

Environmental Health and International Trade

Linkages and Methodologies

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1. Introduction

This paper is aimed at fleshing out the various linkages that exist between trade policy (broadly defined to cover investment, intellectual property rights, goods, services, etc.) and environmental health. It is an analysis of the potential impact pathways by which trade policy might affect environmental health, based on a review of the literature and on the authors' knowledge of trade-environment and assessment issues.

The paper serves as a first step in a journey of exploration, trying to gauge the feasibility and desirability of incorporating environmental health aspects in Canada's environmental assessments of trade liberalization agreements.¹ There is some existing scope for treating such linkages: the handbook for conducting environmental assessments of trade negotiations, at stage 3, asks whether the identified environmental impacts also have impacts on human health. The aim of this paper is to begin exploring how that important question might be further pursued.

Given that aim, the paper will also briefly consider the implications of the surveyed linkages for the prospects for environmental health impact assessment of trade policy (though a proper consideration of these questions is beyond this paper's scope).

From a broad policy perspective, the most useful current conceptions of health are broad, drawing from the concepts of health promotion and population health. Health is to be understood not simply in terms of negative measures such as death, disease and disability but in positive terms as healthy behaviours, self-reported health, sense of well-being, quality of life and life satisfaction. It thus begins to overlap with concepts of quality of life and human development. This is along the lines of the results of a 1994 Canadian report by the Federal, Provincial, Territorial Advisory Committee on Population Health (FPTACPH), which arrived at a broad definition of what determines health.

A starting point in defining environmental health can be taken from the World Health Organization: "Environmental health comprises those aspects of human health, including quality of life, that are determined by physical, chemical, biological, social, and psychosocial factors in the environment." That said, given the broader aim of incorporating environmental health considerations in assessment processes, our definition of environmental health will be, for this first cut at defining the linkages, narrowly cast, reflecting a pragmatic approach.

To that end, this paper will not focus on the quality of life aspects so much as the physical health aspects. Particularly given the overall objectives, it would seem prudent to leave the consideration of wider impacts (associated with, for example, the population health model) as a mid- to long-term goal. The immediate or short-term goal is to move in that direction in a measured and focussed manner, where the assessment of the environmental effects of trade is the catalyst to change.

¹ See Kwiatkowski and De Civita (2002) for an earlier treatment of this subject.

2. Trade-Environment Health Linkages

This section surveys the linkages that exist between trade policy and environmental health. The analysis that follows creates a framework adapted from the DPSEEA model, grouping driving forces into three categories (see Figure 1): changes in production patterns, changes in income and regulatory impacts.² In discussing each, this section describes the potential impact pathways, and discusses briefly for each the types of environmental and health implications that might arise. Figure 2 gives a summary picture of the potential effects of the various types of impact pathways described here.

2.1. Changes in Production Patterns

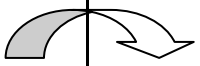
Trade liberalization is a fundamental cause of economic change. As such it can be seen as a driving force which acts on the existing economic structure in a number of ways to change the way goods and services are produced. This in turn will have varied environmental impacts, which again in turn will translate into impacts on the state of human health.

This section examines the various ways in which this sort of dynamic might occur. It looks at three types of impacts that have traditionally been seen as linking trade and environment: scale impacts, structural impacts and direct impacts.³

² The application of environmental health linkages to trade policy builds on the work of, among others, Corvalán et al. (1995).

³ This typology was originally elaborated in this form by OECD (1994). The same classifications are used in the Canadian approach to assessing the environmental impacts of trade liberalization (see Government of Canada (2001)). Regulatory impacts, also used in both the OECD and Canadian typologies, are discussed later in this paper.

Figure 1: DPSEEA Framework for Trade-Environmental Health Linkages

Driving Forces	Trade Flows, Liberalization					
	Changes in Production Patterns			Changes in Income		Regulatory Impacts
	<i>Scale</i>	<i>Structural</i>	<i>Direct</i>	<i>Consumption</i>	<i>Regulatory</i>	
Pressures	Emissions from increased overall production	Emissions from sectoral changes; changed workplace hazards	Increased transport of goods, hazardous goods	consumption/use emissions		See Fig. 4
States	Effluent levels in soil, water, air	Effluent levels in soil, water, air	Particulate levels, risk of spills	Consumption-related pollution, e.g., auto exhaust		
Exposures	Too varied to specify	Too varied to specify	Dose, determined by proximity, exposure	e.g., levels of particulate, NO _x , CO, etc.		
Effects			e.g., respiratory illness, cancer			
Actions						

The details of exposures, effects and actions will vary considerably with the types of environmental harm in question. These types of linkages are well studied. This chart focusses mainly on the linkages between trade as a driving force, and pressures/states.

Figure 2: Summary of Impact Pathways

Changes in Production Patterns			Changes in Income		Regulatory Impacts
Scale	Structural	Direct	Consumption	Regulatory	
<p>Positive: The efficiency that drives scale changes probably reduces environmental impact per unit of production.</p> <p>Negative: More production means more production-related environmental damage.</p>	<p>Positive: The economy might shift to a mix that is less polluting overall.</p> <p>Negative: The economy might shift to a mix that is more polluting overall.</p>	<p>Negative: Increased transport traffic means more pollution; increased transport of hazardous goods (where it occurs) creates more risks.</p>	<p>Negative: Increases in income mean more consumption, which means more consumption-related pollution.</p>	<p>Positive: Increased income might equate to increased demand for environmental quality, leading to more stringent environmental laws.</p>	<p>Negative: Services or investment law might curtail governments' ability to regulate in the public interest. Trade with low-standard countries might lead to industrial relocation and/or regulatory chill.</p>

2.1.1. Scale Impacts

Trade and trade liberalization can expand the level of economic activity possible by making that activity more efficient. This in fact is one of the primary classical rationales for trade liberalization: that it will bring what is known as *allocative efficiency*, allowing more goods to be produced with the same set of inputs (i.e., natural resources, technology and labour). There are a number of ways in which efficiency can be increased by trade and trade liberalization.

Allocative efficiency. Liberalizing trade can allow countries to specialize in producing those items at which they are relatively more efficient—at which they have a “comparative advantage.” Comparative advantage is a relative state that exists between two countries and two goods. Even if a country is less efficient at producing both goods than is a given trading partner, if they each specialize in producing that at which they are most efficient, and then trade, they will be better off than in a situation in which there was no trade. Specifically, they will be able to jointly produce a bigger basket of the two goods in question.

Illustration: Consider a hypothetical case in which Canada maintains a domestic industry in coffee growing, using large greenhouses and huge energy inputs, and protecting the industry with tariffs and quotas on imported coffee. In this hypothetical world, on the other side of the globe the Vietnamese government is engaged in similarly protecting an inefficient effort to grow wheat. If a trade agreement removed the tariff and non-tariff barriers, Canada would instead devote its resources to wheat production, Vietnam to coffee, and they would trade. However, to produce the same amount of wheat and coffee as was produced in the pre-liberalization scenario would require far fewer resources (energy inputs, water, etc.). The freed up resources would be devoted to other economic activity, meaning an increase in the scale of both economies.

Traditionally this argument is used to demonstrate the gains that can be wrung from liberalizing trading relations between countries: more goods can be produced and all will be better off.⁴ But it can also be used to demonstrate that trade and trade liberalization will have environmental impacts. More goods and services produced, other things being equal, means more environmental impacts.

Efficiency from competition. Another way in which trade can increase the basket of goods and services produced is to expose domestic firms to foreign competition and thereby force them to innovate to become more efficient. The idea is that firms that are protected from competition by high tariff or non-tariff barriers can become “lazy,” and will not have to look hard for ways in which they might increase efficiency. Removing those barriers and putting

⁴ Though note that there are some qualifications to this statement: there will be winners and losers in any given country even under the restrictive conditions of the traditional assumptions. And the potential for greater well-being is of course only potential unless the countries involved have the capacity to exploit the potential gains from trade, an issue that is of particular concern to developing countries.

them into more direct competition with foreign firms, then, may cause them to actively do this kind of looking, usually with positive results.⁵

Imported efficiency. A third way that trade can increase efficiency is through openness to foreign investment, or imports of foreign technology, which can bring more efficient methods of process and production.

Illustration: Liberalized trade in Argentina in the 1990s, for example, made it affordable for Argentinean farmers to import equipment such as direct seeders and other efficiency-improving technologies. Previously, import tariffs had made it too expensive to import such equipment. Direct seeding is now widely used, with results that include less soil erosion, less fuel and fewer emissions because mechanical ploughing is not necessary.

These improvements can be embodied in a piece of equipment or in the management techniques brought by a foreign firm setting up shop in a host country.⁶ Some multinational firms adhere to a global standard and bring the same level of technology and practice to all their locations worldwide. Others will diminish the imported efficiency effect by using outdated, less efficient technology in countries where health, safety and environmental protection is more lax, but in the Canadian context this is not normally a problem.

2.1.1.1 Environmental impacts

What will be the final environmental impact of such changes in efficiency and the resulting increases in the scale of economic activity? The answer is not straightforward. There are two effects at work that will tend to pull in the opposite direction, the final result depending on their relative strengths.

The most immediate impact will be a simple increase in polluting emissions, the result of increased levels of production. That is, if Canada expands the scale of auto parts production as a result of trade liberalization, all the emissions associated with that type of production will also increase.⁷

The mitigating impact will result from the very efficiency that gave rise to increased production levels. That is, if a firm increases its production levels by becoming more efficient, the increase in efficiency will usually be environmentally beneficial. In the coffee example described above, Canada stops wastefully using energy and water resources to grow coffee. In the Argentinean example, the direct seeding technology meant fewer passes per harvest with farm machinery, meaning fewer vehicle emissions. The new technology also brought associated benefits, such as reduced soil erosion.

⁵ Of course, if the foreign firms involved have some degree of monopoly power, it may be that the domestic firms will never be able to become efficient enough to compete, and will be forced out of the market.

⁶ These impacts are sometimes grouped on their own as technology impacts.

⁷ Resource use will also increase, but from an environmental health perspective the emissions are the important story.

The final result of increased scale of activity due to increased efficiency will depend whether the reduced pollution per unit of production is great enough to actually drown out the impacts of a higher number of units of production.

2.1.1.2 Health impacts

The health impacts of these types of environmental changes are complex. The final results will depend on at least three factors:

Hazard. What is the hazard involved in the specific pollutants which are increased (or decreased) as a result of increased scale of economic activity? Here we need to think beyond the sense of merely toxicity or the dose-response relationship of a particular toxic compound. Global pollutants such as greenhouse gases, for example, have significant and varied negative health impacts through their impacts on climate.⁸

Exposure. Where are the specific pollutants released and what is the resulting exposure of affected populations? Exposure will depend as well on the characteristics of the pollutant. Some are highly localized and do not travel. Others are more mobile and can be transported by water and air to remote locations. Others, such as atmospheric pollutants, once released have a global impact. Exposure will also be a function of the population densities in the affected areas.

Susceptibility. Different individuals, and different segments of the population, have differing susceptibilities to particular environmental hazards. Children, for example, are more susceptible to many types of pollution than are adults. Poor populations, that typically have lower quality nutrition, are more susceptible to health impacts from a given exposure than are populations that are adequately nourished.

2.1.2. Structural Impacts

The previous section discussed the effects of trade liberalization on the scale of production at the national level. At the firm level, trade liberalization will lead to a sort of creative destruction, wherein some firms (and sectors) grow and others shrink or disappear. The final result will be a change in the structure of the national economy, such that it produces more of the goods it makes well or has in abundance, and trades for those it does not.

Illustration: In the coffee example used above, it was shown that efficiency gains allowed the scale of the economy to grow. Another effect of trade liberalization in that example is an altered structure for the Canadian economy, one that involved less production of coffee in the overall mix, and more production of wheat.

This kind of structural effect can be either positive or negative for the environment and development.

On the *positive* side, if the composition of the economy changes so that less polluting sectors have a bigger share of the pie, then trade has resulted in environmental improvements. Note

⁸ See Kovats, Ebi and Menne (2003).

that this is true only at the national level; the polluting firms may have simply moved to a different country (and, in the case of global pollutants, nothing will have actually changed).

Trading with a country whose consumers demand green goods may also change the composition of the economy, if exporters respond by creating new products or sectors. A number of coffee producers in Mexico, for example, have collaborated on marketing organically grown coffee, which can be sold at premium prices. The potential environmental benefits are obvious. Usually the impetus for a green shift in composition comes not from final buyers of goods, but from other firms buying inputs. For example, Ford and GM, two giants of U.S. automobile manufacturing, have declared that they will buy only from suppliers that are certified as following the ISO 14001 environmental management system. If ISO certification leads to environmental improvements, then Ford and GM will have forced such improvements down the supply chain to foreign and domestic suppliers.

One noteworthy type of structural impact comes from the removal of environmentally damaging subsidies. Many (but not all) subsidies are damaging both in environmental and economic terms; in the common parlance, they are *perverse*.⁹ This is because where they encourage over-production, they also encourage overuse of natural resource inputs, over-production of waste and pollution outputs, and over-harvesting of renewable resources such as fish and forests.¹⁰ Where such subsidies are removed, the damaging sectors in question should shrink as a proportion of the economy as a whole.

Illustration: There are two particularly important subsidies negotiations ongoing in the Doha Round of trade talks that might lead to positive environmental regulatory impacts. One deals with fisheries subsidies, and aims to reign in support that encourages the current global overfishing effort. But overfishing has no significant environmental health impacts.

The other is in the area of domestic support for agriculture. Here the outcome is exceedingly complex – it is not a simple matter of decreased subsidies equaling environmental improvement, but depends on the exact nature of the rules agreed upon (in an area that is more multifarious than even the normal trade negotiations), and on the dynamic reactions of governments and producers worldwide to the negotiating outcome. The environmental health-related impacts of agricultural over-production include climate change and deteriorating groundwater quality, with all the attendant human health impacts.

On the negative side, if the goods that a country makes well are based on natural resources, or are pollution-intensive, then trade liberalization would increase the share of such industries in the national economy. Absent strong environmental policies this would mean increased pollution or accelerated harvesting of natural resources such as fish or timber (the latter not being as important from an environmental health perspective).

⁹ See de Moor (1997).

¹⁰ It is too seldom noted that this result, while common, is not inevitable. It only holds where subsidies move the cost of production *away* from the true social cost. It is possible for subsidies to do the opposite – to in effect internalize positive externalities, thus encouraging desirable behaviour.

A subset of structural impacts that is particularly relevant to environmental health concerns arises from workplace exposure to environmental hazards. If employment expands in a certain sector or contracts in certain other sectors, so too will employment levels in those sectors. Depending on the characteristics of the sectors involved, this will mean an increase or a contraction in the environmental-related workplace hazards faced by workers.

If, for example, employment increases in the manufacturing sector and decreases in the service sector, the likelihood is that this will lead to an increase in environmental-related workplace hazards, as the former tends to be a “dirtier” sector in that respect.

2.1.2.1 Environmental impacts

What will be the final environmental impact of structural changes to the economy, the result of trade liberalization? As noted above, the answer will be directly predicated on the type of change involved in each specific case. If the sectors that thrive under liberalization are polluting, then the result will obviously be increased emissions. On the other hand, if such sectors contract then the result will be environmental improvement.

2.1.2.2 Health impacts

As in the case of scale impacts, the health impacts of structural environmental changes will be determined by the hazards posed by the particular pollution patterns of the affected sectors, by the exposure of affected populations and by the susceptibility of those exposed.

In the context of workplace-related impacts, the most common type of environmental-related hazards arise from the use in production of hazardous materials such as heavy metals, persistent organic pollutants or radioactive materials. Exposure can be accidental or through repeated exposure to low levels of emissions in the normal course of employment. The at-risk populations are those employed in those areas of production where exposure is routine or accidents are more likely.

2.1.3. Direct Impacts

Another class of impacts, related to scale and structural changes, arises from the fact of trade itself. International trade has two aspects that in and of themselves may be harmful to the environment.

The first is transportation-related pollution. As trade increases, so do emissions from the vehicles in which transported goods are transported, be they aircraft, ships, trains or trucks. The latter three are known to have some rather heavy local effects around transportation corridors (main trade routes), at ports and at border crossings where trucks may be forced to idle while waiting for clearance.

The second is increased transport of goods that are in themselves hazardous—hazardous wastes, for example. Where trade liberalization might lead to increased cross-border movement of hazardous wastes, the risks of accidental exposure to such material are increased. There are two noteworthy caveats here. First, such risks only increase if cross-border transport to disposal ends up causing a longer trip than would in-country transport. In Canada, where some wastes need to travel to Alberta for in-country disposal, this is an important consideration. Second, trade liberalization agreements seldom govern the transport of hazardous wastes. The Canadian-U.S. “trade” in such goods is covered by a

bilateral environmental treaty and Canada's trade with most of the rest of the world is governed by a multilateral agreement.

2.1.3.1 Environmental, health impacts

The impacts of increased transportation vary according to the medium involved. Air transport results in emissions that have disproportionate effects on climate change, since they occur in the upper atmosphere. Health risks from accelerated climate change include risks from natural disasters such as floods, hurricanes and landslides, risks from the spread of vector-borne tropical diseases that find new homes, impacts of heat and heat waves, and risks from diminished food security.¹¹

Marine shipping also causes greenhouse gas emissions, but the more immediate threat is from the emissions of diesel, particulate matter and nitrous oxides from marine vessels, and from trucks and trains that serve major ports. These are localized effects that have impacts specifically on populations in major ports. Impacts include asthma, other respiratory diseases, cardiovascular disease, lung cancer and premature mortality.¹² Children are particularly vulnerable to these types of impacts.

Truck transport is associated with the same types of environmental and health impacts as discussed for marine transport. The affected populations are those living close to major transport corridors and those near major border crossings. Again, children have particular vulnerability to the associated health impacts.¹³

2.2. Changes in Income

The trade-environmental health linkages that run through changes in income are particularly complex. The basic impact pathways are two-fold: increased income can lead to increased consumption of goods whose use damages the environment (such as automobiles, air travel) and it can also lead to demands for a stricter regulatory regime for environmental management.

But before describing those linkages in any detail we must first describe the linkages whereby trade and trade liberalization might lead to changes in income levels. The potential for trade liberalization to increase levels of economic activity was described above. If this does occur, then the result will be an increase in aggregate levels of income. Several qualifiers are in order:

First, the opportunity for increased levels of economic activity is not the same as the exploitation of that opportunity. That is, it is fine to lower tariffs that affect Canadian exports, but if the export sector is unable to ramp up production (say, because of the high cost of credit, lack of experience, poor transportation links to major markets or other factors) then export levels will not rise much and neither will aggregate income.¹⁴

¹¹ See Kovats, Ebi and Menne (2003).

¹² See Bailey and Solomon (2004).

¹³ See CEC (2001).

¹⁴ Though there may be a price effect equivalent to a rise in incomes, from lower priced imports that are let in with fewer restrictions.

Second, an increase in aggregate income is not the same as having everyone's income rise equally. Typically the gains will be uneven. Some segments of the population will likely experience income *losses*—women involved in the textile industry in the Southern U.S., for example, have been adversely affected by the lowering of U.S. tariffs on imported textiles, part of the broader scheme of trade liberalization. This sort of unevenness matters from an environmental health standpoint, since different regions and populations have different existing environmental conditions, different susceptibilities to environmental hazards.

2.2.1. Consumption Impacts

Changes in income will mean changes in patterns of consumption. The exact nature of those changes will depend on the preferences of the population in question, but a strong indicator of behaviour will be existing income levels. Those who are better off will tend to focus increased income on consumption of so-called luxury goods such as automobiles, travel, housing. Basic goods such as food and clothing will be the focus of increased consumption from poorer households.

As such, the environmental profile of consumption changes related to income changes is difficult to predict, but as a general proposition increased incomes and increased consumption equate to increased environmental damage.

2.2.2. Regulatory Impacts

This paper analyzes regulatory impacts in greater depth below, but in the context of income-related impacts the impact pathway is for increased income to result in stronger demands for environmental protection. The result would be more stringent environmental standards, better environmental quality and fewer environmental health hazards.

Indeed, there have been a number of studies showing that environmental quality improves as incomes increase—resulting in the hypothesis that the relationship between income and environmental quality is curve-shaped, with environmental degradation rising at a decreasing rate as income rises and eventually falling at some threshold level of income.¹⁵

This hypothesis—the environmental Kuznets curve—has to varying degrees, been discredited by more recent theoretical and empirical work.¹⁶ While it seems to be true that certain types of pollution behave in this way (mostly those with localized and immediate impacts, such as sulphur deposition), the more global and/or long-term the threat, the more pollution actually tends to rise with all observed levels of income.

The result for environmental health seems to be that emissions of local and highly toxic pollutants are lessened by income increases, presumably through the imposition of tighter regulatory controls in response to public demand. But health threats from global pollutants associated with global warming, ozone depletion, biodiversity loss will still be felt. In the Canadian context, persistent organic pollutants are also a problem that increases with income levels—they are not for most countries—because they travel to and accumulate in Northern regions, posing threats to Canadian indigenous populations.

¹⁵ See Grossman and Kruger (1991) for the original statement of this hypothesis, in which the threshold was found to be some USD 5,000 per annum.

¹⁶ For a survey of that work, see Stern (2004).

2.3. Regulatory Impacts

Almost all modern trade agreements contain elements beyond liberalization of trade in goods, going further to liberalization of trade in services and to the “deeper integration” elements such as setting rules for standard-setting, protection of intellectual property rights, treatment of foreign investment, etc. As these areas of trade policy are meant to affect the way regulatory policy is made behind the border, they can affect the ability of governments to regulate in the public interest in areas such as environmental protection. This section will survey the ways in which trade agreements might affect environmental protection regimes and thereby population health. Two areas of trade liberalization in particular are analyzed: investment law and liberalization of trade in services. The section also looks at the arguments on pollution havens and regulatory chill.

2.3.1. Impacts of Investment Law

International investment rules may have various regulatory impacts on environmental protection regimes and thereby population health. Over the past half-century international protections for foreign investors have steadily advanced. Currently, there are some 2300 bilateral investment protection treaties in existence (Canada has signed 23), as well as investment protection commitments in a handful of broader free trade agreements (such as the NAFTA). By giving foreign investors extensive treaty-rights and protections, governments thereby undertake to refrain from certain patterns of behavior, ranging from outright seizure or destruction of a foreign investor’s property, to more nuanced use of regulation or administrative decisions to frustrate the investor’s business activities. Figure 3 gives a summary of the obligations typically found in an investment treaty.

Under the provisions of most investment law, investors have the ability to force host governments into binding arbitration over alleged breaches of these obligations.

Figure 3: Some key investment treaty provisions

<p>National Treatment This protection is a relative one which entitles foreign investors (or investments) to treatment comparable to that enjoyed by domestic investors (or investments).</p> <p>Fair & Equitable Treatment This protection offers some minimum standards of due process, including duties on the part of government to act transparently and to consult foreign investors about policy changes which may impact upon their investments.</p> <p>Restrictions on Expropriation and Indirect Expropriation Governments will have a duty to compensate foreign investors if they have been subjected to interference which rises to the level of a nationalization, expropriation or an “indirect” form of expropriation.</p> <p>Investor-State Dispute Settlement Treaties often permit foreign investors to lodge claims against their host in cases of alleged violation of treaty rights. Claims are resolved before ad-hoc international arbitration tribunals convened to hear a particular dispute.</p>

Several of these provisions may have implications for environmental policy-making.

2.3.1.1 National treatment

Typically, investment treaties offer a guarantee of national treatment which entitles foreign investors to treatment comparable to that accorded to locally-owned firms in the host territory. Normally foreign investors must be “in like circumstances” to local firms in order to trigger this obligation, but some treaties are drafted more loosely and only require that foreign investors be “in like situations.” Some treaties may impose no such restriction whatsoever.¹⁷ These drafting subtleties may have important consequences for environmental policy-making.

The problem is that regulators may need to treat different investments differently for important public policy reasons, including environmental ones.

Illustration: If several existing businesses are polluting to the point where a local ecosystem has reached its absorptive capacity, then regulators may need to treat newcomers differently, and impose more severe limitations on the ability of latecomers to burden that particular environment, *even if the newcomer is in all respects similar to existing investments*. Regulators may thereby be constrained in their ability to differentiate amongst investors for legitimate environmental reasons.

Where foreign investors would need to establish that they are “in like circumstances” to local investors, one might hope that the reviewing tribunal would take environmental factors into

¹⁷ UNCTAD, 1999: 34.

account. However, existing experience of investor challenges under investment treaties gives us no certainty as to whether tribunals would exercise such good judgment.

The situation is even more uncertain where the treaties provide merely that foreign investors be “in like situations” to domestic investors, in order to warrant comparable treatment. In one recent investment treaty dispute, a tribunal interpreted this requirement so loosely that a multinational oil company was able to compare itself with local firms engaged in *other* business lines (such as mining, fisheries and cut-flower exports) in order to claim that it deserved *comparable* tax treatment.¹⁸ This may have significant repercussions for environmental policymaking, where there may be good environmental and public health ground for treating different types of industries differently depending on their potential impacts on the surrounding community or ecosystems.

2.3.1.2 Expropriation

The concern here, stoked by a number of NAFTA claims in the 1990s, is over the definition of what is known as “indirect” expropriation—measures that do not actually involve taking of property, but are so obstructionist as to *amount* to an expropriation. The question yet to be clearly answered is: in what circumstances can regulatory measures that impact on an investment—but which fall short of an outright taking of the property—constitute a compensable expropriation?

Illustration: When Canada banned the import and inter-provincial trade in MMT, a gasoline additive suspected of having neurotoxic properties and known to damage pollution-saving catalytic converters, the US manufacturer initiated a NAFTA 11 challenge alleging that the bans constituted expropriation of its investment in Canada. Canada settled the matter outside the arbitral process by paying the manufacturer \$13 million, and rescinded the legislation.

It is clear that many environmental measures, including administrative or regulatory measures, may be subject to challenge by foreign investors as indirect expropriation. However, dispute settlement tribunals have yet to coalesce around a single test for determining where expropriations have occurred. Some early rulings ignored the purpose of the challenged measures, and focussed exclusively on the degree of impact which the measure had on the foreign investor.¹⁹ Other decisions have emphasized a more nuanced approach which also inquires into the purpose underlying the measure, namely whether it may be a “valid governmental activity” or “regulatory conduct by public authorities”.²⁰ This approach has been given added impetus by, among other developments, the 2004 revision of the Government of Canada’s model Foreign Investment Protection Agreement (FIPA), which now specifies:

“Except in rare circumstances, such as when a measure or series measures are so severe in the light of their purpose that they cannot be reasonably viewed as having

¹⁸ Peterson, 2004.

¹⁹ See the analysis in *Metalclad v. United Mexican States*, para. 111.

²⁰ See *Marrin Feldman Karpa v. United Mexican States*, Award of Dec.16, 2002, at pp.98-100 and S.D. Myers v. Canada, Partial Award of Nov.13, 2000, at para 281

been adopted and applied in good faith, non-discriminatory measures of a Party that are designed and applied to protect legitimate public welfare objectives, such as health, safety and the environment, do not constitute indirect expropriation.”

This text clearly gives more guidance to tribunals, and the regulatory impacts of future treaties in this context are therefore likely to be minimal. Of course, all of Canada’s pre-2004 treaties lack such language.

2.3.1.3 Environmental, health impacts

The environmental impacts of the sort of possibilities described here would manifest as rescinded public interest legislation (e.g., the scrapping of the Canadian ban on importation and inter-provincial trade in MMT in response to the *Ethyl* challenge described above), or as hesitancy to adopt strong new regulations (in response to threats of recourse to Chapter 11, such as those issued by Phillip Morris, over Canada’s proposed plain package labelling regulations for cigarettes). As such, the impacts are impossible to define in general terms, outside the context of a particular piece of legislation. They would presumably involve environmental degradation of some sort, as compared to the baseline case. And there would presumably be attendant health impacts. It is not possible to be more specific, and the implications of this problem are discussed in Section 3.

2.3.2. Impacts of Services Liberalization

International agreements governing trade in services may also have regulatory environmental health impacts. Canada is bound by the WTO General Agreement on Trade in Services (GATS), which imposes certain disciplines on trade in any type of service and certain disciplines on trade in those sectors in which Canada has made commitments.

For example, States have across-the-board obligations to provide most-favored nation (MFN) treatment to foreign service-providers and to provide for a transparent regulatory environment. MFN treatment demands that where some foreign services are permitted to operate in Canada, we accord similar treatment to service providers from all WTO members, without discriminating by country. Transparency obligations mandate that new regulations, laws and administrative guidelines be published promptly.

As well, governments may commit selected service sectors to some of the more *exacting* GATS disciplines such as national treatment and market access which would require, respectively, that governments treat foreign service-providers no less favorably than their own “like services and service suppliers,” and that they provide certain rights of entry for foreign-service suppliers (and eliminate various types of restrictions on the operation of said suppliers).

It is essential to note that the GATS is a work in progress. Negotiations are ongoing as part of the Doha Round of trade talks in the WTO, with a view to both the further liberalization of services sectors and the elaboration of new disciplines on domestic regulation.

The rest of this section discusses the potential regulatory impacts of three aspects of the GATS: non-discrimination, domestic regulation and market access.

2.3.2.1 Non-discrimination (national treatment and MFN)

Academic analyses of GATS' potential impact on environmental health regulation—for example the ability of regulators to ensure water quality, access, availability, and affordability—have emphasized that those impacts are inherently uncertain.²¹ Andrew Lang examines the water sector and cautions against relying on the flexibilities and exceptions built into the GATS. He warns of the “virtual impossibility” of predicting the outcome of challenges to different types of regulation under the GATS.²² Focussing squarely on the GATS non-discrimination obligations (Article II on MFN and Article XVII on National Treatment), Lang identifies a host of scenarios where foreign service-providers might object to new regulations or policies that provide differential treatment to different service-providers—for example, where differing health standards may be imposed on operators in different regions of a given country.²³

Illustration: “... take the example of a country in which water quality standards are set by local and regional authorities. If an operator in one part of the country is made subject to stricter standards than an operator in another part, requiring perhaps a significant capital investment in order to comply, and if there is no clear public health reason for the discrepancy, can it be argued that such different standards constitute discrimination?” (Lang 2004, at pg. 811)

While he contends that governments facing such challenges have legal tools at their disposal for defending against claims of GATS' violation, he concludes that:

“As a matter of principle there appears to be every reason to think that a significant amount of water sector regulation could potentially violate GATS non-discrimination provisions—particularly Article II on MFN treatment. It is clear that discrimination, in the broad sense of differential treatment, occurs within the water industry, for legitimate and perhaps not so legitimate reasons. Neither Article II nor Article XVII contain a satisfactory method of distinguishing with certainty and predictability those forms of discrimination which are justified, and those which are not.”²⁴

The overall message is that there are potential conflicts between those regulations which aim to advance environmental health goals and the provisions of the GATS. The extent to which those conflicts materialize will depend on the specific commitments made by member states, any exceptions which states might create to limit those commitments and the interpretation that trade panels give to such commitments and exceptions.

²¹ Lang (2004). There is a basic debate as to the extent to which the water sector may be covered by the GATS. Lang notes that, while the core function of water distribution is not typically committed by GATS signatories, many water companies will still enjoy some coverage, at a minimum, under various other GATS commitments such as maintenance services, general management services, integrated engineering services, etc.

²² *Ibid.*, p. 805

²³ *Ibid.*, pp. 811; 836. Note, however, that there is some case law under NAFTA's Chapter 11 that argues against seeing differential provincial regulations as violations of national treatment. See Pope & Talbot (2000).

²⁴ *Ibid.*, 837

Governments that make sectoral commitments to provide national treatment and market access will need considerable foresight if they hope to carve out space for every potential public health or environmental measure that may warrant future use (but which might fall afoul of GATS disciplines). GATS imposes a “list it or lose it” process: failure to list exceptions to national treatment or market access offers means relinquishing the ability to impose public health measures which run afoul of those GATS provisions.

The result is a need for due diligence in making commitments. The United States was recently caught out by its own failure to create sufficient exceptions so that its varying domestic laws and regulations governing the gambling sector would be immune from challenge under the GATS.²⁵ The panel ruling that delivered this message, subsequently upheld by the Appellate Body, may have widespread impacts upon Federal and State efforts to restrict various forms of gambling services. This case has no direct environmental implications, but the key message is important: if the U.S., with the world’s best-staffed trade policy advisory machinery, cannot accurately predict the implications of its services commitments in a matter of such integral importance, then Canada clearly needs to approach its own commitments with great caution, ensuring that they do not inadvertently entail the types of regulatory impacts described above.

2.3.2.2 Domestic regulation

Article VI (4) of GATS mandates ongoing negotiations to ensure “that measures relating to qualification requirements and procedures, technical standards and licensing requirements do not constitute unnecessary barriers to trade in services.” This goal is to be effected through new rules which would require new regulations to be “based on objective and transparent criteria, such as competence and the ability to supply the service,” and ensure that such regulations are “not more burdensome than necessary to ensure the quality of the service.”

The domestic regulation negotiations remain at a very preliminary stage, but they have been a lightning rod for controversy. Analysts have warned that the negotiations may have the potential to impact upon health and environmental policy in a variety of ways, as they will subject various (non-discriminatory) domestic health regulations to a necessity test which would ask “whether a particular government measure was necessary to achieve its objectives, or whether less trade-restrictive means could have been used.”²⁶

Illustration: Measures which might be subjected to scrutiny under a proposed necessity test could include environmental or health measures such as “land use and zoning policies ... (and) measures relating to technical standards and qualification requirements.” (Tuerk and Krajewski 2003, at pg.11) For example, in the area of water management, states may place limits on economic activity in designated zones so as to minimize depletion or fouling of ground water sources. What remains unclear, is the extent to which such zoning decisions might need to clear the hurdle of a trade panel’s necessity test.

²⁵ Gould (2004).

²⁶ Tuerk and Krajewski (2003): 10.

Measures which might be subjected to such scrutiny could include environmental or health measures such as “land use and zoning policies ... (and) measures relating to technical standards and qualification requirements”.²⁷

At present, it has not been decided whether these disciplines would apply to all services sectors; to a narrower set of agreed sectors; or only to those sectors where a given government has made specific commitments under the GATS.²⁸ Nevertheless, concerns have been raised that these disciplines would mandate trade panels to act as a global regulatory review agency, determining whether new regulatory measures are more trade burdensome than necessary and whether other less trade-restrictive alternatives might have been reasonably available to regulators.²⁹

2.3.2.3 Market access

Governments that make sectoral market access commitments under the GATS must refrain from imposing various types of quantitative restrictions on service suppliers in those sectors. For instance, governments may not limit the number of service-suppliers or the total value of service operations or outputs.

In the context of environmental regulation the concern is that some forms of regulation may be subjected to a ‘necessity test’ in order to determine if they may stand as limits on these market access rights.

Illustration: Governments might wish to limit the number of suppliers of tourism services in a given region, so as to limit the environmental impact of tour boats, vehicles or customers. However, such restrictions might contravene that government’s promise not to impose quantitative limits under scheduled GATS sectors.

Where such restrictions could be shown to be necessary for the protection of human, animal or plant life or health, governments might be able to justify the use of such measures thanks to a general exception found in Article XIV of the GATS. However, analysts have warned that this provision is subject to a necessity test, under which panels explore whether the impugned regulations were “the least trade-restrictive measures that reasonably could be employed to meet stated objectives.”³⁰ To continue with the tourism example, a panel might rule that the regulators should have propounded tight environmental protections, rather than limiting the number of operators. Some have questioned whether trade panels are best equipped “to make value-judgments about the importance of a domestic policy objective.”³¹

2.3.2.4 Environmental, health impacts

The narrow range of services with environmental implications makes this area of regulatory impacts easier to define than is the case with investment law impacts. But the specifics are still necessarily sketchy. There may be cause for concern in sectors such as:

²⁷ *Ibid.*, p. 11.

²⁸ See Howse and Tuerk, (2002).

²⁹ Howse and Tuerk (2002); Tuerk and Krajewski (2003): 10.

³⁰ Luff (2003): 208

³¹ Howse and Tuerk, (2002): 4.

- Water purification services (potable water)
- Water treatment (sewerage) services
- Tourism services
- Engineering, road-building, remediation and other services provided to natural resource-based sectors such as the oil and gas sector and the forest products sector.

In any service sector with environmental impacts the concern is basically that GATS obligations will make it difficult to appropriately regulate the service or the service provider to protect public health and the environment. But, as argued above, it is practically impossible to predict in which sectors conflicts will occur. Some analysts have taken comfort from the fact that the WTO's Appellate Body—the final arbiter of WTO law in the case of disputes—has of late taken to rendering decisions that are sensitive to environmental and human health concerns.³² This fact does mitigate some of the worries in this area, but it does not obviate the concerns over the implications of ongoing negotiations (e.g., on domestic regulation) or remove the fundamental uncertainties as to scope and interpretation or the agreement.

This uncertainty makes it difficult to specify the environmental and health impacts that might arise as a result of services liberalization. Of the sectors listed above, only the water-related services are of obvious concern from an environmental health standpoint. Inappropriately lax levels of regulation or scrutiny in these sectors can subject affected populations to a wide range of water-borne diseases, some potentially fatal. Section 3 considers the policy implications of the difficulty in predicting and quantifying these sorts of impacts.

2.3.3. Pollution Haven/Regulatory Chill Effects

The types of regulatory impacts discussed in this section would arise more from the *fact* of trade, rather than from trade *liberalization* per se. To be more precise, they would arise in the context of trade with countries with lower environmental standards than ours.

The dynamic would work as follows: Canadian producers face high and costly environmental standards, while their competitors abroad (usually the scenario involves developing country competitors, but they could be from any low-standard country) do not. The cost difference threatens the market share of the Canadians both domestically and in third country markets. As a result, the Canadian producers do one of two things:

1. They relocate to a low-standard country (a so-called *pollution haven*), to capture the resulting cost savings.
2. They threaten to relocate, putting pressure on the government and the responsible regulators either to enforce existing standards more loosely or to scuttle proposed new tough standards (thereby creating what is known as *regulatory chill*).

The preponderance, but not the entirety, of the literature seems to find few if any actual observed instances of the pollution haven effect. Levinson and Taylor (2004) do find some pollution haven effects in the U.S. context. Brusse (2004) finds evidence in the iron and steel

³² See, for example, Knox (2004).

sectors. But most other analysts find none, arguing that pollution control costs for most firms are but a small percentage of the costs they must consider in their location decisions.³³ Other important costs are labour costs, political risks, cost of resource and energy inputs, costs of transport to market, etc. Intuitively it seems obvious that selected sectors, where compliance costs are large and relocation costs are low, would be more affected than would others, but Dean et al. (2005) explain their findings by positing that many OECD investors are wary of exposing themselves to the scandal of migrating to a pollution haven, and so go beyond environmental compliance in their host states.

The environmental health impacts of pollution havens would depend on the type of pollution in question. If it is primarily local, then the impacts of relocation are beneficial for Canadians, detrimental for the new host country citizens. If the pollution in question is global, then relocation changes nothing; Canadians are still affected, but simply from afar. It may be that the firm actually increases pollution in the new location, in response to lower standards; this also should be taken into account.

Gray and Brack (2002) in a review of the literature, find several anecdotal accounts of regulatory chill. Almost all are in the energy sector, where governments have been deterred from climate change reduction measures by industry lobbies voicing competitiveness concerns. This stretches the traditional definition of regulatory chill somewhat, taking it to the blurry line that separates legitimate industry stakeholder input from sectoral blackmail. Overall the study concludes, as have many others, that actual evidence of regulatory chill is difficult to amass, since it would involve proving that a government did not do something (difficult enough on its own) and then establishing a causal link that explained the non-action.

In theory, strong environmental regulations may in fact increase the competitiveness of the regulated firms. This is the so-called Porter hypothesis, which holds that regulated firms are forced to look for greater efficiencies (in much the same way that trade and investment liberalization is said to force efficiency) and can garner first-mover advantage over unregulated firms in other countries.³⁴ This adds another wrinkle to an already complex dynamic: in some sectors it may not be true that regulated firms necessarily face economic hardship. The final result will depend on the state of technology, the firms' ability to innovate, the nature of the regulation in question and a host of other factors. Regardless of the final outcome, some strategic game-playing by firms is not out of the question.

The environmental health impacts of regulatory chill are therefore difficult to assess. The fundamental problem is the lack of empirical evidence of the effect and of its nature. If it does exist it will manifest as an erosion of the integrity of the regulatory regime (see figure 4). The difficulties in trying to model such a dynamic in an assessment exercise are discussed further in the following section, but in the context of limited resources, this area of pursuit might be best set aside until we can generate more information.

³³ See Dean *et al* (2005), for a recent in-depth study related to Chinese FDI (in which there is a pollution haven effect, but only for overseas Chinese investment). Wheeler (2001) offers a political economic explanation for no observed pollution haven effect. Jaffe et al., (1995) is an oft-cited survey of the literature that finds no effects.

³⁴ Porter, Michael and von der Linde, Claas (1995).

It should be re-emphasized that these impacts arise not from trade liberalization, but rather from the fact of trade with countries of different standards. As such, they would not be appropriate targets for an impact assessment of liberalization.

3. Methodological Considerations

The main objective of this paper is to survey the linkages described above, asking how trade and trade liberalization might be related to environmental health. As a sort of a helpful afterthought, this section begins the discussion of what those linkages mean for the assessment of trade policy from an environmental health perspective. That is, given the types of impacts surveyed, what can we say at the outset about the types of impact assessment methodologies that might be employed?

This section will first consider the applicability of the model known as DPSEEA (Driving Forces, Pressures, States, Exposures, Effects, Actions) for considering these types of linkages. It will then ask what other approaches might be considered. It will finish with a few practical considerations and some observations on the appropriate scope of any assessment exercise, given the objective of rendering better policy.

3.1. DPSEEA Considered

The World Health Organization has adopted a framework (DPSEEA) that is a useful model for organizing and developing environmental health indicators. It is based on the Organization for Economic Co-operation and Development's (OECD) Pressure-State-Response model for indicators of sustainable development and identifies driving forces (D), pressures (P), states (S), exposures (E), effects (E) and actions (A).

In the current context, driving forces would stem from trade or trade liberalization, where they play a major role in influencing environmental factors. In the analysis we derived above, we divided the driving forces into different types: changes in production patterns, changes in income levels and regulatory impacts. Figure 1, above, gives a graphical display of the analysis, using the DPSEEA framework.

In the case of altered production patterns, the pressures would be of the traditional type—increased emissions, whether in the workplace, along the transportation corridors or in the course of production. The states would be the magnitude of the hazards associated with those emissions (e.g., concentration of pollutants). Exposure levels from those pollutants and the subsequent effects, general symptoms, morbidity, death) are all as normally worked out in the DPSEEA framework.

In the case of pressures associated with changes in income, the dynamic is somewhat different. In the case of regulatory impacts, the causal chain is the same as that exhibited by the other sorts of regulatory impacts (see below). In the case of consumption impacts, the model works well. The state would be increased pollution from the increased use of goods and services. Exposure levels and effects would be according to the specific type of pollutant.

In the case of the regulatory impacts the DPSEEA model does not work as smoothly. Figure 4 shows the ways in which the regulatory impacts discussed above might fit into the framework, but it involves some modification of the basic design.

In this case the impacts do not work directly through environmental pollutants or degradation, but rather by impacting the integrity of the environmental protection regime. These impacts will in turn modulate the ways in which any environmental impacts play out in the final analysis as effects. For example, investment or services law might impair the ability of the regulatory regime to propound regulations that would keep the driving forces of economic change from resulting in negative environmental pressures.

One of the key values of the DPSEEA framework is its ability to generate indicators of environmental health, linked into a causal chain. Even in the case of the other sorts of linkages described here that would be a challenge, given the complexities and uncertainties involved. But in the case of regulatory impacts this is simply not possible. It was noted above that there is no way to accurately predict the types of environmental pressures that may derive from investment and services law. As such, there is no way to describe the types of exposure or the final effects that will result. It may be that the framework is not well suited to dealing with regulatory impacts.

3.2. Other Models Considered

How else might we approach the regulatory impacts described above, if the objective is to inform policy making and negotiators about the potential environmental health impacts of changes in trade law? One approach might be a sectoral-legal analysis that looked at the sorts of environmental policies that could conflict with trade law under reasonable scenarios. Before trying to quantify the environmental and health effects of such conflicts, the analysis would assess the likelihood of such conflicts and would search for no-regrets legal formulations that would avoid them. As a final step, the analysis would assess the sectors in which an unavoided conflict might have impacts, only then trying to suggest the magnitude of the environmental health hazards involved.

Other approaches are possible as well, but the key to success will likely be to avoid trying to quantify that which is not readily quantified.

3.3. Practical Considerations in Application

The estimation of even the most straightforward of the dynamic relationships expressed in figure 1 would be rather difficult. It will first involve an economic analysis—a modelling exercise—to specify the economic impacts of the trade law changes under consideration. This sort of exercise is fraught with uncertainty.

The next step in the analysis will be to link the economic changes to environmental impacts. There are several existing models that make these sorts of linkages, but again the complexity of the relationship is such that the results are more indicative than definitive.

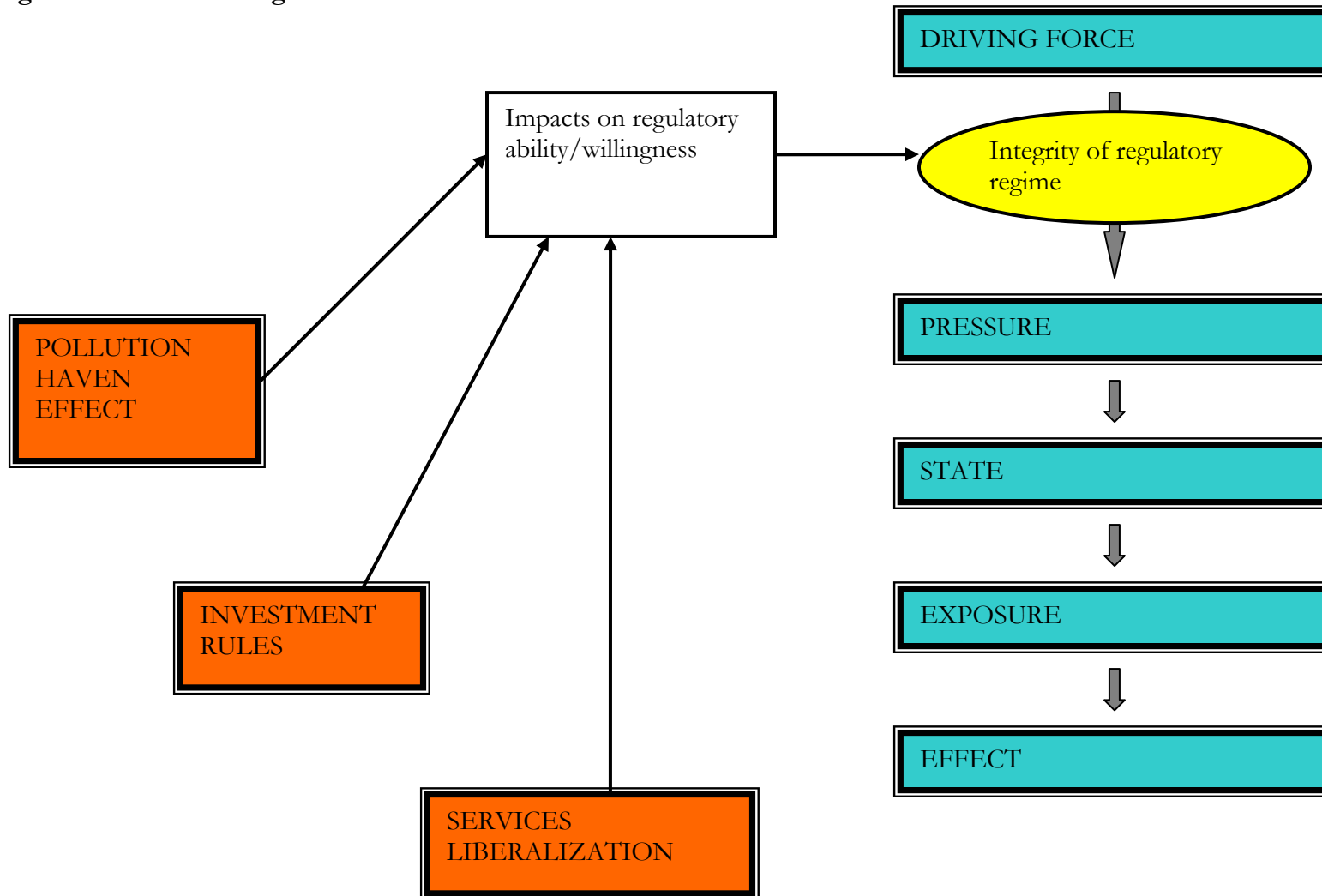
Translating the results of this step into exposure and effect data involves more complexity and uncertainty, and data on population characteristics, toxicity, synergistic effects,

susceptibility and so on. Some work at the international level is being done to assess the disease burden from environmental health risks.³⁵

In the end, any such exercise can give us numbers, but we might be wise to be guided by the modeller's adage: "garbage in, garbage out." The real value of such an exercise is its ability to raise red flags in areas of concern—areas that can then be pursued in greater depth by both quantitative and qualitative analysis.

³⁵ See Prüss-Üstün et al. (2003)

Figure 4: Indirect Linkages



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