Ecological Performance: Ethnic Fragmentation versus Governance Quality and Sustainable Development

Efektywność ekologiczna: fragmentacja etniczna a jakość zarządzania i zrównoważony rozwój

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Abstract

The article is devoted to the consideration of the ethical and ecological aspect of the framework conditions for the welfare state formation. The hypothesis of the negative influence of high ethnic fractionalization on the ecological situation in a country that in the classical welfare states is offset by the high efficiency of government through the initiation of the function of balancing the interests of ethnic groups in the transmission buffer mechanism is tested in the paper. The study used correlation and regression analysis tools using the application statistical software package STATISTICA. The hypothesis of an inverse relationship between the degree of heterogeneous society and the ecological quality is empirically substantiated. It is proved that the quality of governance can weaken the inverse relationship between ethnic fractionalization and the ecological situation in the country. In the welfare states, the neutralization factor of ethnic fractionalization by the quality of governance institutions is traced, which testifies to the existence of an institutional transmission buffer mechanism in the relationship between the structure of society and the offer of environmental goods.

Key words: ecology, ethnic fractionalization, quality of institutions, government effectiveness, welfare state

Streszczenie

Artykuł poświęcony jest rozważeniu etycznego i ekologicznego aspektu warunków ramowych tworzenia państwa opiekuńczego. W pracy podjęto się weryfikacji hipotezy negatywnego wpływu wysokiego frakcjonowania etnicznego na sytuację ekologiczną w kraju, które w klasycznych państwach opiekuńczych jest równoważone wysoką przez rządy poprzez uruchomienie funkcji równoważenia interesów grup etnicznych w mechanizmie bufora transmisji. W badaniu wykorzystano narzędzia analizy korelacji i regresji przy użyciu pakietu oprogramowania statystycznego aplikacji STATISTICA. Hipoteza odwrotnej zależności między stopniem heterogenicznego społeczeństwa a jakością ekologiczną jest empirycznie uzasadniona. Udowodniono, że jakość rządzenia może osłabić odwrotny związek między frakcjonowaniem etnicznym a sytuacją ekologiczną w kraju. W państwach opiekuńczych sprawdzono czynnik neutralizacji frakcjonowania etnicznego przez jakość instytucji rządowych, co świadczy o istnieniu instytucjonalnego mechanizmu bufora transmisji pomiędzy strukturą społeczeństwa a ofertą dóbr środowiskowych.

Słowa kluczowe: ekologia, frakcjonowanie etniczne, jakość instytucji, skuteczność rządu, państwo opiekuńcze

Introduction

Today, in over 200 countries around the world, there are 5,000 ethnic groups, which means that members of groups with different cultural backgrounds and customs that speak different languages have to live in one state. Despite the fact that such a neighborhood can enrich the culture of all participants, increase tolerance and trust in society, but most researchers tend to link the ethnic heterogeneous society with ethnic conflicts, uprisings and civil wars, the problems of economic growth, as well as the inability of political elites to progressive and effective reforms.

The problem of ethnic and cultural heterogeneity has come to the attention of researchers in recent decades of the twentieth century. Numerous publications of scholars link the ethnic heterogeneous societies with social and economic benefits – high-quality public goods, economic growth, minimal corruption, high-quality social capital (Esteban, Ray, 1994; Mauro 1995; Easterly; Levine 1997; Bossert et al. 2011; Fearon, 2003; Dluhopolskyi, Zatonatska et al., 2019; Koziuk et al., 2019). Instead, ethnic fractionalization becomes an obstacle to sustainable development, provokes conflicts and mistrust between members of different groups, reduces the ability to communicate effectively in the political process.

Literature review

When belonging to ethnic identities becomes important in terms of the political process, they are explained by a variety of concepts, the most famous of which is the theory of resource mobilization, the theory of relative deprivation, and the theory of political possibilities.

The theory of resource mobilization covers several areas:

1) the position of the utilitarian logic of a rational actor (Olson, 1965; Deutsch, 1966), which explains the policy solely individual behavior of individuals. In the context of ethnic fractionalization, this means the commitment of ethnic groups to their own values and goals, as well as attempts to ignore the values and goals of other groups;

2) organizational and entrepreneurial approach (McCarthy, Zald, 1973), which emphasizes the totality of informal preferences that are more or less clearly expressed by the population and turn into requirements with subsequent mobilization of groups. The benefits of different ethnic groups can be controversial, provocative conflicts and struggles for resources, and common, which can be achieved through the formation of coalitions;

3) models of the political process (Tilly, Tarrow, 2006; Davis et al., 2005), which substantiate

multifactorial influences on social changes, including due to ethnic and cultural differences.

The theory of relative deprivation explains the emergence of political violence by frustration – the discrepancy between expectations of social groups and what they have (Davies, 1962). This is especially true in the face of oppression (explicit or implicit) by the majority group interests of minority ethnic group. The theory of political opportunities emphasizes the existence of a political space (political rights, political channels and political discussions) and the potential of actors (Pieterse, Oldfield, 2002; Carment, James, 2004; Hibbs, 1973). The political space given to this or that ethnic group allows it to exercise its political capabilities to defend its interests in full or in a limited way.

Forms of conflict arising from ethnic fractionalization include coups, interethnic disturbances, civil and hybrid wars, and external military conflicts (Carment, James, 2004). States that have suffered from violent ethnocultural fractionalization and conflicts usually show low levels of socio-economic development, have problems with attracting foreign direct investment, and lose the monopoly of violence, adding to the ranks of *fragile states* (Collier, Hoeffler, 2004; Rotberg, 2004).

A. Alesina (Alesina et al., 2003) uses the fractionalization category separately for its ethnic, linguistic and religious components. According to research by academics (Alesina et al., 2003; Canning, Fay, 1993; Mauro, 1995), ethnic fractionalization negatively correlates with economic growth and the quality of government, although the negative effects are reduced through education, the development of financial markets and telecommunications, the budget surplus (Easterly, Levine, 1997).

The quality of institutions, social capital, industrialization, urbanization, education and life expectancy are recognized by many scholars as important factors in the *survival and sustainability* of democracies (Bernhard et al., 2001; Graham et al., 2017; Jacobsen, 2015; Paxton, 2002; Dluhopolskyi, 2012), while the phenomenon of *resource curse*, property inequality and ethnic heterogeneity, on the contrary, contribute to their *fragility* (Dunning, 2008; Fish, Kroenig, 2006; Koziuk, Dluhopolskyi, 2018; Boix, Stokes, 2003; Acemoglu, Robinson, 2006; Ahlquist, Wibbels, 2012).

The results of numerous studies (Lipset, 1959; Akhremenko et al., 2018; North et al., 2009; Przeworski, 2005) confirm that economic progress has an impact on democratic institutions in different directions:

1) leads to the emergence of a broad middle class that plays a mitigating role in society (encouraging democratic parties and expelling extremist organizations);

2) promote tolerance and acceptance among citizens in general and politicians, in particular, of

universalist social norms that promote the emergence of an effective bureaucracy (good governance);

3) raises social standards and quality of life of citizens, minimizing the risk of being treated as a plebistic side by political elites;
4) produces a sense of time in different strata of society (extends their horizons of planning);
5) creates conditions for the development of public organizations that are capable of counterbalancing power;
6) ensures the formation in society such volume of aggregate wealth, so that its moderate redistribution is not critical (staying in the power of one party or another party ceases to fundamentally affect the chances of *survival* of other influential groups);
7) alleviates the acuteness of the conflict between interest groups on the redistribution of limited resources (range expansion of distribution public policies, concentration of expected redistribution parameters in the zone of moderate values).

The works (Burgess et al., 2011; Alesina et al., 2005; Alesina et al., 2019) analyze the influence of ethnic fractionalization on the decline of the quality of local public goods through the factors affecting corruption, the quality of social capital, and the level of trust. The example of Indonesia (Alesina et al., 2019) established the relationship between ethnic fractionalization and deforestation in the context of the impact of decentralized management of natural resources. Also, *Africa's growth tragedy* is considered in works (Easterly, Levine, 1997; Canning, Fay, 1993) as an example of low economic productivity due to excessive racial fractionalization.

However, despite the wide range of studies on ethnic fractionalization and its impact on the socio-economic indicators of the development of countries, the relationship problem between ethnic fractionalization and the environmental component of sustainable development – the environmental state remains unexplored.

In scientific paper, three key hypotheses are put forward:

1) there is a cause-and-effect relationship between the ethnic fractionalization of countries and environmental state;
2) this connection is not direct and instant, but is manifested through the transmission buffer mechanism, which is based on the quality and efficiency of state institutions;
3) the negative influence of high ethnic fractionalization on the ecological situation in the country in the welfare states is offset by the high quality and efficiency of governance by initiating the function of balancing the interests of ethno groups in the transmission buffer mechanism.

Research methodology

To construct the original matrix for cross-country analysis, measurements of ethnic, linguistic and religious fractionalization of countries have been used, which are given in the teamwork of authors led by A. Alesina (Alesina et al., 2003). These measurements are based on identified 650 ethnic groups in 190 countries, 1055 linguistic groups in 201 countries and 294 religions in 215 countries.

As an indicator of the environmental situation in the countries, the Environmental Sustainable Index, developed at the initiative of the public organization *Global Leader for Tomorrow*, in cooperation with the Center for Environmental Law and Policy of the Yale University (USA) and the Center for International Scientific Information Networks at Columbia University (USA) in 2000, 2001, 2002 and 2005 (Environmental Sustainability Index, 2005). In order to assess the state of the world environment after 2005, the Environmental Performance Index in 2006, 2008, 2010, 2012, 2014, 2016, and 2018 (Environmental Performance Index, 2018) has been included in the output matrix. This index was first developed in 2006 in a pilot project format by the above-mentioned Yale and Columbia University research centers together with the World Economic Forum (Switzerland) and the Center for Joint Research of the European Commission (Italy).

The quality and effectiveness of the institutes in 2017 was assessed on the basis of six indicators: Voice and Accountability (VA), Political Stability and Absence of Violence (PSAV), Government Effectiveness Index (GEI), Regulatory Quality (RQ), Rule of Law (RL), Control of Corruption (CC), which is an integral part of Worldwide Global Indicator (The Worldwide Governance Indicators, 2018). The estimation of each indicator varies from -2,5 (weak) to +2,5 (strong) management efficiency. The study used correlation and regression analysis tools using the application statistical software package STATISTICA. In the process of correlation analysis, the pair coefficients of the Pearson correlation are defined, which illustrate the direction and closeness of the linear stochastic coupling between the investigated variables. In the course of regression analysis, linear regression models are constructed that reflect the nature and form of causal relationships between the ethnic diversity of countries and the state of ecology in them. The transitivity of such relationships through the indicators of quality and efficiency of governance is illustrated by linear regression models and bubble diagrams, in which the bubble diameter reflects the integral estimation of the environmental state.

Research results

Ethnic fractionalization refers to the number, size, socioeconomic distribution and geographical locat-

Table 1. Criteria for ethnic autonomy, build by the authors based on (Anderson, 2016; Minaeva, Panov, 2017; Ganguly, Mac-Duff, 2003; Roeder, 2014)

Ethnic identity of the territory	Preserving autonomy of the ethnic basis
1) autonomy is provided as a result of an ethno political conflict/movement for self-government; 2) autonomy is provided as a result of the implementation of the ethno nationalism; 3) autonomy is provided as a result of the post-imperial transformation, when the ethnically specific region – the imperial periphery – remained in the metropolis or was included in the composition of another state that arose as a result of the post-imperial transformation	1) normative consolidation (recognition) of the ethnic nature of the autonomy (*the titular group* as a special nationality – distinct nationality); 2) ethnic identity is expressed in the official attributes of autonomy (name, symbolism, historical dates, names of political institutions); 3) official recognition of the language / specific religion of the titular ethnic group; 4) special preferences for the titular ethnic group in this region (guarantees of access to power, language / religious preferences)

ion of particular cultural groups in a state or in a certain other territory. The specific cultural features of these groups relate to language, skin color, religion, ethnicity, customs and traditions, history, or other specific criterion, individually or in combination (Carment, James, 2004). Often, these features are used for social exclusion and monopolization of power, which runs counter to the principles of democratization and inclusive development.

In practice, for the measurement of ethnic heterogeneity, the index of ethnolinguistic fractionalization (ELF) is most frequently used, which is the probability that two randomly selected members of a society will belong to different groups and are calculated as the Herfindahl index (Bossert et al., 2011; Taylor, Hudson, 1972):

$$ELF_j = 1 - \sum_{i=1}^{N} s_{ij}^2, \qquad (1)$$

where s_{ij} is the fraction of the group i ($i = 1, ..., N$) in the population of the country j.

The index varies from 0 (absolutely homogeneous society) to 1 (each member of a society is a separate group). The maximum index of $ELF = 0,98$ is in Papua New Guinea.

However, this index has a rather limited field of application, due both to the difficulty of collecting reliable information on countries (especially those affected by military conflicts), peculiarities of group interaction in providing local public goods, and with distortion of results. So, if in country A there are 7 equal in number of ethnic groups, then $ELF_A = 0,856$. If in country B there is one group that makes up 35% of the population and another 13 groups, each of which is 5%, consequently, $ELF_B = 0,845$ (only slightly lower). However, it is obvious that the impact is differently distributed in these societies: in country B, there is a dominant group that can impose its conditions on others if ethnic heterogeneity prevents them from joining, whereas in country A, such an effect is much harder to realize.

Since ethnic and other cultural minorities have often suffered from other groups in the past, they have vivid memories of their tragedies and fears in the present and future. They cannot trust the state as a *benevolent intermediary*, since there is always the possibility that it will use private information against them, violating consensus agreements, which usually relate to proportional representation and participation in broad collective decision-making (e.g., Switzerland, the Netherlands, Belgium, European Union) (Lijphart, 1977). However, despite the difference in the position of the majority and the minority of many countries (so-called *titular* and *non-titular* ethnic groups), it is often some minorities that are better organized, economically developed and want to manage a majority (e.g., Basques in Spain).

Concerning the optimal number and size of ethnic groups, scholars do not have unanimous opinion. Theoretically, two large groups, commensurate in size, can both balance each other (example of the Wallonians and the Flemish) and create the basis for a multi-year conflict (example of the Israelis and Palestinians). Similarly, a large number of small groups, creating a coalition, can achieve both the maintenance of peace and security in the state, as well as permanent opposition, including armed conflicts. It is precisely in order to avoid the latter that some scholars (Hechter, 2000; Benedikter, 2009; Wolff, 2010) suggest autonomy for certain cultural groups and avoid centralism, since it is decentralization that can restrain militant sentiment (example of Catalans and Basques in Spain, Sicilians in Italy). In this aspect, we are talking about ethnic territorial autonomy, for constructing of which two key criteria have been developed: 1) the ethnic identity of the region in the past; 2) preservation of the autonomy of the ethnic basis at present (table 1).

Table 2 shows the correlation matrix of the pair correlation coefficients between the indicators of ethnic, linguistic, religious fractionalization of the countries and the indices that characterize their ecological situation during the last 19 years. As we can see, between 2006 and 2008, the correlation (-0,515 and -0,523), which is significant (according to Chaddock's table), was found to be inverse between the index of ethnic diversity of countries and the ecological indexes in 2006 and 2008, weak in 2002 and 2005 (-0.286 and - 0,199), in all other years - moderate (from -0,343 to -0,462). Almost all determined correlation coefficients are significant at 0.1% level, with the exception of the 2000 indicator (significant at 1% level) and 2005 (significant at 5% level). Despite a certain difference in the methodology for con-

	Ethnic	Language	Religion	EPI 2018	EPI 2016	EPI 2014	EPI 2012	EPI 2010	EPI 2008	EPI 2006	ESI 2005	ESI 2002	ESI 2001	ESI 2000
Ethnic	1,000 (177)													
Language	-0,086 (175)	1,000 (176)												
Religion	0,045 (176)	0,372*** (176)	1,000 (177)											
EPI 2018	-0,462*** (177)	-0,080 (176)	0,003 (177)	1,000 (180)										
EPI 2016	-0,447*** (174)	-0,045 (173)	0,055 (174)	0,8716*** (177)	1,000 (177)									
EPI 2014	-0,457*** (173)	-0,102 (171)	0,084 (172)	0,884*** (174)	0,876*** (174)	1,000 (174)								
EPI 2012	-0,343*** (131)	-0,083 (131)	-0,064 (131)	0,649*** (131)	0,564*** (131)	0,650*** (131)	1,000 (131)							
EPI 2010	-0,442*** (157)	0,016 (158)	0,068 (158)	0,717*** (159)	0,730*** (159)	0,717*** (157)	0,696*** (129)	1,000 (159)						
EPI 2008	-0,523*** (147)	-0,058 (147)	-0,132 (147)	0,805*** (147)	0,872*** (147)	0,814*** (147)	0,694*** (124)	0,842*** (145)	1,000 (147)					
EPI 2006	-0,515*** (131)	-0,055 (131)	-0,005 (131)	0,814*** (131)	0,863*** (131)	0,858*** (131)	0,720*** (111)	0,790*** (128)	0,889*** (128)	1,000 (131)				
ESI 2005	-0,199* (143)	-0,132 (143)	-0,030 (143)	0,448*** (143)	0,477*** (143)	0,451*** (143)	0,630*** (123)	0,567*** (140)	0,519*** (138)	0,509*** (128)	1,000 (143)			
ESI 2002	-0,286*** (137)	-0,121 (137)	-0,051 (137)	0,503*** (137)	0,545*** (137)	0,500*** (137)	0,622*** (118)	0,638*** (135)	0,627*** (133)	0,546*** (124)	0,854*** (137)	1,000 (137)		
ESI 2001	-0,372*** (121)	-0,172 (121)	0,016 (121)	0,716*** (121)	0,698*** (121)	0,731*** (121)	0,707*** (108)	0,668*** (120)	0,719*** (118)	0,732*** (107)	0,813*** (118)	0,840*** (118)	1,000 (121)	
ESI 2000	-0,396** (56)	-0,195 (56)	0,151 (56)	0,829*** (56)	0,804*** (56)	0,796*** (56)	0,643*** (55)	0,582*** (56)	0,694*** (55)	0,784*** (54)	0,745*** (54)	0,631*** (54)	0,893*** (56)	1,000 (56)

Number of observations in parentheses; * significant at 5%; ** significant at 1%; *** significant at 0,1%

Table 2. Correlations of Fractionalization measures and Environment indexes, build by the authors

Table 3. Ethnicity as a Determinant of Ecological Indicators (Linear Regression Analysis), build by the authors

Dependent variable	Intercept b0	Ethnic b1	R^2	F	Number of observations
EPI 2018	66,785 (0,000)	-23,344 (0,000)	0,213	47,35	177
EPI 2016	79,130 (0,000)	-25,308 (0,000)	0,200	42,89	174
EPI 2014	64,022 (0,000)	-29,240 (0,000)	0,209	45,16	173
EPI 2012	58,968 (0,000)	-13,628 (0,000)	0,117	17,16	131
EPI 2010	68,549 (0,000)	-22,116 (0,000)	0,195	37,66	157
EPI 2008	83,889 (0,000)	-26,287 (0,000)	0,273	54,51	147
EPI 2006	77,101 (0,000)	-27,472 (0,000)	0,265	46,43	131
ESI 2005	53,153 (0,000)	-6,503 (0,017)	0,039	5,79	143
ESI 2002	54,434 (0,000)	-10,130 (0,001)	0,082	12,02	137
ESI 2001	56,866 (0,000)	-17,256 (0,000)	0,138	19,10	121
ESI 2000	65,554 (0,000)	-15,850 (0,003)	0,157	10,03	56

p – statistic in parentheses, critical $F_{0,05}$-value (1,54) = 4,02, $F_{0,01}$-value (1,141) = 3,91

structing the ESI and EPI indices, as well as the continuous improvement of the structure and algorithm for calculating the latter, and also taking into account the values of the calculated Pearson coefficients, it is safe to assert that there is a reliable linear relationship between the ethnic fractionalization of the country and the ecological situation in it. The form and nature of this connection are illustrated by the data in table 3, that presents the results of the regression analysis of these indicators. All constructed regression models are statistically significant with the reliable values of the free member and the regression coefficient. However, the determination coefficients for models are low, which indicates that only a certain part (3,9-27,3% in different years) of the variability of the environmental index in the countries was due to their ethnic diversity. This is quite a logical explanation, since the indicator of ethnic fractionalization cannot be the only determinant of the ecological situation in the country.

Moreover, as already noted in the part of the hypothesis's formulation, the connection between these indicators is obviously an inverse, and most likely, has a transitive nature. Therefore, an important application task is to find out the structure and nature of the action of the transmission buffer mechanism between the phenomena of ethnic diversity and ecological situation in the country. It should be noted that the correlation analysis did not establish a reliable link between the indices of language and religious diversity in the country and the indices that characterize the environmental state in it. As we see from table 2, the absolute values of the correlation coefficients between these indices are insignificant (0,003-0,195), and their signs vary in different years.

In order to test the hypothesis about the role of state institutions as components of the above-mentioned transmission buffer mechanism and their quality as a necessary condition for its effectiveness, a correlation-regression analysis was conducted to establish the causal link between the indicators of ethnic fractionalization and the ecological situation, as well as the transitive dependence between them because of the institutional characteristics of the states.

Table 4 shows the correlation coefficients between the indicator of ethnic diversity in the country and indicators of the quality of governance in it. With all indicators of the quality of state institutions, the correlation is moderate and has a negative sign (r = -0,385 ÷ -0,467). The statistical significance of the calculated pair coefficients of correlation is high (at 0.1% level). The constructed linear regression models (table 5), in which the variables are an indicator of ethnic diversity, but dependent – one of the indicators of the quality of state institutions (GEI, VA, PSAV, RQ, RL, CC), proved to be adequate for all criteria with statistically significant all coefficients. Thus, the calculated Fisher F-criterion for all models ranged from 3,51 to 48,8 and was significantly higher than its critical (tabular) value $F_{0,01}$ (1,175) = 6,79.

Correlation matrix (table 6) illustrates the direction and the power of interdependence between the elements of the other part of the transmission mechanism – from quality and efficiency criteria of state institutions to the ecological quality. As shown in the table 6, there is a closer relationship that is identified by the Chaddock scale as direct significant (for PSAV, VA and CC r = 0.577 ÷ 0.693) and strong (for RL, RQ and GEI r = 0,792 ÷ 0,787). The results of

Table 4. Correlations of Ethnic Fractionalization and aggregate indicators of six broad dimensions of governance, build by the authors

	Ethnic	GEI	VA	PSAV	RQ	RL	CC
Ethnic	1,000						
GEI	-0,436***	1,000					
VA	-0,385***	0,691***	1,000				
PSAV	-0,411***	0,689***	0,643***	1,000			
RQ	-0,423***	0,934***	0,742***	0,640***	1,000		
RL	-0,467***	0,938***	0,763***	0,734***	0,925***	1,000	
CC	-0,446***	0,903***	0,758***	0,740***	0,860***	0,940***	1,000

Number of observations – 177-180, * significant at 5%; ** significant at 1%; *** significant at 0,1%

Table 5. Ethnicity as a Determinant of Indicators of Governance Quality (Linear Regression Analysis), build by the authors

Dependent variable	Intercept b_0	Ethnic b_1	R^2	F	Number of observations
GEI	0,691 (0,000)	-1,605 (0,000)	0,190	41,08	177
VA	0,614 (0,000)	-1,458 (0,000)	0,148	30,51	177
PSAV	0,581 (0,000)	-1,476 (0,000)	0,169	35,55	177
RQ	0,681 (0,000)	-1,576 (0,000)	0,179	38,20	177
RL	0,724 (0,000)	-1,731 (0,000)	0,218	48,80	177
CC	0,700 (0,000)	-1,700 (0,000)	0,199	43,40	177

p – statistic in parentheses, critical $F_{0,05}$-value (1,175) = 3,90, $F_{0,01}$-value (1,175) = 6,79

Table 6. Correlations of Ecological indicator and aggregate indicators of six broad dimensions of governance, build by the authors

	EPI 2018	GEI	VA	PSAV	RQ	RL	CC
EPI 2018	1,000						
GEI	0,787***	1,000					
VA	0,601***	0,691***	1,000				
PSAV	0,577***	0,689***	0,643***	1,000			
RQ	0,738***	0,934***	0,742***	0,640***	1,000		
RL	0,729***	0,938***	0,763***	0,734***	0,925***	1,000	
CC	0,693***	0,903***	0,758***	0,740***	0,860***	0,940***	1,000

Number of observations – 180, * significant at 5%; ** significant at 1%; *** significant at 0,1%

Table 7. Indicators of Governance Quality as a Determinants of Environment Performance – EPI 2018 (Linear Regression Analysis), build by the authors

Independent variable	b_0	b_1	R^2	F	Number of observations
GEI	56,73 (0,000)	10,76 (0,000)	0,618	288,97	180
VA	56,64 (0,000)	8,02 (0,000)	0,361	100,63	180
PSAV	56,95 (0,000)	8,13 (0,000)	0,333	88,86	180
RQ	56,66 (0,000)	10,00 (0,000)	0,545	213,42	180
RL	56,92 (0,000)	9,90 (0,000)	0,532	202,23	180
CC	56,92 (0,000)	9,19 (0,000)	0,481	164,86	180

p – statistic in parentheses, critical $F_{0,05}$-value (1,178) = 3,89, $F_{0,01}$-value (1,178) = 6,78

the regression analysis, in which as the dependent variable the indicator of the ecological situation in the countries for 2018 was chosen as an independent variable, and the quality indicators of state institutions in 2017 (table 7) statistically confirm the existence of causal relationships between the above pairs of variables. So, the determination coefficient (R^2) for all constructed models is within the limits of 0,333 ÷ 0,618, Fisher criterion (F) is 88,86 ÷ 288,97 at $F_{0,01}$ (1,178) = 6,78.
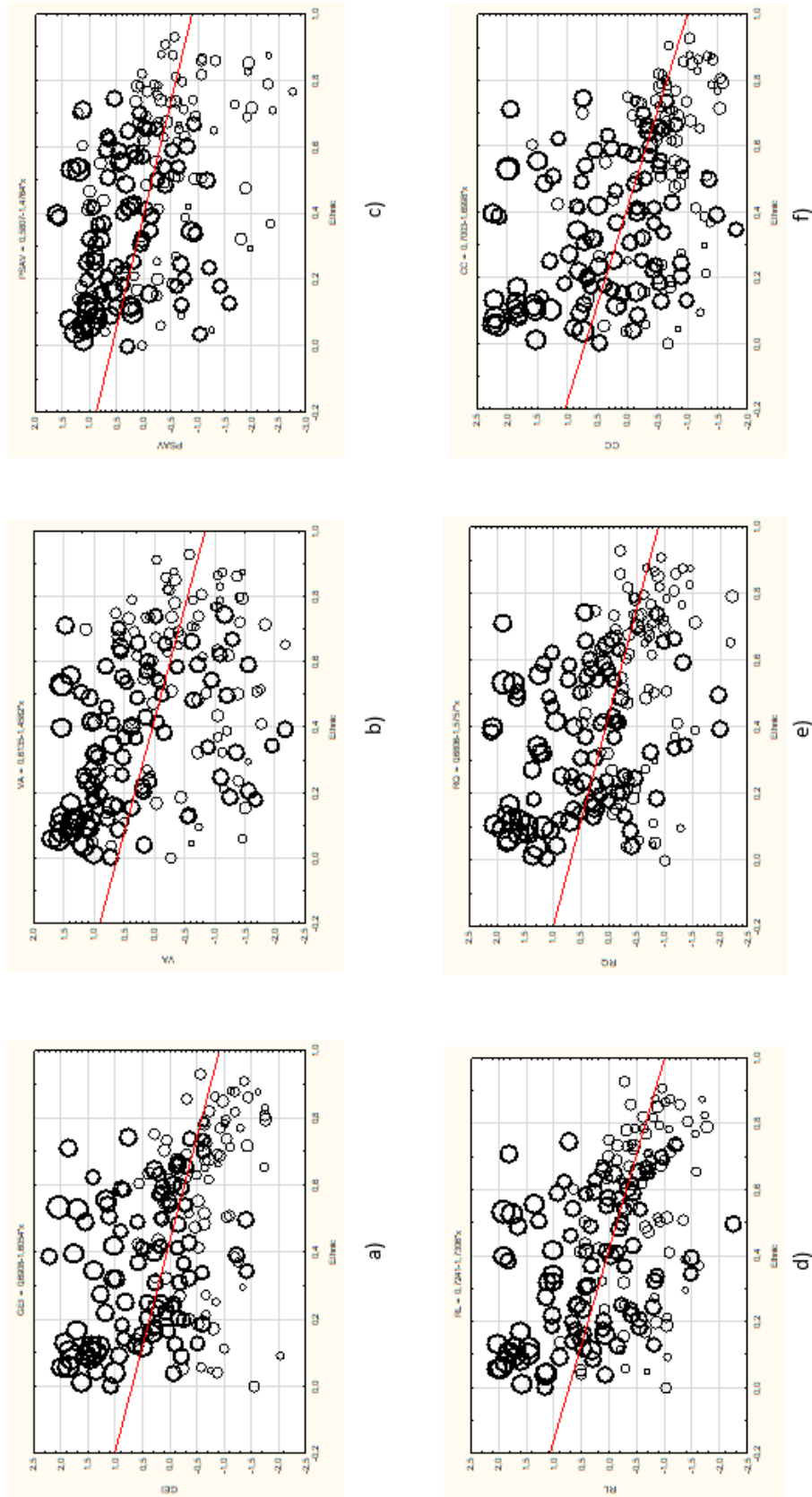
Figure 1. Bubble 2D Scatterplot (X axis – Measure of Ethnic Fractalization, Y axis – governance indicator a) GEI; b) VA; c) PSAV; d) RL; e) RQ; f) CC; Size of bubble – EPI, build by the authors based on (Environment Performance Index, 2018; The Worldwide Governance Indicators, 2018)

Table 8. Basic parameters of the multiple linear regression model: regressors – Index of ethnic fractionalization and Government effectiveness index, regressant – Environmental performance index, build by the authors

	b*	Std.Err. – of b*	b	Std.Err. – of b	t(14)	p-value
Regression summary for dependent variable: EPI 2014-2018 R= 0,844 R^2 = 0,712 Adjusted R^2 =0,709 F(2,174) = 215,57 p < 0,0000						
Inercept			61,900	1,221	50,685	0,000
Ethnic	-0,135	0,045	-7,335	2,464	-2,978	0,003
GEI 2014-2017	0,776	0,045	11,441	0,667	17,157	0,000

Table 9. Partial und semipartial correlation between dependent and independent variables in the multiple regression model, based on table 8

	b* in	Partial - Cor.	Semipart - Cor.	Tolerance	R-square	t(174)	p-value
Dependent variable: EPI 2014-2018							
Ethnic	-0,135	-0,220	-0,121	0,807	0,193	-2,98	0,0033
GEI 2014-2017	0,776	0,793	0,697	0,807	0,193	17,16	0,0000

Table 10. Ethnic Fractionalization, Governance Indicators and Environment Performance Index of OECD members, build by the authors, *based on (GDP per capita, 2017)

Country	GDP per capita*	Ethnic	GEI	VA	PSAV	RQ	RL	CC	EPI 2018
Australia	53800	0,0929	1,54	1,38	0,90	1,93	1,68	1,80	74,12
Austria	47291	0,1068	1,46	1,34	1,04	1,44	1,81	1,53	78,97
Belgium	43324	0,5554	1,18	1,38	0,42	1,24	1,34	1,50	77,38
Canada	45032	0,7124	1,85	1,48	1,11	1,89	1,80	1,92	72,18
Chile	15346	0,1861	0,85	1,00	0,38	1,34	1,01	1,04	57,49
Czech Rep.	20368	0,3222	1,02	0,97	1,02	1,23	1,12	0,57	67,68
Denmark	56308	0,0819	1,80	1,52	0,87	1,62	1,86	2,19	81,60
Estonia	19705	0,5062	1,12	1,21	0,66	1,64	1,28	1,24	64,31
Finland	45703	0,1315	1,94	1,55	1,07	1,82	2,03	2,22	78,64
France	38477	0,1032	1,35	1,15	0,21	1,16	1,44	1,26	83,95
Germany	44470	0,1682	1,72	1,39	0,58	1,78	1,61	1,84	78,37
Greece	18613	0,1576	0,31	0,71	-0,13	0,24	0,08	-0,14	73,60
Hungary	14225	0,1522	0,51	0,37	0,81	0,65	0,53	0,09	65,01
Iceland	70057	0,0798	1,45	1,38	1,37	1,43	1,61	1,84	78,57
Ireland	69331	0,1206	1,29	1,29	1,02	1,59	1,43	1,55	78,77
Israel	40270	0,3436	1,39	0,70	-0,88	1,27	1,02	0,83	75,01
Italy	31953	0,1145	0,50	1,05	0,24	0,70	0,32	0,19	76,96
Japan	38428	0,0119	1,62	1,01	1,12	1,37	1,57	1,52	74,69
Luxembourg	104103	0,5302	1,68	1,52	1,34	1,69	1,74	1,99	79,20
Mexico	8910	0,5418	-0,03	-0,08	-0,65	0,20	-0,57	-0,93	59,69
Netherland	48223	0,1054	1,85	1,57	0,92	2,05	1,83	1,87	75,46
New Zealand	42941	0,3969	1,77	1,56	1,59	2,09	1,92	2,24	75,96
Norway	75565	0,0586	1,98	1,69	1,15	1,81	2,02	2,24	77,49
Poland	13863	0,1183	0,63	0,78	0,52	0,88	0,47	0,73	64,11
Portugal	21136	0,0468	1,33	1,21	1,08	0,91	1,13	0,87	71,91
Slovak Rep.	17605	0,2539	0,81	0,94	0,88	0,82	0,57	0,22	70,60
Slovenia	23597	0,2216	1,17	1,00	0,89	0,58	1,02	0,81	67,57
Spain	28157	0,4165	1,03	1,03	0,27	0,94	1,01	0,49	78,39
South Korea	29742	0,0020	1,08	0,74	0,29	1,11	1,16	0,48	62,30
Sweden	53442	0,0600	1,84	1,58	0,98	1,80	1,94	2,14	80,51
Switzerland	80189	0,5314	2,06	1,56	1,21	1,88	1,93	1,99	87,42
Turkey	10546	0,3200	0,07	-0,71	-1,80	0,04	-0,25	-0,19	52,96
UK	39720	0,1211	1,41	1,33	0,26	1,71	1,68	1,84	79,89
USA	59532	0,4901	1,55	1,05	0,30	1,63	1,64	1,38	71,19

Thus, the results of the statistical analyzes confirmed by the first two working hypotheses of the study. The visual effect of the individual elements of the transmission buffer mechanism of the determination of the ecological state of the country illustrates the fig. 1. As we see, in the left upper quadrant (low ethnic fractionalization and high quality of state institutions), in all scatter diagrams, countries with predominantly high environmental quality dominate and vice versa. That is, in countries that are simultaneously characterized by high ethnic fractionalization and low quality and efficiency of state institu-

Table 11. Correlations of Ethnic Fractionalization, aggregate indicators of six broad dimensions of governance, Environmental Performance Index and GDP per capita for OECD members, build by the authors

	Ethnic	GEI	VA	PSAV	RQ	RL	CC	EPI 2018	GDP per capita
Ethnic	1,000								
GEI	-0,047	1,000							
VA	-0,091	0,856***	1,000						
PSAV	-0,133	0,662***	0,806***	1,000					
RQ	0,027	0,904***	0,843***	0,640***	1,000				
RL	-0,093	0,968***	0,882***	0,705***	0,927***	1,000			
CC	-0,079	0,937***	0,864***	0,658***	0,923***	0,957***	1,000		
EPI 2018	-0,108	0,698***	0,757***	0,496**	0,572***	0,676***	0,661***	1,000	
GDP per capita	0,068	0,743***	0,669***	0,500**	0,688***	0,728***	0,754***	0,706***	1,000

Number of observations – 34, * significant at 5%; ** significant at 1%; *** significant at 0,1%

tions, the latter are not able to fully perform the buffer role, that is, to neutralize the negative impact of different models of ethnic interests on decision making and the introduction of appropriate environmental policies. This means that this mechanism in such countries performs mainly a transmission (transfer) function.

To assess the mutual influence of ethnic fractionalization and the effectiveness of governance in the country on the ecological state, a two-factor regression analysis was carried out in which the average value of the EPI index for 2014, 2016 and 2018 was used as a regressant, and as regressors, the index of ethnic fractionalization and the average index of GEI for 2014, 2016 and 2017. As can be seen from the table 8, the resulting model is significant for all criteria. Fisher F-criterion is 215,57 per $F_{0,01}$ (2,174) = 4,73, and the determination coefficient is quite high (R^2 = 0,712). This indicates that 71,2% of the variation of the dependent variable is due to the variability of the independent variables. Regression coefficients and free membership in the constructed model are highly significant at 1% level.

Analytically the model has the form:

$Y = 61,9 – 7,34x_1 + 11,44x_2,$ (2)

where y is *EPI* 2014-2018, x_1 – *Index of ethnic fractionalization*, x_2 is *GEI* 2014-2017.

The value of the standardized regression coefficients b* indicates that the predictor of government effectiveness affects the environmental state in the country more than its ethnic diversity (0,776 vs -0,135). However, as the comparison of partial and semi-partial coefficients of correlation between dependent and independent variables shows (table 9), none of the predictors (first of all GEI) does not have an independent *part* in explaining the variability of the values of the dependent variable. This suggests that, with a high probability, the influence (direct and indirect) of these predictors on ecology should be analyzed together.

Hypothetically, in countries that are characterized by a set of signs as welfare states, strong and qualitatively functioning institutions should act as buffer elements of such a mechanism and neutralize the neg-

ative impact of inter-ethnic conflicts on the elaboration and implementation of political decisions, including environmental policy.

To test this hypothesis, a correlation analysis of ethnic diversity indices, institutional quality and efficiency and ecological situation in the OECD countries is conducted, the vast majority of which can be identified as welfare states (table 10). Among the members of this group are countries with high levels of ethnic diversity (e.g. Canada, Belgium, Mexico, Switzerland, Luxembourg) and almost mono-ethnic (Japan, South Korea, Portugal, Norway, Sweden, Iceland). At the same time, almost all OECD countries are characterized by high quality and efficiency in governance and the environment.

According to the correlation matrix data (table 11), the correlation coefficients between the ethnic fractionalization of the OECD countries and other indicators are low and statistically insignificant. In the welfare states, the transmission buffer mechanism, through the perfection of state institutions, eliminates the danger of interethnic conflicts, harmonizes their economic, social, cultural and environmental interests, and thus contributes to the development of a balanced and effective environmental policy.

Conclusions and perspectives for further research

Summarizing the problem of relationship between ethnic fractionalization and the ecological situation in the countries, the following conclusions can be drawn:

1. Ethnic fractionalization is considered to be a significant obstacle to inclusive growth and the establishment of quality governance institutions. The presence of inter-ethnic tensions often becomes a prerequisite for the policy of restricting competition to other groups. However, because of the high level of quality of governance institutions between ethnic fractionalization and inclusive development, conflicts are eliminated.
2. Environmental goods may be the subject of a redistributive policy in heterogeneous societies.

As a rule, this is not so much direct expropriation of the welfare of individual groups, as the inability to negotiate goods with significant external effects, the benefits of which are consumed by all.

3. Empirically confirmed the hypothesis of an inverse relationship between the degree of heterogeneous society and the environmental quality. It was found that the quality of governance could weaken the inverse relationship between ethnic fractionalization and the ecological situation in the country. Typically, in the welfare states, the neutralization factor of ethnic fractionalization by the quality of governance institutions can be traced. This means that there is an institutional transmission buffer mechanism in the relationship between the structure of society and the offer of environmental goods.

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