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**ENVIRONMENTAL ISSUES IN POLICY-BASED COMPETITION FOR INVESTMENT: A  
LITERATURE REVIEW**

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## **FOREWORD**

This report presents a literature review of issues associated with environment and policy-based competition for investment. It reviews general trends in competition for FDI and looks into specific issues linked to those trends, including the notions of "pollution havens", "regulatory chill", and "race to the bottom". Both national and regional levels, as well as specific sectors are addressed.

The report was drafted by Kevin Grey of the British Institute of International and Comparative Law, London, UK, and Duncan Brack of the Royal Institute of International Affairs, London, UK. It was contributed to a stock-taking exercise on Policy Competition for Foreign Direct Investment, organised by the OECD Committee on International Investments and Multinational Enterprises (CIME), held in Paris in September 2001. The report has subsequently been revised, based on comments from delegates to the OECD Working Party on Global and Structural Policies.

The report is published under the responsibility of the Secretary-General.

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## **Introduction**

The OECD is currently exploring issues surrounding the question of how policy-based competition for investment” undermines investment liberalisation objectives. Part of this exploration is concerned with how investment competition affects regulatory behaviour (both standards and enforcement) in such areas as environmental and labour policy. This report is a literature review of the environmental implications associated with competition for investment. It deals with the various phenomena associated with the competition for investment such as “race to the top”, “race to the bottom”, “regulatory chill” and the “pollution haven” and “pollution halo” theories. The purpose of the literature assessment is to locate empirical evidence that supports or does not support any of these theories.

The first section addresses the general topic of policy-based competition and what are the consequences that flow from this. The literature reviewed in this section addresses the overall phenomena of race to the bottom, regulatory chill and race to the top from a theoretical standpoint. Various approaches are assessed, including critiques of them. How data is collected and organised is mentioned. The second section examines some of the more specific issues related to these phenomena, from the perspective of both the investor and the host country. This uncovers whether there is any corroboration with any of the theoretical hypotheses introduced in the first section. Along these lines, the third section looks at the competition for FDI at both the regional and national level as well as within particular economic sectors. By moving from the more general analysis to a contextualised approach with geographic and sector case studies, this report attempts to derive a comprehensive and systematic analysis of policy- based competition for investment. This better facilitates the arrival of conclusive findings on the impacts of such competition.

This literature review does not trace the development and implementation of environmental regulations in home countries. Stronger laws may be influenced by several factors including local and community pressure, a strong civil society movement or even initiated by the private sector. The scope of this analysis is primarily concerned with the development of environmental laws and regulations, or their alteration and exemption, in response to the infusion of FDI. In addition, the literature reviewed does neither include general studies on the institutional policy issues concerning the global governance of FDI nor the numerous studies on macroeconomic investment policies in host countries. Threats of investment driven litigation are also beyond the scope of this survey due to their unique and fact-specific nature.

## **General trends of competition for FDI**

### ***Approaches and methodology***

There are numerous studies in the literature that deal with the either the environmental aspects of FDI or the environmental impacts of FDI (Gentry (1999)) (Kirkpatrick & Lee (2001)). Other literature examines some of the institutional issues surrounding global FDI and efforts to regulate it (Goldenmann (1999)). However, there is a considerable amount of attention by academics, economists, legal experts and social scientists towards the environmental regulatory competition for FDI.

The literature reveals a broad diversity in approaches used to either support or refute the pollution haven or race to the bottom hypotheses. Most studies, in summarising the literature on the pollution haven hypothesis, assert that empirical evidence of these phenomena simply does not exist (Esty and Geradin (1998)) (Oman (2000)) (Tobey (1990)). This has been proven to be particularly evident in industrialised

countries (Vogel (1997)), where the political consequences of lowering standards are significant (Porter (1998)).

Some commentators question the methodology supporting efforts to prove the various theories (Kirkpatrick & Lee (2001)). Others conclude that there is no systematic evidence supporting these theories that often use incomplete data (Mani & Wheeler (1998)). Data on industrial flight benefits sometimes stem from a comparative analysis of environmental compliance costs but this information is regularly published only in the United States (Nordström and Vaughan (1999)). There is only one survey comparing the environmental stringency of national environmental regulations completed by UNCTAD in the 1970s (Nordström and Vaughan (1999)) (Tobey (1990)). It is difficult to quantify the optimum or most efficient level of environmental protection for each country (Neumayer (2001a)). Comparing environmental laws is also problematic due to the high number of variables involved. Environmental regulations will render differentiated impacts on decisions to close an existing plant versus deciding to build a new facility (McConnell and Schwab, (1990)) (Low (1993)). Measurement of the impact of environmental regulations on heterogeneous firms, who are subject to a wide range of regulations on various pollutants, is also difficult but necessary to bolster any pollution haven or industry flight findings (McConnell and Schwab (1990)).

One of the most common methods employed involves looking at the rates of exports for pollution intensive products (Mani & Wheeler (1998)) (Neumayer (2001a)) (Low & Yeats (1992)). This has been criticised by some as narrowing the analysis since exports can be based on numerous factors in addition to the strictness of environmental regulations (Xing and Kolstad (1998)). Other studies have focused on aggregate patterns of FDI flows, which indicate a rise in the flows of FDI in dirty industries to developing countries, although some contest that there is still a higher percentage of these flows to other industrialised countries (Nordström and Vaughan (1999)). Moreover, an increase in the presence of dirty industry in developing countries could simply be an indication of growth and industrialization in developing countries (Low (1993)), a rise in demand for such products in those countries (Markandya (1999)), or the countries' possession of higher natural resource endowments (Low and Yeats (1992)). Another study indicates that outward FDI from the U.S. to developing countries and countries with economies in transition was at 45% but the proportion of that investment relating to environmentally sensitive industries (petroleum and gas, chemicals and metals) was small (5%) (Repetto (1995)).

The dependence on aggregate studies to prove such trends as industrial flight/race to the top or race to the bottom fails to separate the effects of environmental regulation from other variables. The industries are selected on the basis of pollution emission indices which do not cover all environmental impacts or costs such as monitoring and planning activities, productivity loss, and research and development (Mabey & McNally (1999)) (Zarsky (1999)). Other costs that are often excluded are occupational health and safety expenses (Chapman (1991)). Mabey & McNally (1999) suggest that a country's inability to internalize environmental costs into its economy might indirectly act as an incentive to woo FDI.

### ***Race to the bottom/pollution havens***

The prevailing opinion is that the empirical evidence is lacking to support the race to the bottom in response to inter-jurisdictional competition (Porter (1998)). No formal econometric models support the argument that states will act contrary to their interest and compete for industry by adopting lower standards (Revesz (1992)). Some analyses examine other factors to provide confirmation that there is no race to the bottom. Local input in decision making, premised on NIMBY (Not in My Backyard) attitudes, can also act as a countervailing force against the race to the bottom (Swire (1996)). However, local pressure against the lowering of environmental standards to attract an investment will vary, depending on the educational

and income levels of the community (Zarsky, 1999)). Afsah et. al (1996) studied factory environmental performance in China, Brazil, Indonesia and the United States, concluding that community and market pressure can play a significant role but that this ultimately depends on income, education and bargaining power.

Another approach is to assess environmental quality in host countries. Wheeler (2001) examined recent air quality trends in the United States and China, Brazil and Mexico, the latter 3 representing the top three shares of FDI for developing countries in the 1990's. A general improvement of air quality in the major cities of all four countries was reported, suggesting that any studies of the race to the bottom fail to account for political-economic aspects of pollution.

Reports supporting the industrial flight, race to the bottom and pollution haven hypotheses tend to be industry or jurisdiction specific. When examining the pollution haven hypotheses across the whole economy, there may be mixed results, as in Poland, where there was industrial flight to some sectors that are heavily regulated in the home countries and a race to the top as a result of environmental improvements (Jha et. al. (1999)). For instance, a US General Accounting Office study of the furnishing industry, found that some companies, who regularly incur heavy expenses for treating toxic wastes from paints, varnishes and solvents, moved out of California to avoid the state's strict pollution control requirements (GAO, (1990)). McConnell & Schwab (1990) found no significant evidence that regional differences in environmental regulation affected choice of location for automobile plants but an exception was found in case of countries that were exceedingly not in compliance with air quality standards.

Dirtier industries, be they resource or pollution intensive, where environmental compliance costs can be higher, may flee to less stringent environmental regulatory regimes (Mabey & McNally (1999)). Mani and Wheeler (1998) refer to the migration of some of Japan's dirty sector (pollution-intensive), as well as the United States, to its trading partners. However, this did not occur with European industries. The laxity of environmental regulations may be a stronger determinant of FDI in these sectors as opposed to less polluting industries such as electrical and non-electrical machinery, transportation equipment and food products (Xing & Kolstad (1998)). Xing & Kolstad (1998) point out that their methodology is unique in relation to other studies that look at the agglomerated effect of investment and export flows, since it focuses on how FDI is influenced by the environmental regulations of foreign host countries. In their study, higher rates of investment for the polluting industries were seen in countries with less stringent environmental regulations.

Industries in this heavily polluting sector would include chemicals, chlorine and pesticides, resource extracting and heavy manufacturing all which are now facing additional costs due to public relations, establishment of environment divisions in firms, liability and insurance, legal fees, occupational health and safety costs, and delays incurred during EIA (Clapp 1998)). Other studies have shown that the most hazardous industries share a tendency to relocate (UNCTC(1988)) (Castleman, (1999)). Evidence of this is found with such industries in Japan and the United States (Mani & Wheeler (1998)). In Japan, public opposition drove out many hazardous industries (Maul (1991)). Xing & Kolstad (1998) found that US chemical companies migrated to developing countries basing their decision on the laxity of environmental regulations governing SO<sub>2</sub> emissions. There has also been an exodus of firms in the chlorine industry partly as a result of the U.S. government banning the land disposal of chlorine wastes and moratorium on its incineration (Clapp (1998)). Similar findings were found for German companies (Bourman)(1997). There is also evidence that increasingly stringent environmental regulations in the EU have contributed to movement of production facilities in Asia (Wood (1995)).

Evidence of a pollution haven can also be seen through the lens of the host country. Jha et. al. (1999) note that there has been an influx of foreign companies coming to Thailand to take advantage of its Article 5 status under the *Montreal Protocol*, available for countries with low consumption of ozone

depleting substances developing countries. A rise in ozone depleting substance (ODS) imports between 1986 and 1991 is used as evidence of this trend. In China, many foreign firms have located their plants for highly polluting industries such as pesticides (DDT) and asbestos (Jha et. al (1999)). A study by Youfou (1995) recorded that over 36 per cent of FDI was invested in highly polluting industries such as printing, dyeing and the electroplating industries. Other instances of industrial flight of heavily polluting sectors have been found in the case of asbestos tile and benzidine dye manufacturing facilities relocating to Mexico and Romania (Cairncross (1990)); wood finishing firms to Mexico from California (GAO 1990); and wet processing in the tanning industry from Europe to Brazil (Mabey & McNally (1999)). In response to these particular cases, some authors have characterised this as being marginal and not showing up in aggregate trade and investment statistics (Nordström and Vaughan (1999)).

### ***Regulatory chill***

In light of the difficulties in preparing empirical evidence, and its related absence in the literature, some authors surmise that competitive concerns can still impact environmental decision-making in host countries (Esty and Geradin (1998)). This is often referred to as the “regulatory chill” where countries refrain from enacting stricter environmental standards in response to fears of losing a competitive edge (Nordström and Vaughan (1999)). As a result, environmental regulations can get “stuck in the mud” (Mabey & McNally (1999)) (Zarsky, 1999)). Porter (1996) questions whether the race to the bottom, or even the stuck in the mud theories can apply to developing countries. He notes that while industrialised countries retain political institutions that can be corrective forces availing these trends, developing countries tend to lack them thus creating the “stuck at the bottom” effect. As a result, concerns about losing competitiveness override responding to public demand to raise standards.

Unlike pollution haven or industrial flight, it is potentially easier to assert that a regulatory chill/or political drag on regulation occurs since it is based on undocumented non-action by governments (Esty and Geradin (1997)) (Mabey and McNally (1999)). However, definitive empirical proof of government inactivity does not exist. Anecdotal evidence is therefore relied upon.

Many of the examples of regulatory chill, at least in the industrialised countries, are seen in the regulation of energy and taxation (Neumayer (2001b)). Von Moltke (1993) argues that regulatory chill is perhaps more evident in the natural resources sector since natural resource laws have a larger impact on the cost and availability of raw material inputs. However, the preponderance of examples in the literature stem from the cases in energy regulation. Esty and Geradin (1997) cite various country examples, such as Australia, the United States and the EU, where governments failed to enact energy tax regimes or other greenhouse gas reduction measures, to be motivated, at least in part, by competitive concerns.

The US federal government introduction of a British Thermal Unit energy tax was ultimately terminated partly in response to complaints by several energy and oil lobbies, who claimed that such a tax would reduce their competitiveness, cause massive job losses and encourage a flight of capital (Erlandson (1994)). In fact, the EU case is interesting because the carbon tax would not be introduced unless a similar tax or measure having an equivalent financial impact was enacted in other OECD member countries. Moreover, there are specific examples where energy companies threatened to leave jurisdictions due to proposed higher environmental costs and taxes, as was seen in the Netherlands (Esty (1994)) (Mabey & McNally (1999)).

Some evidence is brought forward on regulatory chill in developing countries. Mabey and McNally (1999) assert that Brazilian tanneries, specializing in low quality products, are trapped between being unable to compete with better quality competitors in Europe and the lower-cost producers in Asia. As a result, local authorities are unwilling to enforce more stringent regulations due to a concern for loss of

employment and lower tax revenues. Another case they raise occurs with the phosphate industry in Morocco and Tunisia, where the governments have been reluctant to increase the level of regulation partly out of fear that other destinations will become more attractive (Mabey & McNally (1999)).

### ***Race to the top***

Alternatively, there are some country examples where investment has actually brought up the standards of environmental regulation. This is consistent with the “Porter hypothesis” where stronger environmental policies can improve a country’s competitiveness by fostering innovation and efficiency (Porter (1990)). Sometimes referred to as the race to the top, there is evidence of this. In some cases, the host government is selective in the types of investment it allows, refusing or restricting the relocation of “brown” industries. China is a cited example, where the government’s schedule for foreign investment prefers industries that include coal-fired power plants adopting clean combustion technology (Goldenmann 1999)).

Demonstrating the race to the top is what is known as “the California Effect”, introduced by Vogel (1995). California enacted stricter auto emission controls than provided in the U.S. *Clean Air Act*. In 1990, 20 years after the original legislation came into force, Congress raised national standards to the California level. California was allowed to introduce even stricter standards under the amendments, which many states eventually followed. However, Vogel cautions that the California effect is not universal, preconditioned on whether: domestic political or economic pressures in a green country targets the environmental practices of a particular sector in a less “green” country; the country with production aspires to enter into free trade agreement with industrialised countries such as the EU or United States; or the production process is covered by an effectively enforced MEA (Vogel (2000)). Instances of the California Effect can be limited to certain sectors. Mabey and McNally (1999) note that this occurs particularly in areas of high technology. Improved standards according to the California Effect, appear to be primarily, if not exclusively, product standards unrelated to process methods (Vogel (2000)) (Swire (1996)).

International economic competition and greater economic openness and capital mobility can even influence the rate of strengthening environmental regulations (Vogel (1997)) (Vogel (2000)). In addition, obtaining access to greener industrialised country markets can motivate higher standards. Vogel (2000) notes that Japan chose to adopt 1970 American automobile emission standards while Lee (1993) found that Korea upgraded its regulatory standards (pollution abatement for cars) to match what was in effect for the United States, EU and Japan. In China, there is evidence that large state owned factories have endured higher production costs as a result of stronger environmental policies and regulations in industrialised countries (Ruishu et al. (1993)). In Chile, the pulp and paper industry has decreased chlorine bleaching largely in response to export market pressures (UNCTAD (1999)). Israel was reported to have adopted EU pesticide standards in order to get market access to the European Union (Vogel (2000)).

Another contributing factor to the race to the top is that multinational companies are upgrading the environmental standards for the plants regardless of location (Weiss (1993)), Vogel (1997)) (Vogel (2000)). This contributes to the pollution halo theory where environmental standards are improved as a result of FDI imports of newer and cleaner technologies and environmental management systems. For instance, this was seen in the Chinese energy sector, (Blackman & Wu (1998)), where desirable environmental performance can have economic benefits (Mabey & McNally (1999)) (Zarsky (1999)). A “new source bias” emerges where environmental regulations for modern plants will be more stringent than existing regulations that are applied to older plants (Jaffe (1995)). Some evidence reveals that companies are improving their environmental performance in response to more effective national regulation (Dasgapat et. al (1998)), and/or local community pressure (Wheeler et al (1997), (Pargal and Wheeler (1995)) (Zarsky (1999)). In some industrialised countries, such as Canada, Australia and the United States,

sub-federal regulation can be more stringent than national levels (Vogel 1997)). However, some emphasise that greater environmental performance is more attributable to the transfer of new technology and facilities rather than stricter environmental regulation (Dasgupta et. al. (1998)) (Hettige (1998)). In addition, the infusion of cleaner technology can still lead to an intensity of production or other unsustainable methods of production (Zarsky (1999)).

## **Investors and host countries**

### *Private sector determinants*

Countering the pollution haven theory and indirectly the suggestion that host countries induce investment relocation are studies that examine multinational corporation decision making. The general presupposition is that industrial firms seek investment where they can exploit a comparative advantage. Environmental costs due to tightened pollution controls can affect this advantage negatively (UNCTAD (1995)). A great number of studies examine why companies do or do not relocate to less stringent regulatory jurisdictions. The use of determinants provides implicit evidence that multinational companies do not relocate for environmental cost reasons. The general position is that investors rarely, if at all, factor environmental costs into their locational decision-making. The strictness or laxity of environmental regulation in the host country is not determinative (Gentry (1999)) (Zarsky (1999)).

Considering the proportionately low business costs for environmental compliance, corporations would be reluctant to resettle due to the high costs involved in relocating (Esty and Geradin (1997)). By comparison, there are other determinants for location that mark a higher priority for corporations. These include the availability of cheap labour (Esty and Geradin (1997), (Mani & Wheeler (1998)), (Low & Yeats (1992)), (UNCTAD (1996)); natural resource endowments of the host country (Low (1993)); infrastructure (List & Co (2000)); presence of industrial base (Mani & Wheeler (1998)); taxes, transportation expenditures; availability of raw materials and market access (List & Co (2000); market size (Wheeler and Mody (1992)); and concerns about liability or consumer pressures in home countries (UNCTAD (1999)) (Esty and Geradin (1997)). The regulatory framework, both current and its future stability, is a factor that subsumes environmental regulations (Markandya (1999)). In addition, some investors are reluctant to make investments, such as in Eastern Europe, where they may incur liability or other clean up costs, by inheriting a number of environmental contamination problems from certain industries (Zamparutti & Klavens, (1993)).

From the private sector perspective, it is usually more efficient to apply their home country standards (UNCTAD (1993)), (Esty and Geradin (1997)) (Nordström and Vaughan (1999)) or a better strategy to alleviate the pressure from home country environmental regulators, consumers and environment groups (Lall (2000)). Jha et. al. (1999) offers opposite results for China, where foreign firms use obsolete (sometimes banned by the parent company) rather than modern technology, leading to high energy consumption and pollution problems. Companies may anticipate that stricter regulations will be forthcoming and therefore pre-emptive action would be prudent (Jaffe et al.) (1993). Some authors contend that an investor will refrain from investing in a country having lax environmental regulations (Revesz (1994)).

Alternatively, some studies indicate that the private sector will move away from highly regulated environmental regimes or include the environmental regulatory aspects in their decisions on where to invest. Klavens and Zamparutti (1995) surveyed 1,000 multinational corporations, finding that large corporations look systematically at environmental questions when they decide where to invest. A comparative study of Mexico, Morocco, Ivory Coast and Venezuela ascertained that different pollution

abatement costs were significant in determining FDI flows (Eskeland and Harrison (1997)). In addition, environmental problems appear to have discouraged a number of investments across different industries while the question of liability for past pollution problems at industrial sites were the greatest concern for investors (Klavens & Zamparutti) (1995). Some studies indicate that investors can be lured to certain countries because of lower environmental regulatory standards (Van Beers, et. al. (1997)).

### *Difficulty in attracting investment*

The significance of this section is that some of the literature is directed towards examining why developing countries experience problems in attracting FDI (Lall)(2000)). By the nature of this title, it can be anticipated that there would not be much empirical evidence offered by governments claiming that environmental regulation steers away investment. In fact, it is difficult to ascertain why host countries set low environmental standards (Neumayer (2001a)). As a result, data attempting to explain why environmental regulations were lowered in response to FDI attraction problems would most likely be anecdotal. Moreover, in line with the argument that environmental costs are relatively low for corporations, it is unlikely that competition for comparative advantage would lead to the adoption of purposely set low environmental standards (Vogel (1997)) (Stewart (1993)).

Overall government investment policy appears to reflect a desire to encourage investment and therefore streamline their governmental structure to facilitate its efficient entry. Host countries will generally seek as much taxation and pollution control as possible without losing the investment to competitors (Andersson (1991)). Criticism of governmental investment policy is more directed towards how protective the regime is (Lapwongwattana (1997)). In some ways, an overly closed system can prevent technology transfer of environmental abatement equipment. Leonard (1988) points to Mexican import restrictions and Romanian's limited economic resources as barriers to attract the best pollution abatement equipment. Some authors examine the type and scope of incentives that countries offer prospective investors. However, these studies carry shortfalls, lacking "systemic comparable information" on what incentives are offered as well as undeveloped methodologies to assess the impact of such incentives (UNCTAD, 1996)). Moreover, there is a problem with transparency, since incentives are usually given on an ad hoc basis (UNCTAD, 1996).

There is some evidence in the literature that governments have explicitly changed their environmental laws, and therefore lowered the standards, in order to attract investment. Developing countries are seen to be under pressure to gain high rates of economic growth and to secure FDI but that this, in some instances, can tempt them to accept environmentally risky activities (UNCTAD (1999)). In India, Mabey & McNally (1999) found that a British company pressured regional authorities in India to de-notify one of India's three designated eco-fragile areas so that they could go ahead with a port development. The state government initially offered six potential sites but since they did not receive many bidders, they allowed the company to use another site that was previously excluded under certain environmental protections. Esty & Gentry (1997) report that foreign energy companies in China were under pressure to reduce environmental standards in order to satisfy the Chinese authorities that desired the lowest price for power generation.

Related to this, there may be situations where host states, possibly influenced by the investors, deem that lowering environmental standards might be the only way to retain the investors' interest in the country. Mabey and McNally (1998) report of two cases where the host government was pressured to provide post-establishment concessions, such as lowering regulations or preventing its enforcement: oil exploitation and drilling in Nigeria and mining in Southeast Asia. An investor may act as an "environmental renegade" after entering the country while environmental regulators may be lax in their enforcement of regulations (Zarsky (1999)). In sectors where environmental costs are high, developing

countries are faced with deciding whether the costs of environmental protection make the project uneconomic. If so, they can assume the costs itself, decide not to go ahead because the costs are too high, or decide to postpone the project until the costs can be reduced or where the revenue will increase offsetting the costs (Smith (1992)).

However, some studies have examined why countries do not incorporate environmental concerns into their investment policies. Many countries will have resource and other problems inimical to ensuring that environmental concerns are taken into account although there is no evidence that lax environmental regulations are purposely attracting investment (Jesdapipat (1997)). Some have concluded that this is a product of a much stronger influence exerted by economic officials in the government who share a bias that environmental regulation curbs economic development (Goldenman (1999)) (Silva (1996)). In Thailand, although legislative provisions are in place under investment laws, there is insufficient personnel to monitor the environmental aspects of a project and to check if an EIA has been conducted and included in the project proposal (Jesdapipat (1997)).

There may also be deeper institutional and government organisation issues surrounding the lack of integration of environmental concerns. Although countries may be willing to respond to environmental questions, and may even have enacted strong environmental legislation, they often lack the resources and technical expertise for inspection, monitoring, enforcement and prosecution needed to implement appropriate environmental legislation and to work in collaboration with the investors (UNCTAD (1999)) (Esty (1995)) (Lall (2000)). For example, Youfou (1995) notes that many foreign investors in dirty industries enter into joint ventures with China's township factories that are beyond the reach of enforcement efforts by national government officials.

### *Export processing zones*

Export processing zones (EPZ) were chosen for this study because of the potential that countries would alter their regulatory environment for a certain region of the country specifically designated for the purpose of attracting investment. By definition, an export processing zone is a specified area where different sets of policy instruments apply that are not generally applicable to other parts of the country (Ge (1999)). Such incentives to attract investment include: tax holidays; duty free status; simplified administrative procedures; fewer regulations; improved infrastructure and facilities; and advantageous geographical location (Ge (1999)). Regulation of industrial activity in these areas can result in, as with the case of the Mexican northern border region, exempting companies from domestic ownership requirements as well as duty free imports as long as a certain proportion of the output is re-exported (Jaffe 1995). Some have expressed the belief that low environmental costs and prices for energy and raw materials are essential criteria for an EPZ (Kreye et al. (1987)). Recent estimates of the number of EPZs number more than 850 worldwide (Ge (1999)). Developed countries may be under great pressure to set up these zones (Kumar (1995)).

Many authors cite the example of the *maquiladora* region in Mexico as offering evidence of industrial flight and a pollution haven (Kumar (1995)). It has been concluded by some that environmental abatement costs acted as a determinant for the movement of FDI to the region (Molina (1993)) (Jha ((1998) (GAO (1990)), which has been confirmed by industry polls ((American Chamber of Commerce in Mexico (1992)). However, some contend that low labour costs acted as a stronger incentive for relocation (Grossman & Krueger (1993)). Evidence of industrial flight was seen in the chemical industry where investment increased by over twenty fold from 1982-1990, following a tightening of environmental regulations in the United States (Clapp (1998)). One major reason engendering the movement of industry to Mexico was that there were no air pollution standards for the application of solvents (Mabey & McNally (1998)). Severe pollution problems in areas such as Tijuana are partly attributed to the lack of recycling

and refuse disposal facilities (Mungaray (1995)) (UNIDO (1999)). The serious environmental degradation in the area has been linked to the inadequate environmental regulation to control the rapid development and industrialisation processes (Esty & Gentry (1997)). Production of some hazardous chemical products banned or strictly regulated in the US, such as pesticides, has expanded in Mexico (Leonard (1988)). In addition, workers are subject to occupational hazards such as working with asbestos fibres that they would not be exposed to in the United States (Leonard (1988)).

However, the limited regulatory mechanisms in Mexico are more a product of regulatory chill rather than a deliberate drawing down of regulation (Leonard (1988)). The environmental regime in the maquiladora region area was previously relatively light (Grossman & Krueger (1993)). This impacted effluents and hazardous wastes, while there was a lack of Mexican controls on automobile emissions and no governing of sewage treatment and waste handling (Atkeson (1992)).

Recent studies have begun to account for the environmental impacts of FDI in EPZs. However, these attempt to apply a retrospective analysis rather than focusing on the host country efforts to exempt their environmental laws in the zones. Overall studies have concluded that free zones have caused few pollution problems since the processes are generally clean despite the high consumption of water quantities (UNIDO (1999)). Most of the EPZ activity is in the garment industry, which produces only domestic effluent (UNIDO (1999)). For instance, in a study of Malaysia, Sivalingam (1994) notes that there has been favourable effects on the natural environment because the zones were well planned and built in accordance with the zoning and building regulations. Both the federal and state governments are becoming increasingly sensitive to the need for integrating development with environmental concerns, agricultural activities and tourism projects. All enterprises in the zones were usually required to provide a green zone, unlike the SMEs in the rest of the country where backyard industries in residential areas are set up and are sometimes highly polluting. This is consistent with other studies that note that EPZ environmental regulation and performance exceeds what is applied to domestic industries in light of lax environmental attitudes in those countries (World Bank, 1992). Others claim that lax environmental laws apply equally in and outside EPZs (Madani (1999)).

Some states have developed specific environmental regimes in EPZs to address pollution regulation. For instance, in Sri Lanka, there is a separate department in the Board of Investment that monitors the environment and pollution. Each zone has its own environmental laboratory and investors are under specific standards and limits (UNIDO (1999)).

An unreferenced report by Kennett, noted in Madani (1999), reported that there have been cases of EPZ firms contaminating water supplies in the Dominican Republic. Related to this, was the fact that environmental laws in the country were fragmented while monitoring was not coordinated and did not have control over EPZs. There have also been high incidents of pollution associated with the leather tanning industry in an EPZ in Mauritius (UNIDO (1999)).

## **Competition for FDI at the regional and national levels and in specific sectors**

### ***Regional level***

The race to the bottom can pose a problem for regions where the countries compete for FDI. This can play out in economic regions as well as individual states consisting of a number of sub-federal entities. In the United States, the federal government aims to preclude regulatory competition. The US Clean Air Act provides minimum standards to avoid distortions in competition, although there is variance for compliance timetables that are built in to ease the financial and administrative burden for heavily concentrated urban areas (Esty and Geradin, 1997). Portney (1990) specifically refers to the Clean Air

Act, and its subsequent amendments, which were designed partly to limit states' ability to compete for investment by using lax environmental standards.

There is not a great deal of literature looking at inter-regional competition for FDI. Birdsall & Wheeler (1996) completed a study of 25 Latin American countries from 1960 to 1988, although their findings were directed towards rejecting that there was a significant displacement of pollution intensive sectors to the region. One area where the investment-environment interface is mired in a considerable degree of controversy is North America. Under the *North American Free Trade Agreement (NAFTA)* there are numerous protections available to investors including recourse to binding international dispute resolution against host states that provide for the award of financial compensation. One might surmise that national or even sub-national regulators may be concerned about enacting environmental legislation that might be challenged under the Chapter 11 investor-state regime (Mann & von Moltke (1999)). Some authors have provided evidence that threats of Chapter 11 litigation have been used to prevent the passage of new environmental regulations (Rugman (1999)) (Horlick & Marti (1997)). Mann & von Moltke (1999) assert that the only binding Canadian environmental measures on business that were enacted since NAFTA came into force were subjects of Chapter 11 disputes. However, there is no evidence that NAFTA or other bilateral investment treaties are used to lobby against the enactment of environmental legislation or effectively establish a regulatory chill on new environmental regulation (Mann & Araya (2001)).

### *National level*

There is a large amount of literature looking at national regulatory responses to the influx of FDI. Most of the studies do not specifically address environmental regulation. There appears to be predominance of assessments made of host country incentives relating to taxation, export-import/tariffs regulation, local content rules and labour/employment. In many cases, there is no discussion on how host states use environmental regulatory incentives (Campos (1999)) (Chia (1999)) (Sieh Lee (1999)). This may reflect how national governments do not modify environmental regulations or laws in order to attract investment although this is suspect to the limited information that is provided from the host countries themselves. In many cases, negotiations with investors are not open processes (Oman 2000). Country specific reports aim to highlight how the particular country can facilitate FDI. They would be less likely to be forthcoming about any changes in environmental regulation done for this purpose.

However, there are some comprehensive national studies examining the interface between environmental regulations and investment. In Leonard's (1988) analysis of four countries, he uses statistical data assessing changes in investment and trade patterns within and between the United States and industrialising nations. Complementing the methodology is an empirical assessment of corporate activity through industry reports, knowledge of the impact of particular regulations, and a general analysis of industry trends and economic factors. In addition, industrial-development strategies of countries are reviewed.

The four countries that Leonard selects are Ireland; Spain; Mexico; and Romania. They were chosen due to their similar pursuits of integrating pollution factors into their industrial planning. Initially, the four countries chosen for the study attempted to increase their industrial comparative advantage by acting consistently with the pollution haven hypothesis in the 1970s, but success in attracting investment by doing so was mixed and governmental and local attitudes about pollution changed in recent years.

In Ireland, the government became increasingly concerned about pollution and modified their investment policy so that light manufacturing industries were preferred to labour-intensive industries. Leonard's study of Spain revealed that the government did not use environmental regulation as an incentive to attract investment, unlike what it did with tax relief or direct grants. In fact, current

investment decisions are influenced by anti-pollution sentiment. This is attributable to a relatively higher level of economic development and experience with environmental degradation and government legislative responses to pollution problems.

In Mexico, Leonard reports that the government created incentives for companies to relocate to other regions or alleviate the environmental stress in the cities. For instance, a special tax-payment certificate was available to companies for the installation of pollution-control equipment on exiting plants while new plants were eligible for the same benefits only if they located outside the Mexico City area.

For Romania, Leonard notes that government-industrial planners considered environmental factors. However, in the 1970s, Romania became an exporter of a variety of chemical and chemical products whose production was banned or severely regulated in Europe and the United States. The author even points to evidence where Romania's decisions on what types of chemical products to produce for sale were partly influenced by higher environmental and workplace standards in the west.

One example in the literature where a host government actively pursued foreign investment and, in turn, modified their environmental regulation was Costa Rica. The *Free Zone Law* exempted a wide range of laws including environmental norms and rules (Esty 1994). Xiadong (1994) reviews the changes in Chinese law necessary to facilitate incoming FDI. Although there is no discussion of changes in environmental legislation, the Chinese government had to change their land laws since the pre-existing system did not permit private land acquisition. Other changes were also necessary in light of the conflict between FDI and China's socialist economic system.

An interesting point that arises in the literature is the extent of sub-national government decision-making and local decision-making on environmental matters. Such decisions can greatly impact FDI. This undermines the theories holding that environmental standards are changed to encourage investment in advance of the preliminary decision to enter the country. In many government systems, pollution control regulations are site specific and vary according to the wishes of local governments. Few countries enact national standards that govern more than a few general categories of pollutants. In turn, international investors are more concerned about the politics of pollution than the technical and regulatory aspects of the investment (Leonard 1988)).

A study of sub-national decision-making in India was undertaken by Mani et al (1996). It concluded that differences in the level of environmental enforcement in the different states of India did not significantly impact the decisions on the location of new manufacturing plants for 1994. Venkatesan, et.al, in reference to a Ford Plant investment in Tamil Nadu, did another case study for India. In this case, the State Pollution Board indicated that it would not build a suitable sewage treatment facility therefore fuelling their reluctance to issue a "No objection certificate" for the plant's construction. In turn, Ford invested in the facility on its own in order to obtain the certificate, thereby demonstrating that investment did not drive down the environmental standards.

Similar findings to Mani et. al. (1996) were found for the United States by a study led by Bartik (1988). Another study on the United States by Levinson (1996), contained similar results although there were some industries affected by the differences in environmental standards.

Although there are a small number of instances where countries have altered environmental regulations for the purpose of maintaining a competitive edge, some reports attempt to examine the regulatory chill in order to ascertain whether states refrain from either enacting or enforcing environmental regulations. Whether states do this may reflect the level of comparative advantage that they lose if a country decides to relocate or outsource their industry (Albrecht (1998)). Using empirical support from a

survey of 107 countries, the author concludes that the greater the country's export diversification, the less a chance of regulatory chill from the threat of relocation or outsourcing.

In addition to assessing how host countries will act in response to the prospect of FDI, how home countries act under the threat of industrial flight can be equally determinative. The study on the furniture finishing industry reported that in the face of numerous companies moving away from California, regulators refused to lower their environmental standards to retain the investment (GAO (1990)). This may reflect the NIMBY (not in my backyard) syndrome, which can influence government restrictions or bans of certain practices, such as hazardous waste incineration or landfilling, although there is no evidence that this causes industrial flight (Esty and Geradin (1997)).

In turn, it has been common in many industrialised countries, that governments and sub-governments have streamlined their environmental laws or relaxed the enforcement of their regulations in order to maintain a healthy business climate. Examples of this emerge in the province of Ontario, Canada (Esty and Geradin, (1997)) and Germany (1997). However, it is difficult to ascertain that the motivations behind these efforts are to attract new investment or to reassure existing businesses that the jurisdiction is still business-friendly. In addition, government redesigning of their environmental regulations may be more directed towards providing greater efficiency in government service. Overall, there is little reason to believe that the new regulations would not be chosen in the absence of regulatory competition (Esty and Geradin (1997)).

### *Specific sectors*

In order to provide some evidentiary light on the industrial flight, pollution haven or race to the bottom theories, some authors have chosen industry or sector specific approaches. For the pollution intensive industries, where there is greater potential for companies to relocate considering the relatively higher environmental compliance costs they incur, some reports have noted cases of industrial flight. This has occurred for instance with the furniture finishing industry in California (GAO 1990); and the textile and leather tanning industries in Europe (OECD (1991)). However, allocating particular attention to the pollution intensive industries can be detrimental to gaining greater understanding of these theories as applied to the natural resources sector (Jaffe (1995)). This is somewhat surprising since the obvious indicators confirming these theories, such as costs and employment, are heavily impacted in the natural resources sector (Jaffe (1995)). Natural resource sectors are often located far from centres of political and administrative powers and therefore are subject to weaker government infrastructure, lower scrutiny and higher potential for corruption (Mabey & McNally 1999)). Moreover, LDCs still receive a disproportionate amount of FDI in the natural resource sector despite an overall transition in FDI to manufacturing (Mabey & McNally (1999)).

The mining industry represents a natural resource sector that is highly polluting and where there is a great disparity between environmental regulations in developed and developing countries. In most cases, mining legislation was practically non-existent in the latter, with the exception of a few basic standards for water quality and air quality (Warhurst (1992)) (UNCTAD (1999)). Investors can select among a number of different sites within a region and therefore are in a position of strength to obtain the most attractive set of incentives that may include lowering environmental standards (Mabey & McNally (1999)).

The mining industry in developing countries has been reportedly influenced by incentives such as company tax breaks, subsidies inputs and low concession fees. However, laws regulating the mining sector can also play a role. Jha et. al. (1999) report that in Zimbabwe, a country with a high percentage of foreign ownership in the mining sector, the *Mines and Minerals Act* supersedes all other legislation

including acts for the protection of the environment. There are few restrictions on mining rights once an initial permit is issued, which is attributed to the need to secure foreign exchange earnings from mining. In Papua New Guinea as well as Indonesia, mining operations are minimally or completely unregulated. Mining in Indonesia operated pursuant to a Contract of Work, which generally exempted mining corporations from environmental laws. Moreover, in both of these countries, in addition to the Philippines, there were exemptions given to accommodate major mining disasters (Mabey & McNally (1999)) (WWF (1999)).

The relatively low level of environmental governance in the mining sector however can be translated into an opportunity for countries to develop guidelines for their industry, ensuring that it abides by sustainable exploitation objectives. In Ghana, the government commissioned a study to evaluate the impact of underground mines and surface mines on the environment and their socio-economic impacts. The results of the study were to complement existing mining legislation and inform the development of a framework and guidelines regulating the conduct of mining companies in environmental matters (Mate (1992)).

The mining sector is one where environmental regulation imposes a considerable cost burden on operations, sometimes influencing them to enter into negotiations with states in order to obtain a stay of execution against them (Warhurst (1992)). However, developed countries' mining interests have been innovatively developing their own technology and monitoring devices, often with R & D initiatives in developing countries such as Brazil and Jamaica (Warhurst (1992)). Most mining interests apply equal standards to all other worldwide operations (UNCTAD (1999)). These standards will usually exceed what is applied for domestic mining operations, which are often highly polluting due to obsolete technology, poor human resource development, bad management and no accountability (UNCTAD (1999)). Mining investment does not significantly factor in the level of environmental regulation into their decision-making, when compared to issues of political stability and geological potential (Johnson (1990)). In addition, the rapidly changing and unpredictable environmental regulatory framework can be a disincentive for investors to explore investment opportunities in developing countries (Eggert (1993)).

The forestry sector is one where there is a great deal of foreign direct investment interest (UNCTAD (1999)). Consequently, a race to the top may occur, as evidenced by joint ventures that have resulted in the infusion of chlorine free processing the pulp and paper industry in Indonesia (UNCTAD (1999)). It is also a sector that is highly subsidized, such as with the provision of low stumpage fees in Indonesia, Malaysia and Canada (Porter (1999)). Although no empirical evidence can be found, forest companies can relocate where sustainable management requirements become too stringent and therefore costly. In addition, there is also a high potential for regulatory chill on new laws as agencies responsible for timber management, such as the U.S. Forest Service and the Ministry of Forests in British Columbia, may exact a disproportionate institutional response to threats of relocation or outsourcing by the forest products industry (Chalifour (2000)). Changes to retain forestry investors may also be conditioned on the importance of the forest products industry relative to the country's overall economy; the value ascribed to competing uses of the resources; and institutional capture. Ultimately, this may explain why there is more evidence of regulatory chill in Canadian provinces rather than the United States, since Canada is more dependent on the forest products industry and it is a larger sector there (Chalifour 2000).

Another specific sector that was studied is the phosphate fertilizer industry. Heerings (1993) studies how environmental policies have influenced investment patterns of multinational corporations. Although the regulations in the European Union effected the exodus of companies to developing countries, it did not wholly contribute to the relocation. Market forces also played a role. However, there is no evidence that the developing countries actively facilitated the migration through less stringent environmental regulation. Mabey and McNally (1999) also report that European phosphate producers have

been forced into joint ventures with groups from North Africa and the Middle East allowing them to relocate to lower cost regions where they can compete with other producers from China.

## **Conclusions**

The literature review indicates a diversity of opinion on the general trends driven by the entry of foreign direct investment. There are a number of studies that point to various examples of race to the bottom, pollution havens and even a regulatory chill caused by investment. Regulatory chill appears to be the easiest to assume due to government inaction but most difficult to demonstrate as a response to the influx of FDI. Evidence of race to the bottom and pollution havens may be seen in the more pollution-intensive industries or in the natural resources sector. It has been experienced in both developing and industrialised countries.

Most analysts concur that systematic empirical evidence of these phenomena is lacking. The private sector is generally not attracted to investing in other countries where environmental laws and standards are lower because environmental compliance costs are low while other determinants on whether to invest are more important. Evidence on whether host countries positively engage in altering their environmental regulatory system to attract FDI is not forthcoming, partially due to the unavailability of evidence from the host countries themselves. Deliberate areas and sectors for foreign direct investment, such as export processing zones, are governed under a different regulatory system than the rest of a country but environmental standards do not necessarily differ from what already exists and in some instances may be more strict.

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