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*Review*

# International Business and Environmental Issues - Some Empirical Evidence from Transition Economies*

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**Abstract**

A review of the existing scientific literature regarding world trade and foreign direct investment (FDI), both theoretical and empirical, demonstrates the existence of a growing link between international business and protection of the natural environment, in both positive and negative directions. Some authors voice the opinion that accelerated deregulation and trade liberalization play a particularly important role in this relationship. Environmental norms and standards play a significant role in determining the competitiveness of goods and products on the international market. There are a number of different norms and standards concerning environmental management and the implementation of systems of environmental management. Among the most significant is the EMAS system and the concept of an integrated environmental management system according to ISO 14001 that is based on the fundamental elements of the Total Quality Management (TQM) idea.

In light of the explosive expansion of international trade in environmental services that promote "clean" technologies and production equipment, a firm's proper environmental policies may have a positive effect on the international competitiveness of its products and services, yielding an advantage to those producers and exporters who first initiate and implement them.

The aims of this paper are:

- to analyze the general impact of international business on the environment in transition economies,
- to present the results of macroeconomic comparative research concerning changes in the export and import positions of two selected groups of goods and products in countries which have undergone systemic transformation,
- to examine motives of foreign investors for investing in CEE countries connected with environmental issues and to analyze environmental protection strategies implemented by foreign investors, their participation in environmental protection programs and the influence of these activities on the competitiveness of foreign firms, and
- to present the results of a survey of 286 enterprises in Poland concerning the relationship between the application of European and international environmental norms and standards and the enterprises' competitiveness in both domestic and foreign markets prior to Poland's entrance to the European Union.

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## Theoretical Framework

### Foreign Trade and the Environment

International trade becomes a significant contributing factor in effecting strategies of stable development among participating countries when raw material resources are effectively utilized in production and when the cross-border movement of environmentally friendly products and technology is encouraged. Trade and free trade policies regarding the movement of goods have a significant impact on the environment and should be closely connected with the basic standards of environmental protection policies. In countries with high environmental protection standards, losses resulting from environmental destruction have been assessed at 1-2% of GNP, while in countries with much lower standards of protection, these losses have been known to reach 3-5% of GNP [1].

Applicable regulations regarding environmental protection standards may encompass both the protection of indigenous natural resources as well as bans on the import of goods that may be harmful to the environment, such as large vehicles with excessive emissions that pollute the air, products containing heavy metal compounds such as lead, very noisy vehicles or machines and devices or fuels that may be harmful to the environment [2].

The effects of raising environmental protection standards in a given country's foreign trade practices become especially visible in the following sectors of the economy: agriculture, forestry, fishing, transport, as well as in "heavy" industry sectors such as mining, metallurgy and "heavy" chemical production. These effects are usually two-sided; on the one hand the trade of goods harmful to the environment is limited (these goods usually belong to the above-mentioned industrial sectors and are known as "raw material absorbent" - they have a negative impact on the flow of imports and exports taking place between a country and its foreign trade partners), while on the other hand the raising of standards can cause a trend towards cleaner technological production through the reallocation of production resources, which will be closer to meeting international standards (which in turn will translate into more effective competition on foreign markets and an improvement in competition among enterprises in foreign as well as domestic markets, and will in the long run stimulate a rise in exports). Goods which may also have a significant impact on the changing face of foreign trade are those which encourage the improvement of the state of the environment, mainly goods and services related to the measurement, prevention and/or moderation of water and air pollution, as well as those that aid in the resolution of problems regarding waste, noise pollution and ecosystems. These encompass cleaning technologies, goods and services that limit environmental risk and lessen the pollution and exhaustion of natural resources, recycling, as well as waste disposal plant, tools and technology [3, 4].

From a review of studies published concerning the relationship between trade and environmental protection, it can be concluded that the effects of this relationship may be positive and negative. Some authors [5] believe that the accelerated deregulation and liberalization of trade is a factor of major importance in this regard. Generally speaking, two distinct opinions can be portrayed. The traditional approach is that environmental standards limit the competitiveness of companies, which are forced to adopt these standards and as a result limit their export potential. The more contemporary opinion is that the implementation of appropriate environmental standards has long-term benefits which should improve the competitive position of complying companies in the long run [6].

In examining the relationship between foreign trade and the transfer of pollutants, it is useful to distinguish between overt and covert transfers. Overt transfer occurs when pollutants are emitted across borders through the air, water or land as a result of natural causes (wind, oceanic or river currents) as well as human transport of pollutants (waste and other harmful products) onto other countries' territories. Covert transfer occurs through the import of goods and services which degrade the environment in the country of origin. The importing country, while usually avoiding the direct effects, nevertheless is a covert contributor thereto.

Empirical studies on the impact of foreign trade on the environment are scarce in the existing scientific literature. Nevertheless, an interesting analysis of this issue was presented by W. Antweiler, who created an index (the Pollution Terms of Trade Index - PTTI) that represents the quantity of pollutants emitted as a result of the production of exportable goods worth one US Dollar, as compared to imported goods of the same value (the index is multiplied by 100). This is a *terms of trade* index, which means that the prices are replaced by the amount of pollutants. If the index is higher than 100 and if a given country conducts zero-balance foreign trade, then this exchange results in an increase in pollutants in this country's territory [7].

A number of publications analyzing foreign trade with respect to environmental protection factors are available [8, 9]. One of the most complex of these analyses regarding the interdependence of competitiveness and environmental protection standards is that of the World Bank, in which P. Sorsa develops determinants in the trade of environmentally-sensitive materials, as categorized in level 3 SITC, whereby changes in the structure of trade volume were analyzed during the period 1970-1990 [10].

One can conclude from the European Commission's analysis that even though it may be very expensive to achieve positive results within the scope of environmental protection, there are also benefits to be had related to the improvement of the productivity of utilized resources, increased competitiveness, and a positive effect on employment levels [11]. These studies also show that although there is no direct correlation between economic growth and environmental protection, it would be very difficult to achieve a continuous improvement in the state of the environment without economic growth [12]. Economic growth in and of itself is capable of generating addi-

tional resources that may be utilized in limiting pollution and protecting the environment. Positive effects can be strengthened even more by appropriate economic policies, including trade policy.

The relationship between trade policy and environmental protection raises two main issues. The first is based on answering the following question, "what type of trade policy should be adopted from the environmental protection point of view?" - in other words, what trade restrictions should be enforced if we are dealing with cross-border environmental protection issues as well as with common global resources? The second problem is related to the variation of environmental protection standards among nations and how these standards relate to competitiveness. Here, the question posed is, "do lower environmental protection standards have an effect on "unfair" trade advantages?, which includes the problem of using these lower standards as non-tariff barriers.

## FDI and the Environment

The environmental implications of FDI are the subject of special interest on the part of international organizations (e.g. the UNO and OECD), governments of investors' home countries, host countries and non-governmental organizations (NGOs) acting for the sake of environment protection. The issue of the impact of FDI on the environment stirs essential controversies. On the one hand, FDI is perceived as a potential burden for or an outright threat to the environment, especially in less developed countries, for it entails the use of land and raw materials and contributes to growth of consumption in host countries. By introducing new products into the market, foreign investors' activity may also contribute to a change in the consumption patterns in the host country in the direction burdening the environment. Furthermore, the gap in the environment protection standards between developed and developing economies may contribute to the creation of the so-called "pollution havens", since it encourages the transfer of "dirty" industries to countries with lower environment protection norms. There may also arise a problem of the so-called "cascading pollution havens" when a firm contracts its "dirty" production processes with other enterprises so as to make an impression of being environmental-friendly [3, 4]. According to the other group of views, FDI contributes to improvement in the state of the environment, for the investing firms coming mainly from the OECD countries possess more advanced and cleaner technologies than firms in the less developed host countries. Thus FDI leads to improvement in efficiency and transfer of know-how in the area of management. As a result, the environmental protection level in the host country is raised by bringing the protection norms closer to the standards binding in developed countries (the "pollution halo" effect). Foreign investors' activity may also find its reflection in environmentally favorable changes in the consumption patterns.

The research - although there are too few of them - allow surmizing that FDI generates both positive and negative environmental effects. The balance sheet of these influences is dependent on the characteristics of the investor, the sectoral structure of investments and their geographical location. The verification of the extreme hypotheses encounters methodological difficulties and lack of data.

Transnational corporations, like domestic companies, use natural resources in their production processes. Their methods of dealing with the problems associated with their use, however, differ from those applied by domestic companies. For in addition to the common problem all companies have of dealing with the environmental effects of their own activities, transnational corporations have to deal with the issue of the potentially negative environmental effects their foreign affiliates and subsidiaries may produce. The issue thus arises of transborder management, taking into account the issue of environmental protection [18]. In dealing with this problem transnational corporations, like other companies, have two strategies to choose from:

- **The so-called "end of the pipe" strategy,** whereby a firm focuses on technologies which address the twin problems of waste disposal and removal of pollutants. This strategy is designed to *eliminate* negative environmental effects.
- **A strategy oriented on production processes and products,** whereby a firm focuses on *avoiding* negative environmental effects from the very beginning of the production process.

The first strategy is usually chosen by firms which treat environmental issues as a burden on the firm or where there exist limitations on the use of natural resources or available technologies. The second strategy is usually chosen by firms who treat environmental protection as a basic challenge and integrate it into the decision-making process regarding cost allocations and profits.

Regardless of which strategy is chosen, transnational corporations also must choose between alternative implementation strategies within their corporate structures ([18] pp. 292-293). These strategies are:

- **a decentralization strategy**
- **a centralization strategy**

In a decentralization strategy, decisions involving the implementation of environmental protection measures are made at the level of the foreign affiliate or subsidiary companies, based on environmental regulations, norms, and standards applicable in the country where the affiliate is located. If the environmental protection laws of the recipient country are less restrictive than those of the country where the transnational corporation is located, the affiliate company can choose either a strategy based on reducing environmental costs to a minimum, or it can choose to implement a pro-active policy and a responsible strategy of environmental protection. The affiliate company is charged with knowing the environmental protection norms and standards to which it is held and imple-

menting measures to see that it is operating in accordance with the environmental protection laws of the host/recipient country.

In a centralization strategy, the transnational corporation's environmental decisions and policies apply across-the-board to the entire company, which is treated as a single system. This strategy is aimed at assuring that the transnational corporation's stance, position, and policies regarding environmental protection are uniform throughout the company regardless of the country in which it is operating, and as a corollary that the activities of an affiliate will not harm the reputation of the company itself or other affiliates.

The relationship between the implementation of environmental norms and standards and the competitiveness of transnational firms in compliance therewith continues to be the subject of widespread research. Initially it is worth examining the results of a Latin American survey aimed at identifying *advantages* that firms incurred by implementing environmental protection programs and strategies and complying with prevailing norms. The empirical survey indicated five areas where such firms benefited ([14], pp. 276-292), as follows:

- **increased access to export markets** as a result of trade advantages arising from increased consumer demand for high quality, environmentally friendly products, especially in highly developed countries. In addition, EU legislation concerning *eco-labels* has also focused exporters' attention on the environmental aspects of their products.
- **increased cost productivity –** International firms are increasingly aware of the costs resulting from the imposition of fines and penalties for environmental damage. Thus firms engaging in foreign investment are interested in achieving a balance for their invested capital between increased production and the environmental costs associated therewith. Finding the proper balance is important in securing a firm's competitiveness on the global market.
- **achieving and maintaining "public acceptance" –** Transnational corporations are under increasing pressure to be "friends of the planet," both at home and abroad. Their public relations image may play a significant factor in the awarding of public contracts, concerning, for example, water supply, etc.
- **access to financing –** Investors are also acutely aware of the increasing linkage between environmental policies and investment financing. This is particularly true in seeking financial support from public and international organizations, but increasingly so from private banks as well. The risk of creating environmental harm is closely associated with financial risk.
- **investment in the area of environmental protection –** Additional investment funds, sometimes offering profits, are being made available for environmental protection and clean-up programs, such as sewage treatment, waste disposal, etc. These programs are frequently sponsored by governments.

## Empirical Aspects of the Relationship between Foreign Trade and the Environment in the ECE Countries

In this part of the paper, changes in the structure of foreign trade of Poland, the Czech Republic, and Hungary will be discussed with special regard to goods and products deemed environmentally harmful as well as to goods and products designed to aid in environmental protection. The analysis will be based on the classification system proposed by supranational organizations in the 1990's.

Our analysis covers two types of goods and products:
1) those deemed environmentally harmful, and
2) those designed to aid in environmental protection.

Both groups of goods were classified based on the HS (Harmonized System) nomenclature and were analyzed with regard to the dynamics of import and export thereof during 1992-2000.

The definition of goods and products **designed to aid in environmental protection** is given by the OECD/Eurostat Informal Group as follows:

"Goods, products and services protecting the environment, including activities which create such goods and products or offer services concerning the measurement, prevention, limitation, minimization, or correction of air, water, or sunshine pollution, or address problems of waste management, noise pollution, and eco-system management."

The above definition encompasses waste treatment and prevention technologies and goods, products, and services aimed at reducing risks to the natural environment or minimizing pollution and the depletion of natural resources.

**I. OECD/EUROSTAT lists three groups of goods and products designed to aid in environmental protection** [4]**.**[1]

**a. goods and products designed to aid in environmental management:** includes goods and services created exclusively with the aim of environmental protection and having a significant impact on pollution reduction and the identification and collection of statistical data;

**b. cleaning products and technologies:** includes goods and services which reduce or eliminate environmental harm. These are sometime used for other purposes as well, and their identification and classification in relevant statistical data is difficult, expensive, and controversial.

[1]Based on the definition of the environmental protection industry set forth in the OECD/Eurostat Informal Group: "Goods and services protecting the environment include the manufacturing of products and the development of services regarding the measurement, prevention, minimalization, elimination, or correction of water and air pollution and solar system pollution, as well as addressing the problems of waste disposal, noise pollution, and eco-system maintenance.

**c. management and avoidance:** includes goods, products, and services which may have significant positive environmental effects but which are designed and implemented for other purposes (such as energy-saving technologies, creation of alternative energy sources, etc.). This category may be considered optionally and its classification and analysis depends to a great extent on existing environmental policies as well as access to statistical data.

**II. Goods and products harmful to the environment** include mainly those produced by the following industries: mining, metallurgy, chemical, paper and cellulose, energy, construction materials, and means of transportation[2].

An empirical analysis of import and export of the above goods in Poland, the Czech Republic, and Hungary, based on the aggregate reports presented in Figures 1-8, leads to the following general conclusions:

1. In all three of the analyzed countries one can observe significant increases during 1992-2000 in the **import of goods designed to aid in environmental protection**. This trend is particularly observable in absolute terms based on values expressed in USD. In the case of Hungary, a period of relatively low investment in the first half of the 1990s was followed by a dynamic increase in the second half of the decade, spurred by a particularly intensive import of goods and products relating to waste-water management and solid-waste management. In Poland a period of significant growth in imports was observable between 1994-1996, followed by a declining trend between 1997-2000, particularly in goods and products relating to solid waste management (in the second half of 1996 and 1997), followed in 1998 by a decline in imports of goods and services relating to wastewater management. A similar trend of initial increases in imports followed by a decline is observable in the Czech Republic, although the changes there are less intense than in the case of Poland. The most stable and gradually increasing trend in the import of the three groups of goods and products relating to environmental protection, that is *air pollution control, waste-water management, and solid waste management,* took place in Hungary throughout the period in question (See Figs. 1, 3, 4).
2. **Exports of goods designed to aid in environmental protection** in the three CEFTA countries examined during the time period in question rose at a significantly slower level than imports thereof. Nevertheless, one can observe that the greatest increase in exports in the 1990s took place in the Czech Republic, while in Poland a significant growth in exports collapsed in the 1998-2000 period. A stable growth trend, albeit at a lower absolute level, is observable for Hungary during this period (See Fig. 2).
3. On the other hand, **import of goods deemed harmful to the environment** was characterized by a growth trend in all three analyzed countries throughout the 1990s. In absolute terms the growth trend was lowest in Hungary, and somewhat higher in the Czech Republic, particularly in the latter half of the decade. The largest increase in the import of goods deemed harmful to the environment was noted in Poland in the second half of the decade, where such imports were 2 to 2.5 times greater than in the other analyzed countries (See Figs. 5, 6).
4. The **export of goods deemed harmful to the environment** was also characterized by a growth trend in all three analyzed countries throughout the 1990s, although once again the absolute growth trend was lowest in Hungary, while in Poland and the Czech Republic the export of goods deemed harmful to the environment increased more than two- and three-fold during the period analyzed (see Figs. 7, 8).

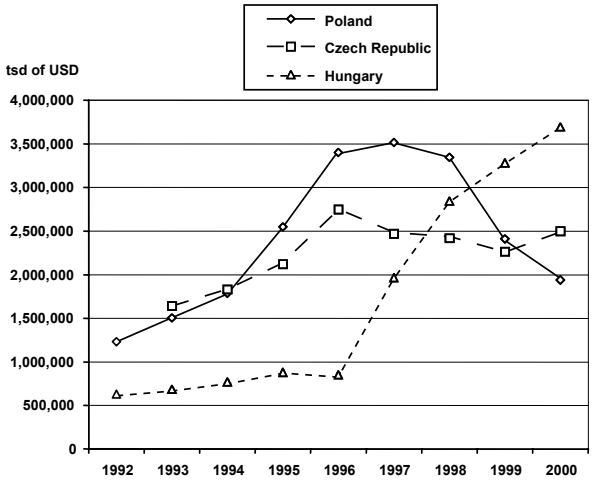


Fig. 1. Import of environmentally friendly goods.

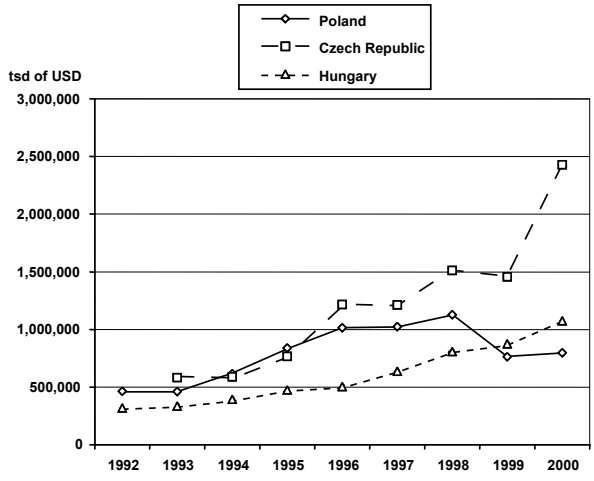


Fig. 2. Export of environmentally friendly goods.

[2]The analysis which follows is based on the author's own research, taking into consideration the earlier-presented analyses in the theoretical part of this presentation.

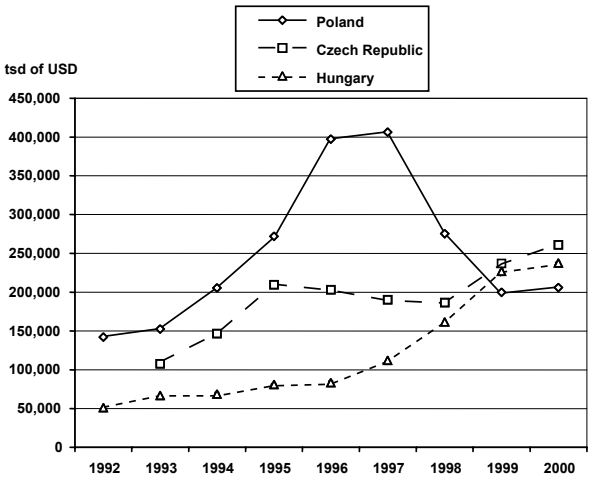


Fig. 3. Import of environmentally friendly goods "solid waste management."

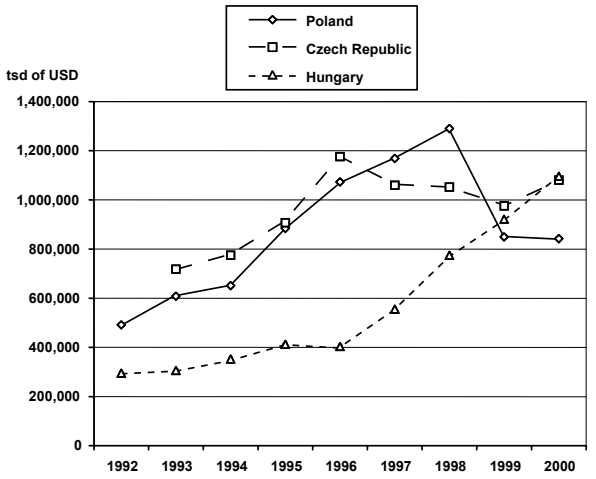


Fig. 4. Import of environmentally friendly goods "solid waste management."

## Empirical Aspects of the Relationship between FDI and the Environment in ECE Countries

Transition economies in Central and Eastern Europe witnessed a significant increase in foreign direct investment (FDI) in the last decade. The growing importance of FDI in these economies measured by the ratio of FDI stock to their GDP and by FDI inflows as a percentage of gross fixed capital formation raises a question concerning the implication of this trend for the environment in these countries. The environmental effect of FDI depends on a combination of macro and micro issues. At the macro level, apart from environmental protection regulations and their enforcement, the impact of FDI on the environment of the host country is determined by the branch structure of FDI involved in a given country and especially by the extent to which it is located in pollution-intensive activities. Traditionally, industries classified as potentially highly polluting include chemicals and related products, mining for minerals and metals, pulp and paper, fabricated and non-fabricated metals, cement, glass and ceramics. At the micro level, the issues are concerned with management of production activities, motives guiding investors' projects in a given country and types of technology used in foreign affiliates, i.e. whether technologies are environmentally sound.

The shares of FDI in so-called "dirty" industries in total FDI in some CEE countries are presented in Table 1. They vary from 16.5% in Hungary to 29.6% in Slovenia.

In the case of Poland, the increased involvement of foreign capital in the form of FDI can be illustrated by the following figures:

- The ratio of accumulated FDI capital as a percentage of GDP grew from 0.3% in 1991 to 21.3% in 2000 - similarly, the ratio of inward FDI to GDP has grown systematically (from 3.1% in 1991 to 5.9% in 2000);
- the share of the annual FDI stream in gross fixed capital formation has grown from 1.8% to 23.4%. [13];

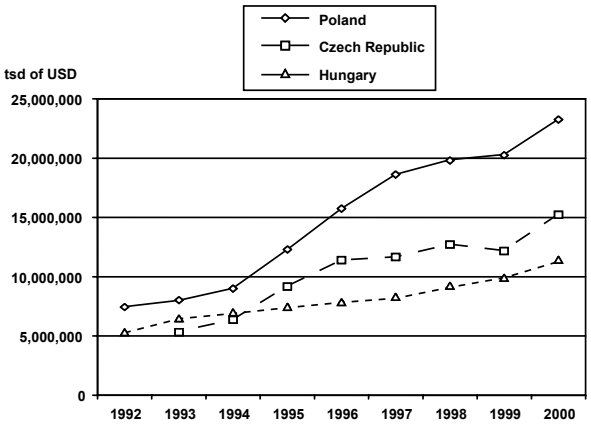


Fig. 5. Import of commodities difficult for the environment.

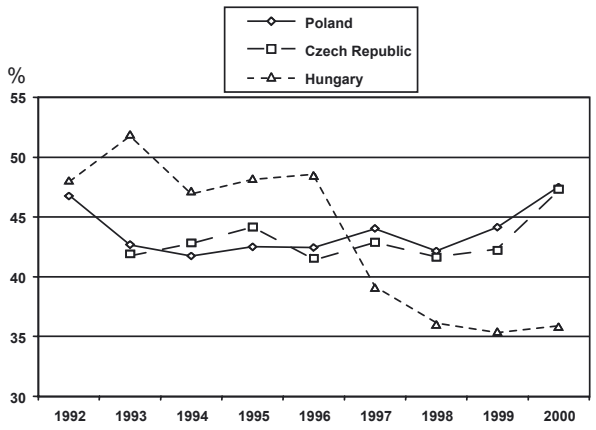


Fig. 6. Share of commodities difficult for the environment in total import.

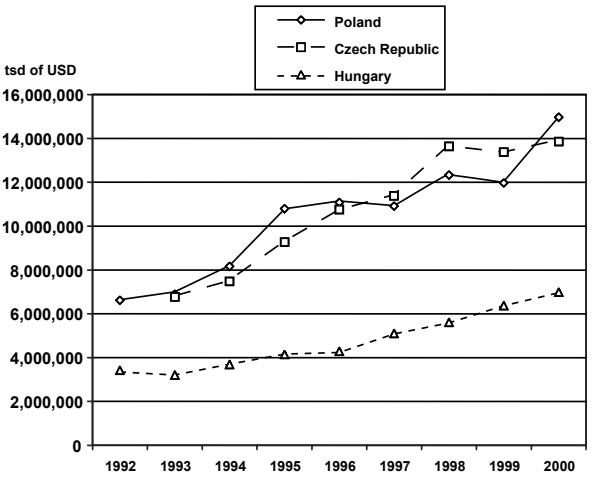


Fig. 7. Export of commodities difficult for the environment..

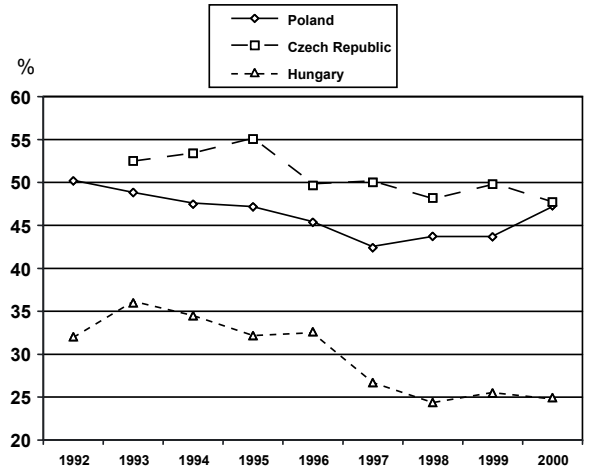


Fig. 8. Share of commodities difficult for the environment in total export.

- The structure of FDI by sector, based on PAIZ data, demonstrates a continual reduction in the accumulated FDI share located in the industrial sector and an increase in the FDI share located in the service sector such as financial agencies, trade, transport, and communications. Such changes in the structure of FDI by sector correspond with trends observed in the highly-developed countries ([15] and our own calculations).

The structure of FDI in industries regarded as burdensome for the environment, in the so-called "dirty" industries, was presented in Table 2. The data shows that in absolute terms, FDI flowing into dirty industries was rising steadily in the entire period of transformation. Their share in total FDI was also changing. In the early transformation period, the share of FDI potentially burdening the environment rose from the level of 13% of total FDI in 1992 to 25.2% in 1995 and next declined to 13.8% in the first half of 2002. Among these industries, major investments flowed into chemicals (2.8% of total FDI), manufacture of cellulose and paper (2.9%), glass, ceramics and manufacture of cement (5.6%). Foreign investments were much smaller in the remaining industries burdening the environment, e.g. they were negligible in the mining and leather industries.

The characteristics of the branch structure of FDI leads to the following conclusions:

- Poland has no large foreign investments in the extractive raw material-processing industries which often cause irreversible consequences for the environment.
- FDI in services does not constitute a major burden for the environment, for the structure of FDI involvement points to much interest in professional services (finances) and traditional ones (retail and wholesale); on the other hand, FDI in services regarded as more burdensome for the environment, i.e. in transport and hotels and restaurants is less significant in the case of Poland.
- The branch structure of FDI in industry shows that about 13.8% of total FDI is involved in the so-called dirty industries; this share fell in the late 1990s, for it amounted to over 25% in 1995.

From the research on technologies used by foreign investors conducted in 2000 for the Polish Agency for Foreign Investment (PAIZ) it follows that most (63.4%) of the surveyed firms with foreign capital participation used one-year-old technologies, i.e. 7.8% more than in the analogous research in 1997 [15]. Over one tenth (11.2%) of the surveyed enterprises used machinery aged 10 years, which means a decline in comparison with 1997. Also, the report on implementation of the Agenda 21 recommendations underlines the fact that the inflow of foreign capital to Poland with the accompanying modern, energy-saving and waste-free technologies considerably increases the possibilities for an environment-friendly modernization of the Polish economy.

The conclusions following from the analysis of the FDI branch structure are also confirmed by outcomes of the research on motives for investing in Poland, conducted on a sample of 110 firms in 1995-1997 [16]. The ranking of 5 major motives for investing in Poland are:

1. costs of the labor factor (according to 49% of the interviewed firms),
2. prospects for economic development of the country (over 42%),
3. a large, absorptive market (over 42%),
4. entering the local market or increasing the share in it (about 34%),
5. availability of qualified labor (about 32%).

The interviewed firms evaluated about 30 factors having a potential impact on their decision to invest in Poland. Among the questions asked there was no direct inquiry about the environment protection norms in Poland and their enforcement but the investors could enumerate other factors affecting their investment decisions. The wish to take advantage of environmental protection norms in Poland as the host country was not pointed out

Table 1. Foreign direct investment stock in pollution-intensive industries in CEE countries, latest date available, (percentage of total FDI stock).

| Specification | The Czech Republic 1998 | Hungary 1998 | Poland 1999 | Slovenia 1998 |
|---|---|---|---|---|
| 1. Mining, quarrying, petroleum and gas | 0.9 | 0.5 | 0.2 | - |
| 2. Wood, furniture, paper, publishing and printing[a)] | 4.8 | 1.8 | 5.7 | 10.9 |
| 3. Coke and petroleum products | 1.6 | .. | .. | - |
| 4. Chemicals and chemical products | 2.4 | 8.9 | 3.7 | 7.6 |
| 5. Rubber and plastic products | 2.3 | .. | 1.3 | 5.5 |
| 6. Non-metallic mineral products | 9.5 | 2.3 | 5.9 | 3.4 |
| 7. Basic metals and products | 3.4 | 3.0 | 1.1 | 2.2 |
| Total FDI stock in pollution-intensive industries | 24.9 | 16.5 | 17.9 | 29.6 |
| Total FDI stock | 100.0 | 100.0 | 100.0 | 100.0 |

Source: UNCTAD and our calculations

a) Owing to the aggregate nature of the date, it was not possible to measure the level of FDI in those areas which pose a particular threat to the environment, that is cellulose and paper production.

by any of them in the anonymous questionnaire and in the supplementary interviews.

The investors also evaluated the barriers to investing in Poland and they ranked them as follows:

1. the inflation level,
2. insufficient legal guarantees for foreign investors,
3. restrictions on people's purchasing power,
4. investment risk,
5. the power of trade unions and workers' councils.

The environmental protection issue did not occur in the questionnaires.

Taking into account the results of the conducted analysis and the fact that environmental protection norms in Poland apply in equal measure to domestic enterprises and foreign investors, it can be concluded that as yet there has been no empirical evidence that FDI has a particularly negative impact on the natural environment in Poland. The fragmentary research rather points to veracity of a contrary hypothesis.

The recommendations which can be put forward for policy towards foreign investors are:

1. to maintain the same environmental protection norms for domestic and foreign investors,
2. to enforce these norms consistently, and
3. to evaluate the influence of these investments on the environment.

## Environmental Norms and Standards and the Activities of Polish Enterprises in Light of the Research Survey Results

The aim of the research survey questionnaire was to conduct an analysis of the changes in the competitive positions of Polish enterprises as a result of applying the environmental norms and standards of the European Union, WTO, and OECD. The survey questionnaire contained 28 questions and was sent to 2138 firms. Replies were received from 286 firms, constituting about 14% of the survey sample[3].

An analysis of the **structure of the respondents, based on the European Classification of Activities (NACE) system,** showed that 14% of the surveyed firms were engaged in the production of ready-made metal products, with the exception of machinery; 12% were engaged in the construction industry; 9% were engaged in the production of otherwise unclassified machinery and equipment; 8% were engaged in the production of chemical products and artificial textiles; 7% were engaged in the production of rubber-products and artificial creations as well as in producing radio, television, and communications equipment and machinery; 6% were engaged in metal production; and 5% were engaged in the production of products from non-metallic natural resources as well as in the productions of foodstuffs and beverages.

18.9% of the respondents were in the public sector and approximately 71% in the private sector. Polish domestic firms dominated the private sector respondents, constituting 84.2% of the surveyed firms, while approximately 7% were foreign firms and 9% contained a mixture of Polish and foreign ownership. German, French, and Swiss firms dominated among the foreign firms.

In response to questions concerning the import of clean technologies and environmental products, approximately 34% of the respondents confirmed the import of such products and technologies, while 61% stated that they did not engage in such import. Approximately 5% of the surveyed firms failed to provide a response to this question.

More positive were the responses of the surveyed firms to questions concerning the environmental strategies they employed. Almost 78% of the respondents stated

[3]57 survey questionnaires were returned without delivery owing to incorrect address information

Table 2. Foreign direct investment in pollution-intensive industries in Poland, 1992-2002.[a)]

| Specification | 1992 | | 1993 | | 1995 | | 1997 | | 1999 | | 2002[a)] | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mln USD | % | Mln USD | % | Mln USD | % | Mln USD | % | Mln USD | % | Mln USD | % |
| 1. Chemicals and chemical products | 100.8 | 5.9 | 255.7 | 9.0 | 373.7 | 5.5 | 818.2 | 4.6 | 1,383.2 | 3.9 | 1,613.0 | 2.8 |
| 2. Cellulose and paper production | 120.0 | 7.0 | 141.2 | 5.0 | 348.5 | 5.1 | 702.2 | 4.0 | 1,029.6 | 2.9 | 1,667.1[b)] | 2.9 |
| 3. Rubber and plastic products | - | - | 1.2 | 0.04 | 537.3 | 7.9 | 326.2 | 1.8 | 451.3 | 1.3 | 629.1 | 1.1 |
| 4. Concrete | - | - | 99.2 | 3.5 | 169.8 | 2.5 | 405.0 | 2.3 | 892.3 | 2.5 | 3,241.2[c)] | 5.6 |
| 5. Glass and ceramics | - | - | 51.9 | 1.8 | 209.5 | 3.1 | 534.8 | 3.0 | 835.6 | 2.4 | - | |
| 6. Basic metals and products | - | - | 40.1 | 1.4 | 73.7 | 1.1 | 232.0 | 1.3 | 331.5 | 0.9 | 542.5 | 0.9 |
| 7. Mining and quarrying | - | - | - | - | 10.9 | 0.2 | 24.1 | 0.1 | 28.3 | 0.1 | 218.5 | 0.4 |
| 8. Leather products | - | - | - | - | - | - | 31.5 | 0.2 | 14.5 | 0.04 | 14.6 | 0.03 |
| Total FDI stock in pollution-intensive industries | 220.8 | 13.0 | 589.3 | 20.8 | 1,723.4 | 25.2 | 3.074.0 | 17.4 | 4,966.3 | 14.1 | 7,926.0 | 13.8 |
| Total FDI stock (investment over USD 1 Million ) | 1,702.4 | 100.0 | 2,828 | 100.0 | 6,832.0 | 100.0 | 17,705.4 | 100.0 | 35,171 | 100.0 | 57,610.3 | 100.0 |

Source: PAIZ and our calculations; □

that they employed a strategy of avoiding environmental harm from the beginning of the production process, while only 36% of respondents stated that they applied the "end of the pipe" strategy.

**54% of the surveyed firms confirmed that they have implemented ecological norms in recent years,** while only 16% stated that they have not engaged in such activities in recent years. 30% of the surveyed firms, however, failed to respond to this question. Among the firms implementing ecological norms, nearly 37% confirmed that they are in compliance with the ecological norms of the European Union; 31%, on the other hand, stated that they were not in compliance therewith. Only 30% of the respondents indicating that they were complying with ecological norms confirmed compliance with international ecological norms of the type ISO 14000, while 70% confirmed that they did not apply such norms to their activities.

**The most common barriers listed** by the respondent firms **to the implementation of ecological norms** were primarily the following:

- lack of legal and financial solutions, in particular the lack of means to finance such investments;
- lack of financial aid programs and funds earmarked for ecological purposes, as well as the high costs of expertise in the area of implementing new technologies;
- frequent and inconsistent changes in the legal regulations and unclear interpretations of environmental regulations;
- instability in national environmental regulation;
- a poorly developed system of waste segregation;
- a complicated system of assessing fines and clean-up charges for environmental damage;
- organizational difficulties with implementation of a system of outside consultation within a firm;
- technical obstacles, including the lack of a network for collecting industrial wastes and a poorly organized market for waste control;
- lack of information, including information about firms engaged in utilization of waste products;
- biurocratic and administrative barriers.

Among the firms responding to the survey only about 12% noted a positive relationship between the implementation of ecological norms and growth in domestic sales, while 15% confirmed the existence of such a relationship as regards sales in foreign markets. 14% of respondent firms stated that they had more opportunities to cooperate with international firms operating in Poland as a result of their compliance with ecological norms, while 16% of respondents felt that they had more opportunities to cooperate with foreign firms abroad as a result of their compliance with ecological norms.

One quarter of the respondent firms indicated that they feel that their compliance with ecological norms and standards and their participation in Integrated Programs of Environmental Management will result in increased sales on the domestic market upon Poland's accession to the European Union**,** while 12% consider

that the same will have no effect on their position on the domestic market and 5% consider that the effect, if any, will be minimal. About 35% of the surveyed firms failed to respond to this question.

The respondent firms' assessment was more positive, however, as regards increased sales on the single European market upon Poland's accession to the European Union, where 29% of respondents indicated that they feel that their compliance with ecological norms and standards will have a positive effect on export sales. 22% of respondent firms, on the other hand, feel that their compliance with ecological norms and standards will have either little effect on export sales or none at all, and 37% of respondents once again failed to respond to this question.

## Environmental Protection Norms and Standards and the Competiveness of Firms with Foreign Ownership

Being part of a wider research project, presented above, the survey was sent to a number of firms with foreign ownership, participating in integrated programs of environmental management. The limited size of the survey must be taken into account in assessing the validity of the conclusions offered, and they should be treated as preliminary findings underscoring the need for further research.

Sixty per cent of the respondent firms with foreign ownership indicated that they have begun to introduce ecological norms and standards, 13.3% indicated that they have not begun to do so, and 26.7% abstained from answering the question. The respondent firms were also asked to assess to what extent they comply with global norms and the ecological norms of the European Union. As regards the ISO global norms series 14000, 36.7% of the respondents indicated that they are in compliance therewith, while only 6.7% indicated compliance with the global norms ISO 2000. As regards the ecological norms of the European Union, 60% of the respondents indicated that they are in compliance with such norms, 20% confirmed that they are not in compliance, and 20% abstained from responding to the question. The European Union norms in question encompass emission norms, including atmospheric emissions, EURO II norms, and EC norm 88/609. Only one firm, however, confirmed that it was in full compliance with all European Union norms. In addition, none of the respondent firms participated in a meaningful way in the special "Care and Responsibility" (Odpowiedzialność i Troska) environmental protection program, although one firm indicated that its principal corporation in the home country did take part in the program.

The firms identified a number of **obstacles to the implementation of ecological norms.** These included: financial obstacles; economic and technological obstacles; a complicated system of assessing financial reparations penalties for pollution emissions; a poorly organized waste disposal system; competition from non-ecological materials, in particular PCV; unfair trade practices by competitors (such as "buying" 14,000 certification); and a lack of consistency in environmental regulations. Only one respondent firm indicated that it did not encounter any significant obstacles in implementing environmental protection norms.

The research carried out in Poland concentrated specifically on the relationship between the implementation of and compliance with environmental norms and standards and a firms' competitiveness. It should be noted, however, that 40% of the firms with foreign ownership responding to the survey reported that export sales accounted for less than 10% of overall sales, and 13.3% reported that export sales fell in the 11-20% range of overall sales. Thus, more than 50% of the surveyed firms were engaged in activities not directed towards export. This is probably connected with the fact, as reported in the first part of this paper, than one of the major motivating factors encouraging foreign investment in Poland is the large, absorptive domestic market. Only 33.3% of the respondent firms indicated a significant orientation toward exports, with 20% of respondent firms asserting that exports accounted for more than 50% of overall sales, and 13.3% assessing exports in the 41-50% range of overall sales. Thus, in drawing any conclusions concerning the relationship between environmental protection programs and policies and a firm's competitiveness, the emphasis on the domestic market must be taken into account.

The respondents were first asked **whether ecological norms and standards constituted an obstacle to export. None of the respondent firms acknowledged ecological norms and standards as an obstacle to export.**

Next the respondents assessed the changes in their firms' competitiveness over recent years, measured in terms of shares in both the domestic and international markets; and were asked to assess the effect of compliance with environmental norms and standards on these changes. While 40% of surveyed firms indicated that their share in the domestic market increased, only 13.3% asserted that their compliance with environmental norms and standards had a positive effect on their competitiveness in the domestic market. The situation differed as regards the export market. While only 26.7% indicated that their share in the export market had risen in recent years, all of the firms so responding indicated that their compliance with environmental norms and standards had a positive effect on their competitiveness in the export market.

Participation in ecological programs was deemed to have a positive effect on sales growth in both the foreign and domestic markets, but this assertion must be treated with caution since only one respondent actually participated in such a program.

More than 33.3% of the respondents indicated that they believed that compliance with environmental norms and standards and/or participation in ecological programs increased their opportunities for cooperation with inter-

national firms operating on the domestic market as well as with international firms abroad. This result should be assessed positively.

In sum, the hypothesis may be offered that in the case of firms with foreign ownership the effect of compliance with environmental norms and standards on their share of the domestic market is very slight, while the effect of compliance with environmental norms and standards on their share of the export market is somewhat greater, but still modest. In addition, the prospect that compliance with environmental norms and standards will increase sales in the European Union market when Poland joins the EU was also assessed as slight. While 20% of surveyed firms anticipate that they will have greater sales on the domestic market, only 6.7% anticipate a growth in sales in foreign markets upon Poland's entry into the EU.

## Conclusions

1. CEE countries analyzed in the paper undertook significant steps in the 1990s to improve their natural environments, increasing their imports of goods designed to aid in environmental protection and technologies to implement "clean production" of export goods. These steps should improve the competitiveness of Polish, Czech, and Hungarian goods and products in the future on both the European and global markets.
2. Research results confirm the pro-ecological emphasis of transition economies' restructuring efforts, particularly when read together with the significant increase in their foreign trade in pro-ecological goods and services.
3. In the case of firms with foreign ownership the effect of compliance with environmental norms and standards on their share of the domestic market is very slight, while the effect of compliance with environmental norms and standards on their share of the export market is somewhat greater, but still modest.
4. An analysis of the results shows that most foreign investors do take environmental protection issues into account in making their decisions, but they do not consider them to constitute a major investment factor. A majority of the respondents favour centralizing strategies. This strategy seems advantageous for recipient countries. Firms with foreign capital frequently introduce environmental protection norms and take part in environmental protection programs.

## References


1. REPETTO R., "Trade and Environment Policies: Achieving Complementarities and Avoiding Conflicts", Washington, DC: World Resources Institute, **1993**.
2. LUCAS R.E.B., (B) Economic Development, Environmental Regulation and International Mitigation of Toxic Industrial Pollution: 1960-1998 in P. Low /ed./ International Trade and the Environment, Discussion Paper 159, Washington, DC, World Bank.
3. OECD, Foreign Direct Investment and the Environment, OECD Proceedings, Paris, **1999**.
4. OECD, Environmental Goods and Services Industry - Manual for Data Collection and Analysis, OECD-EUROSTAT, WTO, Paris, **1999**.
5. EKINS P.C., FOLKE C., COSTANZA R., Trade, Environment and Development: The Issues in Perspective, Ecological Economics, **9**(1), **1994**.
6. ALPAY S., The Trade and Environment Nexus in: E. Ortiz, A. Cabello (ed.), Economic Issues and Globalization: Theory and Evidence, ISINI, **1999**
7. ANTWEILERW., COPELAND B., TAYLOR M., Is Free Trade Good for the Environment?, *NBER Working Paper Series*, No. 6707.2., **1988**.
8. WALTER I., The Pollution Content of American Trade, Western Economic Journal **11**(1), 61, **2000**.
9. XINPENG XU, LIANG SONG, Regional Cooperation and the Environment: Do "Dirty" Industries Migrate?, Weltwirtschaftlisches Archiv, Band 136, **2000**.
10. SORSA P., Competitiveness and Environmental Standards, The World Bank Research Working Papers, February, **1994**.
11. EC, Communication to the Council and the Parliament on Trade and Environment, Brussels, 28.02.96.COM (96) 54, Final, **1996**.
12. EC, Communication on Economic Growth and Environment, COM(94)465 final, Brussels, **1994**.
13. UNCTAD, World Investment Report 2002. Transantional Corporations and Export Competitiveness, UN, New York and Geneva, **2002**.
14. GENTRY B.D. (ed.), Private Capital Flows and the Environment. Lessons from Latin America, Cheltenham, Northampton, pp. 276-292, **1998**.
15. PAIZ, Opinia inwestorów zagranicznych o społecznych i ekonomicznych warunkach działalności w Polsce. Badania przeprowadzone na zlecenie PAIZ, Warszawa (Opinions of foreign investors concerning the social and economic conditions for operating in Poland. Research conducted for PAIZ {Polish Agency for Foreign Investment}, Warsaw), **2000**.
16. WITKOWSKA J., WYSOKIŃSKA Z. (eds.), Motivations of Foreign Direct Investors and their Propensity to Exports in the Context of European Integration Process. Empirical Studies with Special Reference to Eastern and Central European Countries, University of Lodz, Lodz, **1997**.
17. WITKOWSKA J., Bezpośrednie inwestycje zagraniczne a ochrona środowiska w Polsce w procesie transformacji i integracji z UE, w: Integracja Polski z Unią Europejską w dziedzinie ochrony środowiska- problemy, korzyści, zagrożenia. Red. M. Burchard-Dziubińska, Łódź. "Direct foreign investment and the environment in Poland during the processes of transformation and integration with the EU". Article appearing in: Poland's Integration with the European Union in the area of Environmental Protection: problems, opportunities, and threats. Edited by M. Burchard-Dziubińska, Łódź), **2000**.
18. UNCTAD, World Investment Report 1999. Foreign Direct Investment and the Challenge of Development, New York and Geneva, **1999**.