Economic Globalization and the Environment

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Abstract

As the world's economies become more integrated and the global economy subsequently grows, there is increasing concern regarding how such trends will affect the environment. In fact, the relationship between globalization and the environment has become quite contentious in policy circles. In part in response to these controversies, a burgeoning amount of academic attention has emerged that examines the globalization/environment nexus. Although there have been advances in the thinking about these relationships, significant challenges remain. This article provides a critical taxonomy that will help scholars better understand the overwhelming literature on the subject and also outlines the key challenges that scholars and policy makers will face for a second wave of thinking on the subject.

Contents

1. INTRODUCTION

The world economy is witnessing a new wave of *economic globalization*, defined as the integration of the world's economies through an increasing array of bilateral and multilateral, regional trade and investment agreements. Many governments are also unilaterally reducing the role of the state in economic affairs. The result is an increase in the flow of goods, services, and information across the globe. By embedding the flows of goods and services in their institutional context, this definition builds on the thinking of Nye and Donahue who define economic globalization as the process of increasing economic globalism. They refer to economic globalism as the "long-distance flows of goods, services, and capital, and the information and perceptions that accompany market exchange" (1, p. 4).

There have indeed been large increases in the volumes of international trade and investment in the world economy. According to the World Bank, trade (exports plus imports) as a percent of world gross domestic product (GDP) was 24% in 1960, 38% in 1985, and 52% in 2005. In other words, over half of all economic activity in the world economy (which is close to 50 trillion dollars in size) is traded (2).

The environment is also experiencing profound change. In recent years, numerous assessments have been conducted regarding the environmental health of the earth, both at the ecosphere and the sectoral levels. Perhaps, the mostly widely cited ecosphere assessment is the United Nations Environment Program (UNEP)'s *Global Environmental Outlook GEO$_4$ Environment for Development: Summary for Decision Makers* (3). Some of the key findings from UNEP's 2007 assessment include the following:

- The earth's surface is warming, which is impacting water availability, land quality, food security, and biodiversity.
- Upward of two million people die each year owing to outdoor and indoor air pollution.
- The ozone hole is larger than ever before.
- The availability of freshwater is on the decline, and contaminated water is the greatest environmental cause of human sickness and death.
- Aquatic ecosystems are overexploited, risking food supplies and biodiversity.
- Poor people are most vulnerable to environmental change.

Interestingly, for the purposes of this paper, the UNEP assessment also adds that "These unprecedented changes are due to human activities in an increasingly globalized, industrialized and interconnected world" (3, p. 4).

Another ecosphere-wide examination is the *Millennium Ecosystem Report*, *Living Beyond Our Means: Natural Assets and Human Well-being* (*Statement of the MA Board*) (4), conducted

by 1300 experts from 95 countries. This report finds close to two-thirds of the ecosystem services that support life on Earth are being degraded or used unsustainably. The report concludes that "throughout human history, no period has experienced interference with the biological machinery of the planet on the scale witnessed in the second half of the twentieth century" (4).

Of course the most widely discussed issue-specific assessment is the 2007 report of the Intergovernmental Panel on Climate Change (IPCC). Among the main findings in this report are the following:

- Global warming is "unequivocal" and has been observed in increases in "global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level, this has affected ecosystems on all continents and in nearly all oceans."
- The "observed increase in global average temperature" occurring since the mid-twentieth century is "very likely due to the observed increase in anthropogenic GHG concentrations."
- "Anthropogenic warming over the last three decades has likely had a discernible influence at the global scale on observed changes in many physical and biological systems."
- "There is high agreement and much evidence that[,] with current climate change mitigation policies and related sustainable development practices, global GHG emissions will continue to grow over the next few decades" (5, pp. 2–6).

How closely are these trends related? In other words, to what extent is the integration of the world's economies and the subsequent rise in world trade and investment affecting environment quality and the politics and policies of environmental mitigation? Early political debates in the late 1980s and 1990s were rife with contention over this issue. In what is now seen as rather simplistic depictions of a very complex set of interactions, many argued that globalization would automatically improve the environment, whereas others said that globalization automatically makes the environment worse off. At this writing, it is generally understood that globalization has had both positive and negative impacts on the environment and that public policies are needed to ensure that globalization works for the environment. However, what form those policies take and the extent to which those policies are obtainable in a globalizing world are topics still under debate.

This article provides a critical review of the burgeoning field of interdisciplinary research and policy analysis that has emerged surrounding globalization and the environment. Scholarly work on globalization and environment, mirrored in part by policy discussions on the subject, can be divided into three subcategories:

1. Globalization and environmental quality: To what extent do trade and investment flows, and the policies that lead to increases in such flows, affect environmental quality both positively and negatively? This literature consists of work largely (but not exclusively) by economists and natural scientists.
2. Globalization and environmental policy: The conclusion of the globalization and environmental quality literature is that, in the absence of effective public policy, globalization can adversely affect environmental quality. Such a conclusion spawns a discussion of the policy and governance necessary to ensure that globalization and environmental quality are mutually reinforcing. This subfield examines the extent to which new trade rules affect the ability of nations and the global governance institutions outside the trade regime to deploy effective environmental policy. There also is a literature on the extent to which new environmental policies will affect the ability of firms to compete internationally. This literature is often conducted by legal scholars, economists, and political scientists.
3. Globalization and environmental politics: Both the impacts of globalization on

the environment and the politics of public policy to mitigate such impacts are highly controversial in the political realm. It should thus come as no surprise that a cadre of political scientists has arisen that examines the political economy of environmental aspects of trade policy and conversely the trade aspects of environmental policy. This work is largely conducted by political scientists.

After almost 20 years of research that includes countless volumes, special journal issues, articles, testimony, and so forth, a number of the more contentious issues that arose in the beginning of debates over globalization and environment have come close to consensus. A number of issues remain as controversial as ever. After providing a background to the three subissues, this paper demonstrates where consensus lies and then outlines the current shortcomings in theoretical, empirical, and policy aspects of the field. Following this brief introduction, there are four additional sections in this article. Section 2 examines the relationship between globalization and environmental quality; section 3 covers globalization and environmental policy. Section 4 looks at some of the newest developments in the field, namely the newly emerging trade and climate change debate. Finally, section 5 summarizes the findings of this work and suggests directions for future research and policy.

2. GLOBALIZATION AND ENVIRONMENTAL QUALITY

Political and policy debates over globalization and environment stem from conceptions regarding the impact that increasing trade and investment flows will have on environmental quality. Since the early 1990s, some have contended that trade liberalization would lead to economic growth and that once nations reached a certain level of income they would begin to reduce negative impacts on the environment (6). Others countered with the opposite argument: trade liberalization would lead to a mass migration of pollution-intensive firms to nations with weaker environmental laws. This would lead to increases in pollution in the developing world and put downward pressure on environmental regulations in nations with stringent norms. Such debates jump-started what has become a substantial literature on these questions. Ironically, there is now an emerging consensus in academic thinking regarding these questions, yet the policy community is often still mired in older debates. This section of the paper first discusses the theoretical perspectives regarding economic globalization and the environment, then describes the empirical evidence regarding those theories.

2.1. Theories of International Trade and Environmental Quality

In theory, international trade and the environment can be mutually compatible and, perhaps, even reinforcing. According to the theories of international trade on the one hand and environmental economics on the other, trade liberalization can bring economic benefits that can be distributed in a manner to protect the environment.

The economist Ricardo (7) showed that because countries face different costs to produce the same product when each country produces and then exports the goods for which it has comparatively lower costs all parties benefit. The effects of comparative advantage (as Ricardo's notion became called) on factors of production were developed in the Heckscher-Ohlin model. This model assumes that in all countries there is perfect competition, technology is constant and readily available, there is the same mix of goods and services, and factors of production (such as capital and labor) can freely move between industries (8).

Within this rubric, the Stolper-Samuelson theorem (8) adds that international trade can fetch a higher price for the products (and hence lead to higher overall welfare) in which a country has a comparative advantage. In addition, foreign direct investment, which occurs when predominantly multinational corporations (MNCs) move physical operations

to another country, can contribute to development by increasing employment and by human capital and technological spillover effects, whereby foreign presence accelerates the introduction of new technology and investment. In theory, the gains from trade accruing to winning sectors freed to exploit their comparative advantages have the so-called Pareto possibility to compensate the losers of trade liberalization. Moreover, if the net gains from trade are positive, there are more funds available to stimulate growth and protect the environment. In a perfect world, free trade and increasing exports could indeed be unequivocally beneficial to all parties (8).

These theories have been extended to conceptualize the trade and environment relationship. The impacts on the environment can be seen as direct effects and indirect effects.

Direct effects are the least studied but can be the most grave in the short term. Trade is conducted through transportation, namely through shipping, trucking, and aviation. Increased transportation can have negative effects on environmental quality unless the techniques by which we transport goods and services are altered.

A useful framework for thinking about the indirect effects has been proposed by Grossman & Krueger (9). They identify three mechanisms by which trade and investment liberalization impact the environment: scale, composition, and technique effects. Scale effects occur when liberalization causes an expansion of economic activity. If the nature of that activity is unchanged but the scale is growing, then pollution and resource depletion will increase along with output. Composition effects occur when increased trade leads nations to specialize in the sectors in which they enjoy a comparative advantage.

When comparative advantage is derived from differences in environmental stringency, then the composition effect of trade will exacerbate existing environmental problems in the countries with relatively lax regulations. Race-to-the-bottom discussions are perfectly plausible in economic theory. The Heckscher-Ohlin (H-O) theory in trade economics postulates that nations will gain a comparative advantage in those industries where they are factor abundant. Applying the H-O theory to pollution then, it could be argued that a country with less stringent environmental standards would be factor abundant in the ability to pollute. Therefore, trade liberalization between a developed and a developing nation when the developed nation has more stringent regulations may lead to an expansion in pollution-intensive economic activity in the developing country with the weaker regulations.

Race to the bottom: the notion that economic globalization will cause a harmonization downward of environmental standards across the globe

Technique effects, or changes in resource extraction and production technologies, can potentially lead to a decline in pollution per unit of output for two reasons. First, the liberalization of trade and investment may encourage MNCs to transfer cleaner technologies to developing countries. Second, if economic liberalization increases income levels, the newly affluent citizens may demand a cleaner environment.

The economic and environmental dimensions of globalization and environment are outlined in **Table 1**. The first column exhibits the winners and losers of trade liberalization. The second column outlines the economic dimensions; the third outlines the environmental aspects.

From an economic perspective, when liberalization occurs and nations trade where they have a comparative advantage, the winners are those sectors which can now export more of their goods or services. Theoretically, this will cause expansion not only of exports but also of employment and wages in such sectors as well. The losers of the liberalization are those sectors that will find it harder to face an inflow of newly competitive imports. In those sectors, one would expect a contraction of those businesses, layoffs, and wage reductions. If the gains to the export sector outweigh the losses to the import sector, the net gains are positive. This leaves the possibilities that the winners can compensate the losers and/or that the gains from trade can be used to stimulate propoor growth.

Table 1 Stolper-Samuelson theorem and sustainable development[a]

Distribution of benefits	Economic sectors	Environmental results
Winners	**Export sectors**	**Export sectors**
		Pollution halos
		Composition effects
Losers	**Import sectors**	**Export sector**
		Scale and composition effects
		Worker health and safety
		Import sector
		Liabilities
		Genetic diversity

[a]Author's interpretation.

Drawing on the framework on trade and environment outlined above, the third column in **Table 1** outlines potential environmental winners and losers. There can possibly be environmental benefits from being an economic winner as well. First, this can occur if trade liberalization causes a compositional shift toward less environmentally degrading forms of economic activity. Second, there is also the possibility of environmental improvements in relatively environmentally destructive sectors if those sectors attract large amounts of investment from firms that transfer state-of-the-art environmental technologies to the exporting sector.

2.2. International Trade and Environmental Quality: Evidence

According to the peer-reviewed literature, the environmental impacts of economic globalization are far from uniform and straightforward. Here, I briefly review aggregated attempts to assess the impacts of globalization and the environment—the environmental Kuznets curve (EKC) literature. Then, I discuss some of the more specific literature on direct and indirect effects of economic globalization on the environment.

Environmental Kuznets curve (EKC): hypothesis whereby pollution intensity and per capita income have an inverted-U relationship

2.3. The Environmental Kuznets Curve

The EKC literature attempts to examine the aggregate impact of economic globalization and the environment. In 1992, the World Bank's *World Development Report* made the case that, although trade-led growth may cause sharp increases in environmental degradation during the early stages of economic development, such degradation would begin to taper off as nations reached turning points ranging from $3000 to $5000 GDP per capita (9). The Bank was generalizing from a landmark 1991 paper by economists Grossman & Krueger (9). This article examined the relationship between ambient concentrations of criteria air pollutants and GDP per capita. When they plotted their regression results, they found that lower-income nations had higher rates of pollution per capita, whereas the reverse occurred for higher-income nations. A simple depiction of the EKC is exhibited in **Figure 1**.

This relationship became known as the EKC, borrowing its name from the 1950s landmark article by Simon Kuznets (10), who found a similar relationship between income inequality and GDP per capita in a cross section of countries. For the developed countries, the three factors described earlier (scale, composition, and technique effects) are seen to be interacting: As income has grown, the composition of industry has shifted toward relatively less-pollution-intensive economic activity, and at the same time, improvements in technology and environmental regulation have occurred. Although overall levels of growth (scale) have vastly increased, they have been offset by composition and technique effects.

To this day, generalizations of these findings have been used to make the claim that nations should grow now through trade liberalization and worry about the environment later. EKC studies have become a cottage industry, with close to 100 articles published since the original article. What is ironic is that, as the policy community has rushed to generalize the EKC in the political realm, the consensus in the peer-reviewed academic literature on the EKC has become much more cautious. Most importantly, the literature shows empirical evidence that the EKC is relatively weak and limited. Many pollutants do not have an inverted-U relationship. Some environmental degradation, such as CO_2 emissions, residual solid waste, and deforestation, increases as income increases, whereas clean water and urban sanitation decrease along with income increases (11). In addition, when an EKC is found, turning points are usually much higher than originally estimated. For this paper, the articles in Reference 11 were analyzed. **Table 2** lists the studies in the first column, the pollutants examined in the second column, and the turning points (if there was one) in the third column. It was found that only 28% of peer-reviewed EKC studies found turning points at all. When turning points were found, they averaged $19,518, implying that nations have to endure environmental degradation for many years before the environment begins to turn around. When environmental quality does turn toward the better, such forces are not automatic. One specific example is warranted: As East Asian miracle nations grew, they indeed polluted the environment significantly. They show that over time these nations began to improve environmental governance and performance, but this did not happen automatically. Indeed, it was conscious orchestration by the state, which integrated environmental policy into industrial and innovation policies, that led to success (12).

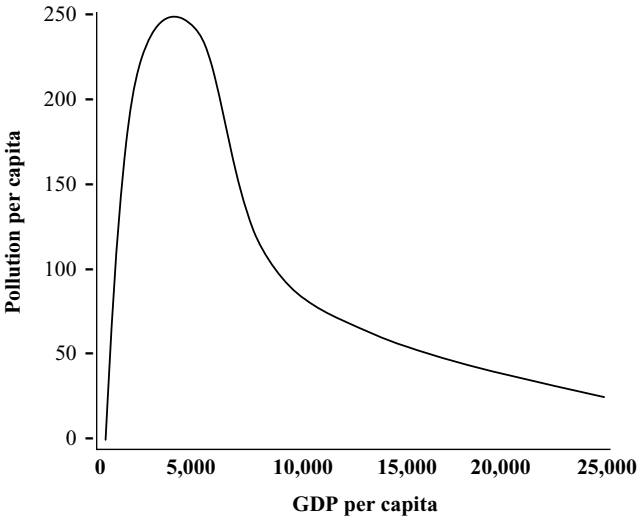

Figure 1

The environmental Kuznets curve. GDP, gross domestic product.

2.4. Direct Effects

There is also an immense literature on the direct and indirect effects of economic globalization. Direct impacts of globalization and environment have received limited study. There are numerous studies assessing the environmental impacts of transportation, but few, other than those discussed here, attempt to analyze the independent and significant impact that economic globalization has on these trends relative to other factors such as population, consumption, technological change, and so forth.

Nevertheless, some interesting work has been done. For the most part, global trade is conducted by aviation, shipping, and cars and trucks. The literature on aviation and pollution is fairly limited, with most of the work to date focusing on climate change. In 1999, the IPCC conducted a study on CO_2 emissions from aviation that found aviation accounted for 2% of anthropogenic emissions and 13% of all transportation-related emissions (13).

Two clusters of analysis have arisen around the shipping industry: (*a*) global shipping and increases in air emissions and (*b*) shipping and the introduction of alien invasive species. Global shipping accounts for 14% of nitrogen oxide (NOx) emissions from all global fossil fuels and for 16% of sulfur from all petroleum fuel (2). In the United States alone, shipping accounts for up to 4% of transportation-related

Table 2 Turning points of various environmental Kuznets curve studies[a]

Study (reference number)	Pollutant (dependent variable)	Turning point: GDP/per US$(1985)[b]
Shafik & Bandyopadhyay (58)	Lack of clean water	NA (decline monotonically)
	Lack of urban sanitation	NA (decline monotonically)
	Level of particulate matters	NA
	SO_2	$3,000
	Changes in forest area	NA
	Annual rate of deforestation	$2,000
	Dissolved oxygen in rivers	NA
	Municipal waste per capita	NA
	Carbon emissions per capita	$4,000
Hettige, Lucas & Wheeler (59)	Toxic intenstiy by GDP	$12,790
	Toxic intensity per industrial output	NA
Panayotou (60)	SO_2	$3,000
	NOx	$5,500
	Suspended particulate matter	$4,500
	Deforestation	$1,200
Grossman & Krueger (61)	SO_2	$14,000
	Dark matter (fine smoke)	$10,000
	Suspended particulate matter	NA
Shafik (62)	Lack of safe water	NA
	Lack of urban sanitation	NA
	Annual deforestation	NA
	Total deforestation	NA
	Dissolved oxygen in rivers	NA
	Fecal coliform in rivers	$11,500
	Ambient suspended particulate matter	$3,280
	Ambient SO_2	$3,670
	Municipal waste per capita	NA
	Carbon emission per capita	NA
Selden & Song (63)	SO_2	$8,709
	Suspended particulate matter	$10,289
	NOx	$11,217
	CO	$5,963
Cropper & Griffiths (64)	Deforestation in Africa	$4,760
	Deforestation in Latin America	$5,420
	Deforestation in Asia	NA
Antle & Heidebrink (65)	Total area of parks and protected areas	NA
	Deforestation	NA
	Afforestation	NA
	Total forest area	NA
Grossman & Krueger (66)	SO_2	$14,000
	Smoke	$6,151
	Heavy particles	NA (decreasing)
	Dissolved oxygen	$2,703

(*Continued*)

Table 2 (*Continued*)

Study (reference number)	Pollutant (dependent variable)	Turning point: GDP/per US$(1985)[b]
	Biological oxygen demand	$7,623
	Chemical oxygen demand	$7,853
	Concentration of nitrates	$10,524
	Fecal coliform	$7,955
	Total coliform	$3,043
	Concentration of lead	$1,887
	Cadmium	$11,632
	Arsenic	$4,900
	Mercury	$5,047
	Nickel	$4,113
Panayotou (67)	SO_2	$15,000
Roberts & Grimes (68)	CO_2	NA
Schmalensee, Stoker, & Judson (69)	CO_2	$10,000
Cole, Rayner, & Bates (70)	NOx	$15,100
	SO_2	$5,700
	Suspended particulate matter	$8,100
	CO	$10,100
	NOx of transport sector	$15,100
	SO_2 of transport sector	$9,400
	Suspended particulate matter of transport sector	$15,000
	Nitrates	$15,600
	CO_2	$25,100
	Energy consumption	$22,500
	Chlorofluorocarbons and halons	$15,400
	NH_4	NA
	Municipal waste	NA
	Transport energy use	$400,000
	Traffic volume	$108,200
Vincent & Ali (71)	Suspended particulate matter	NA (increasing)
	Biochemical oxygen demand	NA (decreasing)
	Chemical oxygen demand	NA (increasing)
	Ammoniac nitrogen	NA (no form)
	Hydrogen ion concentration	NA (no form)
	Solid particles in rivers	NA (no form)
Hettige, Mani, & Wheeler (72)	Industrial water pollution	NA
Carson, Jeon, & McCubbin (73)	Greenhouse gases	NA (decreasing)
	Air toxins	NA (decreasing)
	Carbon monoxide	NA (decreasing)
	NOx	NA (decreasing)
	SO_2	NA (decreasing)
	Volatile organic carbon	NA (decreasing)
	Particulate matter	NA (decreasing)

(*Continued*)

Table 2 (*Continued*)

Study (reference number)	Pollutant (dependent variable)	Turning point: GDP/per US$(1985)[b]
	Air toxins	NA (decreasing)
Moomaw & Unruh (74)	CO_2 (panel) (fixed effect)	$12,813
	CO_2 (panel) (cubic term)	$18,333
	CO_2 (for each country)	NA
Ravallion, Heil, & Jalan (75)	Carbon emissions	NA (U-shaped pattern)
Torras & Boyce (76)	SO_2	$3,890
	Smoke	$4,350
	Heavy particles	NA (decreasing)
	Dissolved oxygen	$19,865
	Fecal coliform	Increasing
	Access to safe water	$11,255
	Access to sanitation	$10,957
Unruh & Moomaw (77)	CO_2	NA
Suri & Chapman (78)	Energy consumption	$55,000
de Bruyn, van den Bergh, & Opschoor (79)	CO_2	NA
	NOx	NA
	SO_2	NA
Kaufmann, Davidsdottir, Garnham, & Pauly (80)	SO_2 (cross section)	$11,577
	SO_2 (fixed effects)	$12,500
	SO_2 (random effects)	$12,175
Chaudhuri & Pfaff (81)	Indoor air pollution	NA
Kahn (82)	Vehicle hydrocarbon emission	$35,000
Islam, Vincent, & Panayotou (83)	Suspended particulate matter	NA
Panayotou, Sachs, & Peterson (84)	CO_2	$12,000
Galeotti & Lanza (85)	CO_2	$13,260
Tuan (86)	CO_2	$16,150
Bhattarai & Hammig (87)	Deforestation	$4,400
Galeotti, Lanza, & Pauli (88)	CO_2, OECD (extended Weibull function)	$10,782
	CO_2, OECD (Weibull function)	$10,069
	CO_2, non-OECD (extended Weibull)	$25,000
	CO_2, non-OECD (Weibull)	$21,974
Stern & Common (89)	Sulfur, world (fixed effects)	$84,786
	Sulfur, world (random effects)	$45,424
	Sulfur, OECD (fixed effects)	$7,743
	Sulfur, OECD (random effects)	$7,694
	Sulfur, non-OECD (fixed effects)	$761,141
	Sulfur, non-OECD (random effects)	$288,044
Canas, Ferrão, & Conceição (90)	Direct material input (DMI), quadratic model	$17,166
	DMI, cubic (country random effects)	$14,100
	DMI, cubic (country fixed effects)	$13,400
Cole (91)	NOx	$12,391
	SO_2	$5,342

(*Continued*)

Table 2 (*Continued*)

Study (reference number)	Pollutant (dependent variable)	Turning point: GDP/per US$(1985)[b]
	CO	$17,347
	Suspended particulate matter	$6,064
	Volatile organic compound	$29,596
	CO_2	$44,708
	Biochemical oxygen demand	$4,931
	Dissolved oxygen	$3,935
	Nitrates	$22,787
	Phosphorous	$7,316
Richmond & Kaufmann (92)	Energy use	$29,848
	Energy use-full panel (model 6)	$35,665
	Carbon emissions	$75,426
	Carbon emissions	$20,255
	Non-OECD nations	NA
	OECD nations' energy use	$22,435
	OECD nations' carbon emissions	$17,390

[a]Author's calculations from Reference 11.
[b]Abbreviations: CO_2, carbon dioxide; GDP, gross domestic product; NOx, nitrogen oxides; SO_2, sulfur dioxide; NA, not applicable; NH_4, methane.

NOx emissions and for 8% of sulfur dioxide (SO_2) emissions (14). The environmental effects of shipping emissions are local, national, and global in nature. Three of the busiest ports in the United States are located in California and Texas (Long Beach, Los Angeles, Houston) and are nonattainment areas for some of these pollutants. The U.S. Environmental Protection Agency estimates that marine diesel engines entering California and Texas account for 15% and 17% of the NOx emissions on summer days in these regions. Emissions of these gases can also contribute to global climate change (15). A recent study found that total emissions from ships are increasing primarily as the result of the increase in foreign commerce (or international trade) (16).

Shipping can also bring alien invasive species from one region of the world to another. Alien invasive species are those that outcompete native species for resources and become pests. The introduction of invasive species can take three forms: The invasive species is an actual traded product, such as a horticultural stock; the invasive species enters by accident in packing materials or with tourists; and the invasive species enters as a "stowaway" in vessels that transport goods, such as ship ballast water with zebra mussels. Econometric models suggest that the introduction of an alien invasive species is positively correlated with trade and can inflict significant ecosystem and economic damages (17).

Even fewer studies have been conducted that examine the trade-related aspects of ground transportation. One study examines the environmental impacts of ground transportation emissions under the North American Free Trade Agreement (NAFTA). Under NAFTA, increased trade has resulted in increased environmental damage along the trade corridors that developed after the agreement went into force. Air pollution was found to be negatively affected by NAFTA-related trade increases, with cross-border freight accounting for 3% to 11% of all mobile NOx emissions and 5% to 16% of all mobile PM10 emissions (18).

2.5. Indirect Effects

Numerous studies have examined the indirect effects of economic globalization and the environment, focusing mainly on composition and technique effects. The bulk of work on the composition effect centers on the "pollution

NAFTA: North American Free Trade Agreement

haven" hypothesis; analyses of the technique effect look at the "pollution halo" hypothesis.

Pollution haven hypothesis: globalization will cause pollution-intensive industries in developed countries that face strict environmental standards to migrate to nations with lax standards

Whereas globalization enthusiasts argue (through the EKC) that globalization automatically will eventually improve environmental conditions, opponents of globalization often claim that it will result in a mass migration of pollution-intensive industry from developed countries with stringent environmental regulations to developing countries with lax environmental standards. Not only will such migration cause increases in pollution in developing countries, they argue that pressure will then be exerted on developed country standards in the name of competition—effectively creating a "race to the bottom" in standards (19). Using the theoretical framework above, this pollution haven theory contends that the composition of pollution-intensive industry will increase in a country with lax standards and decrease in a nation with more stringent ones.

As with the EKC literature, it is also ironic that the majority of the peer-reviewed literature has found very limited evidence for pollution havens, whereas some in the policy community continue to cite them as a dire consequence of trade liberalization (20). Very recently, however, a handful of studies have indeed found evidence of pollution havens in the world economy. A study by Cole (21) examines North-South trade flows for 10 air and water pollutants. Cole finds evidence of pollution haven effects, although such effects are quite small relative to other explanatory variables. Another study, by Kahn & Yoshino (22), looks at bilateral trade data over the years 1980 to 1997 for 128 nations for 34 manufacturing industries and examines how low-, middle-, and high-income nations differ regarding their income elasticity in exporting pollution-intensive products. They find that, among nations outside of regional trade blocs, there is general evidence to support the pollution haven hypothesis. As national incomes rise, exports of pollution-intensive products decrease relative to exports of cleaner goods. Nations participating in regional trading arrangements have slightly weaker pollution haven effects than those observed outside of regional trading blocs.

The reason the majority of studies fail to find evidence for pollution havens (or find only small effects) in developing countries is that the costs of compliance with environmental regulations are relatively much smaller than many other factors of production—especially those that determine comparative advantage (see Reference 20). In general, the developing world is factor abundant in unskilled labor that gives it a comparative advantage in manufacturing assembly plants. On average, such manufacturing activity is relatively less pollution intensive than more capital-laden manufacturing activities, such as cement, pulp and paper, and base metals production.

Irrespective of simultaneous shifts in the developed world, economic globalization can cause independent composition effects. A study of the composition effects of air pollution-intensive industry in Mexico after NAFTA found that the economy shifted toward cleaner industries as a result of economic globalization (23). Barbier (24) shows that globalization can shift the composition of exports from a country toward resource-intensive industries and accentuate "Dutch disease" whereby a resource export boom increases the value of a domestic currency, crowds out other export sectors, and deepens the composition of exports toward an environmentally unsound extractive industry and at the same time pushes the poor into more marginal existences that can also harm the environment. As shown in **Table 3**, there are numerous developing countries that suffer from this.

Weak evidence of a pollution haven does not justify delinking trade and environmental policy. Indeed, given that firms do not generally move to poorer countries in pursuit of weak environmental standards, developing countries can enact environmental policies without scaring away foreign investment (23). The pollution haven hypothesis is a theory of firm location (why firms move from one country to another) and does not provide a framework for analyzing the environmental impacts of firms

Table 3 Low- and middle-income countries and patterns of resource use (24)

Primary product export share	Share of population on fragile land 50%	Share of population on fragile land 30% to 50%	Share of population on fragile land 20% to 30%
≥90%	Burkina Faso Chad Laos Mali Niger Papua New Guinea Somalia Sudan Yemen A.R.	Algeria Angola Benin Botswana Cameroon Comoros Equatorial Guinea Ethiopia Gambia Guyana Iran Mauritania Nigeria Rwanda Uganda	Ecuador Democratic Republic of the Congo Liberia Zambia
50% to 90%	Egypt Zimbabwe	Central African Republic Chad Guatemala Equatorial Guinea Kenya Morocco Senegal Sierra Leone Syria Tanzania	Bolivia Burundi Côte d'Ivoire El Salvador Ghana Guinea-Bissau Honduras Indonesia Madagascar Mozambique Myanmar Panama Peru Togo Trinidad & Tobago
<50%		Costa Rica Haiti Lesotho Nepal Pakistan South Africa Tunisia	China Dominican Republic India Jamaica Jordan Malaysia Mexico Sri Lanka Vietnam

when they do move to another country, albeit for reasons other than the ability to pollute. Zarsky (25) provides an overview of the interaction between foreign investment and environment, showing that firms have the promise to offer pollution halos whereby they bring better environmental practices to developing nations and can help developing nations "leapfrog" to higher standards. Indeed, Zarsky cites numerous cases where this has occurred, such as in the petrochemicals, electronics, and steel industries. Gallagher, however, shows that in the auto sector U.S. firms brought dated cars without catalytic converters to China (26).

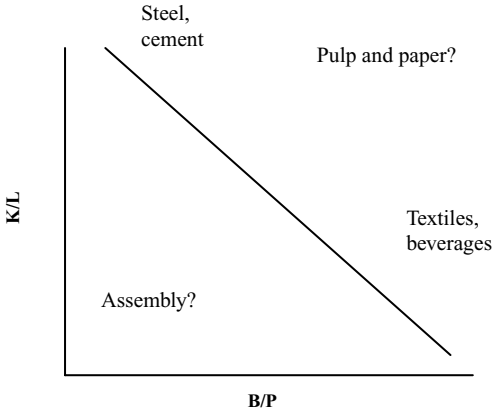

Figure 2

Economics of investment and pollution intensity. Here the y-axis is the capital-labor ratio (K/L), and the x-axis is the ratio of by-product (B/P) emissions to total emissions. The hypothesis can be defined as follows: In industries where pollution is a function of energy combustion technology, new investment will yield cleaner production; in industries where pollution is a function of end-of-pipe technologies, the effects of new investment are more ambiguous. The pattern implicit in the hypothesis is illustrated by the industries that fall along the trend line.

Gallagher (27) has put forth a framework examining the relationship between investment and environmental quality, as depicted in **Figure 2**. When pollution is a function of plant vintage, new investment will more often than not lead to environmental improvement. When pollution is a function of end-of-pipe technologies (which are installed at the end of smokestacks or of pipes into waterways, for instance) and such technologies are not required or enforced, new investment's effects on the environment will be ambiguous.

The question is, if the data were available to adequately test the hypothesis, would sectors such as pulp and paper, or even apparel, fit the pattern? Pulp and paper production is highly energy intensive and creates a significant amount of by-product waste.

If the hypothesis is correct, end-of-pipe technology innovation and transfer are a special case. In the absence of environmental regulations that require end-of-pipe technologies, or in the presence of regulations that are not enforced, such technologies will not automatically be deployed because they are not part of the core vintage of the technology. For innovation or deployment to benefit the environment, change must be a function of vintage, labor-management relations, and firm-state (or civil society) relations. In the case of China, it was found that U.S. car manufacturers transferred basic car models to China but did not transfer catalytic converters that were used in the same models in the United States and Europe because domestic air pollution laws did not make the catalytic converter necessary (26).

This section on globalization and environmental quality shows that scholars have come a long way from thinking about globalization as generally good or bad for the environment. Indeed, research now focuses on the conditions under which a multitude of aspects of globalization affect environmental quality by environmental medium and/or economic sector. In addition, a useful framework has arisen (direct and indirect effects) that helps analysts pinpoint the globalization and environmental interactions.

3. GLOBALIZATION AND ENVIRONMENTAL POLICY

The potentially adverse impacts of globalization on the environment underscore the need to couple economic integration with social and environmental policy at the local, national, and/or international level. The fact that there is limited evidence for the EKC shows that economic integration (and growth in general) cannot be relied on for automatic environmental improvements. Indeed, the evidence shows that the lack of effective institutions in the presence of economic integration has exacerbated long-standing problems in the developing world. This section of the paper takes the need for policy as a starting point. Attempts to deploy effective environmental policies in a globalizing world have given rise to two major challenges. First, how does the formulation of environmental policy affect the ability of firms to compete in a globalizing world? Second, to what extent do the institutions deployed to facilitate globalization limit the policy space for nations to deploy effective environmental policy? Such concerns have been addressed to varying degrees in

recent (and ongoing) regional and global trade agreements.

3.1. Concerns over Competitiveness

Perhaps, a silver lining lies in the fact that there is little evidence of pollution havens. This finding suggests that strengthening environmental institutions and standards in developing and developed countries alike may not deter foreign and domestic investments. Because the abatement costs of pollution are so small relative to other key costs, most firms will not move to or from developing countries as regulations rise (at least to U.S. levels). The Porter hypothesis states that deploying optimal policies—where the marginal social costs of degradation equal the marginal benefits of environmental cleanup—to internalize market failures may even increase firm competitiveness. Well-designed regulation has been shown, in some cases, to inspire innovations that can lead to reduced costs and therefore increased global competitiveness. According to this hypothesis, environmental regulation can lure firms to seek ways of increasing resource productivity and therefore reduce the costs of inputs. Such innovation offsets can exceed the costs of environmental compliance. Therefore, the firm that leads in introducing cleaner technologies into the production process may enjoy a first-mover advantage over those industries in the world economy that continue to use more traditional, dirtier production methods (28).

The initial empirical work on the Porter hypothesis was largely in the form of business school case studies and was scrutinized by economists who found little evidence of such a phenomenon in aggregate-level econometric analyses (29, 30). Jenkins and colleagues (31) have conducted a comprehensive assessment of the so-called Porter hypothesis and found that regulation is more likely to lead to innovation offsets under three conditions. First, the level of research and design is likely to be a factor in determining the impact on competitiveness because cost reductions are more likely to occur where new clean technologies are developed rather than in industries that adopt end-of-pipe solutions. Second, innovation offsets are more likely in industries or firms that have the ability to absorb environmental costs, which is most often determined by profit margins and firm size. Finally, they are more likely in firms that have the ability to pass increased costs on to consumers in the form of higher prices. Note that each condition requires that a firm has substantial market power in an industry in which there is substantial innovative activity.

Porter hypothesis: that environmental regulation may spur "innovation offsets" whereby compliance with an environmental standard can enhance a firm's competitiveness

3.2. Concerns over Policy Space

There is also concern that new environmental regulations will be restricted by existing and proposed global trade and investment rules that govern the world economy. These concerns are manifest on two levels: (*a*) the extent to which national environmental policy will conflict with world and regional trade and investment treaties and (*b*) the extent to which multilateral environmental agreements are in conflict with the World Trade Organization (WTO).

Since the late 1980s, there has been a long-standing controversy regarding the extent to which WTO laws restrict the ability of nations and the world community to establish effective environmental policy. At the national level, numerous cases have gone before the WTO claiming that national environmental policies have served as unfair trade barriers to member nations. Two famous cases (32) involving tuna and shrimp, respectively, occurred when developing country governments challenged U.S. laws that restricted importation of these goods when they were caught by using techniques that also killed dolphins or sea turtles. Developing countries saw such laws as unfair trade barriers. The WTO has ruled that it does not object to environmental policy per se but to environmental policies that are trade restrictive. The United States has since amended these laws to comply with the WTO (32).

The U.S. Marine Mammal Protection Act (MMPA) enabled the United States to impose sanctions on nations whose fishing practices harm dolphins and other protected marine life.

MEAs: multilateral environmental agreements

However, in the late 1980s under MMPA, the United States imposed an embargo on Mexico and Venezuela because their fishing practices were ensnaring dolphins in the process of catching tuna. Mexico filed a complaint under the General Agreement on Tariffs and Trade (GATT), arguing that GATT rules forbid nations from restricting the import of a product on the basis of how it is produced. Later that year a GATT panel ruled that the tuna embargo violated the U.S. GATT obligations. Environmentalists argued that as environmental policy was moving increasingly toward focusing on the environmental impacts of products through their life cycle—including production, distribution, use, and disposal—the world trading regime was moving in the opposite direction (32).

Environmental regulations have led to conflicts with regimes governing investment rules. Most treaties that cover foreign investment (most trade treaties at the bilateral and regional level conducted with Western nations also have these clauses) have clauses that restrict the ability of host nations to expropriate investments without compensation. In recent times, these clauses have been interpreted by firms who claim that the costs of implementing new environmental regulations are tantamount to expropriation. Examples of some of these claims are as follows:

- Occidental Petroleum against Ecuador for the cancellation of oil leases owing to allegations of environmental degradation and human rights abuses;
- A suit by Texas farming interests claiming that Mexico infringed on their water rights;
- Methanex corporation's claim that a fuel additive ban to reduce air pollution was an expropriation;
- A suit against Canada for banning the pesticide Lindane; and
- A case against the United States targeting environmental measures imposed by the state of California on an open-pit gold mining operation licensed to a Canadian mining company (33).

Frequently the damages sought, and in several recent cases awarded, have been in excess of a $100 million (33). Environmentalists decry these suits as tilted in favor of MNCs, arguing that they choke the sovereignty of nations to deploy effective environmental laws (25).

Although thus far the clash over environment and trade regimes has occurred over national environmental laws, many are concerned that the key compliance mechanisms in many multilateral environmental agreements (MEAs) will be deemed illegal under the WTO. At least seven MEAs have actual trade provisions in their text: the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES); the Montreal Protocol on Substances that Deplete the Stratospheric Ozone Layer; the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal; the Convention on Biological Diversity and the Cartagena Protocol on Biosafety; the Framework Convention on Climate Change and its subsequent Kyoto Protocol; in addition to the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (34). The trade provisions of these MEAs, such as the threat of sanctions under the Montreal Protocol and CITES, have in some cases been the key to their success (35). Although a provision of a specific MEA has not yet been called into question by the WTO, some scholars argue that the possibility of such questioning is "chilling" the regimes of MEAs to carry out their mandates effectively (36). Indeed, certain export bans in the Basel Convention have been seen as unsound precedents by the trade community, and it is possible that this is affecting the development of newer MEAs (37).

From a legal perspective, these conflicts can be boiled down to two issues that can violate the core norms in the trade regime: nondiscrimination, treating all a nation's global trading partners the same; and national treatment, treating producers in a domestic economy in the same manner as producers that one relies on

for imported goods. The two issues are, first, over the instruments used to enforce environmental policies and, second, over environmental policies aimed at the production methods of environmentally degrading products. Many of the policies that have been the subject of WTO conflict are over attempts to enhance national (or international) environmental protection through government intervention of various forms. Interventions that use subsidies, quantitative restrictions, and, of course, sanctions often fall into question under WTO law as not being the "least trade restrictive" measures to achieve environmental goals. Another set of conflicts have been over the production processes of various goods and services. Environmental policy is often concerned about processes in the life cycle of a product that could harm or benefit the environment. What causes problems in trade law is when government measures are seen as being discriminatory, that is, pertaining to one set of producers (for example foreigners wishing to sell in a domestic market) but not others (such as domestic producers) (38). The Technical Barriers to Trade agreement under the WTO prohibits the discrimination against products on the basis of their production methods. Again, nondiscrimination is the principal norm of the trade regime (39).

3.3. Institutional Responses to the Globalization and Environmental Policy Issue

Some scholars and policy makers argue that more needs to be done, that indeed a World Environmental Organization should be established to serve as a counterweight to the WTO (40). Indeed, such an institution has also been proposed by none other than former WTO head Renato Ruggerio, "I would suggest that we need a similar multilateral rules-based system for the environment—a World Environment Organization to also be the institutional or legal counterpart to the WTO" (41).

Discussion of a World Environmental Organization has become quite controversial, with many in the environmental community arguing against it on numerous grounds, yet others favor it (40–42). Some say that the existing global environmental regime (surrounding such bodies as the United Nations Environment Programme) has not been able to fulfill its mandate and that the focus should be on reforming the existing architecture, not creating new institutions that could become plagued with the same problems (42).

The debate over a World Environmental Organization has not yet led to any firm action. However, numerous institutions have been established to deal with the globalization and environment nexus. At the world stage, the WTO has a Committee on Trade and the Environment (CTE), which serves as a study group for potential conflicts regarding trade and the environment. The CTE is made up of representatives of member states. Because the CTE works on a consensus basis, there have been relatively few clear recommendations to the WTO from the CTE. In the current round of WTO negotiations, an official part of the agenda is for the WTO to examine the relationship between the WTO and MEAs, though concrete proposals have thus far been limited to the possibility of having observers from the secretariats of multilateral environmental institutions.

There is much variation in how nations deal with globalization and the environment at the regional level. On the one hand, the European Union (EU) has a very deep set of linkages between integration and sustainable development. However, trade arrangements negotiated by the United States are more limited.

The European Union has made decreasing economic, social, and environmental disparities a cornerstone of its regional integration strategies. According to Anderson & Cavanagh (43), the European Union made $324 billion in development grants to this end between 1961 and 2001. Annual aid for a new member of the European Union can be as high as four percent of its GDP. As a result, the relatively less well-off European countries have improved their social and environmental situations while benefiting economically from integration. Coupled with development funds, the European Union

has established regional social and environmental ministries that establish independent standards and allow for civil society participation and monitoring as well.

In its regional arrangements, the United States allows for a much more limited level of linkages between economic integration and the environment. The majority of regional trade arrangements (such as the U.S. agreements with Chile, Jordan, Morocco, Singapore, Central America, and others) have text concerning environmental matters but leave out social concerns completely, set up no institutions, and have very limited avenues for civil society participation. Indeed, according to Anderson & Cavanagh (43), EU development funds are approximately 10 times the amount of U.S. economic assistance grants to all of Latin America. In the largest U.S. regional arrangement, NAFTA, a parallel agreement set up an environmental institution called the Commission for Environmental Cooperation. With an annual budget of $9 million, the institution can do little more than provide technical assistance to the parties involved, but it does allow interesting levels of civil society participation. NAFTA does not include any mechanism to address regional inequality. Thus, although Ireland, Spain, and Greece have used EU development funds to increase standards of living as well as promote social and environmental improvements, Mexico has not seen comparable improvement under NAFTA. Mexican real incomes have grown just over one percent annually since the agreement was signed. In addition, the economic costs of environmental degradation have reached an estimated 10% of Mexico's annual GDP (23).

In terms of investment rules and in response to political pressure, the United States has changed the language on expropriation and created a "test" that is intended to ensure that expropriation does not occur in the presence of bona fide environmental regulations (44). Such language has appeared in the trade agreement with the Dominican Republic and Central American countries and in an agreement with Peru.

Creative policy does not have to be designed by governments. Conroy (45) analyzes how advocacy organizations have used certification processes to reward firms that produce and trade goods that use high social and environmental standards in their production processes. Through such efforts, the Forest Stewardship Council certified 60 million acres of forest between 1995 and 2001, accounting for more than five percent of the world's forests. Working on the demand side of the equation, advocacy groups set up market campaigns to pressure firms to buy these products. Indeed, some retail giants now actually seek to participate in these processes. When governments or citizens' groups recognize more sustainable practices in the developing world, this generates avenues to gain market access for production processes that would be deemed inefficient by an unfettered marketplace. In addition to citizen-advocacy efforts, corporations are sometimes moved to self-regulate for a variety of reasons. Examples of such actions abound in the shipping and chemical industries as well as in others, although there is considerable debate over the extent to which such actions are adequate substitutes for comprehensive regulation (46, 47).

4. GLOBALIZATION AND ENVIRONMENTAL POLITICS

The environment is very much a part of globalization politics. Why do some agreements and institutions that govern globalization have environmental provisions and others do not? This is largely the result of a classic two-level game (international negotiations where simultaneous negotiation occurs at both the domestic and the international levels) between domestic and national politics (48). Those nations that have pushed for the negotiation of environmental provisions into institutions of economic integration have done so because environmental interests in those nations have been able to put together coalitions that have ensured that environment has become a priority in such negotiations. However, such provisions only end up in the final agreement when the nation with the

environmental interest succeeds in negotiating environmental provisions with its negotiating partners. This condition has commonly failed in negotiations between developed and developing countries.

The analysis that is thus far the most comprehensive in scope has been conducted by Vogel (49). Vogel primarily draws from theories of political power (realist) and domestic politics to argue that trade liberalization and environmental protection are not incompatible. In an investigation of the European Union, the WTO, and the NAFTA, he notes that, by and large, trade liberalization has strengthened rather than weakened the ability of nations to protect the environment. Importantly, however, he acknowledges that this did not happen automatically. Indeed, he concludes that the impact of trade liberalization on regulatory standards is a function of the preferences of powerful states (which are in part informed by domestic politics) and the level of economic integration (in other words, the stronger the trade relationship) between the negotiating partners. According to Vogel, "California effects" occur when powerful (often correlating with wealthy) nations prod their trading partners to strengthen their environmental policies in the integration process. "Delaware effects" arise when the opposite occurs (49).

In this light, Vogel concludes that a "trade" occurs when market access is granted by powerful states in exchange for raising consumer and environmental standards. It was the European Union's strong commitment to integration that enabled Germany (which was empowered by its environmental community) to influence the environmental policies of other European states. Whereas, in the case of the GATT, which is a much weaker institution, the ability of strong and wealthy countries to influence their partners was more diffuse. To Vogel, NAFTA falls in the middle. Although it allows the United States to influence Mexican environmental policy more than it could under the WTO, it does not go as far as the European Union. It has been argued that the key condition that powerful countries use to lure weaker ones into protecting their environment is access to the powerful countries' markets (50, 51).

The role of domestic politics is key to the formation of environmental preferences within the powerful state. Interestingly, Vogel (49) explains how "Baptist and bootlegger" coalitions are formed to push hegemons toward advocating environmental policy in trade agreements. During prohibition in the United States, two constituencies had an interest in keeping the southern states "dry." First were Baptists, who had a moral case to outlaw alcohol. Second were bootleggers, who stood to gain from keeping alcohol sales illegal. In a trade and environment setting, Vogel explains,

> For producers who wish to maintain or increase trade barriers, the convergence of trade and regulatory policies provides them with two significant political benefits. First, it furnishes them with an argument for trade restrictions that has relatively wide political appeal: consumer or environmental regulation. They can argue against the removal of trade barriers on similar grounds. Second, it provides them with an important new source of political support, as consumer and environmental organizations enjoy considerable influence in a number of capitalist nations (49).

Baptist and bootlegger coalitions can arise in various forms. DeSombre (51) has shown how such coalitions form to increase the stringency of environmental regulations in other countries. In this case, industry is interested in such action because they fear that because they are subject to such regulation at home, they will not be able to compete with firms that are not (51). For NAFTA, Baptist and bootlegger coalitions were also formed in opposition to trade liberalization, but the coalitions were formed for reasons similar to DeSombre's. Under NAFTA certain industries allied with anti-NAFTA civil society groups in fear of having to compete with foreign firms that did not have to adhere to such regulations (52). This coalition was even broader under NAFTA. Baptists and bootleggers were joined by conservative political constituencies led by leaders such as Patrick

California effects: high-level environmental standards (common in California) are adopted by nations (or entities within nations)

Baptist and bootlegger coalition: a coalition of two unlikely political actors to achieve a shared political outcome

Buchanan and Ross Perot who questioned NAFTA's ability to uphold the sovereignty of U.S. regulations. Both DeSombre (51) and Vogel (49) describe coalitions that form in fear of not being able to compete because firms overseas do not have to comply with stringent environmental standards.

Vogel's work (49) is an in-depth, pioneering analysis of the politics of trade and environment. However, although Vogel eloquently shows how power, markets, institutions, and interest groups all play roles in the formation of trade and environment regimes, he falls short of weighting the relative importance of each of these variables. Such an effort has been undertaken in two studies of NAFTA. In a volume that describes the passage of NAFTA, Mayer (52) devotes considerable attention to explaining the determinants of the trade and environment regime that arose as a result of NAFTA. To Mayer, NAFTA's trade and environment regime was a necessary condition for the passage of NAFTA as a whole. Where Vogel could be said to have drawn from primarily realist and institutional approaches to trade and environment, Mayer's explanation simultaneously blends realist, liberal, and constructivist theories to explain the creation of a trade and environment regime. Drawing from game theory and the process of tracing through a gamut of confidential documents and interviews, Mayer outlines three major episodes that together led to the creation of a trade and environment regime under NAFTA: the need to secure fast-track negotiating authority in the United States, the negotiations themselves, and the ratification process. With political power as a constant force in all three stages, Mayer argues that institutional factors determined the first stage of NAFTA, interests in the second, and constructionism in the third.

For Mayer (52), each stage of NAFTA was a process determined by interactions among institutions, interests, and social construction. From an institutional perspective, U.S. fast-track and ratification policies loomed over the entire period. Interest groups saw that they would be key brokers in seeing that these institutional hurdles were cleared and began linking their demands to the negotiations. During the elections of 1992, William Clinton both needed to support NAFTA but also had to distinguish himself from his opponent, then-President George H.W. Bush. Seeing the support of interests such as environment and labor as seminal to his election campaign, he decided to support both NAFTA and labor as well as environmental side agreements (52). By doing so, he automatically opened the door to even more interest group involvement.

The campaign to finally ratify and pass NAFTA, however, in Mayer's view, lends itself to constructivist analysis. In the effort to win voters during the ratification process, clashing interests waged symbolic campaigns to make their points. The final debates over NAFTA were not about its actual effect but about what NAFTA symbolized. Those against NAFTA associated it with images of corporate greed and as triggering a "giant sucking sound" of jobs and environmental regulations going south of the border. Conversely, those for NAFTA attempted to create images of unanimous support by lining up all the living former presidents with the chief executive officers of many influential corporations, and so forth (52). Newell (53) in this volume demonstrates how similar forces have come to play in clashes over trade and environment in social movements across Latin America.

In short, the particular institutional framework (U.S. elections and the fast-track process) in the United States that gives interest groups a number of opportunities to engage in trade policy, coupled with the ability of such interests (and the interests of the government) to wage symbolic campaigns both supporting and against NAFTA, led to a final outcome that included environmental provisions in the NAFTA text and in the form of formal and informal side agreements. For the other two parties involved, Mexico and Canada, who did not have these constraints, NAFTA's environmental package was more of a formality.

The domestic game is only half the battle. Trade negotiators from developing countries

have been extremely concerned that environmental protections in trade and investment agreements will take the form of veiled protectionism. They argue that developing country products are already having difficulty obtaining access to developed country markets and having to add environmental protections will only increase the cost of such access. Therefore, linking globalization and the environment explicitly in trade agreements continues to favor domestic industries in developed countries (54). All it takes is an understanding of Baptist and bootlegger coalitions to see that such concerns are definitely legitimate. The environmental policies deployed in the developed world in this realm are not always the most optimal from an efficiency standpoint but, instead, are those that were able to survive the political system. For them to get through, according to the literature, environmentalists often have to coalesce with industries most likely to benefit from a regulation. The losers are competing firms in trading countries. Sometimes gridlock has been broken when nations grudgingly exchange market access for environmental provisions (50). Indeed, the agreements discussed above, in which the United States has included environmental provisions, are largely due to the U.S. mandating that the environment be part of the negotiations, and without environmental provisions, market access to the United States will not be granted. Given the enormous size of the U.S. economy, this is an offer very few developing countries can refuse.

Another reason some negotiations fall short of including environmental provisions is that environmental constituents in developing countries at times do not have the same access to government policy as their counterparts in the developed world do. Developing countries have very strong environmental movements and sometimes also have stronger environmental practices than in developed countries (small-scale agriculture in the developing world is enormously less environmentally degrading than industrial agricultural practices in the developed world). However, political processes can be much less open in some developing countries, and therefore, the coalitions necessary to put the environment on a trade agenda are more difficult. This partly explains why many developing country civil societies are more fundamentally against all trade and investment arrangements from the beginning (53, 54).

5. SUMMING UP AND LOOKING AHEAD

This article has offered a critical taxonomy of the relationship between economic globalization and the environment. The burgeoning literature in this area can be divided into three areas, i.e., the extent to which (*a*) globalization affects environmental quality, (*b*) global trade and investment rules affect the ability to deploy environmental policies, and (*c*) how these first two forces affect the politics of trade and environmental policy making. This final section summarizes what we clearly know about globalization and the environment, what we still need to know, and what the key challenges are for future policy in this area.

5.1. What Do We Now Know?

- Globalization is not automatically associated with either positive or negative effects on environmental quality. There is limited evidence for pollution havens or an EKC.
- Analysts have a useful framework for deciphering the relative effects of globalization and the environment by examining the scale, composition, and technique effects.
- Environmental regulation does not always adversely impact global economic competitiveness. Indeed, we now know that there are clear conditions whereby environmental regulation can spur innovations that lead to both environmental improvement and export competitiveness.
- Environmental regulations and trade treaties need to be crafted so that they

can effectively reduce environmental degradation while creating the fewest distortions in the trading system. Many current and proposed national and multilateral environmental policies are in possible conflict with current and proposed trade and investment rules.

- When environmental policy and global trade and investment rules are linked, the nature of their linkage is often a function of both domestic and international politics.

5.2. What Are the Main Challenges?

- The policy community needs to recognize that scholarly assessments of globalization and environment have moved well beyond whether globalization is good or bad for the environment.
- More work is needed to address the direct effects of globalization and the environment. There are numerous studies assessing the environmental impacts of transportation, but few, other than those discussed here, attempt to analyze the independent and significant impact that economic globalization has on these trends relative to other factors such as population, consumption, technological change, and so forth.
- A new trend in the global economy is the proliferation of "South-South" (developing country to developing country) trade and investment. Such trends pose challenges to traditional theories of North-South globalization that examine whether more stringent standards in the North lead to pollution havens or halos. In South-South trade there may be no halo to begin with, though some evidence suggests that developing countries can be the source of environmental sustainability (55).
- How does the issue of climate change shift the globalization and environment debate? Very recent research suggests that a global framework for mitigating climate change whereby developed countries have to face more stringent standards will cause "carbon leakage," which occurs when carbon-intensive firms move to countries where they can more easily emit, a concept analogous to the pollution haven hypothesis. There is also concern that new measures for greenhouse gas mitigation and adaptation may clash with WTO rules (56).
- Generally, the consensus on globalization and the environment is derived from a large literature of ex post facto studies. Yet, what policy makers need are ex ante assessments specific to the actual treaties or pieces of legislation under consideration. The methodologies and experience in this area are very much in their infancy (57).
- Research and policy are needed to examine the potentially adverse effects on competitiveness of environmental regulations for both smaller- and medium-sized enterprises, especially in developing country firms. What determines innovation offsets, and how can they become more prevalent?
- The policy community needs to determine whether environmental policies need to be conducted so as not to distort the global economy or clash with global trade rules or, alternatively, to determine whether trade rules need to be designed so as not to clash with optimal environmental policy. Regardless, political economy is just as important as policy design. Political processes will undoubtedly lead to policies that deviate significantly from the optimal situation and may as a result accentuate the very problems they seek to alleviate. Therefore, as many actors and stakeholders as possible should take part in the policy design process from the beginning.
- Now that there are a number of institutions to mitigate the globalization/environment problem, such as provisions in trade treaties and so forth, a

literature needs to emerge that evaluates the evolution and effectiveness of these institutions so that they may further evolve.

FUTURE ISSUES

1. More work is needed to address the direct effects of globalization and the environment, such as in the transportation sector.
2. Research is needed on the environmental impacts of "South-South" or developing country to developing country integration.
3. Methodologies and instruments for estimating the impacts of future trade or environmental arrangements are in their infancy and in need of improvement.

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