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TRADE AND ENVIRONMENTAL QUALITY IN AFRICAN COUNTRIES: DO INSTITUTIONS MATTER?

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Trade and Environmental Quality in African Countries: Do Institutions Matter?

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Abstract

This paper examines the impact of trade and political institutions on environmental quality in Africa and explores whether political institutions matter to the trade-environment relationship. We use data from a large group of African countries, covering the period 1990-2008 and two indicators of environmental quality: net forest depletion and CO2 emissions. The results from GMM-SYS estimates suggest that political institutions influence the relationship between trade and environmental quality only in the case of CO2 emissions. Interestingly, we find that polity has a U relationship with net forest depletion. In addition, the results are in favor of an environmental Kuznets curve in the case of pollution (CO2 emissions) but not in the case of net forest depletion (deforestation). We discuss the policy implications of these findings.

Key words: Africa, environmental quality, deforestation, CO2 emissions, trade, political institutions

JEL codes: F18, O13, P48, Q56

1. Introduction

In recent years, many African countries have increased exports to the world, particularly to China. In some cases, this trend has also been accompanied by an increase in inward FDI, especially in resource rich countries. At the same time, a large number of countries are still faced with the challenges of reducing poverty and unemployment. Both the rise in exports and the fight to reduce poverty could suggest possible threats to environmental sustainability in Africa.

The World Bank defines environmental sustainability as "[e]nsuring that the overall productivity of accumulated human and physical capital resulting from development actions more than compensates for the direct or indirect loss or degradation of the environment" (World Bank, 2008). The United Nations Millennium Development Goal (MDG) 7 is specifically about ensuring environmental sustainability. Target 7a is to "integrate the principles of sustainable development into country policies and programs, and to reverse loss of environmental resources." The first two indicators associated with this target (as well as with target 7b) are (1) proportion of land area covered by forest, and (2) total CO2 emissions per capita and per $1 GDP (PPP).

This paper examines the impact of trade and institutions on environmental quality (environmental sustainability)[1] in African countries and explores whether political institutions matter to the trade-environment relationship. We investigate whether trade has a significant effect on deforestation and pollution, and whether political institutions mitigate this effect. To do so, we use data covering the period 1990-2008 and variables that are directly related to two indicators identified by the U.N. as indicators associated with MDG 7: net forest depletion and CO2 (carbon dioxide) emissions. More specifically, using the Arellano–Bover system GMM (GMM-SYS) estimator, we examine the effects of trade on environmental quality, distinguishing between the effects of trade volume, export of forest products, and fuel exports. We also examine the impact on institutional quality, focusing in particular on the interplay of political institutions and trade.

[1] In this paper environmental quality and environmental sustainability will be used interchangeably.

The empirical results indicate that fuel exports seem to have a negative effect on environmental quality in Africa. Furthermore, political institutional quality has a direct negative impact on the environment and an indirect positive effect through its interaction with trade. Interestingly, we find that polity—an indicator of *political* institutions—has a U relationship with environmental quality when we use net forest depletion. We find support for the well-known environmental Kuznets curve in the case of pollution (CO2 emissions) but not in the case of net forest depletion (deforestation). We comment on the empirical results and discuss the policy implications of the findings.

The remainder of the paper is organized as follows. In Section 2, we present a brief review of the relevant literature. Section 3 describes the variables and methodology. We present and discuss the estimation results in Section 4. Section 5 provides policy discussion and concludes.

2. Overview of the empirical literature

There is a vast empirical literature on the relationship between development and the environment. Selden and Song (1994) and Grossman and Krueger (1995) are among the early studies that identified a nonlinear relationship between the two; more specifically an inverted-U relationship, similar to the inverted-U relationship between income inequality and per-capita income identified in Kuznets (1955). This led to what has become known as the environmental Kuznets curve (EKC)—first coined by Panayotou (1993). For most of the 1990s, scholars in this area have focused on the relationship between growth (or income) and environmental quality (or sustainability), and generally tried to assess the evidence against or in favor of EKC.[2] For example, de Bruyn et al. (1998) find that the time patterns of three types of emissions, Carbon Dioxide (CO2), Nitrogen Dioxide (NOx) and Sulfur Dioxide (SO2) are positively correlated with economic growth and that "emission reductions may have been achieved as a result of structural and technological changes in the economy."

[2] For interesting literature reviews, see Ekins (1997), Stern (1998), Dinda (2004), and Gassebner et al. (2011).

In recent years, there has been a rapidly growing literature on the link between pollution in particular and income (growth), as well as other determinants of income or growth—such as trade, FDI, and democracy or other measures of institutional quality (Lopez and Mitra, 2000; Dasgupta et al., 2002; Cole, 2000 and 2004, Cole et al., 2006; Eskeland and Harrison, 2003; Friedl and Getzner, 2003; Copeland and Taylor, 2004; Bernauer and Koubi, 2009; Lamla, 2009). The evidence from the empirical literature is in general mixed. While, many studies have documented the existence of EKC in the case of pollution (using various indicators of pollution), some scholars have found that the evidence is either not robust or nonexistent (see for example, Galeotti and Lanza, 1999; Azomahou et al., 2006; and Gassebner et al., 2011). Azomahou et al. (2006) use a panel of 100 countries and examine the empirical relation between CO2 emissions per capita and GDP per capita during the period 1960–1996, using nonparametric poolability test of Baltagi et al. (1996). The authors find evidence in support of a monotonic relationship between CO2 emissions and per-capita income, thus rejecting the inverted-U relationship (EKC).

Many studies have found that there is evidence of EKC in the case of deforestation. For example, Culas (2007) finds significant evidence of an EKC relationship for deforestation in Latin America. Combes Motel et al. (2009) also obtain evidence in support of EKC. However, the empirical evidence on the presence of EKC in the case of deforestation is also mixed (see for example, Koop and Tole, 1999; Bhattarai and Hammig, 2001; and Bulte and van Soest, 2001).

In theory, the effect of trade on environmental quality is ambiguous. On the one hand, trade increases the size of the economy which may cause more pollution. This is particularly so for countries which export products that are generally associated with creating pollution (oil producing countries, for example). On the other hand, through composition effect, trade can lead to better environmental quality. Similarly, FDI inflows to developing countries may be viewed as a way to transfer ‘dirty’ industries to developing countries hence increasing pollution (and deforestation) levels. However, FDI may allow access to better technologies and thus may contribute to significant reduction in pollution (and deforestation). It turns out that the empirical evidence on the effects of both trade and FDI on environmental quality is also quite mixed.

The empirical evidence on the effects of political institutions is, in general, inconclusive. For example, Bernauer and Koubi (2009) test existing theories on the provision of public goods, in particular air quality, using data on sulfur dioxide (SO2) concentrations from the Global Environment Monitoring Projects for 107 cities in 42 countries from 1971 to 1996. Their results show that the degree of democracy has an independent positive effect on air quality, and that among democracies, presidential systems are more conducive to air quality than parliamentary ones. Culas (2007) obtains evidence suggesting that better environmental policies and improvements in institutions for secure property rights can significantly reduce the rate of deforestation without hindering the level of economic growth. On the other hand, Gassebner et al. (2011) did not find evidence that political institutions matter. In contrast, the authors obtain results suggesting that dictatorships are associated with less air pollution per capita. In addition, the authors find that economic freedom seems to increase water pollution. Fredriksson and Wollscheid (2007) obtain empirical evidence suggesting that presidential congressional systems often set environmental policies not significantly different from autocracies.

3. Variable selection and methodology

Our selection of the variables is primarily guided by the discussions in Dinda (2004) and Gassebner (2011). Dinda provides a detailed discussion of a set of factors that could explain the EKC including, among others, income elasticity of environmental quality demand, international trade, foreign direct investment, and property rights. However, Gassebner et al. (2011) conclude that trade openness is not related to pollution levels. The authors note that "the claim that access to 'greener' technologies caused by globalization would lead to an improvement of environmental quality is difficult to maintain." But they did not find evidence in support of the pollution haven hypothesis either. As noted earlier, Gassebner et al. (2011) also fail to show that good political institutions matter.

Our indicators of environmental quality are CO2 damages (an indicator of pollution), expressed as percentage of gross national income (GNI) and net forest depletion (an indicator of deforestation), as percentage of GNI. CO2 damages (carbon dioxide damages) are estimated by

the World Bank to be $20 per ton of carbon (the unit damage in 1995 U.S. dollars) times the number of tons of carbon emitted. Net forest depletion (NFD) is calculated as the product of unit resource rents and the excess of roundwood harvest over natural growth (see World Bank *World Development Indicators* database online for more details).

The right-hand side (RHS) variables include the log of per-capita income (PPP, $2000), openness to international trade (measured by the ratio of exports plus imports to GDP), inward foreign direct investment (FDI) as percentage of GDP, democracy and polity indices, the share of fuel exports (% of merchandise exports), and forest products exports (% of merchandise exports). The variable democracy refers to 'institutionalized democracy' which is an additive eleven-point scale (0-10) indicator assessing "the presence of institutions and procedures through which citizens can express effective preferences about alternative policies and leaders, the existence of institutionalized constraints on the exercise of power by the executive, and the guarantee of civil liberties to all citizens in their daily lives and in acts of political participation" (World Bank database on line). The variable 'polity' is the combined polity score, computed by subtracting the 'autocracy' score from the 'democracy' score. Its scale ranges from -10 (strongly autocratic) to +10 (strongly democratic). Polity data are from the Polity IV project. Unless noted otherwise, all other data and variable descriptions are from the African Development Indicators, World Bank database online.

Our methodology consists of using the Arellano–Bover system GMM (GMM-SYS) estimator, mainly due to the fact that lagged levels of the regressors were found to be poor instruments for the first-differenced regressors. This estimator was suggested by Arellano and Bover (1995) and Blundell and Bond (1998) and has been used in growth models (see Bond et al., 2001). GMM-SYS tends to increase efficiency. It uses the levels equation to obtain a system of two equations, one in levels and one in differences, thus generating additional instruments. The variables in levels in the second equation are instrumented with their own first differences. We treat income, FDI, trade, fuel exports and forest products exports, as well as their interplay with other variables, as endogenous.

4. Estimation results

Table 1 displays the coefficients of linear correlation among the main variables (see also Figures 1-5). We note that trade has a positive and statistically significant but relatively weak correlation with CO2 (0.19) and a stronger negative correlation with NFD (-0.33). On the other hand, FDI does not seem to be significantly correlated with CO2 or NFD. Forest product exports (FP_EXP) have significant positive correlation with CO2 and a statistically significant but weaker association with NFD (-0.08), whereas fuel exports have stronger association with both CO2 (0.34) and NFD (-0.21). Income has significant association with both CO2 and NFD. Interestingly, while the correlation of income with CO2 is positive (0.35), its correlation with NFD is negative (-0.44). Income has a significant positive correlation with both fuel exports and forest product export. Finally, our indicators of institutions (polity and democracy) do not seem to have significant correlation with CO2 and NFD. We also note that the linear correlation between polity and democracy is statistically nonsignificant.

Table 2 reports estimates where the dependent variable is CO2. We first explore the independent effect of four variables: income, openness to trade (TRADE), FDI, and democracy. The effect of openness to trade is negative, implying that trade leads to a reduction in CO2 emissions, while the impact of income is positive. On the other hand, the effects of democracy and FDI are statistically nonsignificant. In columns (2) and (3), we control for fuel exports as a share of merchandise exports, and test for the presence of nonlinearity in the relationship between income and CO2 emissions and the relationship between democracy and CO2 emissions. The coefficient on the variable FUEL_EXP is highly significant and positive, but the coefficients on the squared forms of income and democracy, although negative, are statistically nonsignificant. In columns (4) and (5), we control for the interplay of trade with democracy and the effect of time. The coefficient on the time dummy is statistically nonsignificant. On the other hand, the results indicate that the interplay of trade and democracy has a negative effect on environmental quality (increases CO2) which is marginally significant (at the 10% level). We also note that there is statistical evidence of an inverted-U relationship between income and CO2 damages.

In columns (5)-(7), we substitute 'polity' for 'democracy'. The variable polity has a positive and highly significant coefficient in both columns. The results associated with trade, income, and fuel exports are remarkably robust. We find a negative relationship between openness to trade and CO2, suggesting that open economies actually have lower levels of CO2 emissions as a share of GNI. On the other hand, we show that countries with high levels (shares) of fuel exports have higher rates of CO2 emissions. We also find robust evidence of an inverted-U relationship between income and CO2 (pollution), suggesting strong support for the environmental Kuznets curve. Using the estimates in columns (6) and (7), we find that the turning point for income is between $8,800 (PPP) and $11,200 which is significantly higher than per-capita income (PPP) in most African economies (in 2008 the median in our sample was about $1,410), implying that a large number of African countries is still on the upward-slopping segment of the environmental Kuznets curve. The results associated with the effect of FDI are also robust; there seems to be no significant impact of FDI (as % of GDP) on CO2 emissions. However, this result could be due to the fact that we did not differentiate between different types of FDI and that the effect of FDI going to the oil industry in Africa is already captured by the variable 'fuel exports'. We also obtain statistical evidence suggesting that the interplay of improvements in polity and trade has a positive effect on the environment. Surprisingly, the independent impact of polity on CO2 is positive, suggesting improvements in polity have a negative impact on the environment (more pollution).

In Table 3, we report the results associated with net forest depletion (NFD). In columns (1)-(4) we use democracy as indicator for political institutions. The results indicate that openness to trade has a negative impact on deforestation. Democracy seems to have a negative effect on net forest depletion, suggesting that democracy enhances environmental quality. However, there may be strong diminishing gains (column 3) and the result does not appear to be robust. Export of forest products does not seem to have a significant impact on deforestation. Similarly, the interplay of democracy and trade does not appear to have a significant impact. Interestingly, the results indicate that the effect of income on NFD has a U shape, suggesting that deforestation initially decreases with increases in income but starts rising beyond a certain income.

In columns (5)-(7), we again substitute 'polity' for 'democracy' and examine the effects of polity and its interaction with trade on net forest depletion. The results associated with the effects of trade, FDI and income are similar to the ones derived using the variable democracy. We find that the effect of time is strong and positive, implying that deforestation has significantly increased over time. In addition, the effect of polity on NFD has an inverted-U form, while the effect of income has a U shape (as in the case where we use democracy). Using the results in column (7), we find the turning point for per-capita income at a value of about $4,580 (above the median income in 2008), and the turning point for polity at a value of approximately 1.2. In our sample, the median value of polity in 2008 is 0.5. This suggests that many countries are still below the level at which polity would help reduce net forest depletion.

5. Summary and discussion

Using the GMM-SYS estimator and data from a large group of African countries over the period 1990-2008, this paper examines the impact of trade and political institutions on the environment in Africa using two indicators of environmental quality, CO2 emissions and net forest depletion. In particular, we explore whether political institutions matter to the trade-environment relationship by including the interplay of trade and democracy, and trade and polity in the estimations.

The results we obtain suggest that openness to international trade (trade volume) has a positive effect on environmental quality, both in the case of CO2 emissions and net forest depletion, suggesting the presence of strong composition and/or technique and diffusion of technology effects (see Dinda, 2004). This result is remarkably robust. We find no statistically significant effects of FDI on CO2 emissions or net forest depletion. But this result may be due to the fact that we did not distinguish between different types of FDI (which is a very difficult task, at the least, in macroeconomic panel data analysis). We obtain evidence suggesting that political institutions, measured by the combined polity score, matter to the relationship between trade and the environment in the case of CO2 emission; better political institutions enhance the positive effects of trade on environmental quality (further reduction in CO2 emissions). We also find

robust evidence of an inverted-U relationship between income and CO2 emissions (but not in the case of deforestation), which suggests strong support for the environmental Kuznets curve in the case of this type of pollution. The turning point for per-capita income is in the range of $8,800 to $11,200 which is significantly higher than per-capita income in most African economies. This seems to imply that a large number of African countries are still on the upward-slopping segment of the environmental Kuznets curve and thus slow improvements in income remain associated with more environmental degradation. We find that fuel exports are robustly associated with greater environmental degradation (higher CO2) levels in African countries, suggesting support for the displacement (of dirty industries to developing countries) proposition in the case of fuel poducts. Interestingly, we find that polity—an indicator of *political* institutions—has an inverted-U relationship with deforestation, with the turning point occurring at a polity score of 1.2. Given that the median value of polity in 2008 (last year in the sample) our sample is 0.5, this results implies that a large number of African countries are still in the range of negative link between polity and environmental quality. On the other hand, income has a U relationship with deforestation, suggesting as per-capita income improves beyond the turning point (about $4,580), deforestation starts increasing. One plausible explanation is the fact that rising income is associated with more urbanization and construction which may require much higher demand for forest products.

The results we obtain are particularly relevant to countries that have significantly increased their trade in natural resources, especially oil and gas, since the late 1990s and early 2000s. In addition, increased trade with (exports to) developing countries, particularly to China (especially given the existing evidence on mixed effects of exports to China)[3] may require that African countries pay even more attention to environmental effects associated with their economic activities. The empirical results suggest that environmental polices in African countries should take into account the potential effects of trade. In the present study, we find that fuel exports result in higher CO2 emissions (% of GNI). In general, our results seem consistent with the findings in the growing literature on pollution created by the oil industry in Africa, notably in the Niger Delta (Owolabi and Okwechime, 2007; Adams et al., 2008; Opukri and Ibaba, 2008;

[3] See, for example, Baliamoune-Lutz (2011).

Imoobe and Iroro, 2009; Gbadebo et al., 2010). The set of possible ways Africa can minimize these effects includes regulation, well-defined property rights, adoption of new technologies, and cooperation with foreign investors and trade partners (China in particular) with the aim to implement better technology and production processes.

In the case of deforestation, African policymakers should look at success stories from other countries that rely on industries using forest products as major input, such as wood-based industries (see for example, Clark 2004). In addition, there are well-founded arguments in support of the role of property rights, regulation, and compensation (Araujo et al., 2009; Palmer, 2011; Tacconi, 2009; Combes Motel et al., 2009). In a recent paper, Damette and Delacote (2011) note that demand for timber products is rapidly rising in developing countries at a time where deforestation has become a major environmental issue. Using panel data, the authors find that "countries where timber harvesting is more important tend to experience larger deforestation rates than others, giving the intuition that forest harvesting is generally not sustainable." Importantly, the authors show that timber certification has a negative relationship with deforestation and conclude that this seems to be a good indicator of harvesting sustainability.
There is also documented evidence of environmental sustainability practices in African countries, which could serve as good case studies for other countries. For example, Jagger et al. (2005) examine woodlot devolution in Ethiopia and find that "more devolved woodlot management empowers resource users, providing greater decision-making autonomy regarding harvesting and management." The authors report that there has been limited harvesting of high value products such as poles and fuelwood, a decline in labor inputs, an increase in tree survival rates, and improved average annual net benefits as woodlot management was devolved, suggesting improved efficiency with more localized management. Fisher and Shively (2005) use seasonal household data from Malawi and a Tobit model and examine the relationships between income shocks and forest use. They find that, ceteris paribus, households experiencing an income boost had lower forest extraction compared to households that did not receive such a shock. An excellent discussion of woofuels and policy interventions in Africa is provided in Arnold et al. (2006).

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Figure 1

Per-capita income (PPP, 2000$) and net forest depletion

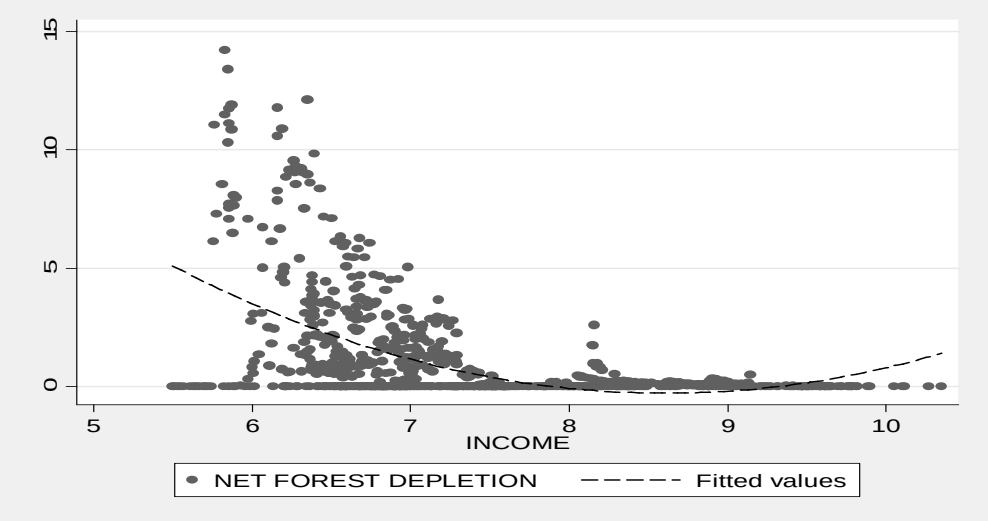

Figure 2

Per-capita income (PPP, 2000$) and CO2

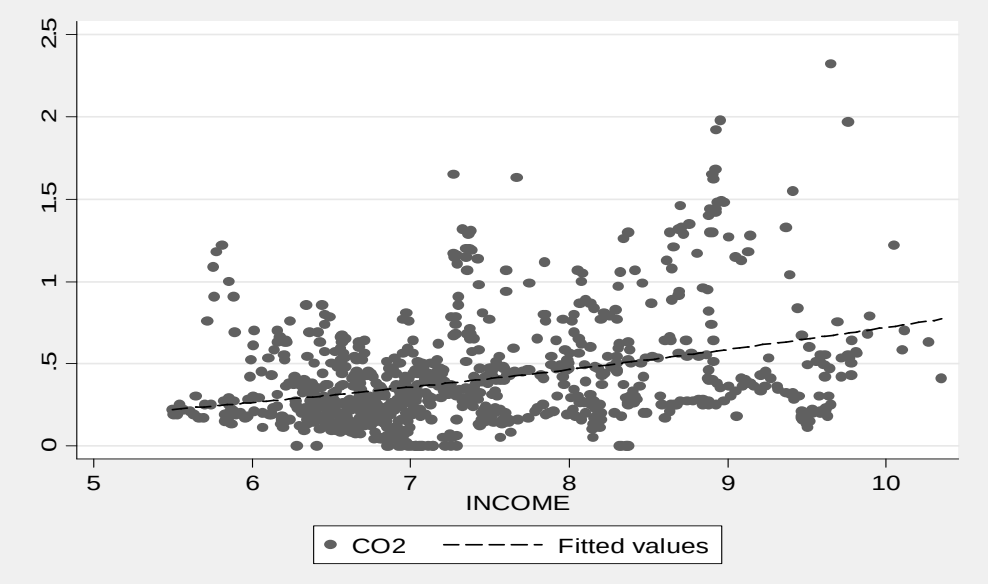

Figure 3
Trade and net forest depletion

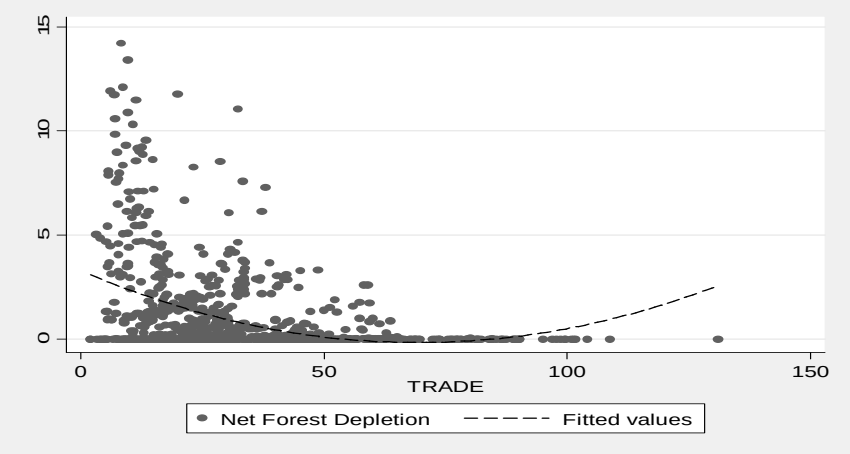

Figure 4
Trade and CO2

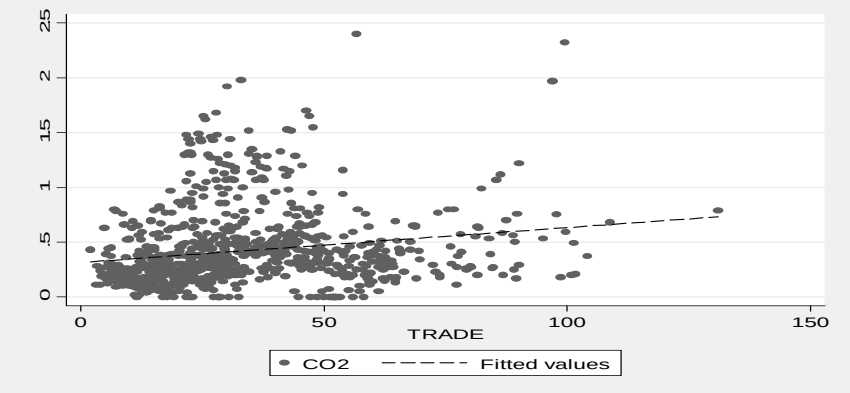

Figure 5
Fuel export and CO2

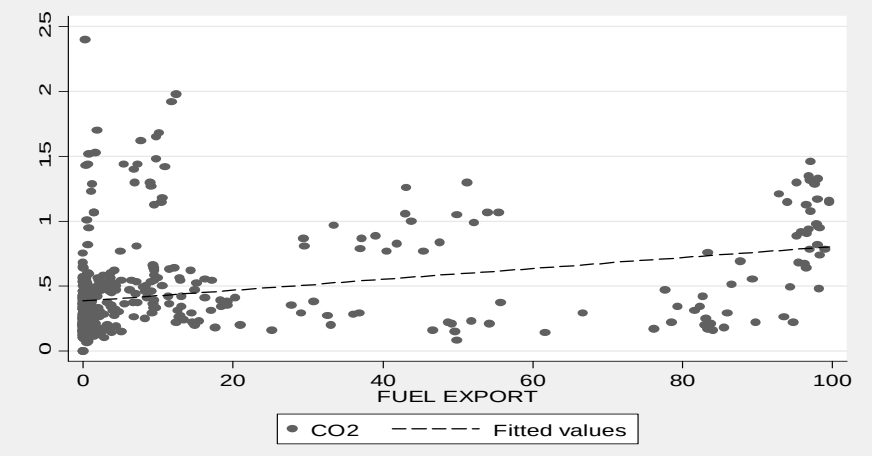

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Table 1
Correlations

	CO2	NFD	TRADE	FDI	FP_EXP	FUEL_EXP	INCOME	POLITY
NFD	-0.124 (0.00)							
TRADE	0.189 (0.00)	-0.334 (0.00)						
FDI	0.061 (0.11)	-0.083 (0.03)	0.125 (0.00)					
FP_EXP	0.30 (0.00)	-0.108 (0.00)	0.078 (0.03)	-0.053 (0.18)				
FUEL_EXP	0.335 (0.000)	-0.21 (0.00)	0.085 (0.06)	0.133 (0.00)	0.092 (0.05)			
INCOME	0.346 (0.00)	-0.441 (0.00)	0.67 (0.00)	0.069 (0.07)	0.315 (0.00)	0.316 (0.00)		
POLITY	-0.059 (0.09)	0.030 (0.38)	0.007 (0.84)	-0.016 (0.67)	0.128 (0.00)	-0.259 (0.00)	-0.039 (0.24)	
DEMOC	0.037 (0.30)	-0.002 (0.95)	-0.015 (0.667)	0.011 (0.785)	0.035 (0.35)	0.015 (0.75)	0.044 (0.21)	-0.053 (0.13)

P-values are in parentheses.

Table 2
GMM SYS Estimation

Dependent variable: CO2

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
CO2 lagged	-0.137***	-0.160***	-0.148	-0.160***	0.181	-0.171***	-0.186**
	(0.051)	(0.062)	(0.15)	(0.06)	(0.12)	(0.06)	(0.07)
TRADE	-0.004***	-0.006***	-0.006***	-0.007*	-0.003*	-0.008***	-0.007***
	(0.000)	(0.001)	(0.002)	(0.004)	(0.001)	(0.001)	(0.002)
FDI	0.001	-0.003	-0.0004	0.008	0.005	-0.002	-0.014*
	(0.01)	(0.01)	(0.009)	(0.014)	(0.011)	(0.004)	(0.008)
INCOME	0.152***	-0.0135	0.203	2.194**	1.89***	1.175***	1.344***
	(0.017)	(0.41)	(0.21)	(1.08)	(0.718)	(0.408)	(0.295)
DEMOC	0.004	0.029*	0.108	0.088	0.014		
	(0.02)	(0.017)	(0.15)	(0.129)	(0.017)		
FUEL_EXP		0.0033***	0.0024**	0.0037**	0.0033***	0.0026***	0.0027***
		(0.000)	(0.001)	(0.001)	(0.0007)	(0.0005)	(0.0008)
INCOME SQUARED		0.0132	-0.001	-0.137*	-0.115**	-0.063**	-0.074***
		(0.26)	(0.01)	(0.07)	(0.04)	(0.026)	(0.019)
DEMOC SQUARED			-0.011	-0.011			
			(0.019)	(0.014)			
DEMOC X TRADE				0.006*			
				(0.0037)			
TIME					-0.005		-0.003
					(0.022)		(0.007)
POLITY						0.0363***	0.0404***
						(0.007)	(0.008)
POLITY SQUARED						0.017**	
						(0.006)	
POLITY X TRADE						-0.001***	-0.001***
						(0.000)	(0.000)
Obs	512	334	334	334	334	334	334
Overidentifying restrictions test, p-value	0.98	0.99	0.99	0.99	0.99	0.98	0.99
AB (1)	0.001	0.005	0.002	0.094	0.042	0.021	0.047
AB (2)	0.143	0.69	0.324	0.288	0.598	0.299	0.482

Equations are estimated with a constant (not shown).
Corrected standard errors are in brackets.
* , ** and *** represent significance at the 10-percent, 5-percent and 1-percent levels, respectively.

Table 3
GMM SYS Estimation

Dependent variable: Net Forest Depletion (NFD)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
NFD lagged	-0.292**	-0.132	-0.169*	-0.151	-0.226*	-0.204	-0.252***
	(0.126)	(0.135)	(0.098)	(0.129)	(0.122)	(0.129)	(0.077)
TRADE	-0.013***	-0.016***	-0.069***	-0.019**	-0.014***	-0.019***	-0.012***
	(0.004)	(0.002)	(0.022)	(0.099)	(0.002)	(0.009)	(0.004)
FDI	0.019	0.0008	0.011	-0.011	0.004	-0.015**	-0.008
	(0.056)	(0.016)	(0.008)	(0.007)	(0.015)	(0.005)	(0.007)
INCOME	-0.773***	-9.409***	-4.209	-10.93***	-9.037***	-11.49***	-11.22***
	(0.147)	(1.178)	(5.919)	(1.378)	(1.82)	(2.32)	(1.873)
DEMOC	0.0037	0.019	-2.898**	-0.442*	-0.447		
	(0.165)	(0.023)	(1.413)	(0.026)	(0.051)		
FOREST		-0.0001	-0.0002*	-0.0001	0.0001	-0.0001	0.0003
PROD_EXP		(0.001)	(0.0001)	(0.001)	(0.001)	(0.001)	(0.001)
INCOME		0.565***	0.137	0.671***	0.536***	0.720***	0.714***
SQUARED		(0.119)	(0.399)	(0.097)	(0.122)	(0.164)	(0.128)
DEMOC			0.397**	0.051			
SQUARED			(0.184)	(0.038)			
DEMOC X				0.001			
TRADE				(0.002)			
TIME					0.089*		0.023***
					(0.051)		(0.003)
POLITY						0.054	0.029
						(0.071)	(0.10)
POLITY						-0.010**	-0.012**
SQUARED						(0.004)	(0.005)
POLITY X						-0.0015	
TRADE						(0.0013)	
Obs	552	478	478	478	478	478	478
Overdentifying restrictions test, p-value	0.97	0.99	0.99	0.99	0.99	0.99	0.99
AB (1)	0.046	0.056	0.066	0.050	0.041	0.012	0.008
AB (2)	0.413	0.140	0.180	0.115	0.218	0.294	0.325

Equations are estimated with a constant (not shown).
Corrected standard errors are in brackets.
* , ** and *** represent significance at the 10-percent, 5-percent and 1-percent levels, respectively.