

REVIEW

Comparison of Environmental Law Violations and Accounting Abuses by Russian Enterprises

Vladimir Glinskiy^{1*} Michael Alekseev² Lyudmila Serga¹

1. Department of Statistics, Novosibirsk State University of Economics and Management, Novosibirsk, 630099, Russian Federation

2. Department of Corporate Governance and Finance, Novosibirsk State University of Economics and Management, Novosibirsk, 630099, Russian Federation

ARTICLE INFO

Article history

Received: 21 January 2019

Accepted: 26 February 2019

Published Online: 19 April 2019

Keywords:

Sustainable development

Ecological law violation

Financial reporting misstatements

ABSTRACT

Sustainable development requires overcoming opportunist behavior of economic entities towards environmental compartments. Another form of opportunist behavior is revealed in fraudulent financial reporting. The research objective is statistical comparison of environmental law violation against accounting abuses by Russian enterprises. A research hypothesis is put forward that companies, that violated environmental law, prepare financial reporting mostly incorrectly. An exploratory sampling from the economic entities of Russia, that violated environmental law in the course of various activities, was formed. Financial reporting of the sampling companies was analyzed by virtue of the authorial probit regression model, making it possible to reveal accounting misstatements, both overreporting and underreporting. The obtained results make it possible to assess the interrelations between the environmental law violations and financial reporting.

1. Introduction: Problem Statement

Any path of implementation of sustainable ecological and economic development faces systemic counteraction by economic entities in terms of both economic and ecological law violation. The source of counteraction lies in “economic justifiability” of opportunist behavior, aimed at generation of above-normal profit at the expense of impairment of interests of other participants of market relations.

The state of natural environment is a public good no member of society can be deprived of. Along with that, the main information channel of interaction between

business and all interested parties (stakeholders) is public reporting making it possible to assess both former and future value and financial state of the company. At that, no participant of market interaction can be deprived of using public financial reporting, and in this regard the latter is also a public good.

Let us formulate a set of reasons for analysis of the transactions related to public goods. Firstly, carrying out transactions regarding public goods requires not only a producer and a consumer but a coordinator as well. A coordinator or state performs the following functions: defines the parties that participate in the interaction, makes quantitative assessment of the results and forms the cor-

*Corresponding Author:

Vladimir Glinskiy,

Department of Statistics, Novosibirsk State University of Economics and Management, Novosibirsk, 630099, Russian Federation;

Email: s444@ngs.ru

responding institutional environment. For public sector transactions the institutional environment encourages transactions with positive effect, often prohibiting activities that could inflict harm.

Secondly, the transactional interaction is carried out between a public goods producer and coordinator acting as a centralized representative of the consumer. At that, physical delivery of a public good takes place from the producer to the consumer that can influence behavior of the coordinator through politics.

Thirdly, a public transaction brings the goals of the coordinator – maximum satisfaction of social needs, in line with the goal of the producer – procurement of the right to supply public goods to the consumer.

Fourthly, if the coordinator takes over the functions of the public goods producer, then there is a hierarchic organization structure. Where the producer is not dependent on the coordinator, market organization structure is in place.

Fifthly, a private transaction requires mandatory conclusion of a contractual agreement. A public transaction can be implemented without conclusion of a contract, through setting of the relevant legislative norms.

Parties to public transactions incline to opportunist behavior. Practical executability of opportunism is based on the use of the economic management mechanisms, which interpret institutional norms and constraints as “creative” as possible. Inside the economic system a “creative” approach forms a set of values and justifications, which allow for non-execution of socially established institutional norms. In this regard, ecological law violation is a special case of display of opportunist behavior of economic entities in the ecological environment. Concurrently with this, the evidence of opportunism, manifested in misrepresentation of economic results of business activities of companies in information environment, is seen.

Based on common ground – public access to address and use of the subjects of research, let’s merge the environmental assets and public information categories for the purposes of the study. Let us compare the facts of ecological law violation with the events of possible infliction of loss through public financial reporting misstatement. We expect that the display of opportunist behavior for economic entities, revealed in ecological law violation, will be confirmed by the respective analytical assessments of probable unreliability of accounting (financial) reporting.

Let us put forward a hypothesis of the research:

H1: There is a statistically significant relation between extra-financial information – confirmed facts (red-flags) of the environmental law violation and financial information, from the perspective of its qualitative assessment in terms of degree of credibility of financial reporting by economic

entities.

Therefore, the goal of research is the discovery of confirmed analytical dependence between the facts of display of opportunist behavior in the context of economic and ecological interaction.

2. Research Hypothesis and Experiment

The economic entities, in respect of which ecological law violation was revealed, display the behavior, aimed at misrepresentation of the results of their business activities in accounting (financial) reporting, with a high degree of probability.

The economic entities, which violated ecological law in 2016, were marked out on the basis of the data of the report on ecological law violation in the Russian Federation, presented in the final statement of the EKO-YURIST (“Ecological jurist”) all-Russian competition^[1]. 69 companies with activities primarily within sections A, B, C and E of the Russian National Classifier of Economic Activities (“OKVED”) were uniquely identified by taxpayer identification number (Table 1).

“SKRIN” Data Base – the System of complex information disclosure on the securities issuers of the National association of stock market participants was the information source at the next stage of the study^[2]. Array of the information, presented in accounting (financial) reporting for 2016, was formed for the selected economic entities.

Table 1. Allocation of the companies, which violated ecological law, by activity types.

Activity type	OKVED section	Number of companies (pieces)	Share of the companies of the respective activity type in the total number of ecological law violations (%)
Agriculture, forestry, hunting, fisheries and aquaculture sectors	A	8	11.6
Extraction of minerals	B	7	10.1
Manufacturing	C	28	40.6
Water supply; wastewater disposal, waste management, pollution settlement activities	E	13	18.8
Construction	F	5	7.2
Wholesale and retail trade; motor maintenance	G	3	4.3
Hotels and public catering activities	I	3	4.3
Real estate operation activities	L	2	2.9
TOTAL		69	100

The methodology, developed and tested on existent populations, of estimation of probability of existence of financial reporting misstatement, based on successive use

of mathematical and statistical models for construction of the resulting integrated index, making it possible to reveal facts of misrepresentation of information presentation of the financial results of business activity and define the focus of the revealed misrepresentations, was applied against the selected companies (overreporting; underreporting, for example please see ^[3,4]).

Any open system of measurements, aimed at estimation of information objects in information space, creates the possibilities of results manipulation. Let us provide an incomplete list of the objects under observation where researchers face the stated problem: accreditation requirements for higher educational institutions; systems of monitoring of effectiveness of activity of higher educational institutions and scientific establishments, publication activity indices (h-index, impact factor), indicators of intensity of the Internet resources visits; systems of accounting (financial) reporting; algorithms of formation of region ratings by various aspects of assessment of social and economic development. The defining property of the systems of measurement is their structuredness.

The authorial technique is based on typological grouping which rests upon a behavior pattern of economic entities as information providers, which makes it possible to obtain the generalized assessment of the object under examination. The definition of the main behavioral types is realized through creation of typological grouping of information space of the financial market in the context of separation of the public and confidential, expressed and hidden information (Table 2) ^[4].

Table 2. Classification of information providers

Availability		Reliability	
		Expressed information	Hidden information
Open access information	Public information	“Herbivorous”	“Plants”
	Information noise	“Parasites”	“Carnivorous”
Confidential information	Inside information	“Symbionts”	“Mimicry”

The companies belonging to the type, designated as "herbivorous" (Table 2), seek to disclose information about them as much as possible and provide participants of the financial relations with authentic data. Realization of similar information strategy promotes formation of the maximum investment attractiveness of the corresponding financial assets since large and detailed amounts of information on the company, which assets are traded in the financial market, promote self-complacency of investors and generate restriction of aspirations in search of its shortcomings.

Information strategy of the companies - "plants" is

focused, on the one hand, on conversion of confidential information into public, and on the other hand – assumes existence of significant hidden component. Similar behavior leads to gradual formation of feelings of uncertainty with the investors owning the specified assets.

"Parasites", when building their information strategy, are focused on formation of the maximum information noise around the expressed information disclosed by them and expect that high frequency, particularity and volumes of public disclosures will attract additional speculators that will increase liquidity of the financial assets offered by them.

Information strategy of the companies, included into the "carnivorous" group, is pointed at use of the information noise at maximum non-disclosure of information, characterizing real condition of the economic entity. Disclosed information is “imposed” upon participants of the financial relations to the uttermost.

“Symbionts”, when preserving information related to company performance within confidential limits, are ready to share it for establishment of long-term partner relations and take systematic actions, aimed at elimination of the possible negative influence of hidden information on interaction with contract partners.

The companies with information strategy marked as “mimicry” not only aim to make confidential information public, but also carry out maximum non-disclosure within inside information. Such behavior is very common in such industry of the Russian Federation as fishery, which is confirmed by statistical analysis of the financial indicators.

Within the offered methodology, by reference to the aggregate concept of data typology, the types of behavioral strategies are initially identified^[5,6,7], followed by verification of the array of information, comprised of financial reports data, to mark out specific indicators. The assessment of presentation of the indicators in information space allows the use of the cross comparison mechanisms.

The construction of the integrated index of revealing probable misrepresentations of the activities of the companies, presented in financial reporting, is performed in five stages, each of which includes the following steps:

(1) Determination of the main behavioral types of economic entities: companies, which allegedly overreport results of their business activities; companies, which disclose results of their activities without misstatements; and companies, which underreport economic results.

(2) Preliminary selection of companies, carrying out main activities within the respective section of the RN-CEA classifier. Analytical procedures, making it possible

to mark out companies, which draw up a cash flow statement in broad terms without significant errors or misstatements, are being realized. The companies, which drew up a cash flow statement in terms of common balance of current and investment transactions reliably, were revealed.

(3) Formation of the training samples. The key indicator which is subject to assessment is comparison of the charge coefficients, calculated by cash method and accrual basis^[3]. Separation is done according to estimation of the difference bias of the coefficients from zero to negative or positive values. The mixture separation procedures assist in restoration of the statistical characteristics of the desired normal distributions with aggregate weight of one (“1”).

(4) A list of the financial coefficients, significant for the following designation of the companies to each of the marked out types regardless of form of ownership or quality of cash flow statement preparation, is being formed.

(5) Model building, definition of boundaries and results check. Determination of the parameters of the probit regression was carried out using STATISTICA program.

The methodology, based on the use of the integrated indicator of assessment of probability of misstatements was applied against the analysis of financial reporting of the companies, carrying out activities within sections A, B, C and E of the Russian National Classifier of Economic Activities^[8,9,10,11,12,13,14,15]. Probit regressions, making it possible to assess the probability of misstatement both towards overreporting and underreporting, were built for the marked out activity types. Probability estimate of reliable preparation of reporting by the companies, which violated ecological law, was performed as well. The results of the study are presented in Table 3.

Table 3. Results of mutual comparison of ecological law violation and estimated misstatement of the results of activity of the economic entities, presented in the financial reporting

Activity type	OKVED section	Number of companies (pieces)	Underreporting companies (pieces)	Overreporting companies (pieces)
Agriculture, forestry, hunting, fisheries and aquaculture sectors	A	8	-	8
Extraction of minerals	B	7	-	1
Manufacturing	C	28	2	18
Water supply; wastewater disposal, waste management, pollution settlement activities	E	13	5	1

3. Results and Conclusions

The suggested hypothesis with a reasonable degree of confidence was proved true only for the group of companies, carrying out activities within section A of OKVED. We consider systematic bias in results of the study for assessments of behavior of agricultural economic entities, which in bulk incline to the estimated overreporting under a pressure of loan debt burden, caused by a high level of seasonality of the production process.

No statistically significant relation between ecological law violations and possible financial reporting misstatements towards overreporting was established for the companies of the “Manufacturing” section. In turn, the economic entities, carrying out activities within section E, show a certain tendency towards estimated underreporting of their business activity results in the event of ecological law violation. Follow-up studies, including those relating to expansion of the exploratory selection, are needed to prove the hypotheses of the significance of the relations for enterprises of these two OKVED sections.

References

- [1] Ecological law violations in regions of the Russian Federation [R]. Materials of the practical part of the EKO-YURIST 2017 (“Ecological jurist”) all-Russian student competition. URL: http://network.bellona.org/content/uploads/sites/4/2018/04/sb_site.pdf [online resource] (date of address: 20.04.2018).
- [2] Russian companies, fields and regions database. URL: <http://www.SKRIIN.ru> [online resource] (date of address: 20.04.2018).
- [3] Alekseev, M.A., Dudin, S.A. (2017) Indicator of revelation of misstatement of company performance [J]. Institute of Professional Accountants (Bulletin for Professional Accountants), 2017, 6: 36-48.
- [4] Alekseev, M.A. Information space of the financial market [M]. Novosibirsk, Novosibirsk State University of Economics and Management Press, 2017: 247.
- [5] Glinskiy, V., Serga, L., Khvan, M., Zaykov, K. Fuzzy Neural Networks in the Assessment of Environmental Safety [J]. Procedia CIRP, 2016, 40: 615 – 619. DOI: 10.1016/j.procir.2016.01.143
- [6] Glinskiy, V., Serga, L., Khvan, M., Zaykov, K.. A Spatio-dynamic Modeling of Environmental Safety of the Russian Federation Regions [J]. Procedia Manufacturing, 2017, 8: 315–322. DOI: 10.1016/j.promfg.2017.02.040

- [7] Glinskiy, V., Serga, L., Novikov, A., Litvintseva, G., Bulkina, A. Investigation of Correlation between the Regions Sustainability and Territorial Differentiation [J]. *Procedia Manufacturing*, 2017, 8: 323–329. DOI: 10.1016/j.promfg.2017.02.041
- [8] Kirilchuk, I., Barkov, A., Shulga, L. Assessment and GIS analysis of the human health risk from negative emissions into the air [R]. *International Multidisciplinary Scientific GeoConference Surveying Geology and Mining Ecology Management, SGEM*, 2017, 17(51): 117-124. DOI: 10.5593/sgem2017/51/S20.052
- [9] Kirilchuk, I., Yushin, V., Protasov, V. (2016) Improvement of the models and algorithms of social and hygienic monitoring in the system of air protection activities[R]. *International Multidisciplinary Scientific GeoConference Surveying Geology and Mining Ecology Management, SGEM*, 2016, 2: 455-462. DOI: 10.5593/SGEM2016/B52/S20.058
- [10] Bezsonov, Y., Andreev, V.. Justification and formalization of approach to regional environmental safety evaluation [J]. *Eastern European Journal of Enterprise Technologies*, 2016, 2(10): 9-18. DOI: 10.15587/1729-4061.2016.64843
- [11] Larionov, A., Larionova, Y. Economic-legal Securing of Integrated Territorial Development for Purposes of Housing Construction in the Moscow Region [R]. *MATEC Web of Conferences*, 2017, 106, 08032. DOI: 10.1051/mateconf/20171060
- [12] Beliakov, S., Kapustkina, A..Analysis of Performance Indicators of Functioning of Territories with Special Economic Status in the Russian Federation [J]. *Procedia Engineering*, 2016, 165: 1424-1429. DOI: 10.1016/j.proeng.2016.11.874
- [13] Graboviy, P.. Methods of Motivation Improvement and Effectiveness Increase on the Example of Construction Industry Enterprises [J]. *Procedia Engineering*, 2016, 165: 1520-1528. DOI: 10.1016/j.proeng.2016.11.888
- [14] Zavyalov, D.V., Saginova, O.V., Zavyalova, N.V. (2017) The concept of managing the agro-industrial cluster development [J]. *Journal of Environmental Management and Tourism*, 2017, 8(7): 1427-1441. DOI: 10.14505/jemt.v8.7(23).12
- [15] Shamaii, A., Omidvari, M., Lotfi, F.N. (2017) Health, safety and environmental unit performance assessment model under uncertainty (case study: steel industry) [J]. *Environmental Monitoring and Assessment*, 2017, 189(1): 42. DOI: 10.1007/s10661-016-5726-0