0.050)
Primary School Enrollment, 1990	0.037 (0.029)	0.022 (0.025)	0.038 (0.031)	0.023 (0.026)
Secondary School Enrollment, 1990	-0.031 (0.020)	0.004 (0.017)	-0.031 (0.020)	0.003 (0.018)
Former Eastern Bloc Country, 0-1	-2.177 (1.001)*	-3.042 (0.849)***	-2.346 (1.160)*	-3.150 (0.909)***
Gender Equity	1.060 (4.086)		1.952 (4.559)	
Intergroup Cohesion	4.059 (2.453)		3.903 (2.611)	
Voluntary association	-0.595 (1.848)		-1.257 (2.115)	
Crime and Interpersonal Trust	11.204 (2.896)***	5.435 (1.931)**	11.176 (3.384)**	4.910 (2.405)*

Civic Activism	1.123 (3.523)		1.900 (3.765)	
Sub-Saharan Africa				-0.276 (1.220)
Latin America and Caribbean				-0.326 (0.882)
Constant	-7.881 (3.861)	-2.041 (2.696)	-8.206 (4.274)	-1.645 (2.968)
N	50	70	50	70
adj. r^2	0.40	0.23	0.37	0.21

Dependent Variable: Per Capita Economic Growth Rate, 1990-9

* significant at the 0.05 level; ** significant at the 0.01 level; *** significant at the 0.001 level

Results are shown in Table 1.0. Reassuringly, the models produce similar findings using the 1990s growth data as was found by Knack and Keefer (1997) using data from the 1980s, in particular regarding the significant coefficient for the interpersonal safety and trust variable. The finding that the interpersonal safety and trust variable functions similarly to the social trust variable included in the Knack and Keefer models can be subject to the same interpretation, namely, that security of property rights and reduced transaction costs are essential and independent determinants of economic growth. Using the new indicator series however allows us to estimate this effect for a much larger sample of countries than was previously possible: whereas 29 countries are included in the Knack and Keefer (1997) specification, model *n* here ranges from 50 to 70 cases. Given the sensitivity of regression models to minor outliers where the sample size is low, the ability to replicate similar findings across a more representative sample is reassuring evidence of the validity of the initial claims.

These findings also help shed light on other aspects of the growth literature. For example, it is commonplace in some growth regressions, such as those of Alesina et al. (2003) or Easterly and Levine (1997), to include dummy variables for Latin America and Sub-Saharan Africa, on account of their regionally weak growth performance. The need for such variables stems from the endemically slow growth of the respective regions during the periods under consideration, yet a convincing reason needs to be supplied for why these countries should experience a long-run equilibrium growth rate that is inferior to others. The inclusion of variables which proxy for security of property rights, such as the level of crime and trust, provides something in the way of an answer. Both regions perform poorly on this indicator, and when dummy variables are included for each of these respective regions (Models 3 and 4), neither are robust to the presence of social institutional aggregates. Sub-Saharan African countries

in the sample score on average about two-thirds of a standard deviation below the global mean on interpersonal safety and trust, while Latin American and Caribbean countries score a full standard deviation below this mean. These results support the view that growth may be endogenous to the institutional structure of a society, including the social institutions that ensure protection of property rights. Because Sub-Saharan Africa as well as the Latin America and Caribbean region fare poorly in this regard, it may constitute one factor that has restrained long-run equilibrium growth.

Because growth rates are sensitive to a range of short-term factors such as macroeconomic policy, growth spillovers, or changes in commodity and other input prices, limited inferences can be made from decadal panel regressions, and it has become more common to discuss the 'deep' or long-term determinants of economic growth. Accordingly, we supplement the above regressions with a deep determinants model of the relationship between different forms of institutions and GDP. Following standard practice in the deep determinants literature, log GDP per capita is used as the dependent variable, and measures of both formal and informal institutions as independent variables. As measures of formal institutions, we include the Worldwide Governance Indicator for Rule of Law (Kaufman, Kraay and Maastruzzi 2007) and the Ease of Doing Business Index (World Bank 2007). The Worldwide Governance Indicator for Rule of Law is a measure of the extent to which agents have confidence in and abide by the rules of society, including the quality of contract enforcement and property rights, the police, and the courts, as well as the likelihood of crime and violence (Kaufman, Kraay and Maastruzzi 2007). The Ease of Doing Business Index measures the costs to firms of business regulations, including in such areas as starting a business, employing workers, and paying taxes (World Bank 2008). As measures of informal institutions, we include each of our five social institutional measures, as outlined in this document: civic activism, safety and trust, intergroup cohesion, gender equity and voluntary association.

Due to the endogeneity between formal and informal institutions and growth, both the formal and informal institutional variables are instrumented. As instruments for informal institutions, we include the fraction belonging to each of the major religious denominations, as provided by La Porta et al. (1997). A strong case can be made that religious beliefs act as a major force conditioning the social norms and conventions that exist in society; furthermore, a long literature has addressed the relationship between social institutions and economic activity, notably the role of Protestantism in fostering greater norms of social trust, voluntary association, and civic engagement (Weber 1958). Following the argument that hierarchical religions foster lower interpersonal trust than more horizontal systems, Zak and Knack (2001) use the proportion of the population that is Catholic, Muslim or Eastern Orthodox as an instrument for

social trust. As instruments for formal institutions, we include the Bockstette et al. (2002) indicator for state history, and the proportion of European language speakers as a percentage of total population, as provided by Hall and Jones (1999). The argument for state history as a determinant of good governance is made by Bockstette et al. (2002), while the argument for the proportion of European settlers as a determinant of contract security and regulatory quality has been made by (among others) Acemoglu, Johnson and Robinson (2001), who contend that in countries where European settlers were able to settle in large numbers, they established institutions to defend property rights, whereas in countries where Europeans were able to rule but not to settle, they established extractive institutions which set a norm for predatory state behavior.

Tables 2.0 Deep Determinants of Growth

Rule of Law	0.237 (0.392)	1.174 (0.141)***	1.251 (0.109)***	0.661 (0.141)***	1.163 (0.113)***
Doing Business Index					
Civic Engagement	6.975 (2.947)*				
Safety and Trust		-0.417 (1.271)			
Intergroup Cohesion			-1.411 (1.351)		
Gender Equity				4.440 (1.087)***	
Voluntary association					-4.097 (1.466)**
Constant	4.758 (1.617)**	8.800 (0.622)***	9.302 (0.701)***	6.312 (0.554)***	10.921 (0.833)***
n	103	98	104	109	74
Adj. r^2	0.79	0.70	0.75	0.81	0.56

Rule of Law					
Doing Business Index	0.003 (0.007)	0.022 (0.003)***	0.025 (0.003)***	0.013 (0.003)***	0.025 (0.002)***
Civic Engagement	7.795 (2.562)**				
Safety and Trust		1.402 (1.327)			
Intergroup Cohesion			-1.215 (1.749)		
Gender Equity				4.513 (1.263)***	
Voluntary association					-3.026 (1.291)*

Constant	4.528 (2.018)*	9.728 (0.860)***	11.368 (1.104)***	7.398 (0.908)***	12.534 (0.793)***
n	96	92	99	103	72
Adj. r^2	0.79	0.62	0.61	0.79	0.58

All independent variables instrumented using: fraction of population Protestant; Catholic; Buddhist; Muslim; Orthodox; fraction of population speaking European languages; state history.
Dependent variable: Log GDP per capita.

Results are presented in Tables 2.0. Two social institutional measures emerge as significant when tested together with formal institutions: civic activism and gender equity. Safety and trust and intergroup cohesion are not significant when tested together with a measure for rule of law, which possibly indicates that these are in part second-order effects of formal institutional quality (World Bank 2008). However, as suggested in our analysis of the proximate determinants of economic growth above, norms of trust and cooperation may be a proximate determinant of development. The results suggest important long-term consequences of informal institutions upon the process of economic development.

The empirical analysis of social institutions and growth included here, suggests a number of areas where the Indices of Social Development are able to contribute to existing debates regarding the origins of long-run economic growth.

II. Social Institutions and Good Governance

In recent years, there has been a proliferation of research on corruption and its causes; indeed, the study of corruption has become *the* defining issue in the 'good governance' agenda (Kaufmann 1998). Not least of all, the international development community has pioneered this shift by finally addressing the challenge of graft in client countries. Following World Bank President James Wolfensohn's 'cancer of corruption' speech in 1996, there were a series of initiatives, such as the foundation of a Governance and Anti-Corruption Network within the World Bank, and the launch of a set of Worldwide Governance Indicators, which include a measure of the control of corruption (Kaufmann, Kraay and Zoido-Lobatón 1999a, 1999b, 2002).

Through empirical work, a range of institutional and policy mechanisms have been suggested as relevant to the level of corruption, including deregulation, decentralization, strengthening of the police and court system, free and fair election to public office, and legal protections for press freedom and the right of association (Goldsmith 1999, Kaufmann 1997, Azfar, Lee, Swamy 2001). In addition to these so-to-speak 'supply-side' measures, that is concerning the institutional framework in which officials may profit or otherwise from public office, a growing number of authors highlight what has been called the 'demand-side' of good governance, in the form of civil society associations, community networks. Using the Indices of Social Development, we are able to empirically verify the role of social institutions in reducing opportunities for corrupt practices in government.

Empirical Determinants of Corruption across Countries

Corruption can be defined as 'the use of public office for private gain'; such acts can include embezzlement (theft of state funds), extortion and bribery (demanding or offering kickbacks on favorable government decisions), and nepotism (giving preferences to family members or associates). Civic activism is defined as the set of practices among citizens which involve greater demand for involvement and scrutiny over public decisions and outcomes, such as popular participation in the media, membership in civil society organizations, and expression of voice through civic activism such as petition, protest, and peaceful demonstration.

What constitutes a full model specification for better control of corruption? In short, that is, what are the factors which determine levels of corruption across countries and over time? While empirical measures of corruption are a recent

development and the literature on corruption and its causes is still emerging, several factors are frequently discussed. First, *deregulation* has been seen as an important instrument for reducing the incidents of graft, as where there are less opportunities for officials to find fault with business for infringing the law, the fewer are the opportunities to extract bribes for non-compliance. Second, the *size of the public sector* is viewed as a determinant of corruption, insofar as, firstly, economic activity in the private sector is subject to norms of open competition for contracts, whereas the state may award contracts based upon internal allocation mechanisms with greater scope for favoritism, and secondly, private sector organizations are subject to greater quality improvement and cost reduction pressures, reducing the margin for nepotism and weeding out companies whose management or staff engage in embezzlement of resources. Third, the level of *political accountability* is a highly important determinant of corruption, in that where there are institutional mechanisms such as elections or legislative oversight to sanction wrongdoing politicians or bureaucrats, this reduces the incidence of such behavior. Fourth, *decentralization* has been widely discussed as a possible factor affecting the level of political corruption; Goldsmith (1999), for example, finds that federal and federative states are significantly less likely to experience widespread corruption on the grounds that public funds concentrated in one source are easier to embezzle, though these results have been contradicted by Treisman (1998). Fifth, the strength of *civil society* has often been viewed, implicitly or explicitly, as a factor determining the ability of politicians to engage in corrupt practices. The media plays a central role in investigating acts of corruption by civil servants, politicians, and members of the political elite; and civil society organizations have an effect in reducing corruption via their own investigative and oversight capacity, including monitoring of the process by which public contracts are awarded, overview of the implementation of public policies, and investigating patterns of extortion or systematic embezzlement by local officials. This is particularly the case in many developing countries, where the absence of a consolidated local media gives civic NGOs a leading role in both of these regards. In addition, greater citizen activism reduces the potential for abuse of public office by increasing the sanction upon politicians found to abuse their position, reducing the likelihood of reelection. This view stems from the strong empirical evidence showing a positive relationship between civic activism and quality of governance (e.g. Putnam 1993, Knack 2002, Inglehart and Welzel 2005), in contrast to earlier theories, such as that of Olson (1982), which viewed civic organizations as potentially contributive to rent-seeking behavior. However, in the absence of a broad civil society, the result is not a 'nightwatchman' state but rather state capture by a small, insider clique; whereas the proliferation of civil society groups, including consumer and taxpayer organizations, prevents any single 'distributional coalition' from emerging.

Hypothesis Testing

We operationalize these factors using the following variables. As measures of economic liberalization, including the regulatory environment and size of public sector, we use the individual components of the Heritage Foundation's Index of Economic Freedom, that is the indices for regulatory burden, trade, fiscal policy, monetary policy, investment framework, financial environment, security of property rights, and labor legislation (Heritage Foundation 2007). As a measure of political openness, we use the Voice and Accountability measure of the Worldwide Governance Indicators, which measures the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media (Kaufmann, Kraay, & Mastruzzi 2006). As a measure of centralization of power we use the Polity III variable for centralization, which is coded into three categories for federal (3), centralized (1) and mixed (2) political systems. Though this variable was dropped from the Polity dataset after 1994, we can make a case for using the 1994 coding on the grounds that there have been few cases of comprehensive decentralization between 1994 and today, and that in any case, corruption is a practice the level of which changes only very gradually, such that the use of a lagged variable is not illogical. Finally, as a measure of the strength of civil society we use the civic engagement measure of the Indices of Social Development, which is an aggregate index of civil activity across countries based on measures of civic activism in petitions and demonstrations, connections to international NGOs, media consumption, employment in the NGO sector, and qualitative assessments rating the health of civil society.

Results of a simple regression model on the level of corruption (as measured by the WGI measures) are provided in Table 3 below. Log GDP per capita is also included as a control; also included is an interactive variable between voice and accountability and civic engagement, on the basis that it may be the combination of political institutions which allow for citizen engagement in politics and the existence of an active citizenry to take advantage of those institutions which ultimately delivers monitoring and sanctioning of corrupt practices.

Table 3. Determinants of Corruption
Dependent Variable: Control of Corruption, 2005

Civic Activism	0.442 (0.521)
Voice and Accountability, 2005	-0.389* (0.156)
Interaction effect, Civic*Voice	1.164*** (0.326)
Log GDP per capita	0.167** (0.058)
Regulatory Burden	0.012*** (0.003)
Trade	0.003 (0.003)
Fiscal Policy	-0.003 (0.005)
Gov	0 (0.002)
Monetary Policy	0.003 (0.003)
Investment Framework	0.002 (0.003)
Financial Environment	-0.002 (0.002)
Security of Property Rights	0.014*** (0.003)
Labor Legislation	0.001 (0.003)
Polity III, Centralization (1994)	-0.03 (0.047)
Constant	-3.169*** (0.555)
n	114
Adj. r^2	0.91

* significant at the 0.05 level; ** significant at the 0.01 level; *** significant at the 0.001 level

In accordance with the literature on deregulation and graft, we find that a significant predictor of control of corruption is the regulatory environment, with countries that have a reduced regulatory burden also have significantly lower levels of perceived corruption. Security of property rights is also significantly associated with the level of graft, perhaps because of its strong *a priori* association with the quality of the legal system. Other hypotheses regarding economic liberalization and corruption are not supported; there is no significant

association for example between trade, the size of the fiscal burden, size of government, or labor regulation, and the level of perceived corruption. Economic development and level of corruption are significantly associated, perhaps unsurprisingly, given the endogeneity between these two measures (Knack and Keefer 1995, Mauro 1995). Finally, the coefficient for the interactive variable between voice and civic engagement is highly significant, and those countries that score well on both measures, such as Costa Rica, Estonia, and Chile, nearly all score near the top on the control of corruption measure[2]. Yet while the combination of civic mobilization with open political institutions may predict lower levels of corruption, neither civic engagement nor voice and accountability alone positively predict success in this regard. Thus we find that countries that score highly on civic engagement but are weaker in political accountability, such as Turkey, Russia, or Egypt, tend to remain poor in their ratings for control of corruption, as do countries that have open political institutions but weaker civic institutions, such as Mali, Mongolia, or Poland. The results suggest that both the combination of active citizens and open political institutions enables countries to monitor and reduce corruption over time.

Can Variations in Civil Society Explain Divergent Patterns in the Relationship between Growth and Governance?

The finding that the combination of civil society and more accountable political institutions may be key to reducing corruption opens an interesting path for investigation with regard to the relationship between growth and governance. In their paper, "Growth Without Governance" Kaufmann and Kraay (2002) have argued that there is no necessary relationship between economic development and improvements in governance, as growth may occur under conditions of state capture rather than as a result of broader participation in economic opportunities. Using one dimension of governance, the rule of law, the authors a negative association between economic development and the quality of governance, in that certain nations at higher levels of income, in particular in Latin America, have poorer rather than better levels of public order. As the authors remark;

> "As countries become richer, higher incomes do not necessarily lead to demands for better institutional quality, despite conventional wisdom to the contrary. In fact, just the opposite might occur: as long as the established elites within a country reap private benefits from the status quo of low-quality institutions, there is little reason to expect that higher incomes will

[2] There is only one outlier across the 131 observations, which is Singapore.

> lead to demands for better governance. The phenomena of crony capitalism in East Asia, of elite influence, cronyism, and regulatory capture in Latin America, and of state capture in transition economies provide vivid examples of the conflict between the interests of the elite and the need for better institutional quality" (Kaufmann and Kraay 2002).

A key factor implicit in such an analysis is the distribution of incomes that arise from economic growth. The case of Latin America, cited by the authors, is a classic case in which state capture during years of authoritarian rule led to highly unequal distribution of the gains from growth, and a sharp division between a minority of regime insiders, with access to the benefits of development, and a large share of regime outsiders, with small if any gains. This has several important consequences, both for social institutions and for governance. At the level of social institutions, rising inequality tends to increase the incentive to engage in violations of property rights, by increasing the marginal returns to theft (Becker 1968). Estimates of income inequality and estimates of criminal violence, such as official homicide rates, are correlated to a greater extent with other each (r = 0.58) than to log GDP (r = 0.26-0.51); as growing inequality leads to rising criminality, this tends to reduce countries' ability to maintain the rule of law. Second, unbalanced growth undermines the widely accepted hypothesis that economic development leads to better governance, as it undermines the main mechanism linking growth to political liberalization, which is the formation of a healthy civil society, populated by a broad-based, educated and asset-owning middle class (Lipset 1959, Moore 1966). In countries such as Brazil, South Africa, or Venezuela, economic gains over the last half of the twentieth century accrued to an insider elite, to the exclusion of much of the population. By contrast in countries such as South Korea, Spain, or to some extent India, economic gains were far more balanced across the nation as a whole. Accordingly, a vibrant civil society has emerged in the latter societies capable of exerting reform of political institutions and practices, including that of corruption, whereas in societies with unbalanced growth civil society remains weak and fragmented. Accordingly, from our data we find that civic engagement is high relative to GDP in the former societies, whereas the level of civil engagement relative to income per capita is weak in Venezuela, Mexico or Guatemala.

In order to examine the relationship between economic growth, the emergence of civil society, and improvements in governance, we examine the changes in each of these three variables over the period from 1995 to 2005. As our indicator of economic growth, we use the change in log GDP per capita at PPP; as measures of governance, we use the Voice and Accountability and Control of Corruption measures of the Worldwide Governance Indicators project; and as our measure

of strength of civil society, we use the civic activism measure of the Indices of Social Development.

Before moving to the regression models, however, some basic summary graphics highlight the three-way relationship between growth, civil society, and voice and accountability for 1995-2005. First, changes in log GDP and changes in civil society are significantly correlated, as illustrated by Figure 1.0, which shows the increase (or decrease) in log GDP from 1995 to 2005, plotted against the increase (or decrease) in civic activism over the same period. Slow growing countries such as Paraguay, Venezuela, but also Germany and the Netherlands saw slippage in levels of civic activism, while faster growing countries such as Mozambique, Estonia, and Botswana saw substantial increases. Second, changes in civil society and the openness of political institutions are significantly correlated, as shown in Figure 2.0, which shows the increase (or decrease) in civic activism from 1995 to 2005 against the increase (or decrease) in voice and accountability over the same period. Countries such as Zimbabwe that experienced weakening civil society also saw reductions in voice and accountability, while countries with large increases in civic activism, such as Croatia, Albania, and Peru, saw a shift to more accountable governance. Finally, changes in log GDP and voice and accountability are significantly related, as one might expect, given the significant relationship between each of these variables and civic activism. This is shown in Figure 3.0.

Figure 1.0, Changes in Log GDP per capita and Civic Activism, 1995-2005

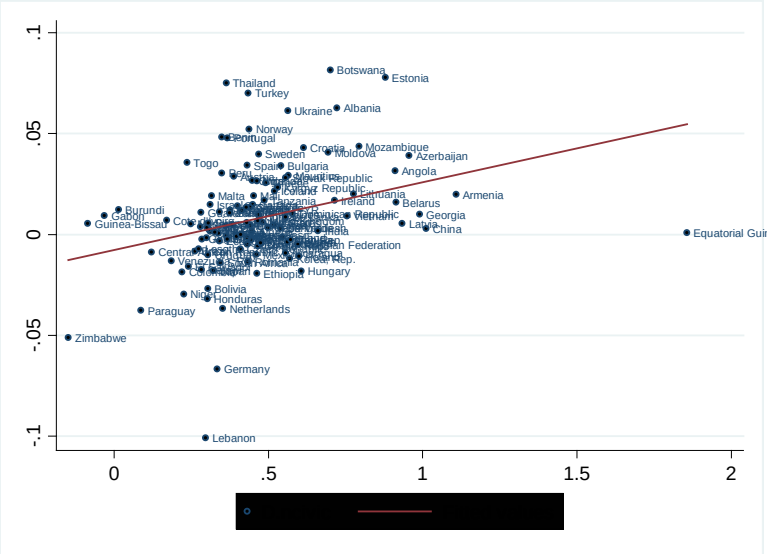


Figure 2.0, Changes in Voice and Accountability and Civic Activism, 1995-2005

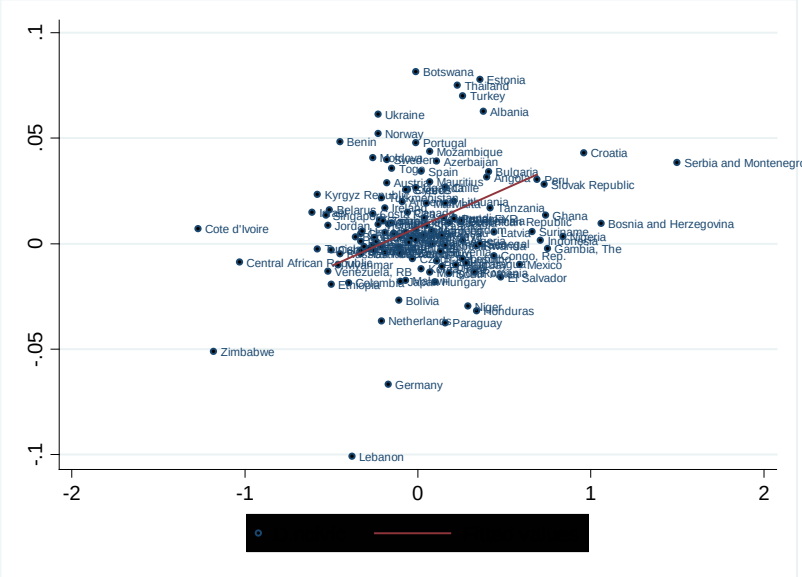
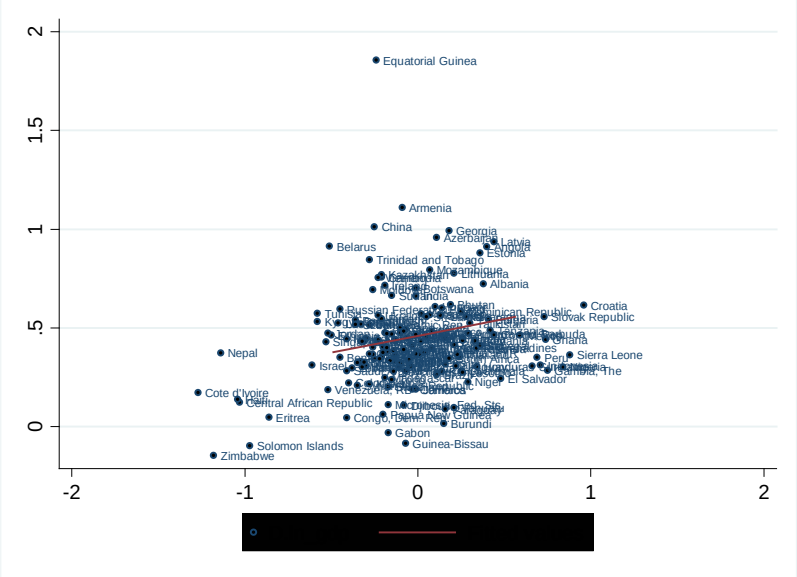


Figure 3.0, Changes in Voice and Accountability and Log GDP, 1995-2005



However, it is interesting to note that the same relationship does not entirely hold between growth, civil society, and control of corruption. While growth is significantly related to changes in civic activism, and changes in civic activism are significantly related to changes in levels of corruption, changes in corruption levels are *not* significantly related to economic growth. A possible implication, which we shall explore further, is that growth is only conducive to control of corruption in certain circumstances, notably where the benefits of growth are balanced across the population and is able to foster the formation of an active civil society capable of exerting pressure on leaders to deliver more accountable governance. Where growth, by contrast, is captured by a small clientele within the regime, for example when growth accrues from natural resource rents that is

managed by the political leadership, there is no corresponding growth of civil society, and no corresponding improvement in control of corruption.

To investigate this hypothesis, we estimate a simple time-series models based on two data periods, 1995 and 2005[3]. Our model attempts to explain variance in the level of corruption in countries in 2005, and as independent variables we include the lagged dependent variable, that is, the level of corruption a decade earlier, the lagged level of voice and accountability, the lagged strength of civic activism, lagged log GDP per capita adjusted for purchasing-power parity, and also the lagged interactive variable between the institutional environment, voice and accountability, and the social environment in the form of civic activism. The theoretical intuition behind this last variable is as follows. In order for effective efforts in reducing corruption, neither institutional change nor civic mobilization are sufficient to deliver change alone. An active civil society, for example, cannot effect change if it cannot influence a country's leadership through elections, the press, and direct engagement with the legislative branch, while mere mechanisms for public participation and oversight of the political process depend upon having an informed and active citizenry that will make use of these instruments to engage politically.

These results are shown in Table 4.0 below.

[3] Worldwide Governance Indicators are those from 1996, the start of the series, and 2004.

Table 4. Determinants of Corruption
Dependent Variable: Control of Corruption, 2005

Control of Corruption, lag	0.489*** (0.069)
Voice and Accountability, lag	-0.207 (0.143)
Civic Activism lag	-0.568 (0.518)
Interactive Effect, Voice*Civic	0.887** (0.273)
Log GDP	0.174** (0.055)
Regulatory Quality	0.183* (0.072)
Constant	-1.306*** (0.385)
N	113
Adj. r^2	0.92

* significant at the 0.05 level; ** significant at the 0.01 level; *** significant at the 0.001 level

The most significant coefficient, besides that of the lagged dependent variable, is for the interactive effect between civic activism and voice and accountability. In countries where both i) public institutions were conducive to greater engagement with the public authorities and ii) a broad base of civic organization existed which could mobilize citizens to engage with political leaders, lower levels of corruption were to be found. Neither the openness of public institutions, nor the level of civic engagement per se, can deliver lower corruption in their own right, independently of one another.

In addition, the models shows a significant association between log GDP and control of corruption, as there is a significant relationship between regulatory quality and control of corruption, though both of these are likely to be endogenous relationships. Countries with lower levels of corruption are likely to have experienced a long run process of cumulative capital formation (that is, economic growth), and while better regulatory quality may reduce corruption to some extent, by reducing the opportunities for bureaucrats to extort bribes from individuals and businesses, both regulatory quality and control of corruption are part of a broader pattern of good governance.

Time-series models that used lagged variables over a short period of time do not avoid the problem of endogeneity, as both of the associated variables - level of

income per capita and control of corruption in 1995 and 2005, in the above example - may be the result of a longer-term relationship between them, that is levels of income and governance during much earlier time periods. In order to overcome this difficulty, another empirical test which we can conduct is to examine simply the changes over time - that is, to take as our dependent variable the *change* in the level of control of corruption from 1995 to 2005. Table 5 below therefore shows the results of a regression with the change in the level of corruption from 1995 to 2005 as the dependent variable, and as independent variables the change in the level of log GDP, the change in the level of voice and accountability, the change in the level of civic activism, and the change in the interactive term between voice and accountability and civic activism.

Table 5. Change Model
Dependent Variable: Control of Corruption, 2005

Civic Activism, Change	1.252 (1.483)
Voice and Accountability, Change	-0.178 (0.357)
Interaction Effect, Voice*Civic, Change	0.911 (0.769)
Log GDP per capita, Change	0.067 (0.181)
Constant	-0.03 (0.086)
N	111
Adj. R2	0.09

* significant at the 0.05 level; ** significant at the 0.01 level; *** significant at the 0.001 level

Disappointingly, none of the independent variables are found to be significant determinants of the change in corruption from 1995 to 2005. However, this is not unsurprising given that stochastic factors and measurement errors play a preponderant role in patterning changes in registered corruption over a short period, such as that of just one decade. Nonetheless, we do find that when we conduct a joint confidence test on the three variables at the center of our attention - namely, the level of voice and accountability, the level of civic activism, and the interaction effect between the two – we find it is significantly unlikely that the combination of these three variables has not had some significant relationship with the level of corruption over the course of the decade from 1995.

Joint Wald Test

F(3, 106) = 3.16

Prob > F = **0.0276**

Using the Indices of Social Development, we are able to show social institutions and the quality of governance are related. Both institutional (or 'supply-side') as well as civic (or 'demand-side') factors in reducing corruption over time, and in explaining why levels of corruption are lower in some countries than others.

III. Social institutions and Environmental Resource Management

Why do some countries have higher levels of environmental sustainability than others? Using the Indices of Social Development, it is possible for the first time to estimate the effect of civic organisation for environmental stewardship and governance for a significant sample of countries across the world. In so doing, such a study can contribute to the growing study of 'environmental governance' - that is, the capacity of states to respond to climate change induced shocks, manage their natural resource endowments, past and present pollution levels, protect the global commons, and improve its environmental performance over time (YCELP 2005). The study of environmental governance has assumed an increasing prominence in recent years, and forms an important centerpiece of the World Bank's upcoming influential World Development Report (World Bank, forthcoming).

Earlier studies in this area have proven inconclusive. For example, Grafton and Knowles (2004) analyzed the relationship between social capital and national environmental performance for a sample of 35 countries, with their data sample being made up largely of high-income countries. Their social capital data were taken from the third wave of the World Values Survey (Inglehart et al. 2000), and employed three different proxies of social capital – trust, civic mindedness, and voluntary association. They found a significant and positive association between environmentally sustainable governance and civic mindedness, yet a negative relationship between trust or voluntary association and environmental sustainability. Their tentative conclusion was that aspects of social capital may be positively linked to environmental governance, but that testing needs to occur along different dimensions and with as best a sample of countries as possible.

To provide further testing of the determinants of environmental governance, it is possible to take as a measure of environmental policy effectiveness the Environmental Sustainability Index (ESI) used by Grafton and Knowles (2004), that was developed by Yale University (Yale Center for Environmental Law and Policy) and Columbia University (Center for International Earth Science Information Network) in collaboration with the World Economic Forum and the Joint Research Centre of the European Commission. The related Environmental Performance Index (EPI), developed by the same authors, is also used here. The Environmental Sustainability Index is a composite index tracking 21 elements of environmental sustainability covering natural resource endowments, past and present pollution levels, environmental management efforts, contributions to protection of the global commons, and a society's capacity to improve its environmental performance over time (YCELP 2005). Whereas the ESI was developed to evaluate environmental sustainability relative to the paths of other countries, the EPI uses outcome-oriented indicators, working as a benchmark

index that can be more easily used by policy makers, environmental scientists, advocates and the general public (YCELP 2008).

Following the established literature, as independent variables we choose the following (Grafton and Knowles, 2004; Midlarsky, 1998). *GDP* and GDP^2 are included to control for the possibility of an environmental Kuznets curve. The environmental Kuznets curve hypothesis posits that there is an inverted-U relationship between environmental degradation and income per capita (see, for example, Dasgupta et al, 2002; Torras and Boyce, 1998), implying a U-shaped relationship between income per capita and the ESI/EPI. It also seems likely that countries that are more densely populated are likely to suffer from more environmental pressure, all else equal. Hence, we include the log of population density as a control variable. We also include industry value added as a share of GDP to control for the possibility that industrial activity places more pressure on the environment than does either the agricultural or services sectors of the economy.

The empirical results obtained from OLS estimation are reported in Tables 4.0 and 5.0, with each column of the table including a different social institutions measure. Table 4.0 reports the results for the *ESI*, and Table 5.0 for the *EPI*. Preliminary testing suggested some problems with heteroskedasticity, hence the t-statistics reported are based on heteroskedasticity-consistent standard errors, following White (1980). Civic Activism and Gender Equity are both statistically significant in either table, with the expected positive sign. The remaining three social institutions indicators are all statistically insignificant.

Table 4.0: Determinants of the Environmental Sustainability Index (ESI)

	Institutional Measure				
	(i) *Civic Activism*	(ii) *Gender Equity*	(iii) *Clubs and Associations*	(iv) *Intergroup Cohesion*	(v) *Interpersonal Safety and Trust*
Social Institution Measure	18.249*	18.982**	0.384	4.605	4.593
	(9.191)	(6.119)	(3.864)	(6.597)	(8.446)
INDUST	-0.031	-0.048	-0.014	-0.039	-0.016
	(0.05)	(0.049)	(0.055)	(0.051)	(0.057)
ln*POP*	-3.121***	-3.047***	-3.186***	-2.78***	-3.224***
	(0.571)	(0.538)	(0.619)	(0.553)	(0.601)
VOICE	3.385**	3.291***	3.573**	3.961***	4.128***
	(1.001)	(0.917)	(1.322)	(0.906)	(1.064)
GDP	-0.318	-0.397	-0.178	-0.113	-0.222
	(0.236)	(0.26)	(0.33)	(0.251)	(0.268)
GDP^2	0.012	0.016*	0.013	0.009	0.012
	(0.007)	(0.007)	(0.009)	(0.007)	(0.007)

Constant	55.663*** (5.102)	55.712*** (3.269)	63.825*** (4.869)	60.466*** (5.021)	62.416*** (3.649)
R^2	0.55	0.563	0.564	0.537	0.556
N	108	118	82	115	106

Notes: heteroscedasticity-consistent t-statistics are given in parentheses. ***, ** and * indicate significance at the 0.1 per cent, 1 per cent and 5 per cent levels respectively (on the basis of a two-tailed test). N denotes the sample size. Variable abbreviations are as defined in the text.

Turning to the results for the other control variables, population density is negative and significant at the one percent level in all specifications, confirming that densely populated countries tend to have poor environmental outcomes, all else equal. The democracy variable is also positive and significant in all specifications, suggesting more democratic countries have higher levels of environmental sustainability, all else equal. *GDP* and GDP^2 are nearly always insignificant, suggesting there is no evidence of an environmental Kuznets curve. The share of industry in GDP is only significant at the ten percent level, when Clubs and Associations is the social institutions proxy. The R^2 ranges from 0.537 to 0.564, depending on which of the social institutions measures are included. Hence, approximately half of the cross-country variation in the ESI can be explained by the variables included in our regression model.

Turning to the EPI (Table 5.0), we can see that the coefficients for population density and democracy (proxied using the *Voice and Accountability* indicator) are no longer significant. We might expect that population density would not be associated with environmental performance in the same way that it is associated with environmental sustainability, though no simple interpretation can be given of the loss of the democracy coefficient. However, once again civic activism and gender equity are significantly positively associated with a more robust record of environmental governance.

Table 5.0: Determinants of the Environmental Performance Index (EPI)

	Institutional Measure				
	(i) *Civic Activism*	(ii) *Gender Equity*	(iii) *Clubs and Associations*	(iv) *Intergroup Cohesion*	(v) *Interpersonal Safety and Trust*
Social Institution Measure	38.425** (14.363)	26.359** (8.245)	-2.316 (6.281)	3.131 (9.131)	-11.884 (9.999)
INDUST	-0.024 (0.078)	-0.069 (0.079)	-0.088 (0.09)	-0.046 (0.082)	0.028 (0.083)
ln*POP*	0.069 (0.797)	0.388 (0.725)	-0.817 (0.857)	0.614 (0.767)	0.185 (0.811)

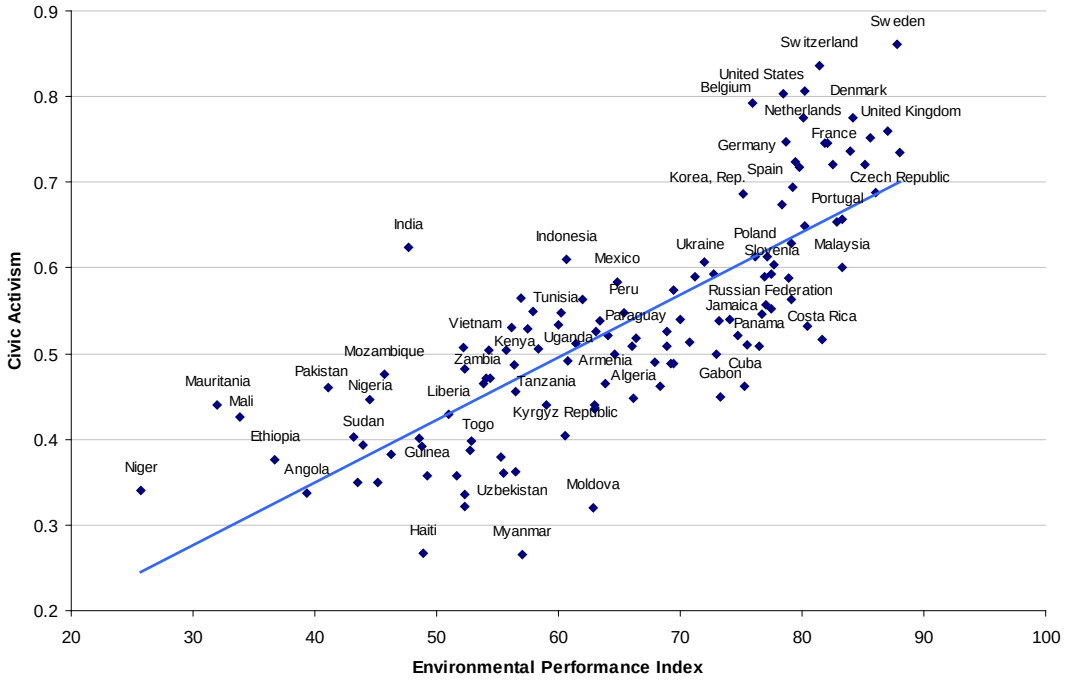
VOICE	1.464	1.352	-0.079	2.262	1.827
	(1.463)	(1.344)	(2.045)	(1.365)	(1.488)
GDP	2.303***	2.529***	2.923***	2.958***	2.689***
	(0.417)	(0.395)	(0.474)	(0.426)	(0.423)
GDP^2	-0.059***	-0.058***	-0.061***	-0.068***	-0.057***
	(0.011)	(0.011)	(0.012)	(0.012)	(0.011)
Constant	34.723***	39.405***	56.948***	47.647***	55.699***
	(7.935)	(5.388)	(6.366)	(6.758)	(4.961)
R^2	0.709	0.719	0.72	0.701	0.689
N	101	111	75	107	98

Notes: heteroscedasticity-consistent t-statistics are given in parentheses. ***, ** and * indicate significance at the 0.1 per cent, 1 per cent and 5 per cent levels respectively (on the basis of a two-tailed test). N denotes the sample size. Variable abbreviations are as defined in the text.

The two tables of results discussed above imply that some forms of social institutions are significantly correlated with environmental performance, whereas others are not. The positive correlation between Gender Equity and both *ESI* and *EPI* may be evidence that women tend to be more protective of the environment than are men, which means that in countries where women have a greater say in society this is associated with better environmental performance. Based on the coefficients on Gender Equity from Table 4.0, a one standard deviation increase in Gender Equity is associated with an increase in the ESI of 1.96 percentage points.

Turning to Civic Activism, this measure of social institutions was statistically significant with a positive sign whether ESI or EPI was the dependent variable. A significant positive correlation on Civic Activism implies that the ESI will be higher in countries where citizens are engaged in the political process, having controlled for whether a country is an electoral democracy or not, though of course the evidence suggests that democratic government helps foster civic networks and activities over time (Bernhard and Karakoç 2007). Based on the Table 4.0 results, a one standard deviation increase in Civic Activism is associated with an increase in the ESI of 2.30 percentage points.

Figure 4.0 Scatterplot of Civic Activism (2005) and the Environmental Performance Index (2006)



The level of electoral democracy is significantly positively correlated with the ESI in virtually all regressions run. In column (i) of Table 4.0, both Civic Activism and democracy are statistically significant with positive point estimates. This implies that *both* whether a country is democratic (as measured by the *Voice and Accountability* index) and the extent to which individuals engage with the political process (as measured by the index of civic activism) are important in explaining cross-country environmental performance.

Institutions and Climate Change Mitigation

If institutions have any role in bringing about improved environmental governance, this should imply some observable association, over time, between the presence of certain norms and concrete indicators of environmental performance. We can examine further whether such an association is observable, by taking data on reductions in carbon intensity (the ratio of gross domestic product to carbon emissions) over time.

Table 6.0 presents the results of a series of regressions with the change in carbon intensity from 1995 to 2005 (whereby 1995 = 1.00), and as our independent

variables a range of controls and institutional variables lagged to the start of the period (1995).

Table 6.0: Determinants of Change in Carbon Intensity (Ratio of GDP to Carbon Emissions), 1995-2005

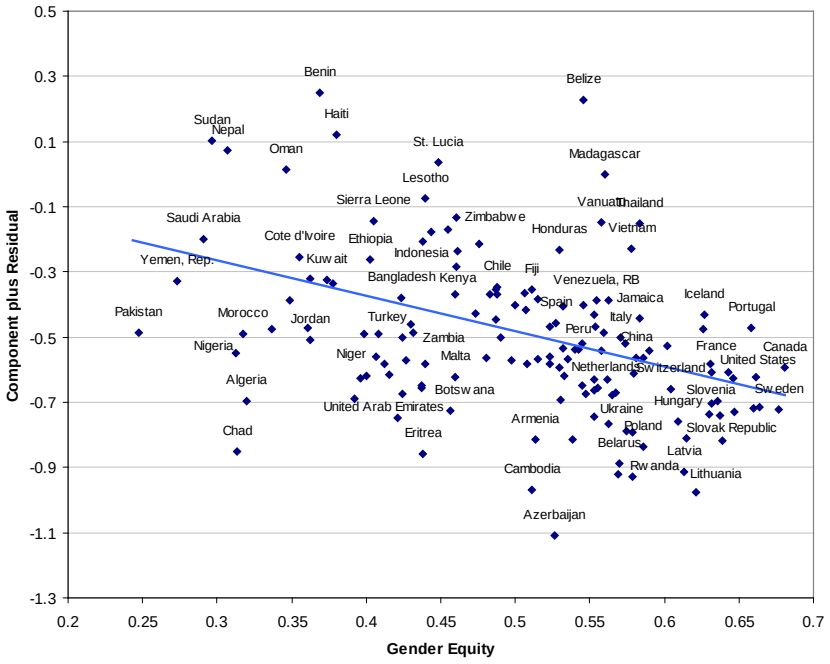
	Institutional Measure							
	(i) *Civic Activism*	(ii) *Gender Equity*	(iii) *Clubs and Associations*	(iv) *Intergroup Cohesion*	(v) *Interpersonal Safety and Trust*	(vi) *Voice and Accountability*	(vii) *Government Effectiveness*	(viii) *Control of Corruption*
Civic Activism	0.325 (0.268)	—	—	—	—	—	—	—
Gender Equity	—	- 1.012*** (0.228)	—	—	—	—	—	—
Clubs and Associations	—	—	0.519*** (0.13)	—	—	—	—	—
Intergroup Cohesion	—	—	—	-0.344 (0.204)	—	—	—	—
Interpersonal Safety and Trust	—	—	—	—	-0.146 (0.21)	—	—	—
Voice and Accountability	—	—	—	—	—	0.043 (0.029)	—	—
Government Effectiveness	—	—	—	—	—	—	-0.003 (0.041)	—
Control of Corruption	—	—	—	—	—	—	—	-0.01 (0.035)
Log population	-0.055 (0.05)	-0.041 (0.046)	-0.027 (0.038)	-0.02 (0.046)	0.005 (0.042)	-0.028 (0.047)	-0.041 (0.048)	-0.011 (0.045)
Population density	0.017 (0.015)	0.019 (0.014)	0.026 (0.014)	0.001 (0.017)	0.017 (0.017)	0.019 (0.014)	0.02 (0.015)	0.018 (0.014)
Log GDP	0.264 (0.286)	0.079 (0.261)	0.644 (0.324)	-0.264 (0.312)	0.025 (0.367)	0.243 (0.27)	0.171 (0.308)	-0.197 (0.293)
Log GDP squared	-0.019 (0.018)	-0.003 (0.016)	-0.038* (0.019)	0.015 (0.019)	-0.001 (0.021)	-0.017 (0.016)	-0.012 (0.019)	0.01 (0.018)
Constant	0.893 (1.439)	1.717 (1.367)	-1.672 (1.557)	2.628 (1.608)	0.633 (1.764)	0.609 (1.439)	1.016 (1.487)	1.983 (1.421)
N	153	146	80	160	79	159	158	132
R^2	0.03	0.15	0.19	0.03	0.02	0.04	0.03	0.04

Notes: Dependent Variable is Change in Carbon Intensity (1995-2005), relative to base year (1995)
***, ** and * indicate significance at the 0.1 percent, 1 percent and 5 percent levels respectively (on the basis of a two-tailed test). N denotes the sample size.

These regressions indicate that short-term (one-decade) changes in carbon intensity are determined by a number of omitted variables and/or stochastic variation, as shown by the low coefficients of determination (r-squared) for these models, which range from 0.02 to 0.19. Given this, we must be careful not to make undue inferences from the coefficients.

This said, the most striking finding is the very significant positive association between gender equity and reductions in carbon intensity. A priori, this may be due to one of two reasons. First, the particular role of female legislators and decision-makers regarding environmental policy, discussed in the above section on gender participation. Second, the role that gender empowerment may have in encouraging economic growth through the expansion of the (more carbon neutral) service sector[4]. In addition, it is also possible, given the high estimated error term, that the gender equity variable is collinear with an omitted determinant of carbon intensity, such that the association is spurious. However, examination of component-plus-residual plot for the gender term in this regression (figure 5.0) does not yield any clear suggestions as to what such a confounding variable might be.

Figure 5.0 Partial Correlation (Residual Plot) between Gender Equity (1995) and Change in Carbon Intensity (1995-2005)



For example, one alternative hypothesis might be that oil-producing states in the Middle East are responsible for the effect, as these societies are low on gender equity yet high on carbon intensity. However, examination of the residual plot

[4] A reverse causal path from expansion of the service sector toward higher scores on gender equity is less likely however, as while service sector expansion may indeed encourage greater female employment, the index of gender equity is primarily composed by non-labor market indicators, such as gender disparities in health and education, levels of gender-based violence, and the prevalence of discriminatory attitudes.

does not confirm this interpretation: while Middle Eastern oil producers are generally very low with respect to gender equity, there is no clear pattern regarding changes in carbon intensity: some states (Saudi Arabia, Sudan) have increased their carbon intensity of GDP, yet others (Algeria, United Arab Emirates) have seen substantial reductions. Another hypothesis is that the association is due to the coincidence of high gender equity in transitional (post-communist) economies, where the industrial sector shrunk very rapidly during the 1990s. This association is accurate, yet the coefficient is also driven by other cases: this includes most states in western Europe and north America. The link between gender equity and falling carbon intensity therefore may reflect some aspect of the extent to which women's employment reflects more carbon neutral, service sector jobs, the growth of which sector has been fastest in the states of Northern America and Northern Europe.

IV. Social institutions and Natural Disaster Response

Natural disasters are responsible for thousands of deaths every year due to their direct impact on vulnerable communities, and millions of deaths every year due to their indirect effects via damage to health, sanitation, and irrigation infrastructure. Alterations in the climate, or 'climate change,' will produce a higher degree of natural disasters, as these by definition are extreme weather events, where 'extreme' is defined in relation to human expectations and capacities. As low-income societies are increasingly faced with unexpected climatic phenomena, to which their infrastructure is poorly adapted, the rate of natural disasters is expected to increase in coming years. Between 1971 and 1995 these caused an average of 128,000 deaths per year, affected 136 million people, and caused a total $439bn of damages; of those affected by natural hazards between 1971 and 1995, 99 per cent were individuals living in the global South (IFRC 1997).

Empirical Literature on the Determinants of Natural Disaster Responsiveness

The Centre for Research on the Epidemiology of Disasters has defined a natural disaster as a 'situation or event which overwhelms local capacity, necessitating a request to national or international level for external assistance; an unforeseen and often sudden event that causes great damage, destruction and human suffering' (CRED 2004). Over the last several decades a considerable literature on such disasters has emerged from human geography, sociology, anthropology and economics (Mitchell 1999; Hewitt 1997; Blaikie et al. 1994; Varley 1994; Twigg and Bhatt 1998). Whereas early research on natural disaster risk arose from the natural sciences and stressed geographic and climatic factors as determinants of population risk, more recent work from within the approach known as 'vulnerability analysis' asserts that for there to be a disaster there has to be not only a natural hazard, but also a vulnerable population. This has shifted the locus of research from natural (climatic) factors to socioeconomic and political forces such as population density, poverty, and the existence of a free media and NGO sector. In a review of the more recent literature, Cannon (2000), for example, distinguishes five determinants of population vulnerability: Initial well-being, Livelihood Resilience, Self-protection, Social protection, and Social Capital. Initial well-being refers to the existing human and economic resources possessed by vulnerable population, and can be proxied by measures of prior life expectancy and income per capita. Livelihood resilience refers to the ability of the population to return to its previous set of activities, and depends in part on the nature of the catastrophe. Self-protection refers to the ability of the individual household to prepare in anticipation of eventual disaster, and can be proxied by measures of education and skills. Social protection in this context refers to the

efficacy of political institutions in providing disaster relief support, and can be measured by indices of governance (Cannon 2000).

In seeking to understand the vulnerability of populations to natural hazard risks, researchers are increasingly considering the institutional deficiencies which lead groups to become marginalized and then prevented from receiving an effective, organized disaster relief operation. As Nates and Moyer (2005) remark in a review of the causes of a range of recent natural disasters, 'the poor outcome in many of these disasters is not the result of lack of knowledge but rather the result of inaction and poor implementation of the necessary measures to prevent, contain, or mitigate the impact of natural disasters on the populations exposed'. Alternatively put, the high impact of certain disasters reflects institutional failure, both in the preparation and in the response to the occurrence of an extreme hazard event.

A range of informal institutions are also relevant to the capacity of vulnerable populations to withstand natural disaster risks. For example, several authors have highlighted the importance of 'social capital', understood as the 'norms and networks that enable people to act collectively' (Woolcock and Narayan 2000) upon the vulnerability of populations to climate risks. Where there are strong local community support networks, in theory people should be able to weather the impact of natural disasters better and be able to recover faster following the event, by pooling welfare risks and cooperating in reconstruction tasks. Adger (2003), for example, argues that social capital is an indispensable precondition to adapting to the effects of global climate change, citing the example of successful adaptation in protecting marine areas in Trinidad and Tobago (Brown et al. 2001, Brown, Tompkins and Adger 2002, Tompkins, Adger and Brown 2002).

Finally, a growing literature focuses on the nature of social institutions, not only within the community, but also within the household. Neumayer and Plümper (2007), for example, provide the latest in a range of studies showing a distinctly gendered pattern to natural disaster impact, and that natural disasters lower the life expectancy of women more than that of men. They also show that in societies where women have higher socio-economic status (SES), this effect is less, and therefore that the overall effect of natural disaster upon mortality rates is reduced. The implication is that norms of gender inclusion are important social determinants of natural disaster resilience.

Data

As a measure of success and failure at managing the effects of climate change, we take the rate of deaths from natural disaster events – that is, the per capita number of deaths arising from floods, heat-waves, tsunami, and earthquakes – for the period 1995-2005. Our source for this measure is the EM-DAT database published by the World Health Organisation (WHO 2008), a joint project with the Centre for Research on Epidemiology of Disasters (CRED) at the Catholic University of Louvain in Belgium, which records all events where either 10 people were killed; 100 people were reported affected; there was a call for international assistance; or declaration of a state of emergency. The data used covers the period from 1995-2005, inclusive, from which a single measure is constructed taking an average across the entire decade. In addition, to further ensure that the regression is robust to the inclusion of any individual outlier (high impact disaster) cases, we take the natural log of the rate of per capita deaths, rather than the raw level[5]. A summary of the numbers of deaths, by event type and by region, can be found in Table 1.0.

We measure the quality of formal institutions using the Worldwide Governance Indicators, released annually by the World Bank (Kaufmann, Kraay and Maastruzzi 2008). The Worldwide Governance Indicators are a set of six composite indices compiled using an unobserved components model based on over 300 items and over 30 data sources, and serve to track the functioning of basic qualities of the state such as the transparency of political processes or the quality of the bureaucracy. From the six indices compiled annually by the project, we include measures for Voice and Accountability, Government Effectiveness and Control of Corruption. The Voice and Accountability measure is an index of the degree of citizen involvement in public decision-making through elections and civic rights; the Government Effectiveness measure is an index of the quality of the bureaucracy and its efficiency in delivering public goods and services; the Control of Corruption measure is an index of the extent to which public officials use their position for private gain, for example through bribes, extortion, and embezzlement (Kaufmann and Kraay 1999).

Finally, we measure informal institutions using the Indices of Social Development (ISD), developed within the Social Development Department of the World Bank (World Bank 2008). The Indices of Social Development combine 200 items, from some 25 sources, into five social institutional clusters: gender equity, intergroup cohesion, interpersonal safety and trust, clubs and associations, and civic activism. For each cluster, items are combined using a latent variables approach, as adopted in the generation of the Worldwide Governance Indicators and Transparency International's Corruptions Perceptions Index (Kaufmann et al

[5] Regressions models were also estimated using the raw (untransformed) rate of deaths from natural disasters. However, in these models no variables emerge as significant due to the leveraging effect of outliers.

1999, 2007; Lambsdorff 2006). The intuition behind these procedures is that each set of indicators represents some implicit value of the underlying phenomenon in each society, on differing scales, with differing country samples, and with varying degrees of measurement error. The first cluster, gender equity, estimates levels of discrimination against women, and includes data on health, educational, and wage-related gender disparities, as well as data on the norms of discrimination that sustain these over time, such as the proportion of managers who believe men have more right to a job than women, or the proportion of parents who believe that boys should be prioritised in access to education. The second area, inter-group cohesion, reflects the extent of social conflict among ethnic, religious, or other social identity groups, using data on overt conflict, such as ratings on the level of ethnic and religious tensions, or the number of riots, assassinations, and acts of terrorism. The third area, interpersonal safety and trust, is an enhanced measure of general social trust, and brings together standard social trust items with data on the "trustworthiness" of others, based on criminal and related activity. The fourth area, clubs and associations measures the level of engagement in local associations and networks. Strength of community is measured using data on levels of engagement in local voluntary associations, time spent socializing in community groups, and membership of developmental organizations. Finally, the fifth area is the level of civic activism, which measures the extent to which social practices encourage a more active and critical interaction with political authorities. The strength of civil society is measured using survey data on participation in civic activities such as petitions or marches, access to media through newspaper and radio, and the density of international civil society organizations[6] (World Bank 2008).

Empirical Testing

The results of these regressions are shown in Table 7.0 below.

Table 7. Determinants of the Rate of Deaths from Natural Disasters, 1995-2005

	Institutional Measure						
	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(ix)

[6] Civic activism differs from measures of formal political institutions, such as the democracy measure produced as part of the Polity dataset, as it measures the specifically social practices and norms that 'make democracy work'. These informal institutions include a high level of civic informedness regarding political debates and policies, a willingness among citizens to express their views through civic forums such as community meetings or the press, and mobilisation to place pressure on officials to deliver better public services, for example via protest or petition. Studies such as Putnam et al. (1993) have identified these practices as essential for maintaining government efficacy, in addition to the existence of formal rules such as elections and constitutional guarantees of civil liberties, which are captured by the Voice and Accountability measure from the Worldwide Governance Indicators.

	Civic Activism	*Gender Equity*	*Clubs and Associations*	*Intergroup Cohesion*	*Interpersonal Safety and Trust*	*Voice and Accountability*	*Interactive Hypothesis*
Civic Activism, 1995	-1.225 (2.207)	—	—	—	—	—	-0.28 (2.218)
Gender Equity, 1995	—	-4.562* (2.017)	—	—	—	—	—
Clubs and Associations, 1995	—	—	3.334 (1.668)	—	—	—	—
Intergroup Cohesion, 1995	—	—	—	-7.663*** (1.831)	—	—	—
Interpersonal Safety and Trust, 1995	—	—	—	—	-4.626 (2.508)	—	—
Voice and Accountability, 1996	—	—	—	—	—	0.034 (0.28)	2.209* (0.847)
Government Effectiveness, 1996	—	—	—	—	—	—	—
Control of Corruption, 1996	—	—	—	—	—	—	—
Voice and Accountability, 1996 * Civic Activism, 1995	—	—	—	—	—	—	-4.832** (1.713)
Disaster events per capita (1995-2005), logged	3.44* (1.359)	3.741* (1.505)	5.737* (2.536)	4.759 (2.448)	4.02 (3.39)	3.856** (1.417)	4.954** (1.479)
Log population, 1995	3.268*** (0.461)	3.45*** (0.454)	2.782*** (0.617)	2.274*** (0.527)	2.774*** (0.653)	3.2*** (0.456)	3.154*** (0.454)
Log population density, 1995	0.128 (0.12)	0.19 (0.122)	0.388* (0.176)	0.156 (0.15)	0.292 (0.21)	0.099 (0.12)	0.113 (0.118)
Log GDP per capita, PPP 1995	-9.081** (2.89)	-8.401** (2.914)	-4.54 (5.351)	-9.366* (4.073)	-8.138 (6.199)	-8.904** (2.943)	-16.258*** (3.82)
Log GDP per capita, PPP^2 1995	0.176 (0.144)	0.141 (0.132)	-0.272 (0.228)	0.079 (0.17)	0.046 (0.255)	0.102 (0.146)	0.471* (0.188)
Log GDP per capita, 1995 * Disasters per capita (1995-2005), logged	-0.423** (0.158)	-0.423* (0.177)	-0.654* (0.282)	-0.576* (0.288)	-0.53 (0.377)	-0.487** (0.164)	-0.612** (0.174)
Constant	5.133 (19.108)	4.144 (20.645)	9.525 (35.327)	36.647 (30.854)	12.12 (44.02)	8.065 (19.585)	45.411 (23.498)
Adj. R^2	0.413	0.414	0.407	0.484	0.4	0.439	0.435
N	145	140	76	88	75	150	144

Notes: Dependent Variable is per capita deaths from natural disasters (1995-2005), logged.
***, ** and * indicate significance at the 0.1 percent, 1 percent and 5 percent levels respectively (on the basis of a two-tailed test). N denotes the sample size.

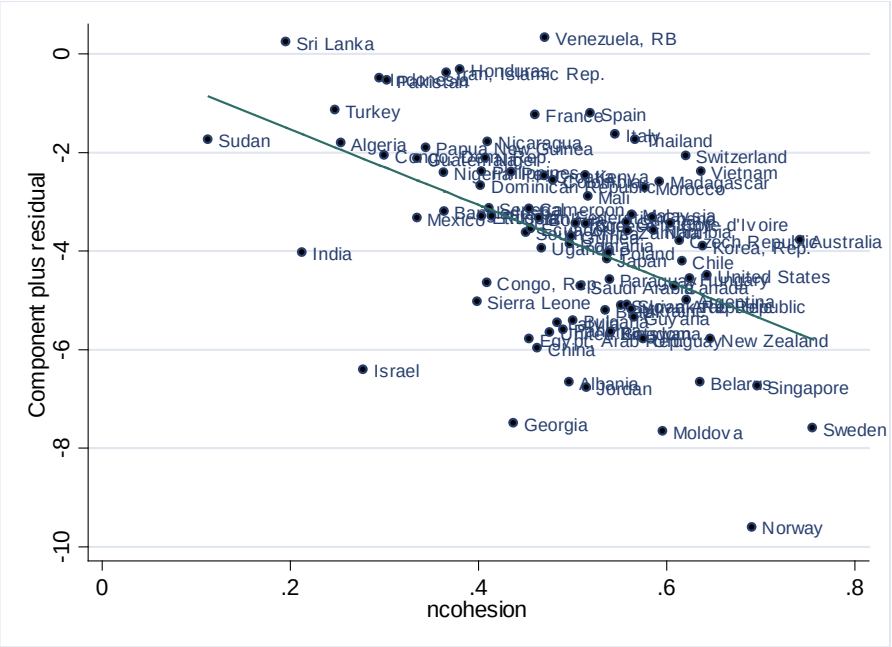
Our findings can be summarized as follows:

First, intergroup cohesion is very significantly associated with effective disaster relief. In societies with pervasive tensions between ethnic and religious groups, the rate of deaths from natural disasters is substantially elevated (Figure 6.0). The coefficient for intergroup cohesion of –7.663 implies that a one standard deviation improvement on this measure would result in a 0.95 fall in the log rate of natural disaster deaths, or a fall from the maximum recorded rate of deaths in the sample of 8,900 per 100,000 (registered by Indonesia), to a much lower level of 3,441 per 100,000. The p-value of 0.000 implies a very low likelihood of this

finding being due to random error. Examination of the residual plot shows no evidence of individual cases leveraging the result. The strong association between intergroup tensions and death from natural disasters may be due to several factors. First, in societies where ethnic and sectarian tensions lead to conflict or partial secession, government agencies and humanitarian organizations face great difficulties in disbursing emergency relief due to the precarious security situation. Second, poor inter- and intra-community relations may also affect the recovery process, as conflict-ridden communities fail to achieve the coordination required in order to manage the post-crisis challenges[7]. Third, the onset of a natural disaster may exacerbate existing tensions and stimulate the outbreak of conflict. As a result, fragile states and conflict-affected regions are especially at risk of the consequences of climate change.

[7] Research has shown strong linkages from ethnic fractionalization to poor governance outcomes in the form of clientelism, corruption and reduced government effectiveness (Alesina et al. 2003), though admittedly the coefficients for the governance variables are not significant when included individually in these regressions, suggesting a direct effect from social institutions to natural disaster vulnerability.

Figure 6.0: Partial Correlation (Residual Plot) between Intergroup Cohesion and (log) rate of deaths from natural disasters.



Second, participative governance increases the effectiveness of disaster relief - but only in the presence of a robust civil society. The coefficients in Model (ix) for Voice and Accountability, Civic Activism, and their interactive term imply that among democracies (countries with a Voice and Accountability score of 1.5) a one standard-deviation increase in the level of civic activism results in a 1.019 fall in the log rate of natural disaster deaths, or a fall from the maximum recorded rate of deaths in the sample of 8,900 per 100,000 (registered by Indonesia), to a much lower level of 3,214 per 100,000. However, this effect diminishes to zero among polities whose score on Voice and Accountability approximates the global mean. Both democratic institutions and a democratic culture, characterized by a high density of civic organizations and norms of political activism, are required in order to ensure prompt, efficient, and accountable government responses to disaster risk management. Civil society organizations cannot operate effectively under authoritarian regimes, yet neither can democratic institutions deliver unless a civil society exists capable of monitoring the public use of funds and pressuring politicians into action (Putnam 1993, Inglehart and Welzel 2005).

Third, gender equity is significantly associated with country resilience to natural disasters. In accordance with earlier work on the effect of women's empowerment on natural disaster recovery, the coefficient for Gender Equity is significant in reducing the rate of deaths. Policies designed to improve women's

education and eliminate discrimination in work, family, and public life ensure women are not made to suffer disproportionately the consequences of natural disaster (Neumayer and Plümper 2007), and are able to play an effective role in securing the wellbeing of themselves and their children, following a disaster event.

V. Social Institutions and Conflict Mitigation

A recent wave of theories predicting the outbreak of conflict have laid emphasis upon short-term economic factors as the central determinant of inter-group warfare, while de-emphasizing endemic group tensions and hatreds (Fearon and Laitin 2003, Collier and Hoeffler 2004). However, researchers have failed to find a reliable and non-endogenous measure of inter-group tensions, such that researchers have instead resorted to proxies such as the 'legacy of a previous conflict' (Harff 2003). In this section, we use a new measure of inter-group tensions to argue that both economic shocks and group hatred matter, with the effect of economic crisis upon political stability being more severe in countries where the existing state of intergroup relations is frayed.

The intergroup cohesion measure of the Indices of Social Development measures the extent or absence of routinized tensions and conflicts between ethnic, religious, or other social identity groups. However, rather than focus on macro-level conflict such as civil warfare, the intergroup cohesion measure instead looks at ongoing, everyday 'social' violence such as terrorism or riots, which typically occur in the absence of open warfare, in addition to surveys of religious and ethnic tensions, and expert assessments which examine the state of intergroup tensions. Essential to the definition of cohesion deployed by the indices of social development are that the indicators track acts of conflict that are i) conducted by non-state actors and ii) perpetrated by and directed against individuals of specific identity groups, without, however, there necessarily being organized armies opposing one another.

In econometric analysis, this measure of intergroup tensions provides a better predictor of the duration and intensity of conflict than either economic variables such as income per capita, or social-structural variables such as ethnic, linguistic, or religious fractionalization. The predictive power of our intergroup cohesion variable is robust to the inclusion of a lagged variable for past conflict duration and intensity. As the intergroup cohesion variable is based, in part, upon expert risk assessments of the state of intergroup relations across various societies, it is perhaps unsurprising to find that such assessments do, after all, reflect the likelihood of a future conflict breaking out, yet it is nevertheless reassuring.

Table 8 shows the results of two multivariate models, in which the dependent variables are the duration and intensity, respectively, of post-1990 conflicts. As our measure of the duration of post-1990 conflict we take the number of years, from 1991-2008 inclusive, in which a civil conflict was occurring in that country. For our measure of the intensity of conflict, we take the log number of deaths in civil conflict occurring during the 1991-2008 period. Data on both conflict deaths

and duration are taken from the International Peace Research Institute (PRIO) Armed Conflict Dataset (PRIO 2009). These estimates provide a high and low estimate for the number of conflict deaths by year, and we use the sum of the mean of the high and low estimate across all years from 1991 to 2008.

We take as our first independent variable the intergroup cohesion index estimated for 1990, the first year for which we have available data. Our intention is to see whether the intergroup cohesion index functions as a useful predictor of conflict outbreak. The intergroup cohesion variable is based on coded risk assessments of ethnic and religious tensions, newspaper coded social tension events (e.g. riots or terrorism) and survey data on mistrust and resentment between ethnic and religious groups. To minimize potential endogeneity, no data from future periods (1995, 2000, 2005) were used in the aggregation of this composite score.

As control variables in these regressions, we include variables which are more commonly used to predict conflict outbreak. Extensive research has established a relationship between low income and conflict outbreak, and therefore a variable is included for GDP per capita (Fearon and Laitin 2003, Collier and Hoeffler 2004). This variable is taken from the World Development Indicators, and lagged to 1990 to prevent endogeneity with conflict. Researchers have in recent years also worked extensively on measures of ethnic, linguistic, and religious fractionalization, and shown association between these indicators and measures of corruption, absence of the rule of law, and state failure (Alesina et al. 2003, Fearon and Laitin 2003). The estimates published by Alesina et al. (2003) for each of these three forms of fractionalization are separately included in this regression, and reported below[8]. Finally, obviously a key predictor of group violence in future is whether there is an existing, ongoing conflict, or has been an unresolved conflict, in the recent past (Gurr and Harff 2003). In theory, it is difficult to separate this from the measure of intergroup tensions - given that this is the means by which a previous unresolved conflict gives rise to future violence - nonetheless, to guard against the accusation that the coefficients report merely a spurious correlation, we include a 'lagged dependent variable' in the form of the years of civil conflict and log civil conflict deaths, respectively, during the prior decade (1980-1990 inclusive). These variables are also taken from the PRIO dataset (PRIO 2009).

Table 8. Cohesion and Conflict
Dependent Variables: Years of Civil Conflict (1991-2008), Civil Conflict Deaths (1991-2008)

[8] A combined variable (not reported) of ethnic, religious, and linguistic fractionalization, was found not to be significant when included in place of the three separately.

	Years in Conflict, 1991-2008	Log Civil Conflict Deaths, 1991-2008
Intergroup Cohesion, 1990	-145.719 (37.941)***	-122.965 (61.043)*
Log Deaths in Conflict, 1980-1990	-	0.6 (0.157)***
Years of Conflict, 1980-1990	-80.238 (173.56)	-
Ethnic Fractionalization	2.495 (2.035)	0.706 (2.78)
Linguistic fractionalization	4.371 (1.68)*	5.409 (2.268)*
Religious fractionalization	-4.325 (1.565)**	-5.401 (2.066)*
GDP per capita	-0.03 (0.056)	0.005 (0.077)
Constant	67.219 (16.625)***	56.682 (26.975)*
n	94	94
Model r^2	0.48	0.52

* significant at the 0.05 level; ** significant at the 0.01 level; *** significant at the 0.001 level

The coefficients shown in Table 8 suggest that, whether it is predicting future conflict duration or future conflict deaths, the measure of intergroup cohesion proves a better predictor than either income per capita or social fractionalization. The relative weakness in predicting the rate of conflict deaths is largely due to the fact a number of extraneous factors determine the rate of deaths in conflict, such as terrain, population density, and urbanization; for this reason, the most significant predictor of future conflict deaths turns out to be rate of deaths during the previous period (Fearon and Laitin 1999). That intergroup cohesion proves a more powerful predictor of conflict duration than the duration of conflicts in the recent past suggests, a priori, that group-based attributes such as the depth of intergroup resentments, may determine the ease or difficulty with which political elites are able to negotiate an end to armed conflict. It may also be because in situations where group-based resentments are particularly intense, this reduces the cost of new recruits, as well as increasing the political payoff to ethnic or religious leaders that take a 'hard line' refusal to compromise, and because where resentments are intense, politically negotiated ceasefires may be violated by radicals on either side of a conflict who conduct spontaneous attacks in defiance of more moderate leaders.

Figure 7.0: The Relationship between Intergroup Cohesion (1990) and Future Conflict Deaths (1991-2008), r = 0.57

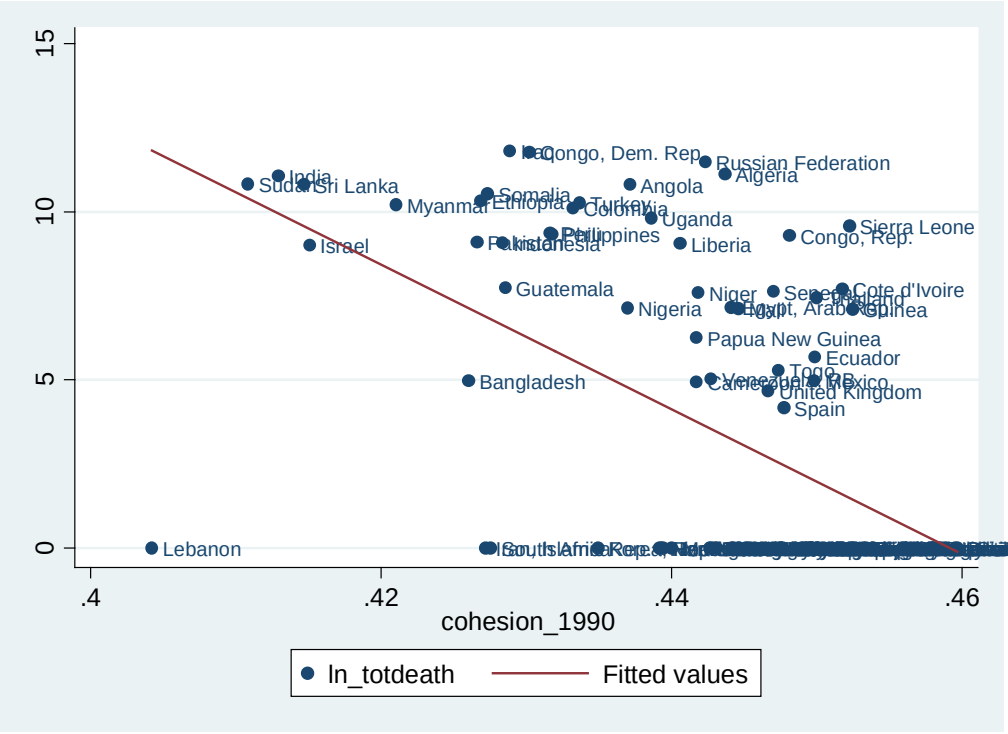
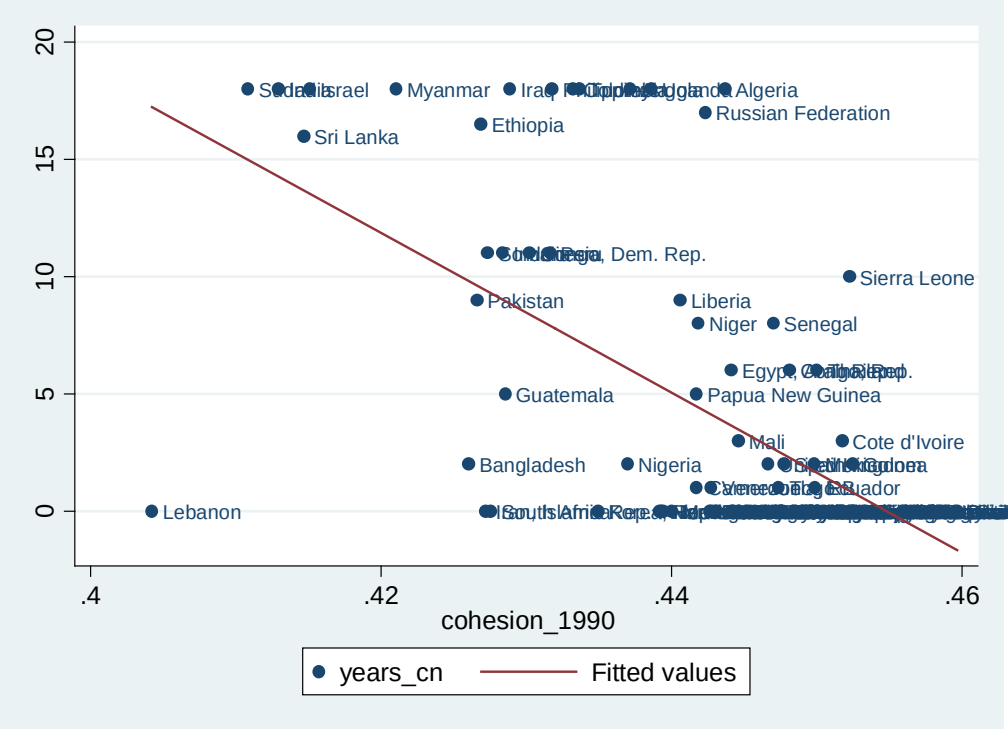


Figure 8.0: The Relationship between Intergroup Cohesion (1990) and Future Conflict Duration (1991-2008), r = 0.62



VI. Conclusion

In this paper, we have begun to explore some of the research areas across which the Indices of Social Development can usefully be applied. The indices of social development are usefully geared toward research in areas where cross-country regression can yield useful results, much of the data used in the indices is difficult to sub-aggregate below the national level. Given that cross-country regression remains, for better or for worse, the staple method for investigating many of the questions in development economics, this proviso does not prevent the researcher from replicating many of the standard models current in the literature with the addition of the new social variables. This, in itself, is an important advance, as for too long social factors have often been disregarded as part of the 'stochastic' component when they are in fact systemic features of social reality that are capable of detection and influence.