

The role of Polish environmental funds: Too generous or too restrictive?

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ABSTRACT. In many countries, and particularly in the economies in transition in Central and Eastern Europe, public environmental funds play an important role in financing environmental investments. These funds provide subsidized financing through grants and soft loans in response to market failures that limit environmental investors' access to capital markets or poorly account for the benefits of environmental improvements. The principal question explored in the paper is whether environmental funds are too generous or too selective in co-financing environmental projects. The authors conducted a survey¹ of applicants whose applications to Polish environmental funds were rejected following appraisal by the funds in 1994. Applicants were contacted to determine whether they had been able to close the financing 'gap' by the end of 1995 that had resulted from the rejection of their application by the Fund. Survey results indicate that a large majority of respondents have secured substitute gap financing and proceeded with their planned investments, suggesting that the fund's assistance was not essential for these projects to be implemented. Generally, the financing gap had been closed by financing from another environmental fund, from own resources, and less frequently from the same fund (after resubmitting a modified proposal). Only in few instances have proposed projects been abandoned.

1. Introduction

Why public financing for the environment?

Environmental protection projects may generate economic benefits in excess of their costs. Nevertheless they may turn out to be financially

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unfeasible. In other words, existing markets will not support some projects which produce positive social benefits net of costs in present value terms. This typically results for any of the following three reasons:

- a potential investor is not aware of all private benefits the project can yield
- substantial benefits—as positive externalities—cannot be captured by a potential investor
- a project proponent does not have access to capital markets.

Thus, the problem can be attributed to three types of market imperfections: imperfect information, externalities, imperfect capital markets, or a combination of the three.

Economists' prescriptions for remedying these problems are relatively straightforward and include the following:

- increase environmental awareness
- internalize externalities
- extend credit opportunities

We can readily observe evidence of these strategies in actual policies throughout the world. Remarkable progress has been achieved in developing environmental awareness in the business community. Various measures have been applied (including those derived from the *Polluter Pays Principle*) to narrow the gap between private and social values. Programs have been launched to improve small-scale investors' access to capital markets.

However, market imperfections such as those indicated above still exist and call for policy interventions. Continued progress requires measures which go beyond educational campaigns and traditional environmental regulations. In theory any level of environmental improvement or spending can be achieved by manipulating property rights or tightening environmental standards. In economies in transition—often lacking good tradition in enforcement and with markets that have not matured yet—there can be no realistic environmental or development policy without a public funding component. On the other hand, such policies cannot be based only on public funding. The challenge is to strike a balance between policies which compel private responses and the use of subsidized public financing to catalyze private actions. This paper does not address the question of how policy makers should theoretically blend these options in an optimal way. Instead it explores whether the subsidy element of government environmental policies in practice might be excessive or inadequate to stimulate environmental investments.

The typical mechanism for implementing environmental subsidies in CEE countries is through concessional financing provided by environmental funds. While many observers have extolled the value of the funds in the period of transition, many questions have been raised about the role of environmental funds, (OECD, 1995). In this paper we will focus on three commonly debated questions:

Are environmental funds providing financing that is too generous?

Given the limited availability of subsidizing funding, could funds better leverage their resources and fund more projects by reducing grant co-financing levels or, in the case of soft loans, the grant equivalent of the subsidies?

Are environmental funds presenting a barrier to the development or wider use of capital markets to finance environmental investments?

To date, it has been difficult to support these discussions with empirical analysis. The purpose of this paper is to present key results of a survey undertaken in Poland to learn more about the actions project proponents take if they are unsuccessful in securing subsidized financing from environmental funds. Our analysis has not been sufficient to fully answer the questions from the previous paragraph, but it should be considered an essential step towards addressing the issues empirically. In section 2, we define the concepts of a financing ‘gap’ and ‘leverage’ and describe the types of concessional financing provided by environment funds. Section 3 of this paper described the role of environmental funds in Poland. In section 4, we examine the project proponent’s motivation to undertake environmental investments and strategy for securing finance. Section 5 describes the survey design and research questions while the last section presents survey results and tentative conclusions.

2. Models of subsidized financing

The financial ‘gap’

The notion of a ‘financial gap’ that must be closed before an environmental investment can be undertaken is very popular in the CEE countries. Generally, a financial gap implies there is a difference between the amount of capital that can be raised from various sources and the higher amount required to undertake an investment (Panayotou, 1995). Any discussion of the need for donor financing in CEE countries is likely to acknowledge the role donor financing might play in closing the financial gap. While a gap surely exists, surprisingly little effort has been devoted to defining it with some analytical rigor. Neither an upper (desired) reference level, nor a lower (available) amount of funding have been defined clearly. Below we discuss several approaches to defining this gap.

The simplest concept of the financial gap is the difference between the total environmental investment expenditures (K^{ALL}) that yield positive net social benefits (NSB) at a given interest rate and the total amount of capital available for these investments, derived as follows

$$K^{ALL} = \sum_{i \in ALL} IC_i, \text{ where } ALL = \{i: NSB_i > 0\} \text{ and } IC_i \text{ is investment expenditures planned for the } i\text{th project.}$$

Net social benefits for the i th project are calculated as

$$NSB_i = \sum_{t=0}^{\infty} (B_{it} - C_{it}) / (1 + \rho)^t,$$

where B_{it} and C_{it} stand for benefits and costs, respectively, expected during the project’s lifetime, and ρ is a real interest rate. Assuming that in the initial period (0) no benefits are obtained, the formula becomes

$$NB_i = -C_{i0} + \sum_{t \geq 1} (B_{it} - C_{it}) / (1 + \rho)^t$$

Of course, $C_{i0} \leq IC_i$ with equality for the special case where all investment expenditures are incurred in the initial year. For an individual project yielding positive net benefits the gap can be defined as

$$g^1_i = IC_i - k_{i'}$$

and for the entire economy as

$$G^1 = K^{ALL} - K \leq \sum_{i \in ALL} g^1_i$$

where K is the total capital available for environmental investments, and k_i that capital actually available for the i th project ($K \geq \sum_{i \in ALL} k_i$; total capital available is at least as large as that available for the project listed. ‘Closing the gap’ means providing additional capital (G^1) so that K is equal to K^{ALL}).

These are hardly satisfactory definitions as the numbers K and k_i would be very difficult to quantify. With the unleashing of private entrepreneurship and the opening of the Polish economy, investors can take advantage of vast resources of private domestic capital as well as that of international financial institutions. Rarely are these sources earmarked as ‘environmental’ or ‘non-environmental’. Many observers have contended that there is plenty of capital; the only question is whether investors are willing to pay for access to this capital, suggesting that at some ‘price’ capital can be obtained. Consequently, it would be difficult to quantify the gaps according to their g^1 and G^1 definitions, without a clear understanding of what is meant by ‘available’ capital. To illustrate the issue, assume the source of capital is a loan requiring repayment in one year. Is this likely to be viewed as available capital by the investor?

A more promising option is to relate the gap to the availability of concessional financing necessary in order to overcome the market failure caused by non-internalized externalities. Let K^{SOC} be the sum of potential investment expenditures on projects that are economically efficient—i.e. yielding positive net benefits at a given interest rate—but financially infeasible in a sense that they yield negative net private benefits (NPB) for investors at that interest rate. All those projects are socially desirable and yet unlikely to be spontaneously undertaken by private investors. In other words

$$K^{SOC} = \sum_{i \in SOC} IC_i \text{ where } SOC = \{i: NSB_i > 0 \text{ but } NPB_i < 0\},$$

where

$$NSB_i = NPB_i + EB_{i'}$$

with $NPB_{i'}$ net private benefits, and $EB_{i'}$ external benefits defined as disjoint components of the overall social net benefits. Since SOC , by definition, is a subset of ALL , $K^{SOC} \leq K^{ALL}$.

The difference between K^{SOC} and the volume of capital available on concessional terms, K^C may be considered as an alternative measure of the financial gap, G^2

$$G^2 = K^{SOC} - K^C \leq \sum_{i \in SOC} g^2_{i'}$$

where $g^2_i = IC_i - k^C_{1i}$, and $K^C \geq \sum_{i \in SOC} k^C_i$ (k^C_i denotes the capital available for the i th project on concessional terms). As the capital available on concessional terms is scarcer than the overall supply of capital, we have $K^C < K$ and $k^C_i < k_i$. From the latter it follows that $g^2_i > g^1_i$, but the corresponding relationship between G^1 and G^2 cannot be determined.

When policy makers in CEE countries refer to a financing gap, they often seem to have in mind the amount of subsidizing funding required. This may be less than the sum of investment budgets of socially desirable projects that are privately non-profitable (G^2), since projects from SOC category do provide some private benefits, albeit insufficient to cover the costs. More precisely, the amount of subsidized financing necessary to make a project financially viable (at a given interest rate) is exactly $-NPB_i$. Therefore the socially optimal demand for concessional financing, K^{DEM} , can be derived as

$$K^{DEM} = \sum_{i \in SOC} (-NPB_i) = -\sum_{i \in SOC} NPB_i$$

Let us denote the gaps implicit in this definition as G^3 and g^3_i

$$G^3 = K^{DEM} - K^C = \sum_{i \in SOC} g^3_i$$

where $g^3_i = -NPB_i - k^C_i$. The gap g^3_i indicates the minimum additional subsidy that is required in order to make the i th project financially viable. From these definitions it follows that $G^3 < G^2$ and $g^3_i < g^2_i$.

The socially optimal demand for concessional financing implies the following criterion for selecting projects to be subsidized. Let all SOC projects be listed and numbered according to their financial non-viability related to the social benefits they provide, that is according to the ratio $(-NPB_i)/(NSB_i)$. Thus $i = 1$ is attributed to the project with the lowest ratio, and $(-NPB_i)/(NSB_i) \leq (-NPB_{i+1})/(NSB_{i+1})$. Furthermore, let $i = marg$ be the number of the last project that can be subsidized if K^C were to be spent cost effectively from the point of view of a concessional financier. Formally the number $marg$ is defined in the following way

$$\sum_{i \leq marg} (-NPB_i) \leq K^C, \text{ and, } \sum_{i \leq marg+1} (-NPB_i) > K^C.$$

The marginal project $i = marg$ defines, in turn, the marginal cost-effectiveness ratio

$$(-NPB_{marg})/NSB_{marg} = \alpha,$$

and the test any subsidized project i needs to have passed

$$(-NPB_i)/NSB_i \leq \alpha.$$

By following such a criterion, an agency in charge of K^C will maximize the sum of net benefits, i.e., the conventionally measured social welfare.

Like G^1 , both G^2 and G^3 are hard to measure because of the difficulty in measuring net benefits. Both K^{SOC} and K^{DEM} depend on benefit estimates some of which comprise environmental and some commercial values. Perhaps that is why less theoretically sound approaches are practiced by a number of public funds.

One rather imperfect substitute for NSB_i is reduction of environmental stress measured usually by reduced pollution, R_{pit} , where the subscript p

stands for a specific type of pollution. A corresponding ‘optimization’ procedure is to define a ‘demand’ for investments yielding pollution reduction. The set of such projects, POL , is defined as

$$POL = \{(p,i): R_{pi} > 0\}.$$

Financial needs, K^{POL} , are then computed in the following way

$$K^{POL} = \sum_{(p,i) \in POL} \delta_i IC_{pi}$$

The coefficient δ_i reflects the fact that various projects have different proportions between private benefits and costs and thus require different rates of subsidy in order to render them financially viable.

In practice, environmental funds in CEE often utilize ‘rules of thumb’ and apply δ coefficients whose upper bounds are fixed for certain project or investor (i.e., private vs. public) categories. In the absence of adequate knowledge of net benefits, rates actually applied depend on what investors ask for. Profit-maximizing investors are motivated to maximize the share of project capital raised from concessional funding. On the other hand, they appreciate the fact that public funds are scarce and the disbursement agencies may favor proposals with relatively lower funding requests. This may mitigate the amount applied for and bring it closer to the amount $-NPB_{pi}$, i.e., that would be required in order to make the project financially viable.

The unsolved problem within this approach is that projects selected to receive subsidies may not be economically efficient to begin with, as the $R_{pi} > 0$ condition does not imply $NSB_i > 0$. Nevertheless K^{POL} seems to be a reference for another popular notion of the financing gap, G^4

$$G^4 = K^{POL} - K^C.$$

For individual projects, corresponding gaps can be defined as

$$g^4_i = \delta_i IC_{pi} - k_{pi}$$

where k_{pi} is concessional funding available for the project (p,i) .

As various project type benefits (R_{pi}) lack a common denominator, there can be no single project selection rule. Instead, the total amount of concessional funding is split into components earmarked for certain project types

$$K^C = \sum_p K_p \geq \sum_p \sum_i k_{pi}.$$

Then for each pollution type p , projects can be listed and numbered according to the number $\delta_i IC_{pi}/R_{pi}$. The maximum environmental effect of a given budget K_p devoted to the project type p is obtained if projects are selected with the lowest $\delta_i IC_{pi}/R_{pi}$ indicators until the budget is exhausted. Let $i = marg(p)$ be the number of such a marginal project in the p th category. As before, it can be formally defined in the following way

$$\sum_{i \leq marg(p)} \delta_i IC_{pi} \leq K_p \text{ and } \sum_{i \leq marg(p)+1} \delta_i IC_{pi} > K_p.$$

The marginal project $i = marg(p)$ defines, as before, the marginal cost-effectiveness ratio

$$\delta_{marg(p)} IC_{pmarg(p)} / R_{pmarg(p)} = \beta(p),$$

and the test that a subsidized project (p,i) needs to have passed

$$\delta_i IC_{pi} / R_{pi} \leq \beta(p).$$

By applying such a criterion for each p , an agency in charge of K^C will maximize the total amount of reduced pollution in each respective category given the *a priori* earmarking of K^C . This, however, is not synonymous with maximizing social welfare as some of the projects selected could be inefficient to begin with.

Finally let us note that some environmental funds, while keeping the R_{pi} as the measure of a project's effects, try to individually adjust the δ_i coefficients to individual circumstances so that financial viability is achieved at least cost to them. This does not guarantee maximizing net social benefits. Neither does it preclude the possibility of selecting projects that are economically inefficient.

Leverage

In addition to a financial 'gap', 'leverage' is another catch word frequently referred to in analysis of environmental fund performance. The funds are expected to 'leverage' or trigger additional expenditure. However, like the 'gap', 'leverage' is understood differently by various analysts and policy makers.

Identifying the gap with G^1 and G^2 or g^1 and g^2 reduces the potential leverage to operating costs and/or environmental benefits. By definitions of K^{ALL} and K^{SOC} , all investment costs of eligible projects are financed and thus the money does not leverage any additional investment expenditures. Nevertheless, it creates the willingness to finance operating costs of projects undertaken. In addition it provides for environmental benefits (hidden in NSB_i) that would not have materialized without those projects. Both outcomes can be considered 'leveraged' by K^{ALL} or K^{SOC} , but this is not the typical concept of leveraging.

More common notions of 'leverage' refer to G^3 and G^4 or to g^3 and g^4 . By closing the g^3_i gap, NSB_i are delivered. Thus a fund's expenditure of $-NPB_i$ triggers someone else's expenditures that otherwise would have been considered financially unjustified. Maximizing leverage with respect to the i th project means to limit the concessional financing to $-NPB_i$. Any more generous subsidy would substitute for the capital that, at least in principle, should be available on commercial terms.

Similarly, closing the gap g^4_i yields benefits of R_{pi} . By spending $\delta_i IC_{pi}$ —if the project is carried out—a fund triggers someone else's expenditure of $(1 - \delta_i)IC_{pi}$. Here, the calculation of leverage is straightforward

$$\lambda = (1 - \delta_i) / \delta_i$$

This is the concept most fund managers invoke when they discuss strategies to maximize the leverage of their spending. The λ ratio can be easily calculated from environmental funds' information on funded projects. For the funds surveyed in this paper the average δ coefficients were around 20 per cent. Hence the λ ratio was on the order of 4: a dollar spent by a fund triggered 4 dollars in expenditure from elsewhere.

This may sound impressive, but it does not indicate whether leverage

has been maximized. Also, if there are a number of public funds, there is potential for overstating the leverage of public funds. A project in Poland could potentially obtain the entire amount of project costs from concessional financing provided by environmental funds. A possible test of whether leverage has been maximized is to try to determine if projects accepted for financing could be carried out even in the absence of a fund's support. In fact, that is the question fund managers try to answer. Unfortunately, because of asymmetric information, only direct indications of projects' financial viability are available. It is only recently that fund managers have formally requested data necessary to evaluate net private benefits of submitted projects. Of course, given the difficulty of verification, investors may engage in strategic behavior to cast the project's benefits in a way to enhance approval. At the time of the survey, such information was not collected routinely at all. Only one of the two funds covered in the survey, EcoFund, was attempting to check the future cash flows of applicants in order to determine the minimum subsidy required for the project to be carried out. This is not necessarily equivalent to computing $-NPB_i$, since financial non-viability could result from factors other than undertaking the project in question.

An indirect indication of whether the funds maximize their leverage can be derived from analysing the fate of rejected projects. In particular, if such projects are carried out even in the absence of a fund's support means that with a higher budget the fund would not have maximized its leverage; it would have been too generous. For with more money available the fund would have spent more on the actually accepted projects or would have accepted some of the actually rejected projects, thus substituting for other sources in both cases. Let us emphasize that this does not necessarily contradict maximizing leverage of the *actual* budget. A hypothesis that the fund is able to perfectly discriminate against applicants who can proceed without concessional funding cannot be rejected on these grounds.

The authors recognize that the soundest concepts of a 'financing gap' and of a 'leverage' are those related to the G^3 and g^3_i measures. Nevertheless, because of the lack of reliable monetary benefit estimates, we will refer to the G^4 and g^4_i concepts in order to address the question of how the funds try to maximize effects of their spending.

Channeling subsidies through investment funds

Environmental earmarked public funds disburse environmental subsidies mainly in one of three common forms:

- direct grant
- interest rate subsidy for a commercial loan
- 'soft' loan

A direct grant is deemed the most transparent way of conveying a subsidy. Direct grants are the most common form of disbursing funds from general budgets and are also employed by many environmental funds in CEE countries. For a direct grant, both the funding source and the beneficiary clearly understand the level of financial contribution and can assess the cost effectiveness. That is, the funding source can assess the

amounts of benefits obtained from a unit of the subsidy. Another advantage of grant financing is its simplicity, since repayment is not required of beneficiaries.

An interest rate subsidy is another special case of a grant. It takes the form of a rebate on the interest rate prevailing on the loan market for a given category of borrowers and projects. The rebate can be granted by the creditor or—more typically—by some other donor. The crucial difference between an interest subsidy and a grant is that the latter can be extended independently of, or even in the absence of, additional financing. On the contrary, the former assumes that the project has already met some feasibility criteria leading to a lender's willingness to invest in it. There is also a technical difference in that direct grant money is disbursed when actual costs are incurred, whereas an interest rate subsidy is spread over the period of debt service.

The notion of a 'soft' loan refers to a situation when the lender's loan conditions differ from those prevailing on the market. This may take the form of an interest rate subsidy or an extended grace period. Sometimes the creditor provides for a partial debt-forgiveness scheme under special circumstances. For example, debt-forgiveness might be linked to the applicants' ability to complete the project according to the proposed schedule, or meeting technological standards of equipment installed, etc. It is usually the creditor, rather than a third party, who sets aside certain funds for debt-forgiveness to stimulate good performance among borrowers.

Terms of a loan depend on the risk associated with given categories of borrowers and their projects. Quite often, small investors undertaking innovative types of investment are perceived by the creditor to be a greater credit risk on average and consequently charged higher interest rates to (statistically) compensate for the risk of non-repayment. Interest rates become prohibitive if perceived risks are high. In order to reduce rates to an affordable level, a third party must come in to shield the creditor against the perceived risk by setting aside certain funds to be drawn if a debtor does not repay the debt.

Effectiveness and efficiency of subsidies

The effectiveness of subsidies can be measured by environmental improvements achieved. For a given project the most successful subsidy instrument is that which implies high leverage, i.e., stimulates large co-financing. The latter may come either from investors' own sources or from the capital market. The lower the subsidy, the greater the demand for co-financing, i.e., 'leverage'. At the same time, however, a lower subsidy makes it less likely—*ceteris paribus*—that the project will be undertaken at all. Thus the maximum effect is achieved when subsidies are just large enough to ensure the projects are undertaken. Any larger subsidies represent a misallocation of public funds, since they would only substitute for other co-financing without increasing the effect.

The type of subsidy instrument may vary according to the type of project. For example, the appropriate level of subsidy for projects that do not generate financial revenues (e.g., educational activities) will be close to 100 per cent. It is obvious that only a direct grant or an equity investment

can be applied to these cases. By contrast, industrial projects that are almost financially viable require a very small subsidy. Here one has a whole spectrum of subsidy instruments to choose from. For instance, if the lack of financial viability results from a substantial time lag before the project generates its first revenues, then a 'soft' loan with a sufficiently long grace period will address the problem. If the project generates financial revenues, but they are lower than for purely commercial investments, then perhaps an interest rate subsidy would be most appropriate.

The effectiveness of subsidies can also be assessed in a broader, long-term perspective. Excessively generous subsidies may attenuate company incentives to spend from their own sources or to seek co-financing on a commercial basis. In addition, the availability of subsidies may impede the development of capital markets to finance environmental investments. However, a contribution from a recognized public fund may also play a catalytic role in attracting private funds to subsidized projects, and ultimately to environmental investment activities overall.

Subsidies implied by various forms of financing can be expressed in a grant-equivalent form by using present-value techniques. In this way, it is possible to estimate the actual expenditure made by a given donor. Consequently, use of grant-equivalents also facilitates ranking of potential projects according to their benefit-to-cost ratio and would enable environmental funds to select projects providing the biggest 'bang for the buck', i.e. the largest sum of benefits given the expenditure.

Cost-effectiveness criteria, useful as they are, do not answer the question of whether, in strictly economic terms (i.e. in terms of an opportunity cost), a project generates more benefits than costs. Assessing economic efficiency of a project requires that benefits be monetized and thus made commensurate with costs. The underlying concern is that given a sufficiently large scale of environmental expenditures and improvements, an economy will sooner or later reach the situation of diminishing benefits. In order to prevent that from happening, the effects of projects should be evaluated not only in physical but also in monetary terms. Projects should then be carried out only if they pass the efficiency test. Nevertheless, as benefits are difficult to monetize, most funds apply (at best) cost-effective tests.

3. The role of the funds: the experience in Poland

Beginning with the first post-Communist government in 1989–1990, Poland developed a National Environmental Policy. A number of institutions and financial mechanisms have been created to implement the national policy. Some of these mechanisms, such as environmental fees, were inherited from the past while others were newly introduced (such as environmental funds). The mix of policy and financial instruments used in Poland is similar to those utilized in many CEE countries. A more extensive review of policy and financial instruments is provided by Zylicz (1994) for Poland and Francis (1994) and Klarer (1994) for other economies in transition. The goal of this section is to examine environmental investment in Poland to illustrate typical problems encountered in financing environmental recovery in economies in transition and to provide an

overview of the environmental funds which are the focus of analysis later in the paper.

An assessment by the Ministry of Environmental Protection, Natural Resources and Forestry (Ochrona, 1996) indicates that, in 1995, 32 per cent of environmental investment expenditures were financed either from firms' own sources or from commercial credit. Municipal polluters accounted for an additional 18 per cent of expenditures out of their budgets or with money borrowed on commercial terms. These two categories correspond to one-half of total expenditures. The remaining half came from heavily subsidized sources. The National Fund for Environmental Protection and Water Management (the National Fund) contributed 20 per cent of the total investment. The 49 regional environmental funds provided an additional 15 per cent. The National and regional funds disburse money mainly in the form of 'soft' loans and direct grants to applicants. Municipal environmental funds, of which there are 2,466, added another 5 per cent in the form of direct grants. The state budget contributed 5 per cent (direct grants only) and foreign assistance accounted for the remaining 5 per cent of expenditures (in grants and loans).

This overall picture is but a very rough approximation of total environmental financing flows. On the one hand, these expenditure estimates include only investments on end-of-pipe projects which are more subsidized, suggesting that the overall role of public funds for environmental investments viewed in a broad way is smaller than 40 per cent. On the other hand, since environmental fees (which provide most of the revenue for public funds) are tax deductible, there is some shifting of the tax burden to other taxpayers, increasing the public's contribution to environmental expenditures. Also, the percentage breakdown quoted above does not include indirect subsidies in the form of modest tax exemptions—not recorded statistically—for limited categories of projects. Thus, the actual contribution of the state budget is somewhat larger than reported in the official statistics for direct grants. Nevertheless, on the whole, this additional public contribution cannot outweigh the additional private funding of investments other than end-of-pipe.

Environmental funds play a crucial role in financing investment expenditures (Anderson and Zylicz, 1995). The National Fund contributes not only by providing grants and loans, but also with interest rate subsidies and equity. In 1990, the Bank of Environmental Protection, Inc. was established as a joint stock company owned by the National Fund and several industrial firms. Pursuant to a long-term contract the Bank has signed with the National Fund, the latter regularly allocates some of its resources to subsidize interest rates charged by the Bank for loans.

Credit guarantees attract little resources for the time being. A relatively small part of foreign assistance comes in the form of guarantees—mainly to support exports of environmental technology or services from donor countries. It is likely that the role of this instrument will grow in economies in transition over the next couple of years (Laurson *et al.*, 1995).

Most foreign environmental assistance takes the form of direct grants. In some cases however, the donors request that the money be repaid to a Polish environmental fund (usually to the National Fund), enabling the

funds to resolve. A share of external assistance—originating from the debt-for-environment swaps authorized by the Paris Club in 1991—is channeled through the Polish EcoFund, a foundation established for that purpose by the Polish Minister of Finance in 1992. The EcoFund gives direct grants only. Another type of external assistance is through equity. The most prominent example of externally funded equity financing is provided by NEFCO (Nordic Environmental Finance Corporation).

This rich variety of available environmental financing instruments—many of them highly subsidized—available in Poland raises the question of their effectiveness and efficiency. Several funding institutions have developed procedures to assess cost-effectiveness of their spending. For instance, certain categories of EcoFund's projects are subject to priority ranking methodologies that utilize economic criteria. Here the adoption of a specific spending policy is facilitated by the fact that subsidies are in a direct-grant form only and thus the monetary cost is easy to measure. Other environmental funds (above the municipality level) apply a variety of instruments which makes the ranking of projects difficult even when grouped into narrow categories. Some funds, however, and most notably the Cracow Regional Fund (Peszko, 1994), adopted methodologies to determine subsidy equivalents of various financing schemes for comparative purposes. Despite efforts to improve allocative efficiency, assessing and achieving cost-effectiveness remains a major challenge.

4. A framework for analysing environmental compliance

To analyse the firm's motivation to undertake environmental investments or make other process changes that enable the firm to meet its regulatory requirements, it is useful to examine the net benefits of compliance *vis-à-vis* non-compliance. In developed countries, such a framework has helped environmental enforcement officials to understand the barriers to achieving high compliance rates and to identify policies to either reduce the costs of compliance and/or increase the costs of non-compliance.

The costs of compliance include capital expenditures and associated operating and maintenance costs to achieve pollution reduction. Environmental investments may also have an indirect effect on production levels or costs. In many CEE countries including Poland, reduction in pollution levels will lower the firm's environmental fee payments to regulators and these savings partially offset the costs of compliance.

The costs of non-compliance depend on the types of sanctions that are imposed by regulators for violations of regulations. The expected cost of sanctions depends on the probabilities of detection and conviction as well as the level of the sanction that is imposed. There may be 'benefits' to the firm if it pursues a non-compliance strategy. In the period of transition, many enterprises are struggling to survive. Thus, since some (but not all) resources for environmental investments could instead be devoted to investment that enhance the firm's chance of survival, there is an opportunity cost to compliance that can be avoided, thus viewed as a 'benefit' of a non-compliance strategy. One role of environmental funds is to lower firms' costs of compliance. In the absence of subsidized funds, fewer environmental investments would, *certis paribus*, be undertaken.

The aggregate rate of compliance can also be increased by making it more costly to violate regulations. Typically, the non-compliance costs can be increased by increasing the severity of penalties or utilizing sanctions such as facility closures. In addition, since the actual costs of non-compliance are probabilistic, enforcement agencies can increase the costs through more effective detection and conviction of violators. In Poland, fines are up to ten times the rate for environmental fees. In addition, fines, unlike regular fees, are not treated as a pre-tax deduction, resulting in even greater incentives to avoid fines. However, Poland provides violators with the option to defer fine payments for up to five years. If, at the end of the negotiated deferral period, the firm has eliminated the violation, the accrued fines may either be (a) waived if the investments costs equal or exceed the value of deferred fines; or (b) reduced by the amount of the investment if it is less than accrued deferred fines. Despite visible progress in Polish enforcement after 1989, environmentally motivated facility closures are still uncommon indicating that enforcement is not pursued to the full extent. There are less than one hundred such cases every year and they include only the very worst polluters. In addition, many of these decisions may be reversed on appeal to the Minister of Environmental Protection, Natural Resources and Forestry. As a result, a typical Polish firm may attach a very low probability to being forced to discontinue its operations as a result of non-compliance.

Whether firms actually carry out such an analysis of the trade-offs between compliance and non-compliance before undertaking investments has been widely discussed in both the economic and related social sciences literature. There are compelling arguments that firms are motivated to comply with standards by non-economic factors such as their public image. We have assumed that most Polish firms are trying to survive the transition period financially rather than use the environment and public image as a spring-board for future expansion. As a result, they view direct compliance benefits narrowly as simply the potential to reduce payments of fees and fines. In Poland, non-compliance is more a manifestation of a firm's struggle for economic survival or inability to raise the necessary capital than some conscious calculation of the trade-offs between compliance and non-compliance.

5. Survey design

To investigate how a firm responds to the rejection of its application for subsidized financing, a survey of applications rejected by Polish environmental funds was undertaken as a joint effort of the Harvard Institute for International Development and the Warsaw Ecological Economics Center. We have assumed that applicants intend to make the proposed investment *if they secure all of their required financing*. Once the application is rejected, the firm must reassess its investment decision. We may pose some questions about the likely responses of firms to the rejection of their application:

- 1 With the loss of subsidized financing and the corresponding increase in the costs of compliance (assuming substitute financing is available

- though not on equally favorable terms), is the firm still motivated to proceed with the investment?
- 2 Are the costs of non-compliance low enough that the firm can afford to postpone its investment for an indefinite period, either to resubmit its application (assuming the reason for rejection can be addressed in the next application) or identify/pursue alternative sources of financing?
 - 3 Does the firm have no recourse following rejection but to abandon the project because there are no options for financing the 'gap' resulting from the rejection of the application?
 - 4 If a firm is already in a 'deferred fine' status, is it more likely to undertake investment at a higher cost to the firm to avoid eventual payment of deferred fines?
 - 5 If the amount of financing requested represents a relatively large share of total project costs, is the applicant more likely to reduce the scale and costs of the project to an affordable level rather than pursue alternative gap financing?

Thus, the aim of the survey was to identify applicants of rejected projects and determine what subsequent steps they had taken to secure gap financing. We decided to focus the survey on applications rejected in 1994 to see what actions had been taken in 1995. The decision to use observations for an entire year was predicated on the perceived need to eliminate the potential impacts of 'seasonal fluctuations' in project cycles characteristic of environmental funds. In addition, a one-year period for the follow-up analyses seems to be sufficiently long to enable project promoters to revise applications, modify the original project or identify alternative gap financing.

The Polish EcoFund, the National Fund for Environmental Protection and Water Management (the National Fund), and the Warsaw Regional Environmental Fund were contacted to determine their willingness to share their lists of rejected applications. The EcoFund and the National Fund agreed to cooperate and provided lists of rejected applications (including contact information for the applicant) in December 1995.

Once the lists of 'rejected' applicants were received, the first step was to exclude applications which did not meet our minimum criteria as projects. Each year, the funds receive large numbers of inquiries about the availability of funding, only a portion of which can be viewed as 'projects'. The National Fund receives hundreds of 'unsuccessful' inquiries each year. Most of these rejected applications are characterized by vague project and technology descriptions, fail to identify environmental impacts, or provide insufficient information on project costs or even the level of financing requested from the fund. These 'non-projects' are counted as rejected applications by the National Fund and were included in the list provided to us by the Fund (see table 1). However, the authors eliminated the 'non-projects' for purposes of the study.

The list of rejected applications provided by the EcoFund was much smaller than for the National Fund. EcoFund is a smaller fund than the National Fund by an order of magnitude and accepts applications for fewer types of environmental projects (transboundary pollution, Baltic Sea

Table 1. *Number of applications to the National Fund and EcoFund in 1994*

<i>Fund</i>	<i>Received</i>	<i>Accepted for funding</i>	<i>Rejected for funding</i>		
			<i>Non-projects</i>	<i>Projects</i>	<i>Total</i>
National Fund	1,596	830	515	251	766
EcoFund	150	35	18	97	115

protection, climate, and biodiversity protection). In addition, EcoFund utilizes a pre-application process that serves as an effective screen for ‘non-projects’ and projects which do not meet the EcoFund’s eligibility requirements. As a result, only 18 ‘non-projects’ were eliminated from the EcoFund’s list of rejected applications (table 2).

Table 2. *Survey size and response rate*

<i>Fund</i>	<i>Number of rejected project applicants</i>	<i>Number of respondents</i>	<i>Response rate</i>
National Fund	251	174	69%
EcoFund	97	84	87%

After the list of rejected projects was finalized to eliminate non-project applications, a written questionnaire was mailed out. Project applicants were not asked to complete the written survey but simply to review the survey questions. Once applicants had an opportunity to review the questionnaire, they were contacted by phone and survey questions were asked orally. Surveys were mailed out to 251 applicants whose applications had been rejected by the National Fund and to 97 applicants of projects rejected by the EcoFund (table 2). Among this initial group of enterprises whose applications had been rejected by the National Fund and EcoFund, 174 (69 per cent) and 84 (87 per cent), respectively participated in the survey.

The questionnaire includes 13 questions (see the appendix). The first seven questions pertain to the rejected applicant. The first two questions asked respondents whether they received written notification of the rejection and the reasons given, if any, for the rejection. The next three questions concerned the amount of financing requested from the Fund, the percentage of total project cost this source of financing represented, and the type of financing requested (grant, equity, soft loan, etc.). The sixth question asked about the applicant’s environmental compliance status and whether, at the time the application was submitted, they faced a deadline for deferred penalties. The seventh question concerned the preparation of the application. Questions 8 through 12 pertained to the status of the project at the end of 1995. In particular, respondents were asked if the project had been abandoned (question 8), postponed (question 9), or financed using other sources (question 10). In question 11, applicants were asked if they had revised and resubmitted their application and whether they had been successful. In question 12, they were asked if the project was

modified in a way that would make it more affordable or attractive to investors or funds. The last question provided respondents with an opportunity to offer additional comments.

6. Survey results and conclusions

Reasons for rejection

The first three survey questions focused on communications between the Funds and applicants of rejected projects. Respondents were asked if they received written notification that their application had been rejected and, if so, an explanation for the rejection. In table 3, responses to the first two questions are provided (the total numbers in various tables may be different due to the fact that the numbers of missing variables for various questions were different). Sixty-five per cent of all survey respondents indicated they (or their enterprise) received written notification. A slightly higher percentage of respondents in the EcoFund survey received notification than in the National Fund survey (70 per cent to 63 per cent). The interpretation of these results for the two funds is quite different, however. The EcoFund, according to its procedures, is required to provide written notification to all applicants whose proposals have been rejected. Thus, 30 per cent of respondents to the EcoFund survey were unaware of this notification. The National Fund does not have a similar requirement, yet often provides written notification. Of those respondents who were aware of written notification, 86 per cent indicated that the notification also included an explanation of the reason(s) for rejection.

Table 3. *Written notification of rejected applications*

Question		Number of responses		
		National Fund	EcoFund	Total
Question 1: 'Did you receive written notification of your rejection?'	Yes	110	59	169
	No	64	25	99
Question 2: 'Did you receive written explanation of your rejection?'	Yes	92	54	146
	No	82	30	112

Respondents were asked also to state as many as two reasons provided by the funds (in writing) for the rejection of their applications. One hundred and forty-six respondents described the reasons given by the funds for rejection. Most respondents provided a single reason, although 22 provided a second reason. This was an open-ended question and respondents provided 19 different reasons for rejection. To facilitate discussion, the 19 reasons have been grouped into six general responses (table 4).

The reason for rejection provided most often was that the type of environmental benefits or the magnitude of benefits (or benefits in relation to costs) did not merit funding. In the case of EcoFund, the eligible environmental project categories are narrowly defined. Thus, an explanation given for rejection might be that biodiversity resources protected

Table 4. *Reasons for rejection*

<i>Reasons for rejection</i>	<i>National Fund</i>	<i>EcoFund</i>	<i>Total</i>
Eligibility requirements	29	8	37
Incomplete documentation	24	3	27
Does not meet Fund requirements	10	17	27
Types/sizes of benefits	11	32	43
Concern about applicant's financing	1	1	2
Fund's resources limited	26	6	32

were not of international significance, or, alternatively, a waste water project might result in a limited contribution to improvements in water quality in the Baltic Sea. In other cases, rejected projects that met the eligibility requirement may simply have yielded less benefits than other projects considered for funding.

Many respondents, particularly in the National Fund survey, were given reasons related to eligibility requirements, incomplete documentation, and failure to meet the Fund's requirements. To be eligible for funding from the National Fund, a project must result in environmental improvements in one of the Fund's priority areas. Eighteen respondents in the National Fund survey received this explanation (that it was not in a priority area) for rejection. Other types of ineligibility included applications for financing where the project had already been completed, requests to fund ineligible activities, such as pre-feasibility studies, and cases where the equipment would be procured from a country not participating in the EcoFund 'debt-for-environment swap'. A failure to meet a Fund's requirements could cover a range of application deficiencies including eligibility as well as failure to receive a high enough score to receive financing (EcoFund). A substantial number of applicants were told that the Fund's resources were limited or exhausted. In the EcoFund survey, this may simply imply that the project did not receive a high enough score to receive funding. In the case of rejected applications to the National Fund, where only limited resources are made available for grants, applicants may have been advised to resubmit and request 'soft' loans instead of grants.

In two instances only, the Funds raised questions about the applicant's co-financing capabilities. The funds take it for granted that complementary financing opportunities exist and they do not disqualify applicants. On the contrary, failure to provide such co-financing is an obstacle to a fund's positive decision.

Financial aspects of applications

Respondents were asked to indicate the total costs of their proposed projects and the share of project costs requested from the Fund in the application. Although we were not able to obtain the same information on most individual project characteristics for accepted projects as for rejected projects in the survey, aggregate information on funded projects was available to facilitate comparisons between the amount of funding requested for accepted and rejected projects and also the relationship between the amount requested and total project costs.

Table 5. *Summary of financial characteristics of applications submitted to the National Fund in 1994*

	<i>All applications</i>	<i>Rejected</i>		<i>Accepted</i>
		<i>All</i>	<i>In survey</i>	
Number of projects analysed	1,596	766	159	830
Average project cost (billion PLZ) ^a	48.7	62.4 ^b	36.4	36.1 ^b
Average amount requested (billion PLZ)	20	11.1	14.2	8.3
Average amount requested (% of cost)	9.7	18 ^b	39	23 ^b

Notes: ^a In 1994, 1 billion Polish Zloty (PLZ) was equivalent to \$44,052.86.

^b Authors' estimate based on extrapolating data for 723 accepted projects.

For the National Fund, there are very striking differences between rejected and accepted applications in terms of average total project costs and the share of project costs requested from the National Fund (table 5). All rejected applications (i.e. those including 'non-projects') involved total project costs that were, on average, 80 per cent larger than accepted applications or rejected applications in the survey. However, the share of total project costs requested in rejected applications (18 per cent) is lower than for accepted projects (23 per cent) and substantially lower than rejected applications in the survey (39 per cent). If the rejected applications used in the survey were separated from the remainder of rejected applications, differences between this latter group and accepted applications would be even larger.

The financing characteristic (high costs, low share requested) of rejected applications—represented by a large number of poorly developed 'non-projects'—conforms to a pattern of behavior that was typical during the communist period. Enterprises expected that more modest requests (in terms of share of financing) were more likely to receive funding. By overstating the total costs of projects, these seemingly modest requests could defray a substantial portion of actual costs. Under the former administrative allocation regime, enterprises did not expect to receive all of the financing needed in a given year, were not motivated to fully elaborate projects, or held accountable (or rewarded) for developing projects to the appropriate scale.

The other interesting trend in table 5 is the share of project costs requested from the Fund in rejected applications in the National Fund survey (39 per cent), much higher than the share requested in successful applications. This trend might be easily explained. First, with scarce resources, funds would prefer to support projects that can cover a larger portion of project costs from other sources. We cannot directly compare net benefits or even cost-effectiveness of rejected and accepted projects, and such criteria are not explicitly used by the National Fund, but clearly the Fund would be able to support substantially fewer projects if, on average, it funded larger shares of projects. While an idealistic interpretation can refer to avoiding excessive subsidies, a cynical one notes that satisfying more applicants means that the fund has more potential allies should its practices and efficiency be questioned.

Table 6. Comparison of rejected^a and accepted projects submitted to the EcoFund in 1994

	Rejected	Accepted
Number of projects analysed	76	35
Average project cost (billion PLZ)	90.5	62.6
Average amount requested	18.9	14.6
Average amount requested (% of cost)	21	23

Note: ^a Includes only rejected applications in the survey which provided project cost data.

Table 7. EcoFund – rejected projects in 1994 (billion PLZ)

Project category	Number	Total cost of projects	Amount to be financed by Fund	Financing share
Air protection	4	95.1	34.9	37%
Baltic Sea	47 ^a	5,571.4	1,082.1	19%
Climate protection	25 ^b	1,077.0	294.3	27%
Biodiversity	2	1.1	1.0	97%
Other	6	139.1	28.4	20%
Total	84 ^c	6,876.6	1,437.7	21%

Notes: ^a Cost information was available for 44 projects only.

^b Cost information was available for 21 projects only.

^c Cost information was available for 76 projects only.

Of the 84 unsuccessful applicants to the EcoFund who responded to the questionnaire, 76 provided information on project costs and share of financing requested (table 6). Based on these data, projects rejected by the EcoFund had substantially higher average project costs than projects funded by EcoFund or those accepted or rejected by the National Fund. This high average project cost is influenced by large water protection projects submitted to (and rejected by) EcoFund (table 7). If these water projects are excluded, the average project cost among EcoFund rejected applications would fall to 39.8 billion PLZ. Similarly, the average project costs for accepted EcoFund applications (62.2 billion PLZ) is nearly twice the average project costs for National Fund applications, due in large part to the two large air protection projects that were funded in 1994 (table 8).

EcoFund supports water protection (especially as it affects the Baltic Sea), air protection (transboundary pollution and mitigation of climate change), and biodiversity. The National Fund supports projects in these categories as well as waste disposal and ‘other’ types including monitoring, environmental accidents, education, research, and consulting (tables A1–A4 in the appendix). Thus comparisons between average project costs for the two funds may be somewhat misleading, since the National Fund supports a larger range of activities than EcoFund. Table 9 presents cost and financing data for the two funds where National Fund averages are based only on projects in the same general categories as EcoFund projects (the six ‘other’ projects rejected by EcoFund — see table 7 above — are excluded from table 9 to make the averages more commen-

Table 8. *EcoFund—applications accepted in 1994* ^a(billion PLZ)

<i>Project category</i>	<i>Number</i>	<i>Total cost^a</i>	<i>Amount to be financed</i>	<i>Financing share^b</i>
Air protection	2	854.1	316.0	37%
Baltic Sea	4	565.8	67.9	12%
Climate protection	12	623.1	99.7	16%
Biodiversity	17	148.4	28.2	19%
Other	—	—	—	—
Total	35	2,191.4	511.8	23%

Notes: ^aAuthors' estimate based on average shares for projects financed in 1994.

^b Average shares for projects financed in 1994.

surable). The average project cost of National Fund applications (both rejected and accepted) increased after separating out waste disposal and 'other' projects. Despite the large increase in average costs, the share of project costs requested experienced only a slight drop.

The main conclusion from these tables is that, rather surprisingly and despite profound institutional differences in the funds, average project costs and the level of assistance requested are quite similar. Differences in the funds' overall expenditures are much smaller than differences for specific project categories such as air and water protection. Even though the differences between *average* projects costs as well as amounts requested turn out to be statistically insignificant, differences in percentage shares requested are significant. Also rather surprisingly, a number of project characteristics such as whether it was a commercial undertaking or not, proved to have no statistical significance for the amount of funding sought from the funds (see the appendix).

In table 10, additional information on financing requests is presented for survey respondents. In the upper part of table 10, the number of applicants requesting different amounts of financing is illustrated. For National Fund respondents, requests were fairly evenly distributed among the various categories. There were very few small requests to EcoFund and a large number of requests in the 10 to 100 billion PLZ range.

Table 9. *Comparison of rejected and accepted projects submitted to the Funds adjusted for EcoFund structure^a*

	<i>Rejected</i>		<i>Accepted</i>	
	<i>National Fund</i>	<i>Eco Fund</i>	<i>National Fund</i>	<i>Eco Fund</i>
Number of projects analysed	128	71	514	35
Average project cost (billion PLZ)	42.4	95.6	54.3	62.6
Average amount requested (billion PLZ)	16.6	20.0	11.9	14.6
Average amount requested (% of cost)	39	21	22	23

Note: ^aData for both Funds adjusted to allow direct comparisons between projects of the type funded by EcoFund (climate/air protection, Baltic Sea/water protection, and biodiversity).

Table 10. Financing requested from funds

Amount requested (million PLZ)	Number of rejected projects		
	National Fund	EcoFund	Both funds
0–500	29	7	36
501–1000	29	8	37
1,001–2,000	28	5	33
2,001–5,000	27	14	41
5,001–10,000	17	18	35
10,001–100,000	26	23	49
100,001 or more	3	1	4
All projects	159	76	235
<i>Percentage of project costs requested</i>			
up to 25%	26	41	67
26 to 50%	85	27	112
51 to 75%	22	5	27
76% or more	26	3	29
<i>Type of financing requested</i>			
Grant	126	73	199
Soft-loan	29	3	32
Grant and soft-loan	3	—	—
Equity and soft-loan	1	—	—

Shares of project costs requested were divided into four categories representing 25 percentage point intervals. The resulting distribution of applications into these categories (bottom half of table 10) reflects, in part, co-financing rules of the National Fund and EcoFund. The National Fund does not set mandatory co-financing requirements for grants and applicants may request up to 100 per cent of project costs. For soft loans, the maximum shares or project costs available to enterprise and municipalities are 50 per cent and 70 per cent, respectively. Thus, although 53 per cent of shares fall within the 26–50 per cent range, shares in each of the other three ranges exceed 13 per cent. EcoFund generally limits their co-financing share to 10–30 per cent of project costs, although EcoFund will finance up

Table 11. Environmental compliance at time of submission for rejected applicants

Question		National Fund	EcoFund	Total
Question 6a: 'Were you in compliance with permitting requirements?'	Yes	160	66	226
	No	13	18	31
Question 6b: 'If not, were penalties for non-compliance deferred?'	Yes	4	14	18
	No	9	4	13
Question 6c: 'If yes to 6b, year of deadline?'				
1995		2	4	6
1996		—	5	5
1997		—	5	5
Not specified		2	—	2

to 50 per cent (for certain projects proposed by local governments) and up to 80 per cent for biodiversity projects carried out by public entities, foundations or non-governmental organizations. Not surprisingly, 89 per cent of applications to EcoFund involved requests of less than 50 per cent of project costs.

Compliance with current standards

In the opening section of the paper, alternative justifications for the existence of funds were offered. One motivation for subsidized funding would be to assist facilities in securing financing to correct permit violations. However, the data in table 11 suggest that applicants of rejected projects, at least, are in compliance with environmental requirements at the time they submitted their applications. Overall, 88 per cent of rejected applications in both surveys were in compliance with their current standards, with a larger percentage of National Fund respondents (92 per cent) in compliance than for EcoFund respondents (78 per cent). Without information on compliance rates for accepted projects, we can only speculate on some of the explanations for the high compliance rates among rejected applications.

First of all, priority in project appraisal might be given to applications which are out of compliance since these projects yield greater environmental benefits. Thus, it might be expected that projects which comply with environmental requirements are perceived as less urgent. In addition, assuming more facilities with accepted projects are in fact out of compliance, it could be that these investors put more effort into preparation of a good proposal when they face non-compliance penalties and are then rewarded with higher rankings. In fact, neither fund gives explicit weight to compliance status in the project appraisal process. Many of those applicants who currently comply with existing standards are making investments in advance of new, stricter standards. For example, the new air emission standards for large combustion plants were expected to take effect on 1 January 1998. Moreover, not all proposed projects involve 'end-of-pipe' investments. Some applicants may develop proposals that are designed to utilize energy and other resources more efficiently or to reduce or modify waste streams. Finally nature protection and biodiversity project proponents would not likely hold pollution permits related to their projects.

An alternative explanation notes that environmental projects may be undertaken for reasons other than current non-compliance.

Of the 31 applicants which did not comply with current standards at the time they submitted their applications, 58 per cent have requested deferral of fines and faced specific deadlines for attaining compliance status to avoid paying the deferred fines. Eleven applicants who deferred penalties faced deadlines for compliance in 1995 or 1996, limiting the amount of time they would have to secure financing for their proposals. The survey indicated that six of these applicants continued the project even after rejection for Fund financing. Most of them (four) secured 'gap' financing from mixed (own and external) sources, while one relied on own sources only and the remaining one managed to attract an alternative external financier.

Table 12. *Status of rejected applications*

<i>Status of rejected projects (end of 1995)</i>	<i>National Fund</i>	<i>Eco Fund</i>	<i>Both Funds</i>
Abandoned	16	12	28
Postponed	47	12	59
Postponed/resubmitted/no answer	3	—	3
Resubmitted/no answer	1	—	1
'Gap' financing arranged (all methods)			
• sources other than the Fund	85	45	130
• resubmitted application only	6	—	6
• resubmitted application + other	10	1	11
• resubmitted application rejected then sources other than the Fund	5	—	5
• resubmitted applications/no answer then sources other than the Fund	9	4	13

Two projects were postponed by two years (expecting to close the gap from own or mixed sources). Two proposals were modified by improving documentation. Only one project was abandoned, and its investor was not explicit as to the consequences of that step. Of the seven applicants who faced deadlines extending further into the future, six proceeded with the investment and only one resubmitted a modified proposal.

These results suggest that the deferral of fines may indeed act as an incentive for firms making extra effort to proceed with investment. Only one applicant in this group abandoned the project completely.

Applicants' actions following rejection

After the applicant's project is rejected for financing by a Fund, a substantial financing 'gap' must be closed to proceed with the investment as proposed. The applicant faces a number of decisions. The project can be abandoned if the task of finding substitute financing is not expected to produce results. For example the applicant may have learned that the project is not suitable for subsidized financing from the Fund (and other funds) and that commercial financing is unaffordable. Alternatively, the investor may not be under pressure to implement the investment because the enterprise already meets environmental requirements. During the project appraisal process, the applicant may have received feedback from the Fund that its experts do not believe the proposed technology is appropriate or cost effective.

If the project is not abandoned, the investor may pursue one of several strategies. First, the investor must decide whether it is necessary to revise the project. For example, an alternative technology might be considered or the project might be scaled down to reduce costs. Also, the project might be divided into smaller investments spread out over a longer time horizon. The applicant may simply revise or update the application without changing the scope of the project. The revised application could then be resubmitted to the same Fund or submitted to another funding source. In terms of methods for securing money to replace the 'gap' resulting from

Table 13. *Planned solutions for financing postponed projects*

<i>Planned solution to financing 'gap'</i>	<i>National Fund</i>	<i>EcoFund</i>	<i>Total</i>
Own resources	4	2	6
External resources	24	8	32
Own and external resources	6	2	8

the rejection, as mentioned above, the applicant can resubmit to the same funding source, secure financing from other sources, or postpone the investment, typically, until the applicant's own resources are adequate to cover the gap.

In table 12, the status of the rejected applications at the end of 1995 is summarized. Only a small number of all rejected projects (11 per cent) were abandoned by the end of 1995. In percentage terms, more projects submitted to the EcoFund (14.6 per cent) were abandoned than for the National Fund respondents (8.8 per cent). Twenty-three per cent of respondents indicated that they had postponed making the investment to secure financing (either from sources other than the Fund or by resubmitting the application) thus presumably leading to project abandonment in some cases. In both surveys, more than 50 per cent of respondents reported that they had closed the financing 'gap' by the end of 1995, using a combination of approaches. Overall, the percentage of rejected applications that were financed by the end of 1995 was similar for the two surveys. However, a considerable number of respondents (16) in the National Fund survey had resubmitted their applications to the National Fund and received financing support. In several cases, these applicants had originally requested grant financing from the National Fund but resubmitted the application requesting either 'soft' loans or a combination of 'soft' loans and grants. More detailed analyses of these results are discussed in the sections below.

Abandoned projects Statistical analyses proved no statistical difference between the abandoned and non-abandoned projects in terms of the amount of funding they sought from the funds (see appendix). Respondents who abandoned their projects were asked to provide an explanation for this decision. Over two thirds of this group (19) indicated that the technology they currently use was adequate and the new project would not be pursued without financing from the Fund. Another two respondents reported that they simply terminated the project. In four cases, respondents provided interesting answers to this question. One respondent abandoned the project after receiving the EcoFund's opinion that the proposed project would actually increase water pollution. A second respondent abandoned their project because they were unable to procure equipment (wind energy production) in Poland or one of the countries participating in EcoFund (US, France, and Switzerland). Two applicants to the EcoFund planned to develop new projects, in one case, using an alternative waste water treatment technology.

In four cases where applicants had decided to abandon projects, their enterprises were out of compliance with existing environmental regulations. Three of these respondents stated they were planning to pay fines,

while the fourth respondent had requested a deferment in fines until 1997 and planned to prepare a new project. In comparing abandoned projects to other rejected applications, there are significant differences in the amount of financing requested and the share of project costs requested. For the abandoned projects submitted to the National Fund and EcoFund, the average amount requested was 1.25 billion PLZ (compared to the average of 14.2) and 7.93 billion PLZ (compared to the average of 18.9), respectively. However, the share of total project costs was much higher among abandoned applications than among all rejected applications to the National Fund (50 per cent compared to 39 per cent) and EcoFund (52 per cent compared to 21 per cent). It is interesting to note that these abandoned projects would have presumably been undertaken if they had received financing and required substantially less funding to close the financing gap than for rejected applications on average. However, project proponents of these abandoned projects had to close a gap that represented about half of project costs. Since the large majority of these applicants were in compliance with environmental regulations, we can speculate that they would only justify the project if a substantial proportion of costs could be covered through grants. Of the 28 abandoned projects, only four applicants (to the National Fund) had requested soft loans. In all other cases, applicants had requested grant financing.

Postponed projects As noted above in table 12, 59 respondents indicated they had postponed their projects. Respondents were asked to indicate how long the project would be postponed and what sources of finance they were considering to close the financing 'gap'. In most cases, respondents did not answer the question concerning the duration of postponement. We believe that many respondents planned to undertake their projects as soon as gap financing could be arranged. Given that some sources of gap financing could not be accessed with certainty (e.g., application to another fund still pending), it would be difficult to answer this question about timing.

Respondents were asked what sources of finance were under consideration to close the financing gap. These responses are summarized in table 13. Several potential sources of finance were mentioned including own resources, regional environmental funds, the National Fund, budgetary grants, and loans through the Bank of Environmental Protection (BOS S.A.) Many respondents simply indicated that 'other sources' would be the source of financing. All resources other than own resources have been included in the category 'external resources' in table 13.

Resubmitted applications Thirty-nine respondents in both surveys reported they had resubmitted their application to the same fund for reconsideration. Of these, the majority (34) were resubmitted to the National Fund. Of these 39 applications resubmitted to the Funds, 17 received funding and five had been rejected a second time. Seventeen respondents had not received an answer from the Fund concerning the second submission. However, 13 of the 17 proceeded with the investment using other resources even though no answer had been received from the Fund.

About 40 per cent of respondents who submitted applications indicated

Table 14. *Changes to resubmitted proposals*

<i>Question 11b: 'What changes, if any, were made to the proposal before resubmitting?'</i>	<i>National Fund</i>	<i>Eco Fund</i>	<i>Total</i>
No changes or no new information	12	3	15
Changed scale of project	2	—	2
Other technologies	4	—	4
Completed documentation and miscellaneous changes	10	1	11
Changed siting of project	—	1	1
Changed co-financing	—	1	1
Requested loan or loan/grant instead of grant	3	—	3

they made no changes to the application (or provided no new information to interviewers). However, 60 per cent of the resubmitted applications were modified. In eight cases, the documentation submitted with the new application was completed. Some applicants to the National Fund requested loans (two cases) or a combination of loans and grants (two cases) after their grant applications were rejected the first time. Six respondents stated they changed the technology before resubmitting. Four respondents reduced their project's scale or costs while one respondent reported increasing project costs. Miscellaneous changes to applications included the following: changes in project location, replacement of consultants who prepared the first application, better description of project's environmental benefits, addition of educational component, and reduction in the co-financing request. Changes to resubmitted applications are summarized in table 14.

Closing the financing 'gap' As noted earlier, 152 respondents reported they had closed the financing gap by the end of 1995. In 16 cases, respondents were successful in receiving funding from the Fund which had previously rejected their applications. However, for ten of these cases, additional sources were required to financing from the Fund to proceed with the project.

In the questionnaire, respondents who arranged financing indicated the source(s) of financing that were used to close the financing 'gap' (table 15). Almost 75 per cent of these respondents used their own resources to close the gap or combined own resources with other sources. By contrast, own resources were identified as a proposed source of gap financing for only 31 per cent of respondents who postponed their projects (table 13). Although these are two separate groups of respondents, it does suggest that project proponents make an effort to secure external financing first and fall back on own resources only if they are unsuccessful in closing the entire gap with external resources.

The types of external sources from which gap financing was secured by rejected applicants is dominated by institutions which provide grants or soft loans. In 81 cases, respondents closed the financing gap with assistance from the National Fund (EcoFund respondents), regional environmental funds, or EcoFund (National Fund respondents). All three of these funds provide grants and the National and regional funds provide

Table 15. Reported sources of alternative financing after initial rejection by Fund

Source of financing	National Fund		EcoFund	
	Only source	One of multiple sources	Only source	One of multiple sources
Own resources	43	35	9	31
National Fund	N/A	N/A	3	19
EcoFund	—	2	N/A	N/A
Regional fund	6	23	1	26
BOS S.A.	2	6	—	7
State budget	8	23	1	6
Other	9	12	1	13

soft loans. Another major source of gap financing was grants from state, regional or municipal government budgets. Thirty-eight respondents reported using this source for gap financing. Fifteen respondents reported gap financing in the form of loans from BOS. It is likely that these loans were softened by the National Fund or regional funds through the provision of interest rate subsidies. ‘Other’ sources of financing include a range of institutions providing grants. Other bank financing is included in ‘other’ sources. However, only two respondents indicated they secured gap financing through commercial loans. Thus, it appears that the most common sources of gap financing included own resources and subsidized sources of financing.

Conclusions

1. A large majority of project proponents either proceeded with their projects or simply postponed projects until alternative financing could be obtained. Preferred gap financing appears to be subsidized financing offers by other funds and sources, but own resources have played an important role as well. Even though most applicants were under no direct pressure to undertake investments to correct a non-compliance situation, they nevertheless continued projects even if larger commitments of their own resources were required. Two possible explanations for this result can be offered, consistent with the motivational structure of the profit-maximizing firm:

Case 1: $NPB \geq 0$

The applicant intended to make the investment but attempted to enhance the rate of return by securing concessional financing.

Case 2: $NPB < 0$

The applicant already had obtained adequate concessional financing from other funds to compensate for negative private benefits or the gap financing secured subsequent to rejection (alone or in combination with other concessional finance already secured) provided adequate compensation for negative NPB .

2. Generally, it appears that gap financing used to replace funding from the National Fund and EcoFund is less subsidized than the financing

provided by these Funds, given the dominant role of enterprises' own resources. This conclusion is consistent with the explanation provided above. With few exceptions, proponents of rejected applications do not appear to have closed the financing gap using commercial credit, although it is possible that the category of 'own' resources may well be equity or credit. Even if own resources are cash reserves, there is an implied opportunity cost; enterprises may be drawing capital away from economically motivated investments, for which capital will need to be raised in commercial markets. From the enterprise's perspective, use of own resources for environmental investments may be desirable since more attractive commercial financing may be available for economically motivated investments than for environmental investments with negative *NPB*.

3. After the application is rejected, an enterprise appears to have adequate time to revise and resubmit the application or to postpone the project to identify and secure alternative gap financing. Partly, this result can be attributed to the fact that many of the respondents either were in compliance with environmental regulations or had requested deferral of penalties for up to five years to enable them to develop and implement projects to remedy non-compliance.
4. It does not appear that the lack of gap financing has contributed to the incidence of abandoned projects. First, only 11 per cent of rejected applications had been abandoned a year later. Second, the financing gap was only one-tenth as large for the abandoned projects as for projects in the survey as a group. Since virtually all of the abandoned project proponents were in compliance with environmental requirements, they seemed to be unwilling to undertake these projects without a larger share of project costs defrayed through direct grants.
5. It is difficult to determine whether a firm which is in a deferred penalty status is more or less likely to close the financing gap using less subsidized financing. There were a surprisingly small number of projects with deferred penalty status which makes analyses difficult.
6. Proponents of rejected applications appeared to be quite receptive to comments received in writing from the funds. A substantial number of applicants changed the technology, scaled down projects and reduced costs, or simply responded to concerns about the proposal in revising the application and resubmitting. Funds should be encouraged to provide written comments to investors when their applications are rejected, both to ensure transparency and to provide information that might be helpful in revising the project or application.
7. Is financing provided by funds too generous or too restrictive? This is the question posed in the title of the paper. At least for the group of applicants we surveyed, it could be argued that—had they originally received funding instead of being rejected—the financing could be viewed as too generous since a majority of these applicants were able to secure gap financing in a short period following the rejection. Can a

fund tell in advance which projects really need its support? The EcoFund, in appraising projects, attempts to determine whether financing from EcoFund is essential to the project going forward. If EcoFund determines that an applicant has access to adequate resources to undertake the project, without EcoFund support, it may reject the application if there are other projects of similar quality for which EcoFund support is critical. As far as we know, the National Fund does not consider this issue in deciding whether to provide financing. Thus, it is quite likely that the National Fund provides financing for some projects that could be financed without support from the National Fund. If this is the case, then the National Fund could reduce its co-financing share and/or reduce the softness of its support without choking off demand among investors. As Poland moves closer to a market economy and many of the imperfections in capital markets disappear, the Funds should reassess financing terms in order to avoid supporting projects that are financially viable.

8. Many critics of funds have suggested that the availability of subsidized financing discourages the formation of capital markets to service environmental investments. The results from this survey lend some support to this argument, although caveats are necessary. At least in 1995, there appears to have been sufficient non-commercial subsidized financing to enable proponents to close the financing gap after being turned down for financing by the National Fund or EcoFund. In many cases, these sources have needed to be supplemented by own resources to close the financing gap. While the demand for commercial credit was low indeed, this might have been caused by the fact that the projects in question were efficient but financially non-viable.
9. The impact of funds on capital markets is difficult to assess because of the interaction of supply and demand for capital. Although the analysis in the paper cannot prove or refute the proposition that environmental funds discourage the formation of capital markets, we can offer some observations that may help to frame future discussions.

Do capital markets differentiate or discriminate between environmental and non-environmental investments? In other words, is there interest in providing capital for environmental projects, because if there is not, then environmental funds should not be implicated in discouraging capital markets to form. The short answer is that it depends on the objectives and criteria that guide decisions to provide capital, particularly the relative importance attached to the rate of return on the investment versus the creditworthiness of the borrower. In addition, environmental investments have not traditionally been attractive to lenders or providers of other equity unless they provide rates of return that are comparable to other investments. Thus, it is not clear that capital markets are particularly interested in servicing environmental investments unless the proponent is willing to pay competitive interest rates or a donor (or a fund) is prepared to buy down interest rates. At the present time, financial intermediaries may simply lack experience in

evaluating environmental investments, given the dearth of loan applications for environmental investments, to have developed a policy. IFIs such as the European Bank for Reconstruction and Development have set up financing facilities in partnership with CEE financial intermediaries to help demonstrate the viability of environmental investments (although the focus has been on energy efficiency and cleaner production investments with positive NPV).

Do enterprises have interest in obtaining financing for environmental projects from capital markets? At the present time, the answer would be 'no' based on the survey results. The supply of concessional financing, given current levels of demand, appears to be adequate. One might argue that the real issue centers on the low level of demand for environmental investments resulting from a lack of government commitment to enforcement. These policies afford enterprises time to secure concessional financing or even postpone environmental compliance decisions. In addition, capital markets still are not well developed in the CEE region and the cost of capital (when available) tends to be quite high as to discourage use of commercial credit.

Is there likely to be a role for capital markets to play in the future? For CEE countries preparing for EU membership, the estimated costs of compliance with EU environmental legislation far exceed current levels of expenditures. Recognizing the financing challenge ahead, the EU-PHARE program will target 70 per cent of its resources to concessional financing of environmental and infrastructure investments in CEE countries. These resources, combined with existing funds will increase the availability of concessional financing, but it is too early to speculate on whether capital markets will play an increasing role. A lot depends on how enterprises manage their investment portfolios. As pointed out earlier, higher priority may be given to directing commercial credit to non-environmental investments. What is clear is that accession will increase the demand for non-environmental investments as well.

If demand for environmental investment increases, should funds make a greater effort to maximize leverage? This is a difficult question to answer since maximizing leverage is not an explicit objective of environmental funds. However for the National Fund, if the competition for concessional financing intensifies, the pressure for greater leverage may come from applicants (who both are demanders of concessional financing and suppliers of the fund's revenues). In addition, funds will be able to gauge demand based on the number of good proposals and increasing difficulty in supporting all applications that meet the fund's criteria. At the moment, the demand for commercial credit among proponents of environmental investments appears to be weak. Partly, this results from the availability of subsidized financing *vis-à-vis* the number of **well-prepared** projects (as evidenced by the distinction between projects and non-projects). With lax enforcement, coupled with a limited number of good projects, investors have time to search for affordable financing. If

CEE countries increase enforcement efforts, the demand for financing will increase to the point that investors may need to tap into capital markets for at least some part of their environmental investment needs.

References

- Anderson, G. and T. Zyllicz (1995), 'The role of environment funds in environmental policies of Central and Eastern European Countries', *Environmental Funds in Economies in Transition*, Paris: OECD, pp. 91–102.
- Francis, P., ed. (1994), *National Environmental Protection Funds in Central and Eastern Europe. Case Studies of Bulgaria, The Czech Republic, Hungary, Poland, and The Slovak Republic*, Budapest: The Regional Environmental Center.
- Klarer, J., ed. (1994), *Use of Economic Instruments in Environmental Policy in Central and Eastern Europe. Case Studies of Bulgaria, The Czech Republic, Hungary, Poland, Romania, The Slovak Republic, and Slovenia*, Budapest: The Regional Environmental Center.
- Lauron, P., A. Melzer, and T. Zyllicz (1995), *A Strategy to Enhance Project Financing for Environmental Investments in Central and Eastern Europe*, London: EBRD.
- Ministry of Environment (1990), *National Ecological Policy*, Warsaw.
- OECD (1995), *Environmental Funds in Economies in Transition*, Paris.
- Panayotou, T. (1995), 'Effective Financing of Environmentally Sustainable Development in Eastern Europe and Central Asia', Environmental Discussion Paper, No. 10, Harvard Institute for International Development, Cambridge, Mass.
- Peszko, G. (1994), 'Dotacje ukryte w preferencyjnych pozyczkach', Quattro-Pro software developed at the Cracow Academy of Economics for the Cracow Regional Environmental Fund ('Subsidies implicit in concessional loans').
- Smith, S. and T. Zyllicz (1994), 'Workshop on taxation and environment in European economies in transition: Rapporteurs' report of the discussions and conclusions', *Taxation and the Environment in European Economies in Transition*, Paris: OECD, OCDE/GD(94)42, 6–15.
- Zyllicz, T. (1994), 'Environmental policy reform in Poland', in T. Sterner, ed., *Economic Policies for Sustainable Development*, Dordrecht: Kluwer, pp. 82–112.
- Zyllicz, T. (1995), 'Cost-effectiveness of air pollution abatement in Poland', *Environmental and Resource Economics* 5: 131–49.

Appendix 1 Rejected projects survey

This survey is designed to examine the fate of important environmental protection projects that were rejected by the {National Fund} {Regional ... Fund} {EcoFund}. According to the files of the Fund, your project was not accepted for financing. We would like therefore to study the fate of your project since the negative decision of the Fund was communicated to you. The survey is sponsored by the Harvard Institute for International Development. We assure confidentiality and guarantee that any specific firm-related information you will provide us with will not be disclosed. The results of the survey will be published in a statistical form only.

1. Have you received a written decision of the Fund's board informing about the rejection?
 Yes No
2. Was there stated any specific reason for rejection?

- Yes No

If 'yes', please state that reason

.....

3. What was the amount of funding you requested?

.....PLN

4. What percentage of the total project cost did you request?

...%

5. What form of support did you apply for?

- grant
 equity
 soft loa

If soft loan, what was the interest rate applied for?

- 6a. At the time of the application were you in compliance with current regulations?

- Yes No

- 6b. If 'no', please indicate whether you received the deferment of your non-compliance penalties at that time?

- Yes No

- 6c. If 'yes', please indicate what was the deadline for you to attain compliance and what were the annual amounts of the deferred non-compliance penalties?

Deadline: Deferred penalties: PLN in 199.,
..... PLN in 9., PLN in 9., PLN in 9., PLN in 9.

7. Who prepared the project proposal?

- Company offices Hired consultant

If a consultant was hired, please state the name of the company:
.....

8. Was the project abandoned?

- Yes No

If 'yes', please indicate what were or have been the implications for your business; *go to 13*

.....

9. Was the project postponed?

- Yes No

If 'yes', please indicate for how long, how do you plan to resume it; *go to 13*

- Postponement:
- Planned solution:
10. After your application was rejected, did you proceed with the planned investment using other financing?
- Yes
 - No
- If 'yes', please indicate how you closed the financing 'gap', and go to 13
- Substitute funding:
11. Did you resubmit the application for funding?
- Yes
 - No
- (a) If 'yes', please indicate to which Fund you submitted the application, (b) the types of changes (if any) made, and (c) whether your application was successful; then go to 13
- Application submitted to:
- Changes to the original (rejected) application:
- Support received (type, amount, cost):
12. Have you prepared, or do you plan to prepare, a modified project proposal?
- Yes
 - No
- If 'yes', please indicate and briefly describe what changes you plan/made
- alternative technology
 - scaled down project
 - divided into smaller investments or implemented in phases
 - other (what)
13. Any other remarks

A series of statistical tests were performed in order to check the robustness of some conclusions seemingly implied by the data. Using the SPSS we analysed the statistical significance of differences between various project groups with respect to:

1. Amount requested from a fund;
2. Total project cost; and
3. Percentage share requested, i.e. (1)/(2)

The following project groups were looked at:

- National Fund projects *versus* EcoFund projects;
- Non-abandoned projects *versus* abandoned projects; and
- Non-commercial projects *versus* commercial projects.

(The 'non-commercial' category includes such projects as sewage treatment plants, municipal district heating systems, biodiversity protection and other non-profit undertakings.) Some other combinations of variables were checked too, but the numbers of observations falling into relevant categories were too small to obtain any meaningful results.

The standard t-test applied to mean differences was used to investigate their equality. It was preceded by the Levene's test for equality of variances (in each case letting treat them as equal). Additionally, non-parametric tests were utilized to check for the equality of distributions. The Kolmogorov–Smirnov test was at the verge of its applicability due to the small sample size. We therefore used Mann–Whitney U/Wilcoxon Rank Sum W Test to confirm the results. Except for the Levene test, in all tests 2-tailed P (significance) levels were calculated in order to reject hypotheses or to determine that statistical significance was lacking.

Two variants of the sample were taken into consideration: all projects with relevant observations of relevant variables or those projects only which conformed with the EcoFund structure (i.e., having excluded such projects related to waste disposal, cleaner production, environmental education, etc.). The samples consisted of 159 National Fund projects and 76 EcoFund projects, or 128 and 71 projects, respectively. There were no qualitative differences between the two variants except for reduced variation in the second case resulting in slightly higher significance levels. Table A5 summarizes our results from the second sample (adjusted for the EcoFund structure; 199 projects).

Supplemental tables

Table A1. *National Fund—1994 applications (billion PLZ)*

<i>Project category</i>	<i>Number</i>	<i>Total cost</i>	<i>Amount to be financed</i>	<i>Financing share</i>
Air protection	419	49,200	8,500	17%
Water protection	426	22,700	4,600	20%
Waste disposal	57	2,154	540	25%
Nature conservation	136	1,892	1,132	60%
Other	558	1,858	672	36%
Total	1,596	77,804	15,444	20%

Table A2. National Fund—applications accepted in 1994 (billion PLZ0)

Project category	Number	Total cost	Amount to be financed	Financing share
Air protection	226		4,700	21% ^a
Water protection	227		1,170	27% ^b
Waste disposal	40		370	33% ^c
Nature conservation	61	1,126	259	23%
Other	276	957	460	48%
Total	830	30,000 ^d	6,959	23% ^d

Notes: ^a Based on 153 contracts signed in 1994.

^b Based on 203 contracts signed in 1994.

^c Based on 30 contracts signed in 1994.

^d Authors' estimate.

Table A3. National Fund—rejected survey applications in 1994 (billion PLZ)

Project category	Number	Total cost	Amount to be financed	Financing share
Air protection	30	262.7	127.4	49%
Water protection	83	4,956.5 ^a	1,936.1 ^a	39%
Waste disposal	21	322.2 ^b	131.9 ^b	41%
Nature conservation	24	84.8 ^c	35.7 ^c	42%
Other	16	258.4 ^d	154.8 ^d	60%
Total	174	5,884.6 ^e	2,385.9 ^e	41%

Notes: ^a Based on 76 applications in survey.

^b Based on 20 applications in survey.

^c Based on 20 applications in survey.

^d Based on 14 applications in survey.

^e Based on 160 applications in survey.

Table A4. EcoFund—1994 applications (billion PLZ)

Project category	Number	Total cost	Amount to be financed	Financing share
Air protection	6	949.2	350.9	37%
Baltic Sea	51 ^a	6,137.2	1,150.0	19%
Climate protection	37 ^b	1,700.1	394.0	23%
Biodiversity	19	149.5	29.2	20%
Other	6	139.1	28.4	20%
Total	119 ^c	9,075.0	1,952.5	22%

Notes: ^a Cost information was available for 48 projects only.

^b Cost information was available for 33 projects only.

^c Cost information was available for 112 projects only.

Table A5. Summary of statistical tests

<i>Test</i>	<i>Variables compared</i>	<i>Statistics</i>	<i>P-level</i>	<i>Rejection</i>
t-test for equality of means: National Fund <i>versus</i> EcoFund	Amount requested	t = 0.33	0.774	—
	Total project cost	t = 1.49	0.138	—
	Percentage share requested	t = 6.02	0.000	Rejected
Kolmogorov-Smirnov test for equality of distributions: National Fund <i>versus</i> EcoFund	Amount requested	Z = 2.077	0.000	Rejected
	Total project cost	Z = 2.490	0.000	Rejected
	Percentage share requested	Z = 3.334	0.000	Rejected
Mann-Whitney U/ Wilcoxon test for equality of distributions: National Fund <i>versus</i> EcoFund	Amount requested	Z = 3.5822	0.0003	Rejected
	Total project cost	Z = 5.0595	0.0000	Rejected
	Percentage share requested	Z = 5.8806	0.0000	Rejected
t-test for equality of means: Non-abandoned <i>versus</i> Abandoned projects	Amount requested	t = 0.56	0.579	—
	Total project cost	t = 0.68	0.495	—
	Percentage share requested	t = 0.09	0.925	—
t-test for equality of means: Non-commercial <i>versus</i> Commercial projects	Amount requested	t = 0.09	0.925	—
	Total project cost	t = 0.49	0.625	—
	Percentage share requested	t = 1.26	0.211	—