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International Trade and Environmental Policy in the Postcommunist World

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This article examines whether commercial openness has affected environmental policy in the postcommunist countries of Central and Eastern Europe and the Commonwealth of Independent States. During the Cold War, these countries had closed trade regimes combined with little environmental regulation and poor environmental quality. Since the fall of the Berlin Wall and the breakup of the Soviet Union, many postcommunist countries have engaged in extensive trade liberalization. Some countries, however, have been slower to open their markets, and others have maintained highly protectionist trade policies. Have countries that opened up to global markets improved their environmental policies, or has increasing exposure to the international trading system undermined efforts to improve environmental policy? The results indicate that trade openness undermined a key element of environmental policy in the region by reducing governments' ability to collect environmental taxes and support environmental investments.

Keywords: *environmental policy; international trade; globalization; postcommunist countries*

In recent years, social scientists and policy makers have expressed considerable interest in the relationship between globalization and the environment. Concerns over the existence of pollution havens, environmental dumping, and a possible "race to the bottom" in environmental policy have been widespread.[1] In this article, we analyze the impact of trade openness on environmental policies in the postcommunist economies of Central and Eastern Europe (CEE) and the Commonwealth of Independent States.[2]

Until the late 1980s, all of these countries had closed trade regimes coupled with weak environmental regulations and extensive pollution. Since then, postcommunist states have followed different paths. Some countries rapidly opened their markets, whereas others did not. Some adopted strict environmental policies, whereas others have been more lax. Although all of these countries began the 1990s with very weak environmental policy regimes, their environmental regulations and pollution levels varied considerably during the next decade. The *2001 Environmental Sustainability Index* (ESI), which ranked 122 countries according to their overall level of sustainability based on 22 composite indicators, placed the Slovak Republic, Hungary, Slovenia, and Lithuania among the top 25 countries. Poland, Moldova, and Bulgaria ranked 58th, 59th, and 60th, respectively. Romania was 80th, whereas the Kyrgyz Republic and Ukraine ranked 98th and 110th, respectively (World Economic Forum, Yale Center for Environmenal Law and Policy, and Center for International Earth Science Information Network, 2001). What explains these variations? Have the trade regimes of these countries influenced the implementation of environmental policy reforms?

A chief fear expressed in the literature on globalization is that this process will precipitate a race to the bottom in environmental policy. The concern is that heightened competition in a globalized economy may lead firms to invest in countries that minimize regulations, taxes, and other costs of doing business. Domestic firms that cannot relocate may press their governments to reduce such costs to avoid being placed at a competitive disadvantage. These pressures could prompt governments to weaken or abolish environmental protections. A number of studies have found support for this argument, although it remains highly controversial (Copeland & Taylor, 2004; Lofdahl, 2002; Low, 1992). Alternatively, globalization may prompt countries to strengthen their environmental policy regimes if, for example, they are required to make such improvements before gaining access to valuable foreign markets, such as the European Union (EU; Andonova, 2004; Mol, 2001; Vogel, 1995; Vogel & Kagan, 2004).

Much research has examined how globalization has affected other domestic policies, especially the size of the welfare state. Evidence on the

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developing countries and emerging markets suggests that increased exposure to trade may lead to decreased social spending and a reduction in the size of the welfare state (e.g., Kaufman & Segura-Ubiergo, 2001; Rudra, 2002; Wibbels, 2006). This literature suggests that an inverse relationship may exist between international trade and spending on environmental policies in the transition economies; however, little systematic research has been conducted on this topic.

This article helps to fill that important gap. We argue that heightened trade openness in the postcommunist world has weakened countries' capacity to implement environmental policies. We begin by discussing environmental policy in the region since 1991 and then present our argument about why increased exposure to international markets might degrade environmental regulation. Next, we test the argument. The results accord with our claim. During the 1990s, trade openness undermined a key element of environmental policy by reducing governments' ability to collect environmental taxes and support environmental investments. Consequently, globalization may be hindering the implementation of certain environmental policies in the postcommunist world.

Environmental Politics in the Transition Economies

Postcommunist governments inherited critical environmental problems. Severe air pollution, soil degradation, and contamination of waterways were common dilemmas in the region (Carter & Turnock, 2002; Weinthal, 2002). The health effects of environmental degradation and the active role played by environmental movements in the breakup of the communist system placed environmental reforms at the top of the political agenda in the early 1990s. However, the environmental enthusiasm of the early transition period soon waned. Economic and social concerns took precedence as some of the worst environmental problems were alleviated by the sharp decline in industrial production.

Since the collapse of the Berlin Wall, the record of environmental policy reform in postcommunist countries has been mixed. Nearly all transition countries updated their environmental legislation. They also adopted a series of economic instruments to control pollution and implement environmental policies. These instruments generally involve charges, taxes, and penalties against polluters that are used to stimulate investments in pollution abatement. The ability of state authorities to enforce economic instruments, however, has varied.

Air pollution regulations, for example, are enforced through per ton pollution charges and noncompliance fees. However, only six of the CEE countries have emission charges for sulfur dioxide (SO2) and nitrous oxide (NOx) pollutants, and these charges are far from uniform. In 2000, the SO2 charge in Poland was one of the highest in Europe at about 85 euros per ton; in Slovakia and Lithuania, these charges were 46.7 and 56.3 euros per ton, respectively; and in Latvia and Estonia, they were much lower, at 17.9 and 3.52 euros per ton (Regional Environmental Center [REC], 1999). The SO2 charges in Russia were a mere 1.4 euros per ton in 2002 (Organization for Economic Cooperation and Development [OECD], 2004). Noncompliance penalties for air pollution have also varied, often according to regulatory formulas, which leave a considerable discretion to regulators and enterprises. Similar variation in charges and noncompliance penalties exist in the regulation of water pollution and waste management. Studies reveal that apart from a few countries, the overall environmental tax burden on industry has been kept low and does not provide strong incentives to undertake environmental improvements (Bluffstone & Larson, 1997; REC, 1999; Speck, McNicholas, & Markovic, 2001).

In light of the disastrous environmental conditions that postcommunist governments inherited and the broad policy reforms undertaken, it is unlikely that they engaged in a true race to bottom as they opened their economies. After all, they were already at or near the bottom, from an environmental standpoint. However, these countries have faced considerable difficulties in implementing their environmental standards. The purpose of our analysis is to address whether differences in the exposure of these countries to international trade has helped to shape variations in their ability to regulate the environment and to generate and disburse resources for environmental protection.

The Argument

There are few, if any, comparative analyses of the impact of trade on environmental spending. Yet the capacity of states to allocate resources is critical for the implementation of environmental policies (Keohane & Levy, 1996). Studies of the effects of overseas commerce on domestic politics have focused primarily on social policies and budgets. Evidence from the advanced industrial countries suggests that heightened exposure to trade has little effect on various aspects of social spending and that it may increase spending on certain programs (e.g., Alesina & Wacziarg, 1998; Cameron, 1978; Garrett, 1998; Rodrik, 1997). In developing countries and emerging markets, by contrast,

rising exposure to trade is often associated with a reduction in social spending and the size of the welfare state (e.g., Kaufman & Segura-Ubiergo, 2001; Rudra, 2002; Wibbels, 2006). Observers have expressed concern that in emerging markets—including the transition economies—globalization might also have an adverse impact on environmental policy, but very few studies have examined this issue (Smarzynska & Wei, 2001).

Economic research, which has dominated the literature on trade and environment, does not offer a clear prediction on the nature or strength of the relationship between these factors in the postcommunist world. Existing studies have distinguished three dimensions along which the environmental effects of trade are likely to vary: scale, composition, and technology (Copeland & Taylor, 2004; Fredriksson, 1999). The scale effect reflects the overall environmental impact of economic growth, stemming from trade and other sources. Growth is likely to stimulate the consumption of a country's natural resources and generate pollution. At the same time, however, rising income is expected to increase the demand for environmental protection. The latter is reflected in the Environmental Kuznets Curve (EKC), which stipulates that the initial increase in pollution associated with growth will give way to declining levels of pollution as societies reach a certain level of prosperity and demand higher environmental quality (Stern, Common, & Barbier, 1996). The composition effect reflects changes in the relative size of polluting sectors and thus could have positive or negative environmental consequences, depending on countries' factor endowments and comparative advantage. Finally, the technology effect reflects the expectation that trade will contribute to efficiency gains and the diffusion of environmentally cleaner technologies. However, international competition coupled with the economic hardship of transition may also induce laxer enforcement of environmental policies and unchecked exploitation of natural resources. Economic theory therefore does not provide clear expectations about the effects of greater openness on environmental policy.

Our focus, however, is on the politics of trade and environmental policy in transition economies. Two sets of political factors could contribute to a positive relationship between trade and environmental policy in these countries. First, as suggested by the EKC, trade may contribute indirectly, via increasing income, to a greater demand for strict environmental policies and a greater capacity of states to implement such policies. Second, firms in transition economies that aim to export products to profitable markets with stringent environmental policies, such as the EU or the United States, may have incentives to press for similar environmental standards at home (Andonova, 2004; Mol, 2001; Vogel, 1995; Vogel & Kagan, 2004).

Yet these factors may be outweighed by others that contribute to a negative relationship between trade openness and environmental policy. This relationship stems from both the demand side and the supply side of politics; that is, from both firms' and governments' incentives in the face of increasing openness. Heightened exposure to foreign competition puts pressure on firms to reduce costs, increasing their resistance to costly environmental policies. Governments that levy environmental taxes and fines on firms raise the costs of production, thereby impairing firms' competitiveness. Import-competing firms may lose market share to cheaper imports. Exporters may find that their products are now more expensive and consequently that foreign demand falls. As trade becomes increasingly important to the economy, more firms are hurt by these environmental charges, thus widening the coalition pressing for their reduction or abolition. Because of this demand-side pressure, opposition to costly environmental policies might grow with rising trade dependence.

On the supply side, governments may have incentives to weaken or laxly enforce environmental policies as globalization rises. Such policies, if costly for firms, may generate political opposition that undercuts leaders' support in at least two ways. When governments are trying to build coalitions for market reforms in general and trade liberalization in particular, they cannot afford to alienate key industrial interests. Hence, such governments may be reluctant to increase environmental taxes or charges that important economic interests oppose, potentially undermining support for the broader reform package. Furthermore, when trade expands, public officials might reduce costly environmental taxes and penalties or reduce their collection efforts to avoid degrading the competitiveness of crucial domestic industries. The loss of competitiveness can lead to firm closings and rising unemployment, which tends to generate political unrest and can undermine the public's support for a government. In sum, the weakening of costly environmental policies or laxity in implementing them may result from both supply-driven pressures and demand-driven political pressures arising from heightened trade openness. These political pressures are likely to be particularly strong for emerging and transition economies, affecting both the political will and the capacity of states to enforce environmental policy.

Russia is the best documented case of rapid economic liberalization accompanied by deteriorating environmental policy. The country markedly increased its exposure to world markets in the early 1990s and its foreign trade subsequently soared from around 30% of GDP in 1991 to about 70%

by 2000. During the same period, the Federal Ministry of the Environment and Natural Resources, established in 1991, was downgraded to a State Committee on the Environment in 1996 and disbanded altogether in 2000. The enforcement of environmental regulations, charges, taxes, and penalties throughout that decade has been characterized as "abysmal," and the system of environmental funds was abolished in 2001 (Danilov-Daniliyan, 2002; Kotov & Nikitina, 2002; Tavernise, 2003). Even Russian President Vladimir Putin admitted that "Right now, industries are not held responsible for harming the environment" (Tavernise, 2003, p. A3).

Competitiveness concerns were voiced by industries demanding weaker environmental policy implementation. Victor Danilov-Daniliyan (2002), the former chairman of the State Committee on Environmental Protection, emphasized that industrial lobbies, fearful that environmental policies would undercut their profits and international competitiveness, have been instrumental in undermining environmental policy in Russia. Norlisk Nikel, Russia's largest exporter of nickel and other nonferrous metals, is a well-documented example of a major polluter able to secure lax environmental policies. The company increased its exports significantly during the 1990s, from 87,000 tons in 1993 to 120,000 tons in 1995, when it controlled about a quarter of the world market for nickel. At the same time, it remained Russia's largest source of air pollution and one of the largest transboundary emitters of sulfur in Europe (Kotov & Nikitina, 1996). The primacy of export-led growth based on Russia's natural resources has also given a free hand to companies in the gas, oil, and timber sectors to expand unencumbered by strict environmental policies (Tavernise, 2003).

The increasing share of export earnings in Russia's federal and regional budgets has stifled government incentives to enforce environmental taxes and penalties. In fact, Kotov and Nikitina (2002) point out that "in 1996 according to official data about 2412 firms in Russia were exempt from payments for pollution, and for 1251 firms the level of payments was reduced." (p. 12). In 2001, after intense lobbying by industrial export giants such as the Kola Mining Metallurgical Company and Norlisk Nikel, the Russian Supreme Court temporarily repealed the pollution charge system on the grounds that it was incompatible with the tax code (Danilov-Daniliyan, 2002; OECD, 2004). In sum, globalization, together with problems such as weak institutions and corruption, has increased both Russian firms' demands for and the government's willingness to supply lax enforcement of environmental policies.

Environmental Funds as Indicator of Environmental Spending and Implementation

Most empirical studies of trade and the environment analyze environmental outcomes, such as the level or intensity of pollution (e.g., Scruggs, 2003). In these studies, trade influences environmental policy only indirectly; it is assumed that trade increases income, sparking demand for stricter policy, and that more stringent policy precipitates a dip in pollution (e.g., Copeland & Taylor, 2004). These studies do not directly confront the question of whether globalization creates political pressures to weaken environmental policies.

Environmental policies are difficult to quantify across countries, however, because countries use many different policy instruments. Data on implementation and environmental spending are even scarcer, especially for developing and transition countries. As a consequence, cross-national studies of developing economies have used indirect proxies for environmental policies, including the ratification of environmental treaties, the strength of environmental nongovernmental organizations (NGOs), and lead content in petrol (Damania, Fredriksson, & List, 2003; Smarzynska & Wei, 2001). These proxies reflect factors that influence domestic environmental policy, but their effect is indirect and they indicate very little about the strength and enforcement of policy.

Cross-country policy or sustainability indicators—such as the European Bank for Reconstruction and Development's (EBRD's) 1997 air pollution regulation index or the ESI—provide data for only a few isolated years and offer researchers little opportunity to examine the impact of trade on environmental policy with time (Esty, Levy, Srebotnjak, & de Sherbinin, 2005; EBRD, 1997; World Economic Forum et al., 2001). The ESI, for example, has changed its method and some of the 25 variables that make up countries' composite scores. As a result, ESI country rankings are not entirely comparable across the 3 years it has been published. The lack of reliable and comparable data on environmental policy has been a critical hurdle in examining the impact of trade on such policy in developing economies (Smarzynska & Wei, 2001).

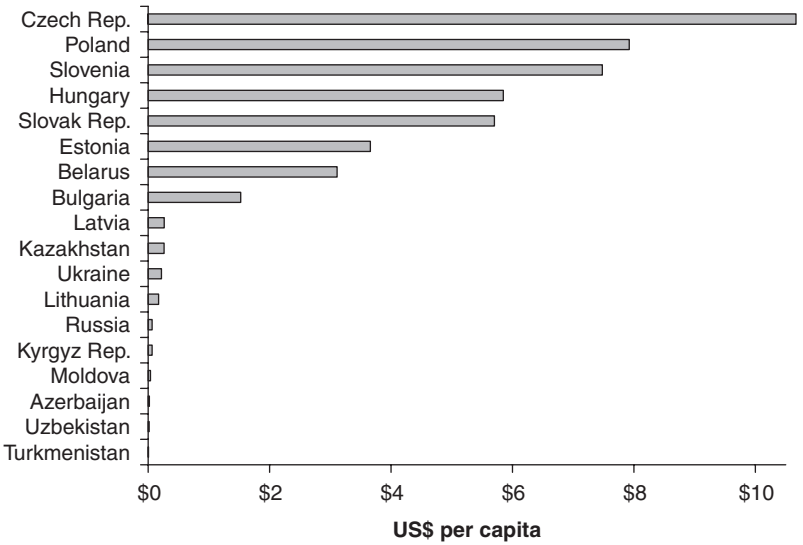
To address this problem, we use the spending of environmental funds as an indicator of state capacity for environmental spending and implementation. In the early 1990s, postcommunist governments established special environmental funds to finance the implementation of environmental policy. Governments realized that during difficult economic transitions, there would be limited public or commercial financing for the environment.

These environmental funds have been capitalized through the collection of environmental taxes and penalties on polluters. They create an extrabudgetary mechanism for public financing of environmental investments through soft loans or grants. Although the environmental funds were conceived as transitional instruments, their statutes did not include sunset provisions.[3] Most funds have persisted as the single most important source of public financing for the environment (Andonova, 2004; Ichikawa, Tsutsumi, & Watanabe, 2002; OECD, 1999; REC, 2001).

Focusing on national environmental funds has a number of advantages, given our objectives. First, the size of a country's environmental funds is a direct measure of a crucial environmental policy instrument, so we do not need to rely on an indirect measure of policy. Furthermore, within the postcommunist world, the average per capita size of a country's environmental funds from 1993 to 2000 is positively correlated with other, less direct measures of overall policy effort, including the 2001 ESI (r = .55), the 1997 EBRD air pollution regulation index (r = .86), the number of environmental treaties ratified by postcommunist states between 1993 and 2000 (r = .26), and the strength of NGOs in each country (r = .53).[4] Second, the size of these funds reflects the environmental fees and fines imposed on polluters and the ability of governments to collect these penalties. Countries with more stringent penalties and higher collection rates, such as Poland and the Czech Republic, generally have better endowed environmental funds than countries with weak penalties and lower collection rates, such as Moldova or Russia (OECD, 1999, 2000).

Third, these funds reflect a government's capacity to make environmental improvements. The public capacity for environmental financing is a critical aspect of countries' ability to implement environmental policies, particularly in developing and transition economies (Keohane & Levy, 1996; OECD, 1999). From 1993 to 1997, for example, Bulgaria, the Czech Republic, Estonia, and Poland allocated more than 30% of their environmental funds for waste water treatment and improved water quality. Slovenia, Hungary, the Czech Republic, Poland, Bulgaria, and Russia allocated sizable shares of their national funds to air pollution abatement projects. In Russia, Kazakhstan, Ukraine, Moldova, and Uzbekistan, a large share of fund resources went to nature protection. Countries such as Kyrgystan, Moldova, and Uzbekistan that accumulated smaller funds have faced greater difficulty supporting investments in pollution abatement (OECD, 1999). Finally, as we show later, these funds have contributed to improved environmental outcomes: Greater spending has led to a reduction in sulfur dioxide (SO2) emissions. Environmental funds are thus an important aspect of environmental policy and implementation in transition countries.

Figure 1
Mean Annual Environmental Fund Expenditures



For these reasons, we use the annual spending of environmental funds normalized by the size of a country's population as the dependent variable. Data on these expenditures are taken from the OECD (1999) and the REC (2001). Data on national population are taken from the *World Bank Development Indicators*. Figure 1 ranks the countries according to the mean value of the per capita expenditure of environmental funds from 1993 to 2000. The Czech Republic, Poland, Slovenia, and Hungary are at the top of this list. Existing research identifies these countries as having made the most successful environmental reforms in the postcommunist world (Andonova, 2004; Ichikawa et al., 2002; OECD, 1999; REC, 2001). It is not surprising that countries with the weakest capacity for environmental policy—such as Moldova, Azerbaijan, and Turkmenistan—rank lowest on the scale of environmental funds. By relying on a measure that reflects the stringency of environmental taxes and penalties, our study is one of the first to directly address the hypothesis that globalization undermines the political will and capacity of states to enforce environmental policy.

A Statistical Model of Environmental Funds

In this section, we develop a statistical model to assess the impact of trade openness on the size of environmental funds in the postcommunist world. There is a burgeoning empirical literature on the political economy of the environment. Failing to account for the factors emphasized in this literature could yield misleading results if they are systematically related to both openness and environmental policy. As such, the following model includes many of these factors and a variable designed to assess the impact of trade on environmental policy.

$$\text{Environmental Funds}_{it} = \beta_0 + \beta_1 \text{Openness}_{it} + \beta_2 \text{Development}_{it} + \beta_3 \text{Growth}_{it} + \beta_4 \text{Land}_{it} + \beta_5 \text{Environmental Funds}_{i(t-1)} + e_{it}$$

The dependent variable in this model is the national environmental funds spent by each country, *i*, in each year, *t*, divided by *i*'s national population in *t*, as discussed above.

Turning to the independent variables, $Openness_{it}$ is the sum of state *i*'s imports and exports divided by its GDP in year *t*. Because our argument is that heightened trade openness undermines environmental policy, we expect the coefficient of $Openness_{it}$ to be negative.

The remaining independent variables are included to account for political and economic factors that previous research has linked to environmental policy. During the past decade, studies of the environment have displayed a growing interest in the effects of per capita income, focusing on the EKC (Copeland & Taylor, 2004; Stern et al., 1996). As explained earlier, the EKC is premised on the view that a positive relationship exists between per capita income and the stringency of environmental policy as pollution increases and after a certain level of development is reached.[5] For the transition countries—with both an average per capita income of about $4,500 and widespread concerns about high pollution levels inherited from communism—we anticipate that a positive relationship will exist between per capita income and the resources a country is willing and able to earmark for environmental spending (Smarzynska & Wei, 2001). To test this hypothesis and to ensure that any observed effect of international trade is not due to per capita income (Frankel, Stein, & Wei, 1997), we analyze $Development_{it}$, which is the natural logarithm of the per capita GDP of state *i* in year *t*.

In the same vein, some recent research has found that economic growth increases the demand for environmental quality (Copeland & Taylor, 2004;

Lofdahl, 2002). Economic growth could also contribute to the size of environmental funds directly, by increasing the base for environmental taxation and thus fund revenues. We therefore analyze $Growth_{it}$, which is the percentage change in country *i*'s GDP from year *t*–1 to year *t*.

Next, $Land_{it}$ is the natural logarithm of the land area of state *i*.[6] Various studies suggest that land area affects pollution levels (Frankel & Rose, 2002; Lofdahl, 2002; Mitchell, 2003). All else being equal, it is harder to effectively regulate the environment as the size of what is to be regulated increases. Equally, it is well known that trade is related to various aspects of a country's size (Frankel et al., 1997). Including $Land_{it}$ limits the possibility that any observed relationship between trade openness and environmental funds is driven by the effect of size on both variables. To account for any temporal dependence in the data, we include a lagged dependent variable, $Environmental\ Funds_{i(t-1)}$. Finally, e_{it} is a stochastic error term.

Our sample is made up of all postcommunist states for which data on environmental funds are available (OECD, 1999; REC, 2001) from 1994 to 1999 (years *t*).[7] After pooling these data across states and with time, we estimate the model using least squares regression. Tests of statistical significance are based on Huber (robust) standard errors that account for any heteroskedasticity in the data and for the fact that the observations for each country may not be independent.

The Statistical Results

The results of this analysis are shown in the first column of Table 1. They indicate that our model provides a good fit to the data, explaining 85% of the variation in $Environmental\ Funds_{it}$. Moreover, the results provide strong support for our argument that heightened commercial openness has weakened environmental policy in the postcommunist world. As expected, the parameter estimate of $Openness_{it}$ is negative and statistically significant. The effect of this variable is also substantively large. Increasing the mean value of $Openness_{it}$ by one standard deviation, for example, yields more than a one-third decline in the predicted value of $Environmental\ Funds_{it}$.

It is not surprising that a postcommunist country's trade regime is only one of various factors affecting its environmental policy. Our results indicate that environmental policy is "sticky," tracking closely with policy in the recent past, because the parameter estimate of the lagged endogenous variable is positive and statistically significant. Of greater substantive interest is the tendency for environmental policy to become more stringent as

Table 1
The Effects of Trade Openness, Economic Development, Growth, and Geographical Size on Environmental Funds

Variable	Model 1.1	Robust *SE*	Model 1.2[a]	Robust *SE*	Model 1.3	Robust *SE*	Model 1.4	Robust *SE*
Intercept	–6.83***	1.80	–6.13**	2.29	–5.70***	1.85	–7.58***	1.91
Openness	–0.015**	0.006	–0.016**	0.007	—	—	—	—
Development	1.68***	0.34	1.59***	0.38	1.53***	0.31	1.69***	0.36
Growth	0.035*	0.018	0.038*	0.020	0.037*	0.018	0.035*	0.018
Land	–0.399***	0.188	–0.385***	0.129	–0.401***	0.116	–0.366***	0.111
Lagged environmental funds	0.682***	0.045	0.688***	0.056	0.689***	0.055	0.688***	0.055
Imports	—	—	—	—	–0.026**	0.010	—	—
Exports	—	—	—	—	—	—	–0.026**	0.012
N	94		82		94		94	
R^2	0.85		0.85		0.85		0.85	

Note: For presentational purposes, each parameter estimate except that of lagged environmental funds is multiplied by 1,000,000.
a. Estimates are generated using instrumental variables regression.
***$p \leq .01$. **$p \leq .05$. *$p \leq .10$. Two-tailed tests of statistical significance are conducted for all parameter estimates.

economic development and the rate of economic growth rise. The parameter estimates of both $Development_{it}$ and $Growth_{it}$ are positive and significant.[8] Equally, states with a smaller land mass tend to have larger environmental funds per capita than their bigger counterparts, because the parameter estimate of $Land_{it}$ is negative and significant.

To assess the robustness of these results, we conduct a variety of supplemental tests. First, we address some issues regarding the estimation of our model. To model the dynamics in our data, we have relied on a lagged endogenous variable. An alternative approach is to estimate the model using feasible generalized least squares (FGLS), a technique that involves generating the parameters using ordinary least squares and then purging the errors of serial correlation. Recent research indicates that there are substantial advantages to using a lagged dependent variable rather than FGLS to model dynamics, especially when the number of temporal observations is relatively small (Beck & Katz, 1996). Because our analysis covers the period from 1994 to 1999, the approach we have taken is therefore quite appropriate. Nonetheless, we also omit the lagged endogenous variable and then estimate the model using FGLS and assuming that the errors for each state follow a first-order autoregressive process common to all postcommunist countries. Like our earlier results, the estimated coefficient of $Openness_{it}$ is negative and statistically significant. Furthermore, the remaining estimates are much the same as before, except that the coefficient of $Growth_{it}$ is no longer significant.

Another issue concerning the estimation of our model is whether there are factors specific to countries in the region (for example, their history or culture) that affect environmental policy. We have assumed that there are no such factors. To address this assumption in more detail, however, we experiment with including country-specific fixed effects. The results do not allow us to reject the null hypothesis that the fixed effects should be omitted ($F = .72$, $p = .78$). Equally, a Breusch and Pagan (1980) Lagrange multiplier test provides no indication that the model should be estimated using a random effects specification. As such, there is no reason to be concerned that our results are threatened by unmeasured heterogeneity in the data.

Second, it is useful to determine whether the results are being driven by any particular postcommunist state. We therefore estimate the model after removing each of the 17 states in our sample, one at a time. The results are remarkably consistent. There is no case in which a parameter estimate in the first column of Table 1 changes sign. There are only three instances in which a statistically significant estimate becomes nonsignificant, all of which involve $Growth_{it}$. Most important for our purposes, however, is that the parameter estimate of $Openness_{it}$ is negative, statistically significant,

and relatively large in each of these 17 regressions. As such, no single country is driving our results.

Third, we have treated the effects of $Openness_{it}$ as exogenous. It is also important, however, to ensure that our results are not undermined by any simultaneity bias that could emerge if a country's environmental policy affects its trade openness (Frankel & Rose, 2002). Countries with environmental policies that impose substantial costs on firms may see their trade competitiveness erode. Costly environmental policies might then stimulate a rise in imports, threatening domestic industries and increasing unemployment. Hence, trade patterns could be shaped by the extent and nature of countries' environmental policies.

To address this issue, we estimate our model using instrumental variables regression. Recent research indicates that the trade policies of postcommunist countries are influenced by their GDPs and regime types, the number of veto players in government, and whether they were part of the Soviet Union (Frye & Mansfield, 2003). To create an instrument for $Openness_{it}$, we use these variables, the four independent variables other than $Openness_{it}$ in our model, and a dummy variable indicating whether each country was a member of the General Agreement on Tariffs and Trade (GATT) or the World Trade Organization (WTO).[9] The results of this analysis are reported in the second column of Table 1 and continue to furnish strong evidence of an inverse relationship between $Openness_{it}$ and environmental funds. Furthermore, the parameter estimate of $Openness_{it}$ is virtually the same size regardless of whether we treat this variable as endogenous or exogenous.

Fourth, we have defined trade openness as the sum of each country's exports and imports in each year, divided by its GDP in that year. Although this measure is very widely used, it is useful to consider whether the effects of openness are primarily determined by either imports or exports. To this end, we replace $Openness_{it}$ with country *i*'s imports divided by its GDP in year *t*. We then replace it with *i*'s exports divided by its GDP. The results—shown in the third and fourth columns of Table 1—indicate that the coefficient estimates of these variables are the same size and that both of them are negative and statistically significant. Consequently, the observed effect of trade openness on environmental policy is not driven by either imports or exports alone.

The Effects of Omitted Variables

Another issue that merits attention is whether variables that are not included in our model account for the observed effect of openness on environmental funds. A wide variety of tests, however, provide no evidence of

this sort. To ensure that openness does not reflect other aspects of trade policy, we include a variable indicating whether state *i* had formally applied for membership in the EU as of year *t*, another variable indicating whether *i* had signed an association agreement with the EU as of *t*, and a third variable measuring whether *i* was a party to the GATT or the WTO in *t*.[10] None of these variables has a statistically significant influence on environmental funds. Moreover, including them in our model has little effect on the size of the parameter estimate of $Openness_{it}$ and no effect on its sign or significance level. These findings do not imply that the EU had had no impact on environmental policy in the postcommunist world. In fact, recent research provides considerable evidence that the EU played a key role in stimulating the reform of environmental legislation and regulatory measures in CEE countries as these countries applied for EU membership (Andonova, 2004; Holzinger & Knoepfel, 2000). However, our dependent variable is an economic instrument of environmental policy implementation. Although EU pressure has strengthened environmental laws in CEE states, it has a limited impact on the choice of implementation instruments and the willingness of governments to apply them.[11]

Nonetheless, various studies have found that other international institutions have a pronounced influence on environmental quality. One set of studies concludes that states participating in international environmental institutions reduce their pollution levels (Helm & Sprinz, 2000; Mitchell, 2003). As such, we analyze the number of environmental treaties and protocols to which state *i* is a party, as of year *t*.[12] Another set of studies emphasizes that institutions designed to promote economic development became an important part of the transnational policy network established to support environmental reforms in transition countries (Gutner, 2002; Nielson & Tierney, 2003). To determine whether assistance from international financial institutions influenced environmental policy, we include three dummy variables indicating whether state *i* received aid (loans or grants) from the World Bank, the International Monetary Fund, or the EBRD, respectively, in year *t*.[13] Of these three variables and treaty participation, only the EBRD has a statistically significant effect on environmental policy. Postcommunist states that receive aid from this organization have relatively small environmental funds. This probably reflects the tendency for the EBRD to assist countries with especially serious economic and environmental problems. Nonetheless, including these variables has no bearing on the parameter estimate of $Openness_{it}$.[14]

Besides international institutions, domestic politics might affect both commercial openness and environmental policy. Particularly important in this regard are a country's regime type, whether political power is centralized or

fragmented within the national government, the partisan composition of government, whether the country is a former Soviet republic, and whether it is at war (Andonova, 2004; Aslund, Boone, & Johnson, 1996; Frankel, 2005; Frye & Mansfield, 2003, 2004; Milner with Kubota, 2005). To measure each state's regime type, we rely on two variables. The first is a 21-point index developed by Jaggers and Gurr (1995) that reflects five institutional features in state *i* (as of year *t*) and ranges from –10 for a highly autocratic state to 10 for a highly democratic one.[15] The second was coded by Przeworski, Alvarez, Cheibub, and Limongi (2000). It equals 1 if elections in country *i* are contested as of year *t*, 0 otherwise. We also include two measures of the fragmentation of political power. One measure was developed by Shugart and Carey (1992) and modified by Frye (2002); it taps the extent to which power is concentrated in a country's chief executive. The other measure was created by Frye, Hellman, and Tucker (2000) and reflects the number of partisan actors that can block policy change in country *i* as of year *t*. Finally, we include variables indicating whether country *i*'s chief executive is leftist, rightist, or centrist, whether this country is a former Soviet republic, and whether it is at war (either external or civil) in year *t*.[16]

Our results reveal that none of these domestic political variables has a strong influence on environmental funds. Furthermore, including them has very little bearing on the estimated effects of trade openness. As such, there is no evidence that domestic political conditions underlie the links between exposure to international markets and environmental funds.[17]

In addition to political factors, we must ensure that economic and demographic factors, as well as the environmental conditions that governments inherited after the collapse of communism, do not account for the inverse relationship between openness and environmental policy. First, it is well known that economically large states tend to be less open with respect to trade than their smaller counterparts; they may also be better able to raise sizable environmental funds. Second, governments that spend extensively are likely to be interventionist. They may have a tendency to heavily regulate both the environment and overseas commerce (thereby reducing openness). Third, in countries where the domestic oil and gas industry is economically important, this sector is likely to be politically potent, hostile to policies designed to reduce pollution, and dependent on open overseas trade.[18] Fourth, it is important to consider the effects of foreign direct investment. The pollution haven argument suggests that greater exposure to international markets creates political pressure to reduce environmental standards, because countries with higher standards will suffer economically if foreign firms choose to locate in and do business elsewhere. One implication is that the flows of

foreign direct investment into state *i* in year *t* should not be positively associated with the extent of environmental policy.

Fifth, a recent study has found that economic and political reform in the postcommunist world has followed a pattern of spatial diffusion (Kopstein & Reilly, 2000). Countries with capitals that are geographically close to the West have engaged in more extensive reforms than countries that are farther away.[19] Sixth, some research has indicated that pollution tends to rise with population density (Frankel & Rose, 2002). Seventh, we consider the effects of the environmental conditions at the time of the Soviet bloc's demise. Countries with especially serious initial environmental problems might be expected to spend more to resolve these problems during the 1990s. However, our results reveal that none of these factors strongly influences the environmental funds of postcommunist countries.[20]

Finally, we consider the effects of the existing environmental conditions in each country. The inverse relationship between openness and environmental policy could stem from a tendency for heightened trade to drive highly polluting firms out of business, thereby reducing the taxes collected on such firms and consequently the size of the environmental funds. This possibility is suggested by the composition effect that we mentioned earlier (e.g., Copeland & Taylor, 2004). To address this issue, we examine the effects of aggregate SO2 emissions and aggregate NOx emissions for country *i* in year *t*, SO2 emissions per capita and NOx emissions per capita for *i* in *t*, and the changes in both types of emissions for *i* between years *t*-1 and *t*, respectively.[21] We find no evidence, however, that any of these variables has a statistically significant effect on the size of environmental funds. Furthermore, we continue to find strong evidence that trade openness has a negative effect on environmental policy in the postcommunist world.

The Effects of Environmental Funds on Environmental Conditions

For reasons discussed earlier, we have focused on how international trade has influenced environmental policy rather than environmental conditions. Nonetheless, it is useful to briefly assess the extent to which the policy instrument that we have analyzed affects these conditions. To this end, we treat $Environmental\ Funds_{it}$ as endogenous and estimate its impact on the annual change in SO2 emissions for each postcommunist country. To create an instrument for $Environmental\ Funds_{it}$, we use $Openness_{it}$, $Development_{it}$, $Growth_{it}$, $Land_{it}$, a lagged endogenous variable, and the level of state *i*'s emissions of SO2 (in gigagrams) in year *t*. Then we regress the change in state *i*'s

Table 2
Instrumental Variables Regression of the Effects of Environmental Funds on the Annual Change in Sulfur Dioxide Emissions

Variable	Environmental Funds	Robust *SE*	Changes in Sulfur Dioxide Emissions	Robust *SE*
Intercept	–3.88	4.60	–182.49*	104.90
Openness	–0.019**	0.009	—	—
Development	1.51***	0.49	34.84**	13.75
Growth	0.039	0.027	2.40*	1.15
Land	–0.510***	0.192	–7.02	6.26
Lagged environmental funds	0.678***	0.071	—	—
Sulfur dioxide emissions	2.49×10^{-4}	3.61×10^{-4}	–0.064***	0.014
Environmental funds	—	—	–13843.07***	4723.03
N	81		81	
R^2	0.85		0.50	

Note: For presentational purposes, each parameter estimate in the first column except that of lagged environmental funds is multiplied by 1,000,000.
***$p \leq .01$. **$p \leq .05$. *$p \leq .10$. Two-tailed tests of statistical significance are conducted for all parameter estimates.

SO2 emissions from year *t* to year *t*+1 on this instrument, $Development_{it}$, $Growth_{it}$, $Land_{it}$, and the level of state *i*'s emissions of SO2 in *t*.

The results, which are presented in Table 2, confirm that trade openness is inversely related to environmental funds. Moreover, the size and significance level of the estimated coefficient of $Openness_{it}$ is the same as in our earlier analyses. These results continue to indicate that the level of SO2 emissions does not have a strong bearing on a country's environmental funds. As shown in the second column of the table, however, the size of these funds has a strong, inverse effect on the change in SO2 emissions. The coefficient estimate of the instrument for $Environmental\ Funds_{it}$ is negative, statistically significant, and large, indicating that bigger funds are associated with decreases in SO2 emissions. Consequently, the policy instrument on which we focus seems to have a marked impact on environmental conditions in the postcommunist world.

Conclusion

The countries of CEE and the former Soviet Union have undergone massive transformations during the past 15 years. Particularly important have

been the efforts made by many of these states to increase their integration into the global economy. Heightened commercial openness has yielded many benefits, but it has also limited the ability of governments to use economic measures to improve environmental conditions. Demands by firms for lower environmental taxes and penalties have multiplied, hampering governmental efforts to collect such taxes and enforce policies. Moreover, in the face of fundamental domestic transitions and pressures stemming from globalization, governments placed less emphasis on implementing stringent environmental policies as their exposure to global markets increased.

Our results strongly support the argument that heightened openness has placed significant limits on the size of environmental funds in the postcommunist world. This finding accords with the claim that globalization has fostered pressure for lax enforcement of environmental standards. Of course, even lax standards in the region may represent an improvement over the disastrous environmental policies that marked the Soviet era. Furthermore, we have focused on only one form of environmental policy. Nonetheless, environmental funds are the central economic instruments used to support the environment in postcommunist countries, and they have received scant attention in research on environmental governance. As such, our study sheds new light on the relationship between trade and environmental policy in the region.

Studies of other regions have suggested that the pressures exerted by globalization can be constrained and reshaped by domestic political institutions. Advanced industrial countries, for example, have not cut social spending in response to increasing trade exposure (Adsera & Boix, 2002; Garrett, 1998). In postcommunist countries, however, heightened openness is associated with weaker environmental policy even after controlling for a range of institutional factors. Furthermore, these factors have little effect on the size of environmental funds, which may reflect the relative weakness of political institutions in transition economies. This suggests that where domestic institutions are weak, policy makers can have difficulty restraining and reshaping the pressures stemming from globalization. Our results accord with earlier findings that developing countries often respond to globalization by reducing their social welfare spending (e.g., Kaufman & Segura-Ubiergo, 2001; Rudra, 2002; Wibbels, 2006). With stronger political institutions, these countries might be better able to pursue both an open trade regime and a cleaner environment.

A second reason why domestic political factors appear to have little direct impact on environmental policy is related to the salience of environmental concerns. Unlike economic reforms and restructuring, which have

been hotly contested issues, environmental protection in these countries fell to the bottom of the political agenda during the 1990s. Neither leftist nor rightist governments had well-defined environmental strategies. Apparently, globalization and concern with economic redistribution have overridden tendencies for leftist parties, which are elsewhere more sympathetic to environmental concerns, to play that role in transition countries. If anything, leftist postcommunist parties that were closely associated with the business interests of the "red directors" have had even fewer incentives to tighten environmental standards. Similarly, political polarization, which enables the groups that gain from partial economic reforms to block policy change, has had little effect on these environmental funds. In transition countries, interest groups have raised concerns over competitiveness to demand lenient application of environmental rules. The relative weakness of environmental NGOs in these countries may also have helped keep environmental policies low on the political agenda.

The effect of international institutions is also interesting. In general, these institutions seem to have had little impact on economic instruments of environmental policy in the postcommunist world. These findings diverge from case study analyses concluding that the EU has influenced environmental policy in CEE states (Andonova, 2004; Holzinger & Knoepfel, 2000) and that international institutions have been active proponents of reform in the region (Gutner, 2002; Weinthal, 2002). This divergence is related to the different forms of environmental policy that these institutions have targeted. Most external pressure has focused on legislation and regulatory standards, whereas we have focused on economic policy instruments that have been especially important in the transition economies to assure the enforcement of laws.

For countries undergoing massive social, economic, and political transformation, increasing trade openness creates pressures that weaken environmental policy. But this finding does not imply that heightened protectionism is the best way to improve the environment. As political institutions mature, these countries may become better able to shape globalization to their benefit. Furthermore, the positive scale, composition, and technology effects associated with trade might arise only through longer periods of time. Trade may promote economic growth and increase wealth in the long run, both of which are likely to foster better environmental policy and conditions. With time, trade may also foster a more environmentally friendly mix of industries. It is too early in these countries' economic transition to counsel protectionism and closure, developments that would jeopardize economic modernization and the pressures it may bring for environmental reform.

Notes

1. For reviews of the literature on international trade and the environment, see Copeland and Taylor (2004) and Low (1992).

2. The CEE countries are Bulgaria, the Czech Republic, Hungary, Estonia, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia. The Commonwealth of Independent States includes the Russian Federation, Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan.

3. After 2000, only Slovenia, Estonia, and Russia eliminated their environmental funds, whereas Bulgaria and Hungary consolidated theirs into national budgets for greater fiscal control.

4. Sources of data are the Center for International Earth Science Information Network (2002) for treaty participation; World Economic Forum, Yale Center for Environmental Law and Policy, and Center for International Earth Science Information Network (2001) for the Environmental Sustainability Index; and European Bank for Reconstruction and Development (EBRD; 1997) for the EBRD index. The measure of NGO strength is the number of International Union for the Conservation of Nature and Natural Resources (IUCN) member organizations by year for each country. The data were provided by IUCN. All of these correlations are statistically significant at the .05 level.

5. Various studies have estimated the local maximum or tipping point of the inverted U-shaped relationship between per capita income and pollution to be somewhere between $2,000 and $5,000, depending on the polluting substance and estimation method used, although some estimates run as high as $10,000 to $15,000 (Stern, Common, & Barbier, 1996).

6. Data on openness, per capita GDP, growth, and land are taken from the *World Bank Development Indicators* (electronic version 2004). Note that data on per capita GDP are expressed in constant U.S. dollars adjusted for purchasing power parity.

7. The postcommunist countries excluded from our sample because of the absence of data are Armenia, Bosnia, Georgia, Lithuania, Macedonia, Mongolia, Romania, and Yugoslavia.

8. Note that including a quadratic term for per capita GDP, which is suggested by the Environmental Kuznets Curve, has little bearing on our results.

9. Data used to construct this instrument are taken from Frye and Mansfield (2003) and from the World Trade Organization (http://www.wto.org/english/thewto_e/whatis_e/tif_e/org6_e.htm).

10. Data on EU membership and association agreements are taken from Europa (http://europa.eu.int/comm/enlargement/). Data on General Agreements on Tariffs and Trade and World Trade Organization membership are taken from the World Trade Organization Web site: http://www.wto.org/english/thewto_e/whatis_e/tif_e/org6_e.htm

11. The high correlation between per capita GDP on one hand and whether a country is an EU applicant or has an EU association agreement on the other hand (r = .88 and .50, respectively), is one reason why the latter two variables are not statistically significant.

12. Data for this variable are taken from the Center for International Earth Science Information Network (2002).

13. Data on International Monetary Fund assistance are taken from Vreeland (2003); data on EBRD loans are taken from EBRD (various years); and data on World Bank assistance are taken from World Bank http://lnweb18.worldbank.org/ECA/eca.nsf/General/E6B6CA3E53D868DB85256C37005CC332?OpenDocument

14. In addition to analyzing whether the receipt of aid or loans influences environmental policy, we also addressed the effects of loans that are earmarked for environmental purposes. More specifically, we include the total value of all "brown" and "green" loans that country *i*

received in year *t* from the EBRD or from the World Bank, respectively, using data compiled by Parks, Tierney, Roberts, and Hicks (2004). Neither variable is statistically significant, and including them (separately or together) has no effect on the remaining variables in the model.

15. Data for this variable are taken from http://weber.ucsd.edu/~kgledits/Polity.html and ftp://isere.colorado.edu/pub/datasets/p4/p4vksg.asc

16. Data for these variables are taken from Frye (2002), Frye, Hellman, and Tucker (2000), and (in the case of war) the Correlates of War Project (http://cow2.la.psu.edu).

17. We also included a measure of nongovernmental organization strength—namely, the number of IUCN member organizations by year for each country (data provided by the IUCN)—because these organizations might influence environmental policy. However, including this variable had no bearing on our results.

18. This might be the case for states with a large manufacturing sector. However, we find no evidence that a country's manufacturing value added as a percentage of its GDP in year *t* is strongly related to its environmental funds, and the estimated coefficient of $Openness_{it}$ remains negative and statistically significant.

19. Including a variable capturing diffusion among countries (the average of all other countries' environmental funds) has no impact on the effect of trade openness. Furthermore, the coefficient estimate of diffusion is negative but is not statistically significant.

20. We included the GDP of country *i* in year *t*, *i*'s government spending as a percentage of GDP in *t*, a dummy variable indicating whether it was heavily dependent on oil revenue, its net inflows of foreign direct investment in *t*, its population density in *t*, the distance (in miles) between its capital city and Vienna, its SO2 emissions (in metric tons) per populated kilometer in 1990, and its NOx emissions (in metric tons) per populated kilometer in 1990.

21. Data on SO2 and NOx emissions are taken from the Cooperative Program for Monitoring and Evaluation of the Long-Range Transmission of Environmental Pollutants in Europe accessed via http://www.emep.int/index_data.html, in December 2004; and from Eco-Portal Central Asia accessed March 2005 via http://www.eco-portal.kz/modules.php?name=News&file=article&sid=35#21

References

Adsera, A., & Boix, C. (2002). Trade, democracy, and the size of the public sector: The political underpinnings of openness. *International Organization*, *56*(2), 229-262.

Alesina, A., & Wacziarg, R. (1998). Openness, country size, and government. *Journal of Public Economics*, *69*(3), 305-321.

Andonova, L. (2004). *Transnational politics of the environment: The EU and environmental policy in Central and Eastern Europe*. Cambridge, MA: MIT Press.

Aslund, A., Boone, P., & Johnson, S. (1996). How to stabilize: Lessons from post-communist countries. *Brookings Papers on Economic Activity*, *1*, 217-311.

Beck, N., & Katz, J. N. (1996). Nuisance vs. substance: Specifying and estimating Time-Series-Cross-Section Models. *Political Analysis*, *6*, 1-36.

Bluffstone, R., & Larson, B. A. (Eds.). (1997). *Controlling pollution in transition economies: Theories and methods*. Cheltenham, UK: Edward Elgar.

Breusch, T., & Pagan, A. (1980). The Lagrange Multiplier Test and its applications to model specification in econometrics. *Review of Economic Studies*, *47*, 239-253.

Cameron, D. R. (1978). The expansion of the public economy: A comparative analysis. *American Political Science Review*, *72*(4), 1243-1261.

Carter, F. W., & Turnock, D. (2002). *Environmental problems in Eastern Europe* (2nd ed.). New York: Routledge.

Center for International Earth Science Information Network. (2002). *Environmental treaties and resource indicators*. Retrieved April 19, 2002, from http://sedac.ciesin.columbia.edu/entri/

Copeland, B. R., & Taylor, M. S. (2004). Trade, growth, and the environment. *Journal of Economic Literature*, *42*(1), 7-71.

Damania, R., Fredriksson, P. G., & List, J. A. (2003). Trade liberalization, corruption, and environmental policy formation: Theory and evidence. *Journal of Environmental Economics and Management*, *46*(3), 490-512.

Danilov-Daniliyan, V. (2002). *Two years of ecological disorder under "delicate direction" of the Ministry of Natural Resources*. Retrieved November 11, 2003, from http://www.opec.ru/library/article.asp?d_no=455&c_no=66

Esty, D. C., Levy, M., Srebotnjak, T., & de Sherbinin, A. (2005). *2005 Environmental Sustainability Index: Benchmarking national environmental stewardship*. New Haven, CT: Yale Center for Environmental Law and Policy.

European Bank for Reconstruction and Development. (1997). *Transition report*. London: Author.

Frankel, J. A. (2005). The environment and globalization. In M. Weinstein (Ed.), *Globalization: What's new* (pp. 129-169). New York: Columbia University Press.

Frankel, J. A., & Rose, A. K. (2002). *Is trade good or bad for the environment? Sorting out the causality* (National Bureau of Economic Research Working Paper No. 9201). Cambridge, MA: National Bureau of Economic Research.

Frankel, J., Stein, E., & Wei, S. (1997). *Regional trading blocs in the world economic system*. Washington, DC: Institute for International Economics.

Fredriksson, P. G. (Ed.). (1999). *Trade, global policy, and the environment*. Washington, DC: World Bank.

Frye, T. (2002). The perils of polarization: Economic performance in the postcommunist world. *World Politics*, *54*(3), 308-337.

Frye, T., Hellman, J., & Tucker, J. (2000). *Data base on political institutions in the post-communist world*. Unpublished Data Set, Ohio State University, Columbus.

Frye, T., & Mansfield, E. D. (2003). Fragmenting protection: The political economy of trade policy in the post-communist world. *British Journal of Political Science*, *33*(4), 635-657.

Frye, T., & Mansfield, E. D. (2004). Timing is everything: Elections and trade liberalization in the postcommunist world. *Comparative Political Studies*, *37*(4), 371-398.

Garrett, G. (1998). *Partisan politics in the global economy*. New York: Cambridge University Press.

Gutner, T. L. (2002). *Banking on the environment: Multilateral development banks and their performance in Central Eastern Europe*. Cambridge, MA: MIT Press.

Helm, C., & Sprinz, D. F. (2000). Measuring the effectiveness of international environmental regimes. *Journal of Conflict Resolution*, *45*(5), 630-652.

Holzinger, K., & Knoepfel, P. (Eds.). (2000). *Environmental policy in a European Union of variable geometry? The challenge of the next enlargement*. Basel, Switzerland: Helbing & Lichtenhahn.

Ichikawa, N., Tsutsumi, R., & Watanabe, K. (2002). Environmental indicators of transition. *European Environment*, *12*, 64-76.

Jaggers, K., & Gurr, T. R. (1995). Tracking democracy's third wave with Polity III Data. *Journal of Peace Research*, *32*(4), 469-482.

Kaufman, R. R., & Segura-Ubiergo, A. (2001). Globalization, domestic politics, and social spending in Latin America: A time-series cross-section analysis, 1973-97. *World Politics*, *53*(4), 553-587.

Keohane, R. O., & Levy, M. A. (Eds.). (1996). *Institutions for environmental aid: Pitfalls and promise*. Cambridge, MA: MIT Press.

Kopstein, J. S., & Reilly, D. A. (2000). Geographic diffusion and the transformation of the postcommunist world. *World Politics*, *53*(1), 1-37.

Kotov, V., & Nikitina, E. (1996). Russia wrestles with an old polluter. *Environment*, *38*(9), 6-37.

Kotov, V., & Nikitina, E. (2002). *Reorganisation of environmental policy in Russia: The decade of success and failures in implementation and perspective quests* (Working paper of Fondazione Eni Enrico Mattei). Retrieved November 11, 2003, from http://www.feem.it/NR/rdonlyres/59A79BBF-DE58-4819-BC3F-C0FE71384402/346/5702.pdf

Lofdahl, C. L. (2002). *Environmental impacts of globalization and trade: A systems study*. Cambridge, MA: MIT Press.

Low, P. (Ed.). (1992). *International trade and the environment*. Washington, DC: World Bank.

Milner, H. V., with Kubota, K. (2005). Why the move to free trade? Democracy and trade policy in the developing countries. *International Organization*, *59*(1), 107-143.

Mitchell, R. B. (2003). *The relative effects of environmental regimes: A quantitative comparison of four acid rain protocols*. Paper presented at the annual meeting of the International Studies Association, Portland, OR.

Mol, A. P. J. (2001). *Globalization and environmental reform: The ecological modernization of the global economy*. Cambridge, MA: MIT Press.

Nielson, D. L., & Tierney, M. J. (2003). Delegation to international organizations: Agency theory and world bank environmental reform. *International Organization*, *57*(3), 241-276.

Organization for Economic Cooperation and Development. (1999). *Sourcebook on environmental funds in economies in transition*. Paris: Author.

Organization for Economic Cooperation and Development. (2000). *Environmental compliance and enforcement in the NIS: A survey of current practices of environmental inspectorates and options for improvement* (OECD Report CCNM/ENV/EAP[2000]87). Almaty, Kazakhstan.

Organization for Economic Cooperation and Development. (2004). *Reform of pollution charges in the Russian Federation. Assessment of progress and opportunities and constraints for further improvement* (Report No., ENV/EPOC/EAP/POL). Paris: Author.

Parks, B., Tierney, M., Roberts, T., & Hicks, R. (2004). *Greening aid: Understanding environmental assistance to developing countries*. Unpublished manuscript, College of William and Mary, Williamsburg, VA.

Przeworski, A., Alvarez, M. E., Cheibub, J. A., & Limongi, F. (2000). *Democracy and development: Political institutions and well-being in the world, 1950-1990*. New York: Cambridge University Press.

Regional Environmental Center. (1999). *Sourcebook on economic instruments for environmental policy: Central and Eastern Europe*. Szentendre, Hungary: Author.

Regional Environmental Center. (2001). *Environmental funds in the candidate countries*. Szentenedre, Hungary: Author.

Rodrik, D. (1997). *Has globalization gone too far?* Washington, DC: Institute for International Economics.

Rudra, N. (2002). Globalization and the decline of the welfare state in less-developed countries. *International Organization*, *56*(2), 411-445.

Scruggs, L. (2003). *Sustaining abundance: Environmental policy in industrial democracies*. Cambridge, UK: Cambridge University Press.

Shugart, M. S., & Carey, J. M. (1992). *Presidents and assemblies: Constitutional design and electoral dynamics*. New York: Cambridge University Press.

Smarzynska, B. K., & Wei, S. (2001). *Pollution havens and foreign direct investment: Dirty secret or popular myth?* (National Bureau of Economic Research Working Paper No. 8465). Retrieved on July 12, 2003, from http://www.brookings.edu/views/Papers/wei/20010614.pdf

Speck, S., McNicholas, J., & Markovic, M. (2001). *Environmental taxes in an enlarged Europe*. Szentendre, Hungary: Regional Environmental Center.

Stern, D. I., Common, M. S., & Barbier, E. B. (1996). Economic growth and environmental degradation: The environmental Kuznets Curve and sustainable development. *World Development*, *42*(7), 1151-1160.

Tavernise, S. (2003, October 5). Oil rush in Siberia puts other treasures at risk. *The New York Times*, p. A3.

Vogel, D. (1995). *Trading up: Consumer and environmental regulation in a global economy.* Cambridge, MA: Harvard University Press.

Vogel, D., & Kagan, R. A. (Eds.). (2004). *Dynamics of regulatory change: How globalization affects national regulatory policies*. Berkeley: University of California Press.

Vreeland, J. (2003). *The IMF and economic development*. New York: Cambridge University Press.

Weinthal, E. (2002). *State making and environmental cooperation: Linking domestic and international politics in Central Asia*. Cambridge, MA: MIT Press.

Wibbels, E. (2006). Dependency revisited: International markets, business cycles, and social spending in the developing world. *International Organization*, *60*(2), 433-468.

World Economic Forum, Yale Center for Environmental Law and Policy, and CIESIN. (2001). *2001 Environmental Sustainability Index.* March 12, 2003, from http://www.ciesin.columbia.edu/indicators/ESI

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