

Environmental risk management in loan activity in Polish banks

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Key words

Environmental risk management, ecology, value at risk, bank

Abstract

In the banking sector worldwide more and more financial institutions show interest in credit servicing of ecological investment. That is why banks, step by step, enlarge their loan offer, raise its attractiveness according to conditions, availability and rate of interest, as well as the amount of a granted loan and the length of its repayment period. The document which initiated the beginning and development of ecological banking is the UNO declaration 'Banking and Environment', in which signatory banks declared an obligation to take ecological risk into consideration while granting loans, promoting new services and banking products of ecological nature and combining their statutory activity with environmental protection. By accepting this declaration, banks commit themselves, among others, to:

- *analyze loan applications paying attention to whether they fulfill formal and legal requirements of environmental protection,*
- *apply loan preferences and facilitation for investments and investors who accomplish environmental protection rules,*
- *apply ecological criteria while analyzing and assessing technical and economic assumptions of investment projects within applicable procedures of granting loans,*
- *identify and define risk extent of environmental protection in decisions concerning loans,*
- *offer products and services which finance economic pro-ecological undertakings*
- *refuse loans with bad ecological reputation or investments to units which do not fulfill environmental requirements.*

All these actions of banks are taken in order to limit ecological risk, which gains a particular significance in the contemporary world.

Introduction

The term environmental risk is understood in various ways by various authors. G. Borys defines it as 'a possibility of occurring natural disasters at a company location or a probability of ecological disaster caused by equipment breakdown or technology which is applied in a company' (Borys 2000). This definition narrows ecological risk understanding to a possibility of occurring sudden and unexpected damaging with disastrous results. However, it omits ecological threats caused by affecting specific factors as well as threats which are generated. Other factors such as ecological risk results of a smaller extent, (for instance, financing by a bank launching a new product on the market, whose use in an unforeseeable way degrades the environment) should be considered. Environmental risk is also defined as an antropogenic occurrence (breakdown, catastrophe) or nature one (catastrophe, natural disaster) threatening the environment, economy or health and life of a human beings, whose probability may be defined (Poskrobko 2007). Ecological risk may have drastic results. If it is disregarded during a loan process, this may mean straight a risk of losing a profit or even capital (Perman, Ma, McGilvray, Common 2003). Therefore, each financial institution should take ecological risk into consideration in their activity (Dziawgo 2010).

Environmental risk occurs in bank activities in two planes:

- 1) as an environmental risk of a bank institution, that is in the functioning of the bank itself,
- 2) as a risk of corporations being interested in business with a bank.

Therefore, environmental (ecological) risk in bank activities can be defined as a possibility of negative environmental results occurring in the action of people and businesses having a contact with the bank and the bank itself in a given period of time.

Identification and assessment of ecological risk is becoming a very difficult task (Perman, Ma, McGilvray, Common 2003). In order to do it a variety of methods are applied, to which the author, while researching operational and ecological risks in banks, paid a lot of attention (Kulpa 2015).

In the aspect of a contemporary social and economic development ecological orientation of banks may become one of main factors. These factors enable banks to achieve in a long time a stable acceptance of consumers in accordance with human beings' existing aims on the earth (Poskrobko 2012). Activities in this scope are called Corporate Social Responsibility (CSR). Actions within CSR are taken by organizations whose manager staff's decisions are not limited only to multiplying shareholders' profits but also take into consideration interests of providers, workers, retailers, local people and broadly understood interest of the society. Therefore, ecological aspects are from the one side a sign of peculiar ecological responsibility of contemporary loan institutions, and on the other side may determine a competitive advantage of these institutions which will acquire social approval of their activity which will have an influence on the growth of their participation in the market. Some researchers call such actions ecologisation of loan institutions (Zabawa 2013).

The basic principle of environmental responsibility of a loan institution is the care and attention to ensure a stable improvement of life quality both of the present as well as future generations. This may be achieved by shaping proper proportions between three kinds of capital bringing in development of: economic, natural and human ones. It is convergent with the principle of stable and sustainable economic development, which is included in the set of regulations concerning capital requirements and risk management in banks. These regulations were, among others, issued by Basel Committee on Banking Supervision, called Basel III (Basel Committee on Banking Supervision 2010). Premises of ecological orientation of loan institutions result from two principal groups of factors:

- 1) global trends of social, economic and environmental development system which in an objective and natural way force ecologisation of contemporary banks,
- 2) advantages which are a result of ecologisation of banks themselves.

The principle of ecological responsibility is not only placing ecological aims in the strategy of business development of the bank at the point bank - corporate and individual clients but also taking this aspect into consideration in a bank's economy so that ecology will be a chance and not a threat for the development of a given institution.

Here one can point out two groups of activities. The first one concerns financing typical ecological investments, for instance, wind power stations, sewage treatment plants, whereas the next group concerns financing standard business investments which base on ecological solutions. This must be stressed that eco-economy of banks, in the context of the mentioned idea of stable and sustainable development, is an extremely important element of contemporary economy development. Activities in the scope of eco-economy still are not accepted enthusiastically by all loan institutions. An important problem here is the ability to value assessment of ecological risk, particularly in the context of the amount of bank's own capital,

which makes it possible adequate safety of a bank against the results of this risk. It is important for banks to realize definite actions connected with environmental protection.

Environmental activities of chosen Polish banks

Environmentally activity of Bank for Environmental Protection

Among Polish banks with pro-ecological orientation Bank for Environmental Protection (Bank Ochrony Środowiska SA) plays an important role. This is the bank which has granted the largest number of preferential loans and it is the bank with the greatest experience in financing ecological undertakings (Toruński, Wyrębek 2010). Bank for Environmental Protection (BEP) is the bank with the idea to service undertakings serving environment protection and support a balanced development of the country. For example, in the area of wind energy scope BEP has granted several dozen loans so far, at the value of over 120 million EUR. In 2013 BEP granted 4,904 loans (pro-ecological loans granted for environmental protection) the amount was 37 million EUR including 34 million EUR on air protection, 0.8 million EUR on water protection and 2.2 million EUR on soil protection (Central Statistical Office 2014). Among various tasks financed by BEP a significant group are projects connected with using renewable energy sources (RES). The bank's experience in this scope are 1,550 projects, on which over 170 million EUR have been granted. Loans granted in the cooperation with The National Fund for Environmental Protection and Water Management are directed to the greatest investment tasks; in 2013 the amount of 15 million EUR was granted. At present, the bank offers loans for investments connected with using RES, first of all preferential loans granted in the cooperation with regional funds of environmental protection and commercial loans. In cooperation with regional environmental protection and water management funds 22.5 million EUR was granted on such loans. BEP offers, among others, a special line KfW5, which is designed for small and medium businesses for financing tasks connected with using RES. They were mainly: modernization of heating systems, thermo-modernization of buildings, backyard sewage treatment plants, removing products containing asbestos. A bank negotiates the granting of loan conditions applying them to the specificity of investment, divides payment of particular sources of financing, monitors achieving ecological effects.

Loan activities limiting environmental risk in Bank Pekao S.A.

Bank Pekao S.A. follows an environmental awareness policy which comes from the United Nations Environment Programme Finance Initiative (UNEP FI). This initiative refers to natural environment and sustainability, considering environmental impact factors in performing credit risk analyses of its transactions as well as in processes monitoring transactions (Bank Pekao S.A. 2014). In its everyday activities Bank Pekao S.A. strongly supports protection of the environment. Environmental risk assessment is one of the crucial factors which evaluates credit transactions executed with businesses. It involves a number of steps: from review of a customer's business profile and preparation of assessing a preliminary environmental risk assessment, to assessment proper, which includes a visit at a client's premises and review of documents which relate to the environmental aspects of an undertaking, to management phase, which includes a credit decision and agreement execution, to monitoring of environmental risks. If a borrower's business profile creates potential environmental risk, the bank does its best with the customer to reduce the potential implications of the environmental risks. The bank and client cooperate to identify such risks, assess their scale and mitigate their potential impact. Such a cooperation, which forms part of credit risk assessment, relies on the methodology and industry guidance developed by the European Bank for Reconstruction and Development. The bank does not finance all types of business activities on environmental grounds. Such activities

are listed in the Environmental Exclusion List prepared on the basis of international standards, including the Convention on International Trade in Endangered Species (CITES). Furthermore, the bank refuses to finance trade in goods representing environmental threats or projects which are dangerous to health and public safety laws. The bank's credit risk policy prohibits it to finance activities which may be risky environmentally. In line with its credit policy, the bank supports and is willing to accept projects with environmental benefits. The commitment to the protection of the Polish bison has been an aspect of the development and promotion of the bank's corporate social responsibility in the sphere of ecology.

Results and Discussion

Environmental risk associated with lending activities

The most important instrument to support environmental protection by banks is pro-ecological loans. Loans for financing ecological undertakings can be granted by banks on market conditions when an undertaking fulfills economic and ecological criteria and preferential ones when an undertaking fulfills ecological criteria but not economic ones in full and financial support is required. Then a less expensive loan makes economic realization of this undertaking possible. Preferences for such a loan refer to: extra money to interest, a lower loan commission and writing-off a part of a loan. Loan preferences can be applied when banks distribute special credit lines from external sources or when they create their own funds of support.

Commercial banks in Poland are engaged in granting pro-ecological loans connected mainly with modernization and innovation of businesses, which is in favour of promoting new technologies of production which is 'environmentally friendly'. Furthermore, loan activity of commercial banks in the scope of environmental protection is directed to granting loans for investments directly connected with environmental protection in the area of: water protection (e.g. building of water treatment plants of city and industrial sewage), atmosphere (e.g. investments within limiting emission of pollution), economic use of waste (landfill building, organization of recycling) (Górka, Poskrobko, Radecki 2001).

According to the latest data issued by Polish Central Statistical Office in 2013 pro-ecological loans were granted on a sum of 456 million EUR, mainly in the form of commercial credits - 419 million EUR. Among commercial credits, credits for purchase of foods and appliances for environmental protection purpose equipment are predominant, the amount is 328 million EUR. In the second place there are loans coming from foreign investment of financial institutions such as EBI, CEB and KfW). The ecological effects achieved after completing actions co-financed by the bank for Environmental Protection only in 2013, as a result of finishing tasks co-financed by BEP with the use of pro-ecological credit were: reduction of particulate emission 155 tons/year, reduction of SO₂ emission 1,817 tons/year, reduction of NO_x emission 618 tons, reduction of heat consumption and loss as well as the use of primary energy 68,982 GJ/year, production of electricity with the use of renewable energy sources 376,385 MWh/year.

The most popular source of financing structural projects is a bank loan, it is shown by world data as well as Polish ones. It has been used since the start of functioning of the system of EU funds in Poland by businesses and self-government units which have good financial standing and suitable collateral. Credits financing EU projects connected with investments in ecological protection are bridging loans (pre-financing a part of a project to be subject to refund) or credits financing a beneficiary's own contribution and unqualified expenses of a project. They are granted by commercial banks, cooperative banks and state banks, all beneficiaries can use them. The largest amount of funds obtained within foreign help came from Operational Program Infrastructure and Environment (for years 2007- 2013 28 billion Euros was allotted and

in the program for 2014 - 2020 over 32 billion Euros will be allotted). From the point of view of allotting the given assistance a majority of funds was spent on financing projects connected with water protection (over 412 million EUR in 2011).

Bridging loans are the most important loan products apart from loans financing unqualified expenses of a project and co-financing one's own contribution. They are equally important parts of bank activities in the area of environmental protection. They serve to ensure financial liquidity during the period from spending money to the date of receiving a refund. A considerable part of ecological investment loans is granted to local government units. Green banking assumes that the environmental business model should consider all above mentioned ecological solutions; but it depends on investment risk, which is very high in Poland.

It must be mentioned that these investments carry a lot of environmental risk, but not as big as investment in the traditional sources of energy. It is difficult to foresee, for instance, in investment in traditional sources of energy how natural environment will behave both during realization and exploitation of an investment (e.g. power plant in Fukushima). Because of violent shrinking of mineral deposits and a big ecological risk while using traditional sources of energy threatening with climate changes, world tendencies are moving towards the development of renewable energy. Together with global economic development an awareness of environmental risk among banks and investors must grow (Baron 2013).

Environmental risk management in banks

Each bank in its loan activity should take ecological risk into consideration that is a risk connected with environmental protection. Ecological risk is usually examined together with credit and operational risks. Therefore, ecological risk management in a bank should be realized in two platforms. These risks interpenetrate each other, sometimes multiplying the results of their occurrence in practice. There could be some instances like financial instrument transactions and the earthquake in Kobe which led to a loss of 1.3 billion USD and bankruptcy of Barings Bank, the oldest British bank (Kulpa 2014).

Operational risk management is a decision making process whose aim is to reduce a probability of occurring an ecological event causing a threat, securing against possible damage or reducing their size. Risk management process is facilitated by methods of ecological risk assessment (Poskrobko 2007). In the process of environmental risk management one should consider the following areas:

- ecological risk assessment connected with a given loan transaction, cost assessment connected with occurring an ecological event;
- assessing client's abilities and engagement in effective coping with ecological risk connected with their economic activity;
- defining kinds of ecological events exposing a bank to potential risks and their acuteness;
- taking indispensable steps towards bank's protection against its exposure to these risks and financial obligations resulting from them;
- current risk monitoring resulting from ecological problems occurring in transactions and reacting to changes in bank's exposure to these risks;
- taking risk and potential obligations into account while passing on a fixed property which is collateral to bank's ownership or while performing restructure tasks.

In the examined banks the process of ecological risk management is realized in 4 phases which consecutively include:

- 1) Phase I: inspection according to environmental protection

- 2) Phase II: ecological risk assessment
- 3) Phase III current ecological risk management
- 4) Phase IV monitoring ecological risk.

Re 1: The aim of screening is defining a character and a range of actions within ecological risk assessment for a given transaction. The review according to environmental protection is performed for all applied loan transactions with businesses. From further processing a bank excludes transactions financing actions being placed on a list of environmental exclusions, that is transactions which a bank excludes from loan processing

Re 2: In the phase of ecological assessment a bank realizes the following aims:

a) Assessing a client's creditworthiness to a responsible protection against ecological risks which creates potential obligations for a bank.

b) An order to apply suitable means to ensure that the exposure of a bank to such obligations should be acceptable during the lasting period of a transaction.

Re 3: During the phase of current environmental risk management a bank performs an overview of reports concerning credited ecological risk and works out, together with a legal department suitable ecological clauses and requirements concerning information passing and report submitting which should be included in a transaction agreement. In order to limit environmental risk a bank can ask for insurance, guarantee or collateral against liability. In this phase a bank can change transaction conditions (e.g. a form of collateral, period of repayment, extra guarantees, submitting extra expertise etc), ask a client to implement environment management program, e.g. ISO 14001 or EMAS. Furthermore, it is necessary that a bank should be informed about all future changes in the risk profile of a given transaction. It is expected that a client should submit all copies of notices about imposed penalties for environmental pollution to a bank. A client is expected to inform a bank about planned or carried out inspections within the scope of environmental protection, changes in conditions of given permissions and licenses, submitting reports from monitoring performed by a client and inspection in an ecological area of a business run. Ecological risk is acceptable when potential obligations resulting from ecological problems do not threaten financial stability of a client or their ability to repay funds to a bank.

Re 4: The aim of the monitoring phase of environmental risk is to ensure that after starting a transaction a bank would receive as soon as possible important information concerning ecological problems. During the monitoring phase of ecological risk it must be ensured that during the whole period of a lasting transaction a bank should receive from a client all required reports concerning ecological risks. These reports are subject to examination and assessment by a bank, if necessary a bank may issue suitable recommendations.

All these actions aim to minimize the effects of ecological risk which a bank must balance by separating a proper buffer amount from bank's own capital.

Calculating capital value for covering environmental and operational risk for the purpose of capital adequacy of a bank

Defining capital requirements of a bank to cover environmental risk is not an easy task, they are included in credit and operational risk categories. Below, we will pay attention to the risk of loss resulting from improper or failing internal processes, people and system, or also from external events pointing out internal and external sources. Internal risk is connected directly with business functioning which cooperates with a bank. And here one can mention the reason or result of risks connected with fire, stealing, explosion, equipment breakdown, electrical damage, tool wearing out, bad technology, bad managerial and financial decisions, incompetence of employees or personal risk connected with accidents while working. Natural

threats like floods, earthquakes, hurricanes as well as political and economic risks caused by ecological panic and other ecological threats occurring around a bank can be considered as external risk (Filipiak, Dylewski 2010). These risks must be secured with proper capital.

While making projects of New Capital Accord (NCA) (Basel Committee on Banking Supervision 2004) some bank representatives claimed that environmental risk as part of operational risk is not possible to be quantified in a way that would guarantee credibility of achieved results. They pointed out difficulties with measurement which they saw in using complicated mathematical approaches (Kulpa, Zaręba 2013).

Capital requirement calculated by using advanced approaches requires the possession of data base concerning sets of internal events, external events, operational risk scenarios, key environmental and operational risk indicators. An internal model used to calculate the value of capital requirement for environmental and operational risk is accepted by the board of a bank according Pillar I of NCA while using advanced approaches (AMA - Advanced Measurement Approach).

The internal model is based on **four** basic sets:

- 1) data concerning internal losses,
- 2) data concerning external losses,
- 3) data concerning operational risk scenarios,
- 4) data concerning key operational risk indicators.

Data concerning internal losses are events concerning environmental and operational losses incurred by internal units of a bank.

Data concerning external losses are events concerning operational losses incurred by financial institutions and other banks nationwide and worldwide ones. External data come from interbank and international bases of environmental and operational losses and a public base of environmental and operational losses.

Data concerning scenarios constitute a set of fictitious events used to integrate internal and external data in the area of high amount losses but of a low frequency.

Data concerning key environmental and operational risk indicators come from surroundings and data coming from internal audit and they inform, basing on previous experience of potential exposition of a bank to environmental and operational risk.

In the following model proposal with universal possibility of applying AMA in a commercial bank, the calculation of capital requirement is used by subsequent iteration of stages of estimating sizes which are necessary to determine adequate capital for covering operational risk in a bank by using Loss Distribution Approach - LDA. The proposal of the following model is based on experience of one of the examined banks.

The LDA method suggested by NCA is a method of calculating capital necessary to cover losses for operational and environmental risk in a bank by using the loss distribution model. Historical data for estimating distribution and at the same time for calculating the capital size are taken from the period with values of at least 5 years. However, in order to estimate a future value of losses one can take a longer period. In this method, the size of capital for covering losses resulting from occurring events connected with operational and environmental risk is an expected and unexpected losses - C_{AMA} .

$$C_{AMA} = EL + UL \quad \text{where}$$

EL - expected losses;

UL - unexpected losses

Total capital for operational and environmental risk C_{OPEN} is equal to OpEnVaR calculated with taking available reserves into account is:

$$C_{OPEN} = OpEnVaR = VaR - EL$$

Conclusions

The data in Table 1 show a scale of a capital reserve which banks must create from their own capital in order to secure operational and ecological risk. Basing on a survey of 16 banks working in Poland only in 2014 an amount to be spent on operational risk results was over 16 million EUR. At the moment it is not possible to reach exact published data concerning the size of the capital adequacy of banks for ecological risk, it is included in the amount of capital securing credit risk as well as operational risk. In the case of operational risk we can distinguish from historical data base events resulting in losses of banks because of events connected with natural environment (Kulpa, Magdoń 2012). If we accept the estimation that this influence is 10%, so in the surveyed banks 1.6 billion EUR is separated from banks' own capital for securing this risk, that is, such an amount could be used as extra capital for financing economy.

The Basel Committee should accept environmental risk and their increasing importance directed towards the stability and sustainability. Based on this, they should stimulate and support bank regulators to work out, together with banks, best practice in the management of environmental problems and gather all the data which are necessary and perform analyses to make banks understand better and be able to address environmental risk in the future. Authorities which supervise banks pay attention to the feasibility of including forward-looking scenarios that evaluate the potential financial stability impact of granting loans to environmentally unsustainable or sustainable task over time in Pillar 2 – Supervisory Review stress tests. Supervising institutions should be obliged to scrutinize Pillar 3 - Market Discipline in order to estimate the feasibility of banks to disclose information about being exposed to and managing environmental risk.

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Table 1. Share of environmental and operational risk capital requirement in the equity of banks

Bank	2012			2013			2014			Average share of risk capital requirement in the equity
	Equity	Environmental- operational risk requirement	Share of risk capital requirement in the equity	Equity	Environmental- operational risk requirement	Share of risk capital requirement in the equity	Equity	Environ- mental- operational risk requirement	Share of risk capital requirement in the equity	
Alior Bank	580045	18035	3,11%	518930	18200	3,51%	927177	37213	4,01%	3,61%
BGK	453251	25306	5,58%	1737440	27413	1,58%	1957125	27647	1,41%	4,00%
BGŻ	759119	38988	5,14%	854822	45120	5,28%	918857	50174	5,46%	5,87%
BNP Paribas	85857000	4092000	4,77%	80048000	4029000	5,03%	77168000	4355000	5,64%	5,14%
BPH	997633	69589	6,98%	1067867	67967	6,36%	1071476	59159	5,52%	6,83%
BPS	250863	10495	4,18%	223547	12873	5,76%	143488	14667	10,22%	6,34%
BZ WBK	1989424	118771	5,97%	2808410	183652	6,54%	3060536	220495	7,20%	6,66%
Credit Agricole	38590000	1800000	4,66%	47341000	2000000	4,22%	47267	1700	3,60%	4,10%
Deutsche Bank	57015000	5018000	8,80%	55464000	5253000	9,47%	67787000	7598000	11,21%	9,16%
EuroBank	277773	36884	13,28%	243285	32560	13,38%	291337	26239	9,01%	12,27%
Getin Noble Bank	1289486	61735	4,79%	1414837	66517	4,70%	1566912	62215	3,97%	4,99%
ING	1624205	96989	5,97%	1756848	105517	6,01%	1757619	107759	6,13%	6,29%
Pekao SA	4705855	240311	5,11%	4810162	254179	5,28%	4707251	165587	3,52%	5,19%
PKO BP	4896294	157607	3,22%	5137201	152151	2,96%	5805082	178073	3,07%	3,98%
Raffaisen Polbank	1309157	75886	5,80%	1284201	79164	6,16%	1289128	77313	6,00%	6,39%
UniCredit	62018395	4094938	6,60%	57651159	4161024	7,22%	54856807	3538233	6,45%	6,89%
Total:	262613501	15955534	6,08%	262361708	16488336	6,28%	217608032	16343181	7,51%	6,06%

Source: Author's own study based on disclosure of capital adequacy of polish banks; all positions in thousands EUR, calculation based on average NBP exchange rate