OECD DEVELOPMENT CENTRE

Working Paper No. 161
(Formerly Technical Paper No. 161)

GLOBAL CAPITAL FLOWS AND THE ENVIRONMENT IN THE 21ST CENTURY

by

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Research programme on:
Responding to Local and Global Environmental Challenges

OECD OCDE

July 2000
CD/DOC(2000)5

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ACKNOWLEDGEMENTS

Without implicating them, the author would like to acknowledge the helpful comments of Colm Foy, Kii Fukasaku, Kenichi Haga, Ulrich Hiemenz, Tom Jones, Helmut Reisen, David Wheeler, Yuko Yano, and panellists and participants in the Osaka City University Faculty of Commerce and Economics 50th Anniversary Symposium, where an earlier version of this paper was presented. The views expressed here are the author's own and should not be attributed to his affiliated institution.

PREFACE

Capital confers command over resources, natural as well as human. The size and composition of the capital stock are perhaps the most important determinants of resource use and new investment the single most important factor shaping changes in the pattern of use. Though net foreign capital inflows contribute only a small fraction to gross domestic capital formation in most countries, the last few decades have witnessed a steep rise in flows from capital–abundant countries (often OECD Members) to capital–scarce ones. Thus, investors from the former increasingly shape patterns of resource use in the latter; this applies in particular to private investors, since private flows have grown rapidly even as public flows have stagnated. Moreover, the composition of private flows has changed markedly. While foreign direct investment (FDI) inflows have risen fairly steadily over the past decade and a half, other financial flows (mostly portfolio debt and equity and bank lending) have — despite their volatility — substantially increased their share of total flows.

The multilateral and regional development banks, as well as the major bilateral aid donors, have made concerted efforts in the past decade to build environmental safeguards into their projects. Yet, as their share of total capital flows from rich to poor countries continues to shrink, are those efforts doomed to irrelevance? What sorts of environmental performance can be expected from different classes of international private investors? These are the questions addressed here. Unlike much of the previous literature on globalisation and the environment, which focuses on trade or on capital flows as FDI, this paper differentiates between different types of capital flow and financial instrument to examine the incentive structures associated with each *à propos* the treatment of the environment.

A key finding is that FDI has the strongest built–in environmental safeguards of all types of capital flow, largely because of the strong managerial links between parent and subsidiary and the perceived advantages of employing comparable environmental procedures throughout a multinational firm's operations. Equity markets also show growing signs of sensitivity to environmental "bad news", reflected in adverse share price movements. Bank lending is likely to consider environmental impacts only insofar as a borrower's future environmental liabilities might bankrupt it or otherwise compromise loan repayment. Finally, the paper highlights the interesting developments occurring in a global insurance industry faced with the (uncertain) prospect of accelerating global environmental change that could threaten its own survival.

This paper is a contribution to the Organisation's horizontal work on sustainable development and, more specifically, to the research theme, "Responding to Global and Local Environmental Challenges", of the Development Centre's 1999–2000 Programme of Work.

Jorge Braga de Macedo
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July 2000

ABSTRACT

Both the magnitude and the composition of capital flows from rich to poor countries have changed markedly over the past decade. While official flows have stagnated, private flows have mushroomed and portfolio investment and bank lending have grown more rapidly than foreign direct investment (FDI), though with much higher volatility. Given the impact of investment decisions on patterns of resource use (including the environment), what are the implications of these trends?

A bricks–and–mortar investment by a multinational corporation (MNC) requires consideration of environmental impacts in a way that neither a bank loan nor portfolio investment does. The evidence suggests that foreign direct investment (FDI), especially by large MNCs, is not concentrated in "dirty" industries, and where it does go into such sectors environmental performance of MNCs is usually above local standards. For smaller OECD investors, reliance on public–sector investment guarantee and insurance agencies can serve as an external discipline on overseas environmental practices, assuming those agencies have clearly defined and strictly enforced guidelines. Not enough is known yet about the environmental practices of small–scale investors from non–OECD countries, but anecdotal evidence points to problems, perhaps reflecting limited home country investor interest in — or information on — such practices.

With respect to bank lending, only the United States has environmental liability legislation that systematically forces banks to perform environmental due diligence on prospective borrowers, but this does not extend extraterritorially. Elsewhere, the environment is likely to figure in bank loan decisions only insofar as it threatens either the borrower's repayment capacity or the lender's reputation. In the case of portfolio investment, adherence to the "prudent man" rule dictates that fund managers consider environmental performance only when material to financial performance. Some evidence suggests that environmental "bad news" may already be adversely impacting firms' market valuations; in addition, portfolios screened for environmental and social practices appear to be gaining in popularity among individual and institutional investors.

Perhaps the most significant recent development has been awakening of the insurance industry to the possible implications of global environmental change for its long–run viability and *modus operandi*. While strongly conservative in its own investment strategy, the industry has become more proactive in devising innovative insurance products to address what may be a growing secular risk of catastrophic events, in working with clients to reduce their exposure to such risks, and in nudging governments' climate policies towards a more vigorous application of the precautionary principle.

RÉSUMÉ

Au cours de la dernière décennie, l'ampleur des mouvements de capitaux des pays riches vers les pays pauvres, de même que leur composition, se sont profondément modifiées. Tandis que les flux de capitaux publics stagnaient, les flux privés ont connu un grand essor ; parmi ceux–ci, les investissements de portefeuille et les prêts bancaires ont progressé plus vite que les investissements directs étrangers, en dépit de leur plus grande volatilité. Compte tenu de l'impact des décisions d'investissement sur les modalités d'utilisation des ressources (notamment sur l'environnement), quelles sont les conséquences de cette évolution ?

Un investissement « en dur » par une firme multinationale doit s'accompagner d'une prise en compte des effets sur l'environnement, ce que ne font ni les prêts bancaires, ni les investissements de portefeuille. On observe que les investissements directs étrangers, notamment des grandes firmes, ne concernent pas en priorité les industries « polluantes » et que, lorsque c'est le cas, leurs pratiques sont généralement plus respectueuses de l'environnement que ne le recommandent habituellement les normes locales. En ce qui concerne les investisseurs de petite taille des pays de l'OCDE, le besoin de recourir aux garanties d'investissement du secteur public et aux compagnies d'assurance peut servir de discipline extérieure pour les initiatives à l'étranger ayant un impact sur l'environnement, à supposer que ces organismes aient clairement défini des règles de conduites et qu'elles les fassent strictement respecter. On sait encore peu de choses sur les pratiques des petits investisseurs des pays non membres de l'OCDE par rapport à l'environnement, mais l'observation des faits fait apparaître des problèmes, peut–être liés au faible intérêt du pays d'origine de l'investisseur sur ces pratiques, ou à l'absence d'informations.

En ce qui concerne les prêts bancaires, seuls les États–Unis se sont dotés d'une réglementation qui contraint les banques à mener une enquête précise sur les pratiques environnementales de leurs emprunteurs potentiels. Mais cette contrainte ne s'applique pas hors frontières. Partout ailleurs, l'environnement n'intervient dans les décisions de prêt des banques que dans la mesure où il est susceptible de menacer la capacité de remboursement de l'emprunteur ou la réputation du prêteur. Dans le cas des investissements de portefeuille, la règle de prudence incite le gestionnaire de fonds d'investissement à ne prendre en compte la dimension environnementale que lorsqu'elle influe sur les résultats financiers. Il ressort de faits récents que les « mauvaises nouvelles » sur le front de l'environnement affectent déjà la cote des firmes sur le marché. De plus, les portefeuilles établis en fonction des pratiques sociales et environnementales semblent gagner en popularité auprès des investisseurs individuels et institutionnels.

La prise de conscience dans le secteur de l'assurance des implications possibles du changement climatique sur sa viabilité à long terme et son mode de fonctionnement constitue peut–être l'évolution récente la plus importante. Alors que ce secteur est profondément conservateur dans ses propres stratégies d'investissement, il s'est montré particulièrement créatif dans la conception de produits d'assurance innovants pour prendre en compte ce qui pourrait se révéler comme un risque séculaire d'événements catastrophiques. Pour ce faire, les compagnies d'assurance travaillent de pair avec les clients pour réduire leur exposition à ce type de risque et incitent les pouvoirs publics à adopter des politiques relatives au risque climatique qui aillent au–delà du simple principe de précaution.

I. INTRODUCTION

For the international economist, the decade of the 1990s will be remembered for the rapid global integration of markets (for commodities, services, capital and, to some degree, skilled labour), with all the opportunities and risks this entails. For the environmentalist, it will be remembered for the Rio Earth Summit of 1992 and the steps taken subsequently towards further defining and setting the framework for implementing various international environmental agreements — on ozone–depleting substances, biodiversity and climate change. “Globalisation” and “sustainable development” have become the decade–defining buzzwords. In recent years, there has been a growing interest in exploring the possible complementarities and contradictions between these two phenomena. Researchers from various backgrounds have posed the question: “Is globalisation good or bad for the environment?” or, alternatively, “Under what conditions can globalisation and sustainable development be mutually reinforcing?” Our focus here is on the possible implications of one particular manifestation of globalisation, viz., expanding global capital flows and tighter global capital market integration, for sustainable development. We are especially interested in analysing the growing investment links between the wealthy OECD countries on the one hand and the developing world on the other.

Section II briefly reviews recent trends in global capital flows, and the forces underlying them. Section III then examines one major component of global flows, foreign direct investment (FDI), weighing the empirical evidence on its environmental impacts. Sections IV and V do the same for bank lending and portfolio capital flows respectively. Section VI examines the global insurance business and its treatment of environmental risk, particularly the emerging risk of global climate change. Section VII offers some concluding observations on the implications for developing countries.

II. FINANCIAL GLOBALISATION AND THE ENVIRONMENT

Mobility of capital is not a late 20th century invention; economic historians have been quick to note that capital mobility was also high in the late 19th and early 20th centuries. Environmental awareness on a large scale is, however, a relatively recent phenomenon, dating only from the 1960s in most OECD countries and more recently in other parts of the world. That awareness has been engendered in large measure by the evident environmental pressures, including environmental health risks, arising from an ever–larger scale of economic activity concentrated in a given geographic area. The rapid expansion of global capital flows of the last few decades takes place, therefore, in a very different institutional and policy environment from earlier periods of expansion. Environmental regulations now exist in the OECD countries that govern the ways in which industrial and other enterprises can produce goods and services. While there is a growing array of such regulations in developing countries as well, it is generally acknowledged that they are less effectively enforced. This asymmetry in the environmental regulatory framework has given rise to concerns that, *ceteris paribus*, capital may be induced to flow from "tight regulation" to "lax regulation" economies, particularly in heavily polluting industries.

Assuming government that is reasonably responsive to the public will, it could be argued that, in those countries where environmental regulation is lax, this is because popular preferences for environmental quality are weak, suggesting that environmental degradation is not yet perceived as a serious problem. Within any given country, local perceptions may be quite different from national ones inasmuch as some localities may suffer heavy pollution even before it becomes a pervasive, nation–wide problem. In the event, responsive local governments may lead the national government in instituting stricter environmental safeguards, and there may also be significant local differences in the stringency of such measures. Thus, just as high labour costs in more developed areas may push out labour–intensive industries to less developed ones, so higher regulatory costs in more developed areas may push out heavily polluting industries to less developed ones. In short, international comparative advantage has its local correlate.

In the normal course of events, with rising income and education levels, the people of a developing country could be expected to reach the limits of their tolerance of further environmental degradation, at which point stricter regulation and/or stricter enforcement should ensue. If this means discouraging further investment by polluting industries, people may at some point be willing to make this trade–off. In other words, eventually, internalisation of national environmental externalities becomes a credible government policy objective. Where the externalities are essentially global in nature, as for example with climate change, there is less incentive for governments unilaterally to adopt restrictive regulations on polluting industries. Hence the current international debate on the likely magnitude of "carbon leakage" under the Kyoto Protocol.

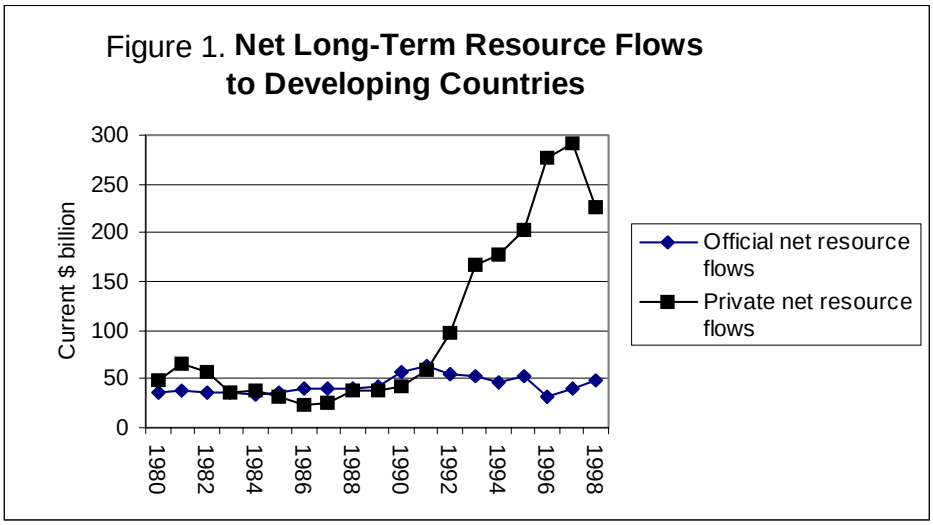
The question addressed here is to what extent the incentive structures built into global product and capital markets, bank loan agreements, and insurance contracts moderate the effects of disparities in environmental regulatory frameworks across countries or localities. It is not necessarily the case that all such disparities represent market, policy or institutional failures. Nevertheless, markets would appear to be exerting an as yet weak but intensifying pressure towards upward convergence of environmental standards. That is not to say that the convergence is likely to be towards the strictest standards found

anywhere in the world, but rather towards the standards found in the countries that are the dominant suppliers of investment capital to, and the principal purchasers of products from, the rest of the world. Even here, there is need for qualification, since there remains a rather big difference across OECD countries in "shareholder culture" and in consumers' willingness to pay for "green" products.

Trends in Global Capital Flows

In the last decade of the 20th century, there has been a significant shift in the composition of global capital flows, notably those from high–income countries to low– and middle–income developing countries. Official development assistance (ODA) has been declining in real terms, while private capital flows have mushroomed (see Figure 1) (though stalling momentarily in the wake of the Asian financial crisis). It seems very likely that, in the near future, global capital flows will resume their upward trend, with a growing share of private flows destined for developing countries. With diminished official aid resources, OECD governments will have to reorient their development assistance away from "big ticket" infrastructure projects towards "capacity building" and other "software" investments, leaving the former increasingly to private finance. This suggests that, in future, fewer and fewer of those projects with the largest potential environmental impacts will be subject to direct review by OECD governments or multilateral finance institutions like the World Bank and regional development banks.

Figure 1. **Net Long-Term Resource Flows to Developing Countries**

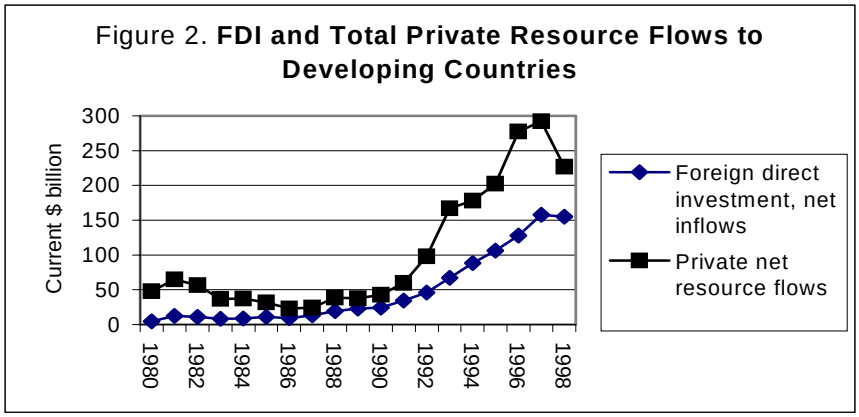


Notes: Developing countries include the "low and middle income countries" in the World Bank's classification. Preliminary figures for 1998.
Source: Global Development Finance database, World Bank, Washington, D.C.

The future composition of private capital flows cannot be readily predicted, since certain types of flow can fluctuate widely from one year to the next. The three main types are foreign direct investment (FDI), portfolio investment (in equity or debt), and commercial bank lending. From a global perspective, and in particular for developing countries in the 1990s, the first has represented by far the most stable flow (see Figure 2). The relative stability is a function of the long time horizon of most multinational corporations that undertake such investments, which in turn owes much to high exit costs and long payback periods. In short, near–term reversal can be far more costly for FDI flows than for portfolio flows or bank lending. Thus, while overall net private flows fell during the recent emerging

market crisis from $327 billion in 1996 to $194 billion in 1998, FDI continued to grow, from $93 billion to $120 billion (IIF, 1999). In contrast, portfolio equity investment in emerging markets collapsed from $36 billion in 1996 to $2.4 billion in 1998 and nonbank private credit (mostly bonds) fell from $79 billion to $49 billion, while commercial bank lending reversed from a net inflow of $120 billion in 1996 to a net outflow of $29 billion in 1998.

Figure 2. **FDI and Total Private Resource Flows to Developing Countries**



Source: Global Development Finance database.

As the recent emerging–market crisis makes plain, the volatility of portfolio investment and commercial bank lending can inflict serious damage on developing economies. This has led some governments to seek means of limiting the scope for sharp reversals of capital flows. Here is not the place to evaluate various options for reducing global financial instability. Rather, our primary concern is with the implications of instability for the natural environment. One common feature of the adjustment process in most economies struck by loss of investor confidence has been a sharp currency depreciation (the major exceptions being those with currency boards), usually involving abandonment of an effective currency peg. To the extent that the peg — most often to the US dollar — had caused the excessive appreciation of the national currency, floating it causes a depreciation towards a market–determined rate, though very often with an initial period of "overshooting". Resources shift towards export production, while imports contract — often steeply. Depending on investors' expectations, overshooting may cause an excessive expansion of exports and contraction of imports. Both may be environmentally damaging: the former especially when the country's exports are natural–resource–intensive and/or pollution–intensive, the latter to the extent that imports are curtailed of new, cleaner capital equipment intended to replace existing, polluting capital stock (e.g., in state–owned heavy industries following privatisation or in electricity generation).

Another implication of financial crisis can be a steep drop in real incomes and in the level of economic activity. While the implications for the environment are somewhat ambiguous (e.g., declining industrial output may actually reduce some pollutant loads), the immediate impact on human welfare is unambiguously negative. Moreover, the more protracted the crisis, the more likely the environmental effects are to be negative. For instance, a large–scale return of unemployed urban dwellers to rural areas in order to farm marginal agricultural lands could exacerbate rural environmental pressures — e.g., denudation of hillsides, soil erosion, flooding, etc. Also, as suggested above, in the industrial, energy and transport sectors, recession is likely to lead to postponement of investment in new, more efficient equipment generating less pollution per unit of output. Existing pollution control equipment may also go unused as struggling enterprises seek to cut costs by whatever means available.

While in time the international community and individual governments may succeed in devising new rules and institutions capable of averting, or at least minimising collateral damage from, financial crises, in the meantime foreign direct investment (FDI) will continue to play a valuable stabilising role in emerging market economies. There are additional benefits associated with FDI that make it especially attractive to developing countries, viz., its frequent association with export processing, facilitating host countries' access to world markets, and its role as a conduit for the transfer of technologies and know how between countries. Few generalisations can be made about FDI's environmental impacts, since they depend on the sectoral and geographic concentration of investments among other factors — e.g., host government policies affecting technology choice.

Driving Forces

The rapid expansion of international capital flows over the past decade has a variety of roots: technological, political, demographic and economic. The information and communications technology revolution has greatly facilitated international capital mobility. Technology development has interacted with policy change (e.g., financial sector deregulation) to spawn rapid financial innovation, and the liberalisation of capital accounts in a growing number of countries has permitted these new financial instruments to be traded in truly global markets. In addition, improved technologies and lower costs of communications and transport have made possible the wider geographic dispersion of manufacturing operations through FDI. The mere possibility for capital to move abroad does not tell us much about where it is likely to move. There are a number of factors that influence global capital allocation. At a macroeconomic level, the allocation rule is simple: capital should flow across countries and regions until its marginal productivity (hence, return) is everywhere equal. All else equal, this implies a net flow from rich countries, where capital is relatively abundant and its return low, to poor countries, with a scarcity of capital yielding a correspondingly high return. The *ceteris paribus* assumption would appear not to hold, however, since capital flows between rich countries still dwarf those from rich to poor countries. What are often lacking in poor countries are the facilitating conditions for the productive investment of capital, including a well–developed physical infrastructure, an adequate supply of human capital, and well–functioning legal and other institutions governing commerce, enforcing contracts, protecting property rights, etc.

What role, if any, do environmental regulations and standards play in attracting (or repelling) internationally mobile capital? In one view, such regulations serve to raise the costs of doing business and thereby discourage investment inflows. To the extent that this is a concern, it is likely to be important only in that handful of industries where pollution–control costs represent a significant share of total costs. On another view, prospective foreign investors from the OECD countries already possess relatively advanced pollution–control technologies and would prefer to adopt them in their overseas operations, irrespective of host country regulations. Clearly, this will depend on how high are the costs of the relevant technologies, and on how those costs are distributed between capital costs (which may be particularly high in low–income countries) and operating costs (which may be particularly low, especially if labour is a sizeable component). Multinational corporations also have to consider reputation effects and ultimately effects on stock market valuation of their environmental practices outside their home country.

III. FOREIGN DIRECT INVESTMENT AND THE ENVIRONMENT

By its nature, foreign direct investment (FDI) involves a closer monitoring by owners and home–country managers of overseas operations than do other forms of international investment. For, FDI is not an arm's–length, anonymous transaction like portfolio investment; rather, it represents a fairly long–term commitment of corporate assets to the host country by a clearly identifiable legal entity, the parent company. While the banker may also enter into a long–term relationship with an overseas corporate borrower, in general the former takes little interest in the day–to–day management of the latter.

To varying degrees, overseas subsidiaries and affiliates of multinational corporations are linked to networks of suppliers — some home–grown host country firms, others sister multinationals. In either case, the hub MNC may possess the bargaining power *vis–à–vis* those suppliers to force them to comply with environmental standards it dictates. In the case of MNCs with valuable reputational capital to protect in their markets, it may well be in their self–interest to do so. This applies not only to upholding environmental standards but also to abiding by certain labour and social standards. Thus, for example, in the area of labour relations, it can be materially relevant to an international–brand sports shoe company how workers are treated not only in its own overseas factories but in those of its suppliers and even their suppliers. In short, it is becoming increasingly difficult for MNCs to evade responsibility for meeting certain environmental and ethical standards by contracting out along a local supply chain.

Does Country of Origin Matter?

To a significant degree, the environmental accountability of multinational corporations (MNCs) depends on the environmental sensitivities of their major shareholders, major customers, and major creditors. If none places a high priority on environmental performance, then the pressures on MNCs to adhere to high environmental standards overseas are apt to be weak. It seems likely, by this criterion, that MNCs based in the United States and a few European countries are under greater environmental pressure than those from most developing countries. The extent of public or shareholder pressures faced by Japanese MNCs is less certain, but the major corporate groups that are members of the *Keidanren* (the leading business organisation) are expected to take a leadership role on environmental issues, both at home and overseas. To this end, in 1992 the *Keidanren* established a Nature Conservation Fund that is intended to finance the transfer of environmental protection technologies. While the *Keidanren* may be a public opinion shaper, it seems at least as likely that its policy statements on the environment reflect prevailing public sentiment about what constitutes "good corporate citizenship". Probably of greater concern are the medium–sized companies investing abroad that may not be subject to the same reputational discipline and peer pressure.

In June 2000, governments of OECD Member countries agreed to revised guidelines for their multinational corporations. Key features are the international applicability of good environmental (and labour) practices, irrespective of host country of investment, and their

applicability to local suppliers and subcontractors of MNCs. Also, each government would be expected to provide for national contact points responsible for monitoring corporate progress with compliance and handling complaints, though the guidelines would remain voluntary in nature.

Since OECD–based MNCs are by far the largest sources of FDI, there is reason to suppose that most FDI flows are subject to at least some environmental monitoring. Even in the case of OECD–originating FDI, however, the extent of external discipline on firm behaviour depends significantly on the visibility of the firm to the public. Traditionally, this has meant that firms producing familiar household goods and consumer durables are more likely to face scrutiny than specialised producers of capital or intermediate goods. In the past decade, the rapid growth in portfolios of institutional investors and the boom in retail equity investing in the United States (and to a lesser extent in other OECD markets) has raised the public profile of firms that might before have enjoyed a certain anonymity. Even so, the overwhelming mass of shareholders remains preoccupied with financial results, and if environmental performance is perceived to be immaterial to those results it is irrelevant to their investment decisions. Perceptions do change, however, and to a degree they may already have begun to do so in the United States and a few European countries (as discussed below in the section on portfolio investment).

In the last decade and a half, the volume of FDI originating in non–OECD countries has grown significantly (though with Korea, a major source of such FDI, having joined the OECD in 1996, this changes the picture considerably). In any case, what is of interest here is not OECD membership but rather the extent of domestic pressures on international investors to conform to certain environmental standards overseas. At this moment it is not possible to assess the strength of those pressures, except on the basis of anecdotal evidence (e.g., press accounts in host countries of environmental accidents, disputes, etc.). That evidence does suggest that enterprises from some non–OECD Asian countries have been the object of strong environmental complaints from local citizens in countries where they have invested. In the event, with only a weak home country constituency for sound environmental practices overseas, the burden falls heavily on host countries to enforce environmental safeguards.

FDI's Links to Trade

Foreign direct investment is often closely linked to trade flows, either between home and host country or with third–country partners. For that reason, one cannot analyse the effects of FDI on the environment without considering the associated trade flows and their environmental repercussions. The essential feature of trade is that it creates a potential market for a country's output that is normally many times larger than the domestic market. Thus, if a country has a comparative advantage in resource–intensive industries, trade makes possible a much larger scale of resource extraction. This "scale effect" tends to predominate, though it is also possible that, with new investment in export sectors, the average efficiency of resource extraction and processing technologies would improve, resulting in a smaller raw material and energy input per unit of final output. Naturally, in those countries not enjoying a comparative advantage in resource extraction, FDI–related export flows are likely to be in less resource–intensive sectors and trade may actually lessen pressure on the domestic resource base.

In analysing comparative advantage, it is important to bear in mind that policies and institutions contribute to a particular country's advantage. This applies to environmental policies and regulations as well as to those directly affecting factor costs. Thus, the extent to which a country enjoys a comparative advantage in resource extraction activities depends not only on the available supply of resources but on the rules and regulations governing their extraction. In two countries with identical endowments, say of virgin forest and timber stock, the country with a stronger forest conservation policy will, all other things being equal, have the higher marginal costs of timber production. Of course, the *ceteris paribus* assumption seldom holds in a dynamic setting, since it is quite possible that the stronger conservation policy will induce technical innovation that permits sustainable harvesting of timber at a cost competitive with unsustainable practices used elsewhere. Even if not, there is also the possibility that consumer preferences in importing countries will permit a higher price to be charged for sustainably harvested timber, to recuperate the higher costs.

The possibility that comparative advantage might be affected by regulatory regime has led some to search for evidence of policy competition among countries to attract FDI through a lowering of environmental and/or other standards. Not surprisingly, the evidence on this score is not very convincing. First, environmental costs are for most industries only a small fraction of total costs, and therefore a marginal change in such costs is likely to have little effect on a country's comparative advantage. Second, if a country were to seek to gain *comparative* advantage in some sectors through lowering standards, it would necessarily *lose* comparative advantage in others. It is not immediately obvious why all countries would seek advantage in the same small set of polluting industries that might be attracted by lax environmental standards, at the expense of discouraging investment in other, cleaner industries. Third, to the extent that MNCs adopt comparable environmental practices and procedures throughout their global operations, they are unlikely to be responsive to local variations in the stringency of government–mandated standards. Just how widespread a practice this is remains uncertain: a 1995 survey of 153 Danish MNCs found that only 12 per cent had a policy of employing Danish environmental standards regardless of location (Hansen, 1998).

The empirical evidence provides little support for the "pollution haven" hypothesis. There are undoubtedly specific instances where domestic regulations in OECD countries have raised costs sufficiently to induce some firms to shift production overseas, but this does not appear to be an important overall rationale for outward FDI (see literature review in OECD, 1997). In the four developing countries they study (Cote d'Ivoire, Mexico, Morocco, and Venezuela), Eskeland and Harrison (1997) find very little evidence that FDI is concentrated in "dirty" sectors. Neither do they find evidence that outward FDI from the United States is skewed towards sectors with high pollution abatement costs. They also find evidence that, within any given sector, foreign companies tend on average to operate with lower energy intensity and a cleaner fuel mix than domestic enterprises, suggesting that the former use less polluting production methods. Hansen (1998) finds, in the case of Denmark, that industries with high pollution abatement costs tend to be overrepresented in a sample of outward FDI to developing and transitional economies, not one of the 153 manufacturing firms surveyed in 1995 mentioned variation in environmental control costs as a motive for its investment decision. Oman (2000) even suggests that policy competition to attract FDI may, given the concentration of much FDI in relatively clean high technology industries and the quality of life concerns of expatriate managers, "create *upward* pressure on environmental standards" (p. 94).

This is not to suggest that inter–sectoral production shifts occasioned by trade and investment liberalisation can never intensify environmental degradation. It is possible that a country with a comparative advantage (on the basis of land costs, capital costs, or whatever) in resource– or pollution–intensive industries would experience rapid growth in the output of those sectors and associated resource depletion or pollution. Even if the country has resource conservation and environmental policies in place, the marked shift in relative prices and incentives might overwhelm whatever safeguards they provide. Policy reinforcement or realignment may be required to ensure sustainable resource use and acceptable environmental quality.

Two developments with implications for future environmental impacts of FDI are worth noting. First is the structural shift in most OECD countries away from materials production (primary and secondary activities) towards the services–providing tertiary sector. To the extent that this shift reflects a reallocation of materials production towards non–OECD countries, partly through FDI, the implications for the environment in those countries would appear to be negative. A second development must also be considered, however, viz., the trend towards lower resource intensity of economic activities. In short, new technologies are making possible the production of greater and greater economic value with fewer and fewer material and energy inputs. To what extent are these technologies diffusing globally, from the OECD countries to the rest of the world? Further empirical research on this matter is certainly warranted.

IV. INTERNATIONAL BANKS AND THE ENVIRONMENT

The distinction between institutions offering traditional banking services (discussed in this section) and those managing portfolio investments (the focus of the next section) has become less clear–cut in recent years, as the structure of the financial services industry evolves in the major OECD countries towards one in which diversified financial companies provide a broad range of services to customers through one or another of their affiliates. Also, the trend towards securitisation has further blurred the distinctions between the financial products offered by different types of financial institutions. Nevertheless, it is useful for our purposes to maintain the distinction between bank lending, on the one hand, and portfolio investment, on the other, since the regulatory environment, sets of actors, and structures of markets still tend to differ significantly for the two sets of activities.

Banks and Environmental Liability

Traditionally, banks have been in the business of providing secured or unsecured loans or credit lines to business or individual customers. They may also provide specific project finance, e.g., for a highway, power plant, or port facility. In the course of evaluating creditworthiness, banks typically examine the financial performance and prospects of the borrower, taking into account as far as possible all those factors that may be "material" to the ability to repay the loan. What about environmental factors?

An international survey of private financial service providers (Ganzi and Tanner, 1997) finds that less than half of the 51 respondents "always" or "usually" require that environmental due diligence be performed on lines of credit, project finance transactions, or equipment financing. The vast majority of respondents do, however, require due diligence in at least "some" credit extension. (The primary focus of due diligence until now has been on real estate collateralised debt.) Over half of respondents indicate that they expect to place a "somewhat" or "materially" greater emphasis on environmental risk quantification for credit extension activities in the next few years, with three–fourths of European respondents so indicating but only one–third of North American respondents. Both groups of respondents agree that the priority areas for environmental risk assessment will continue to be real estate secured loans and project finance.

In another international bank survey conducted by the UN Environment Programme, UNEP (1994) finds that four–fifths of the 90 commercial and investment bank respondents perform some environmental risk assessment of borrowers, while fewer than half build environmental liability into their loan contract terms or monitor risks after the loan is made. The survey also finds that the financial risks associated with environmental liability arising from the extension of credit have become a major concern to many financial institutions. Differences in environmental regulations, and liability laws in particular, both within and across national borders pose an increasing problem — and cost — to the industry.

The UNEP survey finds that all the international bank respondents believe the environment will become more important to their operations in the next 15 years and will be increasingly integrated into their core business activities. Extrapolating their own survey

results into the future, Ganzi and Tanner (1997) suggest that environmental due diligence may eventually become a “core component of the credit and investment decision making process”. It would appear, however, that the financial industry is still some way off from that day.

The US legislation known by its acronym, CERCLA (or simply as ‘Superfund’), has made that country’s banking industry rather sensitive in recent years to performing due diligence on collateralised properties. While amendments to the legislation spell out lender exemptions from environmental liability, in some cases the courts have found financial institutions to be liable as effective “operators” involved in the day–to–day management of facilities designated Superfund sites (normally following foreclosure on collateralised properties in the wake of borrower bankruptcy proceedings; cf. cases in Schmidheiny and Zorraquin, 1996). A survey conducted by the American Bankers’ Association following a 1990 court ruling in one such case found that 45.8 per cent of US commercial banks had discontinued financing environmentally risky sectors, such as gasoline stations and chemical plants. The number of banks involved does not necessarily accurately reflect the sums of credit involved, since many are small state and local banks. (It is also not known whether this was a temporary or more long–lasting policy change.) Such restrictions on lending are likely to affect small and medium sized enterprises (SMEs) disproportionately, since their small average loan size makes it difficult to justify costly risk assessments and, in addition, their small size may make them “judgment–proof” in the sense that, should they be bankrupted by a liability suit, they would not have sufficient assets left to compensate the victim(s) (see Pritchford (1995) for a theoretical treatment). So, rather than expose themselves to potentially large liabilities, banks may simply refuse to extend loans to SMEs in certain lines of business.

European bankers have also become more concerned about environmental liabilities following the issuance of a European Commission discussion paper in 1993 on “Remedying Environmental Damage”. Since then, they have lobbied against Superfund–type legislation in Europe, and, until recently at least, governments have generally been sympathetic to their concerns (Schmidheiny and Zorraquin, 1996).

Beyond direct environmental liability, banks face the possibility that liability on the part of borrowers may undermine the capacity to service their debts. In the United States, some federal bankruptcy proceedings have given priority to clean–up costs over loan repayments. Apart from statutory liabilities that can be imposed by laws like CERCLA, companies may also face potential liability for personal injuries and property damages. Thus, as Waite and Jewell (1997) point out, the lending bank must walk a tightrope: on the one hand, it needs to acquire enough information from a customer about potential environmental liabilities; on the other, it must maintain a sufficient distance from the day–to–day operations of that customer to avoid being designated an effective “operator” and thus potentially liable.

The risks to a bank from loan default occasioned by a borrower’s environmental liabilities or of direct liability for clean–up of collateralised property are dependent to a large degree on the laws and legal precedents set in the country of operation of the borrower. Thus, for multinational banks lending to developing country projects or enterprises, those risks would appear to be rather small. This is because few countries outside the United States have comparably strict environmental liability laws, and even fewer developing countries do. On the other hand, in the European economies–in–transition, initial uncertainty

about how far foreign investors in domestic enterprises would assume any environmental liabilities associated with past practices of the latter is reported to have been a major stumbling block to FDI, at least in certain sectors.

Lending for Environmental Investment Projects

Thus far, the discussion has focused on banks' exposure to environmental risks through their lending operations. On a more positive note, banks may profit from financing investments in environmental technologies and projects. The extent to which they might expect to do so depends on the induced demand for cleaner technologies resulting from the combination of government regulation, consumer preferences, and public pressure. For instance, in the 1970s, following the first upsurge of environmental awareness among the citizens of OECD countries and the ensuing wave of national environmental legislation and regulation, corporations were forced to increase significantly their investments in pollution control. With a portion at least of those investments financed from bank loans, there was some impact on the composition of domestic loan portfolios. From the mid–1980s, however, pollution abatement and control (PAC) expenditures in OECD countries have remained roughly constant as a share of GDP. In newly industrialising countries, on the other hand, such expenditures have been rising both in absolute terms and in relation to GDP, and they are likely to continue rising for some time as countries get to grips with severe environmental problems. While a sizeable portion of such investments are still financed through multilateral bank loans, private bank loan portfolios are likely to be affected as well. The most capital–intensive industries happen in many instances (petroleum refining, chemicals, metallurgy, non–metallic minerals) to be among the most heavily polluting, and a rising proportion of capital costs in these sectors is attributable to mandated environmental controls.

Also, many developing countries are undertaking large environment–related infrastructure investments, notably for water supply and municipal sewage treatment, and more frequently incorporating environmental controls in traditional infrastructure projects like power plants. For the most part, these too are still financed by the multilateral banks, but private infrastructure financing is growing, notably in the power generation, telecommunications and transport sectors, but also in water supply and sewage treatment. In a few countries, private project finance has also been raised for hazardous waste treatment facilities (e.g., Malaysia, Thailand). Because of their visibility and their potentially large environmental and social impacts, major infrastructure projects are often closely scrutinised by environmental and human rights advocacy groups (e.g., Narmada, Three Gorges). This can make the financing of such projects a highly charged political issue, at times rendering multilateral financing unfeasible. In those instances, governments or other project sponsors may well turn to the private sector to raise financing. This is the case, for instance, with Three Gorges, where — in the light of World Bank reluctance to provide financial support — an international bond issue is under consideration. Environmental due diligence by potential financiers/underwriters can reduce the risk of financial losses and/or reputational damage, but only assuming that environmental risk perceptions bear a reasonably close correlation to objective risk (something that the "psychology of risk" literature suggests may not always be the case).

The legitimacy of environmental pressure groups' claims inevitably needs to be weighed on a case–by–case basis. In some cases, there may be important global environmental values (like biodiversity, climate change, ozone depletion) at stake. In others, those advocacy groups may claim to speak on behalf of affected parties in developing countries that lack a strong political voice (e.g., because of unrepresentative government, ethnic minority status, poverty, and/or lack of education). Financial institutions, as responsible global corporate citizens, need to give due consideration to the legitimacy of these claims, quite apart from the issue of how ignoring them may affect their bottom line.

V. PORTFOLIO INVESTMENT FLOWS AND THE ENVIRONMENT

One of the most important institutional developments of the last decade has been the phenomenal growth of the mutual fund business and the growing share of OECD wealth tied up in such funds. Whereas in 1987 foreign investment by mutual funds was negligible, at present US mutual funds own 12 per cent of their net assets in long–term global or international equity and bond funds, while US pension funds hold an average 10 per cent of their portfolios in non–US assets (Tesar and Werner, 1998).

As a means of debt finance, developing countries as a group have traditionally relied more heavily on commercial bank borrowing than on bond issues. Before the Asian financial crisis, however, bond issues had been on the rise as more countries acquired investment–grade ratings for their sovereign debt. Latin American governments have relied especially heavily on the bond market, while corporate bond issues are particularly important in Asia.

International portfolio *equity* investment takes two forms: companies from one country listing (or placing) their shares on another country's stock exchange, and investors from one country investing directly in the domestic stock market of another country. The developing country share of international equity issues has been rising and stood at roughly one–fourth in 1997. One important vehicle for foreign investment in emerging stock markets has been privatisation of state–owned companies. In 1997 this accounted for roughly 10 per cent of international placements by developing countries, while foreign participation in privatisation issues from those countries was 44 per cent in 1996 (the bulk of that being through FDI).

The United States, United Kingdom and Japan (in descending order) are the three largest sources of equity and debt portfolio investment in international markets. In 1996 their combined outward portfolio investment amounted to almost $300 billion.

In the case of foreign equity investment, there are two sorts of considerations: what are the requirements of listing an overseas company on one of the major OECD exchanges, and what are the factors that shape the portfolio choices of OECD investors (whether individual or institutional) when they invest in foreign companies' stocks?

The US Securities and Exchange Commission (SEC) has environmental disclosure requirements for publicly traded companies that can influence their environmental practice. These requirements are intended to provide accurate information to shareholders about actual or potential environmental costs that can "materially" affect the firm's financial performance. The requirements have apparently affected the environmental calculations of some newly privatised companies in Latin America in the course of their preparations for listing on US stock exchanges (Gentry, 1998). One such example is the Argentinian national oil company, which found that improved environmental disclosure facilitated access to the US stock market (OECD, 1999). This could be a powerful incentive indeed in initial public offerings (IPOs), since the launch price of the stock (hence the capital raised per share issued) depends critically on the strength of demand for the IPO. If that demand is limited to a small domestic equity market (one moreover in which foreign investment is capped), the price could be much lower than if the company were able to tap into the enormous potential demand in a market like the United States.

Normally, placements on the US or other overseas exchanges take the form of ADRs (American Depository Receipts) or GDRs (Global Depository Receipts), which allow firms to avoid domestic limits on foreign ownership of shares. Disclosure requirements for ADRs differ by level, with "level 1" having the most lenient requirements. This type of ADR is popular among those foreign companies wanting to list on the US exchanges but having difficulty meeting more stringent SEC registration requirements. The lax disclosure requirements applying to many ADRs placed by privatising emerging market companies could lead investors to undervalue potential risks, especially since many such companies operate in infrastructure and heavy industry where environmental impacts can be significant (OECD, 1999). Those risks depend primarily on the stringency of environmental laws and regulations in the foreign countries of operation — not only on current ones but also on expected future ones. It seems reasonable to expect that, in most rapidly growing economies, environmental regulations will grow stricter over time. Then the question is how that might affect the future earnings prospects of a particular company (for discussion of a new accounting method for examining this question, see Repetto and Austin, 2000).

In mid–1999, the Government of the United Kingdom introduced new disclosure requirements for pension funds (effective July 2000), whereby they must state whether they have a policy on ethical investment (*The Independent*, 2 July 1999). Ethical investment (also known as SRI, for *socially responsible investing*) is a concept that emerged in the 1980s to describe the targeting of investments away from companies that: *i)* engage in arms manufacture or manufacture of tobacco products, *ii)* are implicated in serious environmental degradation, *iii)* engage in corrupt practices, in particular, supporting undemocratic governments, and/or *iv)* have poor records of management–employee relations. Under the rule, however, those funds wanting to avoid scrutiny of their portfolios by pension investors can simply state that they have no policy.

One global effort aims at achieving consistency in environmental reporting standards on a par with standards of financial reporting. The Global Reporting Initiative has been launched by the Coalition for Environmentally Responsible Economies (CERES), with help from non–governmental organisations (NGOs) and some companies. In March of 1999, CERES issued a draft of its proposed Sustainability Reporting Guidelines, which are currently being tested by several multinational corporations. Also, the major accounting/consultancy firms have been developing new reporting and auditing techniques to address environmental and social performance criteria (*Financial Times*, 15 July 1999).

Despite these efforts, portfolio investment managers seldom feel compelled at present to take environmental factors into account when allocating their portfolio because these factors are usually not "material" — i.e., significant enough to affect the corporate bottom line. This is borne out by the above–mentioned survey of private financial institutions, which finds that only 10 per cent of respondents indicated that they "always" or "usually" apply environmental screening criteria to investment decisions in the area of stocks and bonds (Ganzi and Tanner, 1997).

One of the most difficult issues to be resolved if portfolio investment flows are to become more environmentally sensitive is the interpretation of the fiduciary (or trustee's) duty of investment fund managers. By law, they are bound to minimise risk, maximise returns, and preserve capital. On the narrowest interpretation of this duty, introducing environmental, ethical or other criteria than financial performance into investment decisions would be indefensible. The "prudent man rule" remains dominant within modern–day

investment culture. New financial engineering products like derivatives are even farther removed from environmental or social concerns than are traditional financial instruments. A 1994 survey by *Institutional Investor* found that 90 per cent of the (mostly corporate) pension funds surveyed considered "economically targeted investing" (whereby a portion of funds is directed into socially important areas like low–cost housing) to be out of line with their interpretation of fiduciary duty (Schmidheiny and Zorraquin, 1996).

Investment fund managers are paid to serve their clients or, more often, share in the financial gains from investing clients' assets. So, it is unlikely that there would be a significant reinterpretation of the "fiduciary duty" of such managers unless pressure were brought to bear by the shareholding public and the major institutional investors. There have been some instances of such pressure (e.g., in the case of the Edinburgh Java Trust that was investing pension funds for several British institutions in, among others, an Indonesian company fined in 1990 for illegal logging). As of the early 1990s, however, this remained the exception. For instance, in an early 1990s survey of 85 top financial analysts in the City of London, 58 per cent indicated that non–financial issues like the environment are unimportant to clients, though one–third said they had received requests from customers for information on environmental issues (conducted by Extel Financial and cited in Schmidheiny and Zorraquin, 1996).

Attitudes of investors towards SRI appear to have become somewhat more favourable since the mid–1990s, perhaps reflecting in part a "warm glow" effect associated with booming equity markets, in part the preferences of the "baby boomers", particularly in the United States, regarding the investment of their retirement savings. Thus, the Social Investment Forum's *1999 SRI Trends Report* estimates that, as of 1999, roughly 1 of every 8 dollars under professional management in the United States was in some form of social investing (mostly socially screened portfolios, shareholder advocacy, or a combination of the two). Moreover, from 1997 to 1999, assets defined as SRI have grown at roughly twice the rate of all assets under management in the United States.

There is also some evidence, both for the United States and for a few emerging stock markets, that investors *are* sensitive to publicity concerning listed companies' environmental performance. In the former case, Hamilton (1995) finds that access to toxics release inventory (TRI) data (provided for by US law) had a statistically significant negative short–term effect on firms' stock market valuations (averaging $4.1 million), which was exacerbated by any subsequent press coverage. Dasgupta *et al.* (1999), based on a study of several markets (Argentina, Chile, Mexico and Philippines) find that local stock market prices do respond to certain types of "good news" and "bad news" (in the form of press reports) about a company's environmental performance. While the explanation for this reaction remains elusive, perhaps shareholders are viewing the environment as increasingly material to the bottom line. In the absence of information on environmental performance in filings with the regulatory authorities, press coverage is probably the main source of such information. Perhaps in time, more securities exchange authorities in emerging markets will adopt environmental disclosure rules similar to those of the US SEC, in which case investors could expect to be regularly informed about how environmental factors are likely to affect listed companies' results and could factor this information into portfolio choice. As more and more emerging market companies seek public listings, a growing segment of the business community would be subjected to a similar discipline. The question remains, however, of how effective that discipline would be in countries lacking the strong environmental liability laws that govern enterprise behaviour in the United States. Would expectations of strict enforcement of environmental regulations and standards suffice?

VI. INSURANCE MARKETS AND THE ENVIRONMENT

Environmental Risk Insurance

Perhaps the segment of the financial sector that can least afford to ignore or downplay environmental issues is the insurance business. For some players in this business at least, the environment is a “life or death” issue. There is concern in some quarters that the environmental claims associated with climate change could bankrupt the industry. According to one recent industry assessment, insurance providers will need to take into account scenarios involving the possibility of an increasing average loss burden, with larger year–to–year fluctuations, which may be reflected in higher premium rates (Swiss Re, 1999).

Presently, there are two main types of environmental coverage provided by insurers: pure risk transfer, which addresses third–party bodily injury and property damage, and a combination programme that covers this plus self–finance risk management, e.g., to protect buyers of a commercial property from the cost of cleaning up pollution of which they were unaware. (The latter in particular is an artefact of the US legal system and, more specifically, of Superfund.) The business of insurers involves calculating risk and limiting damage and, in this sense, they have a natural affinity with environmentalists. Thus, the precautionary principle advocated by the latter is a logical extension of good insurance business practice. The marketing of environmental risk insurance in the United States has given insurance companies a considerable expertise in the management methods and technology options for containing or obviating those risks. Information on environmental risk reduction is transferred as a matter of course from insurers to customers as part of the business relationship, since adoption of appropriate practices is in both parties’ self–interest: the former by reducing expected payouts, the latter by reducing insurance premia. It is expected that climate change related damage risks will cause insurance companies to become even more involved with clients in risk management — e.g., in ensuring adequate construction standards, sea protection, tree management, etc. (Dlugolecki, 1994).

At the same time, the prospect of widespread damage from climate change raises a whole new set of issues and calls for new approaches from the insurance industry. Re-insurers – those in the business of insuring insurers against catastrophic risk – are in the forefront of efforts to move the industry towards a more activist stance, both in its own investment strategy and in the political arena. The first is somewhat alien to the character of the industry which, in its investment strategy, is among the most conservative, holding the bulk of assets in government bonds. Thus, though the commercial interests of some insurance companies are in conflict with those of fossil–fuel–dependent industries in the matter of climate change policies, it is questionable how far the former would be willing to back with their money (over $1 trillion in assets under management) climate–friendly technologies and the companies that provide them. Perhaps strategic support for such technologies through an industry–sponsored venture capital fund would be one option worth considering. More likely is a flexing of lobbying muscle in an effort to shape government policies in a more climate–friendly direction, though the diversified nature of the industry complicates any such effort.

Climate change poses a special challenge for the insurance business because of the massive uncertainties involved and the difficulties of predicting future events based on historic ones. The industry is in the business of providing protection against catastrophic loss from natural disasters, and the magnitude of such losses can vary widely from year to year, but there is no way of knowing at present what the probability is that future losses will not turn out on average to be an order of magnitude or more higher than those of the last few decades. This is necessarily making the insurance industry more cautious about the terms of contracts (in particular, clauses providing full replacement or guaranteed replacement cost), forcing consideration of increased deductibles and higher premium rates, and perhaps eventually limiting or excluding insurance cover to certain types of customers or property (Nutter, 1996). To the extent that property insurance cover becomes prohibitively expensive (or unavailable) to those customers, this will undoubtedly increase investors' risk perceptions and, in the case of traded companies, exert downward pressure on their stock market valuation.

Beyond the property insurance business, climate change could also significantly affect health and life insurance, to the extent that it is associated with changed rates and patterns of human morbidity and mortality. Shifts in agricultural production could affect crop insurance. No matter how successful the insurers and insured are in adapting to the new environment, some of the risks of climate change will remain largely uninsurable and will therefore have to be borne by society at large — e.g., damage to ecosystems, gradual degradation and loss of economic value of coastal property (Knoepfel *et al.*, 1999).

The likelihood is that a very sizeable portion of the physical damage and loss of life caused by natural catastrophes associated with climate change will occur in developing countries, where private insurance markets are still quite underdeveloped. Unless adequate defensive investments can be made in advance (another kind of "insurance policy", but one with high up–front costs), the result is likely to be a growing demand for disaster relief services and consequently a growing claim on the tax revenues of both the developing countries themselves and of those OECD countries that shoulder their share of the responsibility to assist them. Given this prospect, it might make sense to enlist the risk management expertise of the private insurance industry in support of stronger avertive measures in vulnerable developing countries. The Kyoto Protocol's article authorising the establishment of a Clean Development Mechanism (CDM) for financing climate mitigation investments in developing countries does indeed earmark an unspecified portion for assisting adaptation in the most vulnerable developing countries. It may be possible to devise insurance policies that would enable developing country governments to transfer some of the risk from severe weather events (whether induced by climate change or not) to international financial markets. The World Bank, for example, has devised an experimental project for "Rainfall Risk Management" in Nicaragua in which ODA will initially finance the government's premia payments on an insurance contract linked to a rainfall index. Sustainability beyond the ODA phase is naturally a question.

Other Types of Insurance (and Guarantees)

Besides environmental risk insurance *per se*, other types of insurance can have environmental implications. In particular, certain public–sector financial institutions in developed countries extend insurance cover (or investment guarantees) to projects or commercial transactions involving developing countries. According to one recent report by *Friends of the Earth*, while most OECD–based development co–operation agencies

and multilateral development banks have detailed social and environmental procedures, most export credit agencies (ECAs) and public investment insurance agencies have few if any environmental and social standards. We were not able to conduct a thorough survey of OECD–based ECA policies and practices, but a quick search of Internet websites of the US and Japanese Ex–Im banks suggests that this conclusion requires, at the least, some qualification. In the case of the United States, for example, the Ex–Im Bank states in its environmental procedures: “The Bank will decline to finance an export transaction if the Board of Directors determines that this is appropriate in light of the project’s serious adverse environmental impacts”, and it requires applicants for financing to submit adequate environmental documentation. It also publishes a list of hazardous chemicals that are excluded from export credit insurance coverage. Before its recent merger with the Overseas Economic Co–operation Fund (OECF) to form the Japan Bank for International Co–operation (JBIC), the Japanese Ex–Im Bank had extended a number of environment–related loans. For example, in the energy sector, the bank has financed several co–generation projects in China; it has co–financed a loan with the World Bank to improve air quality in Shanghai; and it has made a large loan to Russia for coal industry reform, including reduction of coal subsidies. Moreover, the Environmental Guidelines of JBIC state the following: “While confirming that appropriate consideration is given to the environmental aspects of the project, JBIC has an affirmative policy to finance those projects that are designed to improve the environment, including those that reduce the emission of green house gas”.

The US Ex–Im Bank environmental procedures make reference to an ongoing effort “to seek agreement among the other export credit agencies within the framework of the Organisation for Economic Co–operation and Development (OECD) on appropriate responses to environmental issues associated with financial support of foreign projects”. This suggests something less than unanimity among OECD countries on how ECAs ought to treat environmental concerns that arise from their financing and insurance activities. In April 1999, agreement was reached within the OECD Working Party on Export Credits and Credit Guarantees “to refine case–by–case voluntary environmental information exchange” procedures for large projects (where ECA support exceeds US$100 million) in environmentally sensitive sectors like mining and power. The same Working Party’s April 2000 “Action Statement on the Environment” does not point to the emergence of a stronger consensus, calling for continuing work on methodologies for identifying and assessing environmental impacts of ECA–supported projects and endorsing a work–plan to be completed by end–2001.

Where agencies, whether bilateral or multilateral, provide investment guarantees or insurance cover, they have the potential to leverage sizeable amounts of private foreign investment. The sorts of projects most likely to need insurance against political, or country, risk are precisely those in the oil, mining and other resource extraction sectors, and also in the energy sector, where sovereignty issues are most sensitive and where environmental impacts are also apt to be greatest. In 1998, for example, 36 per cent of projects supported by the US Overseas Private Investment Corporation (OPIC) were in the minerals and energy sector — by far the largest sectoral beneficiary. The multilateral and major bilateral investment guarantee and insurance agencies generally have environmental guidelines (e.g., since 1985, OPIC has been required by statute to assess the environmental impacts of projects under consideration for political risk insurance and financing), but evidence on how faithfully environmental procedures are followed is merely anecdotal. For example, OECD (1997) cites an October 1995 case where OPIC took steps to cancel political risk insurance cover for a US mining company, Freeport McMoRan, operating a large gold

mine in Indonesia because of what were judged to be deficient environmental practices. OPIC itself, in its premier Environmental Report (1998), mentions the case of a gold mining project in Kyrgyzstan for which it insured a trust funded by Chase Manhattan Bank and other lenders to the Kumtor Operating Company (KOC), the local investor. A May 1998 truck accident involved the spillage of 1 700 kg. of sodium cyanide used in the mining operation into a river upstream from a village and a popular lake resort. Following this, in July of that year, OPIC organised a meeting with KOC and the other project financiers to review and strengthen emergency response procedures and examine the transportation route for the chemicals. It continues to monitor the project's compliance with international environmental standards and best practices.

Potentially at least, bilateral and multilateral investment guarantee agencies can significantly influence environmental performance of private FDI in developing countries. Denmark's Industrialisation Fund for Developing Countries (IFU) participates as joint venture partner and/or lender in roughly half of all Danish investment projects in developing countries, requiring all partners to abide by its Environmental Guidelines (Eriksen and Hansen, 1999). Even if one discounts somewhat for self–promotion, the World Bank's Multilateral Investment Guarantee Agency (MIGA) claims that in 1998 its guarantee operations facilitated foreign investment worth $25 billion, compared with total net private capital flows to emerging markets in that year estimated at $143 billion (IIF, 1999). MIGA's total exposure has consistently risen since its founding in the late 1980s. Like similar bilateral institutions, its principal appeal is in its ability to attract FDI to countries that otherwise might receive little because of their high political risk. Insofar as those countries are also among the least developed in terms of environmental and other institutions, the ability of an investment guarantee agency to act as surrogate for a national environmental regulatory agency is especially important.

VII. CONCLUSIONS

The developing world will continue to attract sizeable net capital flows from the OECD countries in the decades to come. This should be good for their development prospects, assuming macroeconomic management limits risks of excessive volatility and encourages a healthy share of FDI in total flows. Rapidly growing developing economies are certain to face environmental problems, as do many of the Asian "tigers" — not least, China. While FDI from the OECD area may well raise environmental standards locally, it is no substitute for an effective government policy framework, including strong and impartial enforcement.

Corporate codes of conduct and international guidelines are likely to govern the environmental practices of only a portion of the companies involved in FDI — mainly the biggest. The challenge facing host country governments is to influence the environmental behaviour of the many medium– and small–scale foreign investors. Home–country governments can assist them in this endeavour insofar as these investors are beneficiaries of publicly provided credit guarantees and investment risk insurance, which usually come with environmental "riders".

Until recently at least, other types of capital flow have been less responsive to environmental concerns. While in their domestic operations, US banks are bound by strict legal liability (notably under Superfund) to perform environmental due diligence on collateralised real estate of their borrowers, the law does not apply abroad and other countries have been reluctant to introduce similar legislation. Equity fund managers are bound by fiduciary duty to focus singlemindedly on financial performance, though some evidence suggests that short–run stock market performance may be affected by adverse environmental information. Also, a growing number of investors appear to favour "socially responsible investment" of at least a portion of their portfolios, which usually involves some environmental screening.

If the world community should decide that climate change poses a sufficiently urgent threat to global prosperity to warrant more forceful action than is mandated by the Kyoto Protocol, then it is inevitable that the developing countries will need to acquire the resources to slow their own greenhouse gas emissions. Though there is still intense debate on how these resources are to be mobilised, most agree that significant transfers from high–income to lower–income countries will be required. Seriously addressing global warming is likely to provide a significant boost to North–South capital flows. A portion of those flows will be channelled through multilateral development banks and funds managed by those banks (on the model of the Global Environmental Facility) or jointly by the Parties to international environmental agreements (e.g., the Multilateral Fund under the Montreal Protocol). Private companies will also contribute a sizeable share, as they seek to acquire low–cost carbon credits by investing in greenhouse gas mitigation or sink enhancement projects in the developing world.

Private financial institutions will almost certainly become actively involved in financing climate–change–related global investments. If not, they could be forfeiting a significant new business opportunity. Any projects financed as part of a global climate change mitigation strategy (e.g., under the Clean Development Mechanism provided for in the Kyoto Protocol) would require certification of their "carbon savings", and so investors' interest in a given

project would be in part a function of its “carbon certifiability”. Thus, the emergent global carbon permit market has a potential to catalyse the environmental awareness of the global banking and broader financial community.

Within the financial community, the insurance industry has taken the lead in addressing climate change. This reflects concerns for self–preservation in the face of uncertain but potentially enormous future payouts for climate–change–induced damages — from storms, floods, droughts, forest fires, etc. While in terms of “value at risk”, vulnerable locations (e.g., some coastal areas) of OECD countries may surpass developing countries, in terms of threats to life and physical damage to productive assets, the latter are likely to face far greater risks. This poses particular insurance challenges, since by definition poor countries are less able to afford the premium payments to ensure adequately against those risks. International financial institutions are beginning to rise to the challenge.

More positively, the emergence of climate change as a major global policy concern would almost certainly spawn a new set of growth industries devoted to addressing the technological challenges of mitigating greenhouse gas emissions, sequestering carbon, brokering trades in GHG emission permits, and helping societies and economic systems adapt to the consequences of such change. Yet, while some market participants may be allies in the effort to avert a “worst case” climate scenario (e.g., insurance companies fearing bankruptcy from future environmental liabilities, renewable energy suppliers and their financial backers, etc.), ultimately public pressure on governments around the world to take more forceful preventative measures will be decisive.

NOTES

1. See column by Peter Dauvergne, page 27 of *Far Eastern Economic Review*, 15 July 1999.
2. See JETRO's website at: http://www.jetro.go.jp/top/index.html.
3. During the course of discussions leading to endorsement, concerns had been raised by at least one OECD country about possible adverse impacts on inward FDI of adoption of the guidelines.
4. Professor Masanori Kondo of International Christian University, Tokyo, has initiated a research project on "Foreign Capital and Pollution", with support among others from the World Bank. He intends, through an extensive firm survey in Asia, to explore what factors shape the environmental performance of overseas subsidiaries and to shed light on the role of country of origin.
5. Comprehensive Environmental Response, Compensation and Liability Act.
6. This report can be downloaded from http://www.socialinvest.org/areas/news/1999–trends.htm.
7. According to Franklin Nutter, president of the Reinsurance Association of America, nearly half of the insured losses from natural disasters during the past four decades have been incurred since 1990. This reflects in part the increased frequency of natural catastrophes, in part the significantly increased value of insured losses. In his words, "The insurance business is first in line to be affected by climate change; it could bankrupt the industry" (Evan Mills, "Claims on The Global Warming Debate", *The Washington Post*, 4 December 1997, p. A23).
8. In the event, it is possible that government will intervene to ensure that insurers provide continued cover, as has occurred in hurricane–prone areas of Florida, USA, according to Dlugolecki (1996).
9. Weather futures markets are also evolving rapidly as an alternative to insurance. Currently, the main traders are energy utilities and other large weather–sensitive enterprises in OECD countries. These companies are willing to pay a premium to ensure a steady profit stream in the face of unpredictable weather variations. A benefit of using financial derivatives rather than insurance is the possibility of trading out of the asset if the market moves in such a way that the profit outweighs the remaining risk. Naturally, the future evolution of prices of specific weather futures will depend on whether there are long–term climate trends which tend to shift demand — e.g., by raising the probability over time of above average temperatures. See *Financial Times*, Supplement on Derivatives, 28 June 2000, p. 6.
10. Another recent report, by the World Resources Institute (WRI, 2000), finds that over 70 pour cent of ECA–supported projects involve fossil fuel exploration, extraction, processing, distribution or power generation, raising concerns about the consistency of such practices with objectives of the UNFCCC.
11. See the JBIC website: http://www.jbic.go.jp/english/environ/index.html.
12. See OPIC website at http://www.opic.gov for more details of its environmental procedures.
13. Already, the reinsurer Swiss Re has expressed interest in securitising international emissions trading permits. It also sees a substantial business opportunity in helping clients assess their carbon liabilities and assets. See *The Economist*, 30 October 1999, p. 83.

BIBLIOGRAPHY

DASGUPTA, S., B. LAPLANTE, AND N. MAMINGI (1999), "Pollution and Capital Markets in Developing Countries", Policy Research Department, World Bank, Washington, D.C., January (processed).

DLUGOLECKI, A. (1994), "Climate Change and Financial Services", in *UNEP Bank Report September 1994: Greening Financial Markets*, Environment & Trade Unit, United Nations Environment Programme, Geneva.

DLUGOLECKI, A. (1996), "An insurer's perspective", in Leggett, *op. cit.*, pp. 64–81.

ERIKSEN, J. AND M.W. HANSEN (1999), "Environmental Aspects of Danish Direct Investment in Developing Countries", report to UNCTAD/DICM Project, Copenhagen Business School.

ESKELAND, G.S. AND A.E. HARRISON (1997), "Moving to Greener Pastures? Multinationals and the Pollution Haven Hypothesis", Policy Research Department, World Bank, Washington, D.C., January (processed).

FRIENDS OF THE EARTH (1999), *A Race to the Bottom: Creating Risk, Generating Debt, and Guaranteeing Environmental Destruction*, Washington, D.C.

GANZI, J.T. AND J. TANNER (1997), "Global Survey on Environmental Policies and Practices of the Financial Services Industry: The Private Sector", National Wildlife Federation, Washington, D.C. (website: www.nwf.org).

GENTRY, B.S. (ed.) (1998), *Private Capital Flows and the Environment: Lessons from Latin America*, Edward Elgar, Cheltenham.

HAMILTON, J.T. (1995), "Pollution as News: Media and Stock Market Reactions to the Toxics Release Inventory Data", *Journal of Environmental Economics and Management*, 28, pp. 98–113.

HANSEN, M.W. (1998), *Transnational Corporations in Sustainable Development*, PhD. Series 3.98, Copenhagen Business School.

IIF (Institute of International Finance, Inc.) (1999), "Capital Flows to Emerging Market Economies", Washington, D.C.

KNOEPFEL, I., J.E. SALT, A. BODE AND W. JAKOBI (1999), "The Kyoto Protocol and Beyond: Potential Implications for the Insurance Industry", UNEP Insurance Industry Initiative, Geneva, 10 June.

LEGGETT, J. (ed.), (1996), *Climate Change and the Financial Sector: The Emerging Threat — The Solar Solution*, Gerling Akademie Verlag, Munich.

NUTTER, F.W. (1996), "A reinsurer's perspective", in Leggett, *op. cit.*, pp. 82–90.

OECD (1997), "Foreign Direct Investment and the Environment: An Overview of the Literature", Paris, December (processed).

OECD (1999), *The Environmental Effects of International Portfolio Flows*, Working Party on Economic and Environmental Policy Integration, Environment Policy Committee, Environment Directorate, ENV/EPOC/GEEI(98)23/FINAL, 3 March.

OMAN, C. (2000), *Policy Competition for Foreign Direct Investment: A Study of Competition among Governments to Attract FDI*, Development Centre Studies, Paris.

PRITCHFORD, R. (1995), "How Liable Should A Lender Be? The Case of Judgment–Proof Firms and Environmental Risk", *American Economic Review*, Vol. 85, No.5, December, pp. 1171–1186.

REPETTO, R. AND D. AUSTIN (2000), *Pure Profit: The Financial Implications of Environmental Performance*, World Resources Institute, March.

SCHMIDHEINY, S. AND F. ZORRAQUIN (1996), *Financing Change: The Financial Community, Eco–efficiency, and Sustainable Development*, MIT Press, Cambridge, MA.

SWISS RE (1999), *Sigma*, No.1/1999, Zurich.

TESAR, L. AND I. WARNER (1998), "The Internationalization of Securities Markets since the 1987 Crash", in R. LITAN AND A. SANTOMERO (eds.), *Brookings–Wharton Papers on Financial Services 1998*, Washington, D.C.

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