



# Sociocultural Diversity, Competitiveness, Development

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### Abstract

There is a belief that ethnic or cultural diversity would necessarily bring about difficulties of understanding and cooperation, lower economic performance, less stable economic and social processes and, ultimately a slowdown of economic output. On the other hand, ethnic fractionalisation and the resulting cultural diversity can create a pool of valuable resources comprising knowledge, traditions, skills, customs, that can initiate innovative ideas and creativity. The paper analyses the impacts of ethnic, linguistic and religious diversity on the competitiveness of countries, their income levels, and quality of life. measured by the Global Competitiveness Index. A cross-country multiple regression analysis of 155 countries was done, comparing different diversity indicators and assessing their impacts on GCI, GNI per capita and HDI. Linguistic diversity was found to positively influence economic performance, while ethnic fractionalisation had negative impacts only in high-income countries. Religious diversity did not show any significant impacts on any of the three assessed development indicators.

### Keywords

Diversity; Ethic fractionalisation; Linguistic fractionalisation; Religious fractionalisation; GCI; GNI; HDI

### Introduction

Increasing concern is experienced about the fact, that global migration may cause serious problems in the societies of affluent countries. Immigrants having cultural backgrounds very different from the host country might generate ethnic conflicts, and their integration might become difficult or impossible, creating intolerable cultural fractionalisation in the host countries. There is a belief that ethnic or cultural fractionalisation would necessarily bring about difficulties of understanding and cooperation, lower economic performance, less stable economic and social processes and, ultimately a slowdown of economic output. On the other hand, ethnic fractionalisation and the resulting cultural diversity can be welcome as a pool of valuable resources comprising knowledge, traditions, skills, customs, that can initiate innovative ideas and creativity. History can provide examples for both. Countries with ethnically and culturally mixed populations are among the most developed countries of the world, that provide high living standards for their population, while others suffer from low living standards often aggravated by wild and violent ethnic conflicts. The question arises, whether differences leading to tensions and conflicts, or variety leading to the enrichment of resources play a

stronger role. What are the mechanisms through which the effects of diversity operate on various socioeconomic processes? Many papers have analysed the impacts of cultural diversity on various measures of economic performance, but relatively little is known about the possible impacts on competitiveness, and on the quality of life. Therefore, in the present paper evidence is looked for the relationship between ethnic, linguistic and religious diversity and the performance of countries measured by GNI per capita, Human Development Index and Global Competitiveness Index, in a cross-country statistical analysis of 155 countries of the world. The main objective is to find patterns of diversity that distinguish countries that are successful actors in the global economy.

### Literature Review

The relationship between diversity - including ethnic, religious, or linguistic diversity - and development has been intensively researched in the past decades. Theoretical considerations suggest, that the varied ethnic or cultural composition of the population can be a valuable human resource, and generate increasing innovative capacity and creativity, which in turn, can improve the economic performance of firms, businesses, regions and countries [1-4]. On the other hand, social heterogeneity can hinder economic performance, by influencing individual preferences, strategies and the production function itself. Individuals tend to attribute higher utilities to events that increase the well-being of their own social groups. People prefer to have homogeneous work environments to decrease transaction costs, which has an impact on their individual strategies. Variability and diverse pools of skills and abilities may increase productivity, but lack of understanding and disinclination to cooperate may decrease it, thus variety can change the production function, too [5]. The positive or negative economic impacts of diversity may be enhanced or dampened by education, that raise or diminish prejudices and discrimination. Better education can lead to more tolerance and capability to cope with diversity, and tolerance is an important social value, related to the preservation of cultural heritage [6].

The relationship of economic development to diversity has been tested by many researchers, most of whom based their assessment on regressions of the growth rate of GDP per capita to the level of diversity described by an index of fractionalisation, discussed later. Most of the results showed that increasing diversity - especially ethnic diversity - leads to lower growth of GDP per capita [7-11], although ethnic fractionalisation may have less harmful effects in more developed countries [5,12], where the level of democracy, or initial income per capita is higher. The impact of fractionalisation is also influenced by several conditions, handled in models as control variables. These include geographic location, schooling, infrastructural level, political and societal instability, level of education [5,9,12], or country size, measured by area or population [10,11,13,14].

Another aspect of the impact of sociocultural fractionalisation is its relationship to the actual level of GDP per capita, as is analysed by Alesina et al. [15] and Bacsi et al. [16,17]. These studies used control variables of regional location and the historical past of the country (type of colonisation, state foundation, etc.), and found a negative effect of ethnic fractionalisation on GDP per capita, while the effects of control variables were not significant. Ethnic fractionalisation was

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also found to have a negative impact on public policy spending and on government transfers [5,18,19].

The impact of diversity on the quality of life was assessed by measuring its impact on the Human Development Index (HDI). The impacts on HDI are more controversial: ethnic or linguistic fractionalisation did not show any significant impact, while religious fractionalisation showed a negative effect on HDI of 2003 [20], while other studies revealed positive impacts of religious diversity on HDI of 2014 [16,17].

As greater diversity may be associated with more varied human skills and resources it is reasonable to expect some impacts of it on the innovative capacity or competitiveness of a country. Such analyses were done by Ogden et al. [21], who found that cultural diversity of employees has a positive partial correlation with product innovation. Hlepas et al. [22] showed that many highly developed countries are often quite heterogeneous, and underdeveloped countries are often homogeneous. He argues, that the Global Competitiveness Index (GCI) may be a better indicator of economic performance than GDP/capita, as the latter measures only production and consumption, while GCI can reveal other important components and capacities of a country, which may explain lower or higher GDP values. DiRienzo et al. [23] found the effect of ethnic fractionalisation negative and linguistic fractionalisation positive on the Global Competitiveness Index, while religious fractionalisation was insignificant. Positive impacts of diversity were established on tourism competitiveness [24] in 2007 while others found ethnic [25], and linguistic fractionalisation to have negative impacts on tourism competitiveness in 2014, with the effect of religious diversity being insignificant. The contradictory results suggest, that the effects of fractionalisation may depend on the difference between the year of the fractionalisation data and that of the dependent variables (representing a possible time lag), and also on the changes in level of fractionalisation from year to year.

Ethnic and linguistic diversity can be measured by the index of *ethno-linguistic fractionalisation (ELF)* applying the formula  $ELF = 1 - \sum_{i=1..n} s_i^2$  where  $s_i$  is the proportion of the population belonging to the  $i$ -th ethno-linguistic group of the society. Thus the index measures the probability of two randomly selected individuals belonging to different groups. This formula was first applied for linguistic diversity by Greenberg et al. [26], and has been widely used for measuring not only linguistic fractionalisation, but for ethnic, cultural and religious diversity, too.

A weakness of the index of fractionalisation is that it does not consider differences or similarities between separate groups. This weakness is corrected by Greenberg et al. [26], by a *weighted fractionalisation index*, which can be interpreted as the average difference between two randomly selected individuals [27]. When a population is made up of many small groups, its ELF may be high. For instance, a society of four groups, each having 25% of the total population will have  $ELF=0.75$ , but these small segments may smoothly cooperate with each other. On the contrary, a society of two equally large, and equally powerful groups (with 50% of the population in each) will have a smaller ELF ( $ELF=0.50$ ), but may have to face rivalry and antagonism. To handle this situation an index of polarisation is developed [28], which is highest for two groups of similar sizes, and has smaller values for many small groups, or when one of the two groups is large and the other is considerably smaller. Esteban et al. [29] developed another general index of polarization, that considers not only the number and sizes of societal clusters, but the relative distance between them. These indices were tested to

describe the occurrence of conflicts, civil wars, social tensions as a result of ethnolinguistic or religious diversity. Results confirm that an increase in social (ethnic or religious) polarization reduces the rate of investment and increases public consumption and the incidence of civil wars [28]. Desmet et al. [30] and Desmet et al. [27] compared the impacts of various fractionalisation and polarisation indices on government transfers, public goods provisions, and occurrence of civil conflicts, and found rather similar impacts of both fractionalisation and polarisation.

A crucial point in assessing the impact of sociocultural diversity on any aspect of development is the availability of reliable data on the ethnic, linguistic or religious structure of countries. Most of ethnic composition data are quite old. The ethno-linguistic fractionalisation index (ELF) based on data compiled by Soviet ethnographers in 1964 (in the Atlas Narodov Mira) is probably the most extensively used index for testing the impacts of ethnic and linguistic heterogeneity. Easterly et al. [7] use this dataset for their paper. A different set was developed by Alesina et al. [19] based on population data collected from the Encyclopaedia Britannica of 2001, CIA's World Factbook of 2000, Levinson's Ethnic Groups Worldwide of 1998, and Minority Rights Group International's World Directory of Minorities of 1997, and in most cases the primary source is national censuses. Language and religion data are from 2001, ethnic data are from the 1990s, or even earlier. Fearon et al. [31] also created an index of ethnic (ethnoreligious) fractionalisation, and a cultural fractionalisation index relying on the same data sources as Alesina et al. [19].

The website Ethnologue [32] regularly publishes Linguistic Diversity Index (LDI) series for the countries of the world using the formula by Greenberg. Patsiurko et al. [11] developed ethnolinguistic diversity index values for 1985 and for 2000 for OECD countries. Desmet et al. [30] computed various fractionalisation and polarisation indices for ethnolinguistic diversity based on linguistic data by Ethnologue for 2005. Bacsi et al. [16] computed a religious fractionalisation index using the ELF formula and a religious polarisation index by the RQ formula, based on the religious affiliation in 2010, provided by the Pew Research Centre [33].

## Regression Analysis and Results

### Data, methodology and objective

**Objective:** As the literature review indicated in Section 1, most of the former research results show negative effects of diversity on GDP per capita or on the growth rate of GDP per capita, and mixed results on HDI. There is a general feeling, that variety may have as many advantages as disadvantages. However, most of the empirical analyses show the opposite. The advantageous impacts, however, may depend on certain internal conditions of the countries analysed, that can be captured by control variables; or may manifest themselves through dependent variables other than GDP per capita or its growth. The objective of the present paper is to assess the impacts of ethnic, cultural and religious diversity on GNI per capita, HDI and GCI, using the same set of control variables suggested by the recent literature. A secondary objective is to see whether these impacts are similar or different for more affluent countries, that may be better prepared to handle problems arising from heterogeneity.

**Data:** The current paper examines the impacts of diversity on various aspects of development and the quality of life. For measuring the quality of life in the Human Development Index values were available for 2010-2014 by UNDP [34]. The level of economic development was measured by the per capita values of GNI

(purchasing parity base) for 2013 and 2014 (GNI2013, GNI2014) by World Bank [35,36]. The creative capacity of the assessed countries was measured by the Global Competitiveness Index (GCI) value by the World Economic Forum, for 2014 and 2015 [37].

For measuring the impact of various types of diversity earlier research datasets were applied. Ethnic, religious and cultural fragmentation indices were taken from Alesina et al. [5] for 2001, while linguistic fractionalisation was measured by the LDI index provided by Ethnologue for 2014 [32]. For religious fractionalisation the index computed by Bacsi et al. [16,17] was applied, relying on data for 2010 from the Pew Research Center [33], together with an index developed by Alesina et al. [5] for 2001 data. The notations and variables are presented below.

Diversity indices:

- EFIA: ethnic fractionalisation by Alesina et al. [5] - based on ethnic data for around 1985-2000
- LDI: linguistic fractionalisation - based on language data for 2014 [32]
- RFA: religious fractionalisation by Alesina et al. [5]- based on religious diversity data for 2001
- RFIPew: Religious fractionalisation index based on data by Pew Research Center for the year 2010 [16,33].
- Output variables of quality of life, competitiveness and economic performance:
- HDI- the Human Development Index published by UNDP [34]
- GCI- the Global Competitiveness Index [37], or more precisely, its natural logarithm for 2014.
- GNI- the per capita GNI (purchasing parity base) for 2014 published by World Bank [35,36], and its natural logarithm.
- Control variables:
- Pop% : population in 2014 expressed as percentage of the world total population [38];
- Area%: the total area of the country expressed as percentage of the world total area [35];

- IndYear: the year of the country attaining independence [39];
- Lit: literacy rate measured as the number of literate persons per 1000 adults [34];
- PriEd%, SecEd%, TerEd%: primary, secondary, tertiary net school enrollment rates for the year 2014, as % of the relevant age group [37];
- EcFree: the index of Economic Freedom [40].

Methodology

A cross-country analysis of 155 countries was attempted. However, due to data availability, analyses have occasionally been restricted to only 129 countries. First, all the variables are presented by descriptive statistics, and then simple Spearman-correlations are computed.

The impact of diversity is assessed by applying multiple regression analysis with the listed output variables as dependent variables, and diversity indicators and control variables as dependent variables.

As literature indicated that the more affluent countries are better prepared to utilise advantages and minimise harms of diversity, the same analyses are repeated restricting the range of countries to those having per capita GNI levels above USD13000.

Descriptive statistics and correlations

Descriptive statistics of the above indicators are presented in Tables 1-3. It is worth noticing that skewness and kurtosis data indicate a non-normal distribution for most of the diversity measures and output variables alike.

As is seen in Table 4, only the Economic Freedom index and the natural logarithm of GCI are of normal distribution. For this reason correlations are tested by Spearman’s rho value, presented in Table 5.

As it is seen in Table 5, ethnic and linguistic diversity indicators are positively correlated to each other, the two religious diversity indicators are also positively correlated, but the ethnic and the linguistic diversity indices have only a weak - though still significant - positive correlation to religious diversity. Ethnic and linguistic diversity show medium negative significant correlation to the output variables, the religious diversity index of 2001 (RFA) does not

Table 1: Descriptive statistics for fractionalisation and polarisation indices.

	N	Year	Minimum	Maximum	Mean	Std. Dev	Skewness	Kurtosis
EFIA	155	2001	0.0000	0.9302	0.4593	0.2560	-0.0810	-1.1890
LDI	155	2014	0.0000	0.9880	0.4612	0.3007	0.0500	-1.2950
RFA	155	2001	0.0023	0.8603	0.4377	0.2314	-0.1830	-1.0810
RFIPew	155	2010	0.0020	0.7920	0.2926	0.1940	0.2890	-0.9600
PR_Pew	155	2010	0.0000	0.2500	0.1230	0.0725	-0.0500	-1.2400

Table 2: Descriptive statistics for control variables - All data are for 2014.

	N	Minimum	Maximum	Mean	Std. Dev	Skewness	Kurtosis
Pop%	151	0.01	19.05	0.65	2.16	7.522	60.096
Area%	155	0.00	12.62	0.64	1.56	4.945	28.332
IndYear	155	0	1993	1785.54	418.83	-3.070	9.229
Literacy	155	191	1000	845.94	188.57	-1.387	1.081
PriEd%	131	40.81	100.00	90.89	10.26	-2.082	5.245
SecEd%	133	24.68	131.29	79.04	26.91	-0.535	-0.773
TerEd%	132	0.82	103.11	37.51	27.00	0.389	-1.016
EcFre	155	0.00	89.40	57.79	16.20	-1.895	5.103

**Table 3:** Descriptive statistics for output variables - All data are for 2014.

	N	Minimum	Maximum	Mean	Std. Dev	Skewness	Kurtosis
GNI	155	580.73	83960.62	16000.50	16477.85	1.557	2.483
LogGNI	155	2.7640	4.9241	3.9388	0.5333	-0.321	-0.850
HDI	155	0.3000	0.9439	0.6842	0.1638	-0.338	-0.985
GCI	134	2.8500	5.6700	4.1572	0.6645	0.377	-0.428
LogGCI	134	1.0500	1.7300	1.4123	0.1591	0.026	-0.458

**Table 4:** Tests of normality.

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
HDI	0.103	129	0.002	0.945	129	0.000
GNI	0.158	129	0.000	0.851	129	0.000
LogGNI	0.084	129	0.027	0.968	129	0.004
GCI	0.072	134	0.084	0.972	134	0.007
LogGCI	0.059	129	0.200 <sup>*</sup>	0.985	129	0.171
EFIA	0.101	134	0.002	0.954	134	0.000
LDI	0.099	134	0.003	0.933	134	0.000
RFA	0.097	134	0.004	0.959	134	0.000
RFIPew	0.083	134	0.024	0.965	134	0.002
Pop%	0.381	129	0.000	0.265	129	0.000
Area%	0.345	129	0.000	0.375	129	0.000
Ind year	0.363	129	0.000	0.499	129	0.000
Literacy	0.246	129	0.000	0.766	129	0.000
PriEd%	0.173	129	0.000	0.808	129	0.000
SecEd%	0.135	129	0.000	0.934	129	0.000
TerEd%	0.120	129	0.000	0.930	129	0.000
EcFre	0.042	129	0.200 <sup>*</sup>	0.995	129	0.934

**Table 5:** Correlations of diversity indicators and output variables. <sup>\*\*</sup> Correlation is significant at the 0.01 level (2-tailed); <sup>\*</sup> Correlation is significant at the 0.05 level (2-tailed).

Spearman's rho	EFIA	LDI	RFA	RFIPew	GNI	LogGNI	HDI	GCI	LogGCI
EFIA	1.0								
LDI	0.706 <sup>**</sup>	1.0							
RFA	0.210 <sup>**</sup>	0.302 <sup>**</sup>	1.0						
RFIPew	0.010	0.124	0.565 <sup>**</sup>	1.0					
GNI	-0.519 <sup>**</sup>	-0.399 <sup>**</sup>	-0.027	0.239 <sup>**</sup>	1.0				
LogGNI	-0.519 <sup>**</sup>	-0.399 <sup>**</sup>	-0.027	0.239 <sup>**</sup>	1.000 <sup>**</sup>	1.0			
HDI	-0.587 <sup>**</sup>	-0.488 <sup>**</sup>	-0.006	0.253 <sup>**</sup>	.955 <sup>**</sup>	.955 <sup>**</sup>	1.0		
GCI	-0.434 <sup>**</sup>	-0.285 <sup>**</sup>	0.037	0.217 <sup>*</sup>	.861 <sup>**</sup>	.861 <sup>**</sup>	.870 <sup>**</sup>	1.0	
LogGCI	-0.434 <sup>**</sup>	-0.285 <sup>**</sup>	0.037	0.217 <sup>*</sup>	.861 <sup>**</sup>	.861 <sup>**</sup>	.870 <sup>**</sup>	1.000 <sup>**</sup>	1.0

correlate to output variables at all, while the religious diversity index of 2010 (RFIPew) is positively correlated to each output variable.

**Impacts of diversity on competitiveness, quality of life and income**

As former research suggests, diversity influences income levels, economic growth, HDI and competitiveness. However, these impacts considerably differ according to the structure of multiple regression models, and especially on the set of control variables applied. Therefore the present analysis applies the same model structure with the same set of control variables, to create comparable results.

Four model versions were defined, applying the same set of control variables, listed in Section 2.1:

- Model 1: Dependent: logGCI, independent diversity indicators: EFIA, LDI, RFIPew

- Model 2: Dependent: logGCI, independent diversity indicators: EFIA, LDI, RFA
- Model 3: Dependent: HDI, independent diversity indicators: EFIA, LDI, RFIPew
- Model 4: Dependent: logGNI, independent diversity indicators: EFIA, LDI, RFIPew

Multiple regression results are presented in Table 5 for all the countries, and in Table 6 for restricting the sample to high-income countries.

First, the multiple regression estimations were done with all the countries for which the full set of variables were available, i.e. for 129 countries. Then, following the example of Patsiurko et al. [10,11] the multiple regression estimations were done separately for high-income countries with the same model setup of diversity and control



**Table 6:** Regression statistics, for all countries, model fit with VIF<5. Note: Beta is the standardised coefficient of the variable, sign(p) indicates the p-value of significance for Beta.

Model	1		2		3		4	
Dependent	LogGCI		LogGCI		HDI		LogGNI	
Independent	Beta	sign (p)	Beta	sign (p)	Beta	sign (p)	Beta	sign (p)
RFA			0.016	0.726				
RFIPew	-0.007	0.867			-0.014	0.591	-0.001	0.983
EFIA	-0.061	0.321	-0.064	0.301	-0.021	0.553	-0.095	0.119
LDI	0.226	0.001	0.221	0.001	0.073	0.047	0.181	0.005
<b>Controls</b>								
Pop%	0.132	0.002	0.129	0.002	0.002	0.930	0.001	0.978
Area %	0.030	0.462	0.029	0.477	0.068	0.004	0.130	0.001
Ind Year	-0.120	0.009	-0.122	0.009	-0.049	0.063	-0.051	0.255
Lit	0.088	0.249	0.083	0.289	0.176	0.000	0.161	0.034
PrimEd %	0.168	0.003	0.169	0.002	0.098	0.002	0.041	0.442
SecEd %	0.317	0.000	0.321	0.000	0.416	0.000	0.490	0.000
TertEd%	0.12	0.087	0.118	0.085	0.306	0.000	0.218	0.002
EcFre	0.435	0.000	0.428	0.000	0.152	0.000	0.155	0.002
<b>AdjR<sup>2</sup></b>	<b>0.808</b>		<b>0.809</b>		<b>0.937</b>		<b>0.815</b>	
F	50.104		50.153		176.663		52.818	
df1	11		11		11		11	
df2	117		117		118		118	
sign (p)	0.000		0.000		0.000		0.000	

variables. Countries were classified into three groups: the group of high-income economies included countries with GNI per capita values above USD13000 (measured as PPP), a low-income group with GNI per capita under USD4000, and a medium-income group with GNI per capita between USD4000 and USD13000. The value USD4000 is about the upper limit for lower middle income countries according to the classification of the World Bank, and USD13000 USD is approximately the lower limit for high income countries [36]. For the low-income and medium-income group no significant relationships were identified.

### Results - All Countries

The results of the regression analyses are presented in Table 6. In all the four model versions linguistic diversity had significant positive impact on competitiveness (LogGCI), quality of life (HDI) and income (LogGNI), while neither ethnic fractionalisation, nor religious fractionalisation showed any significant impacts. Using either of the two religious fractionalisation indices (RFA and RFIPew) resulted in very similar model parameters for rLog GCI as output, which is somewhat surprising, as RFA describes a religious situation 10 years before the other diversity index, and 15 years before the output variables. As Figure 1 shows, the religious situation, and therefore the religious indices do differ, but being insignificant, their difference does not show in model results.

Among the control variables the size of population, the level of economic freedom, and the three school enrollment rates had positive significant impact on competitiveness, while year of independence had significant negative impact, and area had no effect at all. Taking HDI as dependent variable, population had no impact, year of independence had negative significant impact, and all the other control variables had positive significant impacts on it. Finally, population, independence year and primary school enrollment rate did not have any impact on LogGNI, while the rest of the control variables had positive significant impact.

The strength of the regression models was quite high, adjusted R<sup>2</sup> values were above 0.80 for each model version.

#### Results -high-income countries

For high-income countries results are different (Table 7). Similar to the all-countries models, linguistic fractionalisation showed positive significant impacts on all the dependent variables, while for high-income countries ethnic diversity produced negative significant impacts on competitiveness and income, of about half the magnitude of the language fractionalisation effect. Religious fractionalisation had no impact, and Model 1 and Model 2 resulted in nearly the same parameter values though they use different religious fractionalisation indices.

The impacts of control variables on competitiveness are different from the all-countries-models. Only the role of population (significant positive) and of independence year (significant negative) are similar. None of the school enrollment rates played any significant role in influencing competitiveness.

Looking at HDI as dependent variable, among the control variables only secondary school enrollment, tertiary school enrollment, and index of economic freedom did have significant and positive impacts, which is again different from the all-countries model results.

For GNI as dependent variable, among the control variables only secondary school enrollment and index of economic freedom did have significant and positive impacts, the rest of the control variables did not matter.

Adjusted R<sup>2</sup> values were somewhat lower than for the all-countries models, but still high, above 0.70 except for the model for LogGNI, for which the adjusted R<sup>2</sup> value was 0.514.

### Discussion

The present paper had a double objective. First, to assess the effects of ethnic, linguistic and religious diversity on the competitiveness,

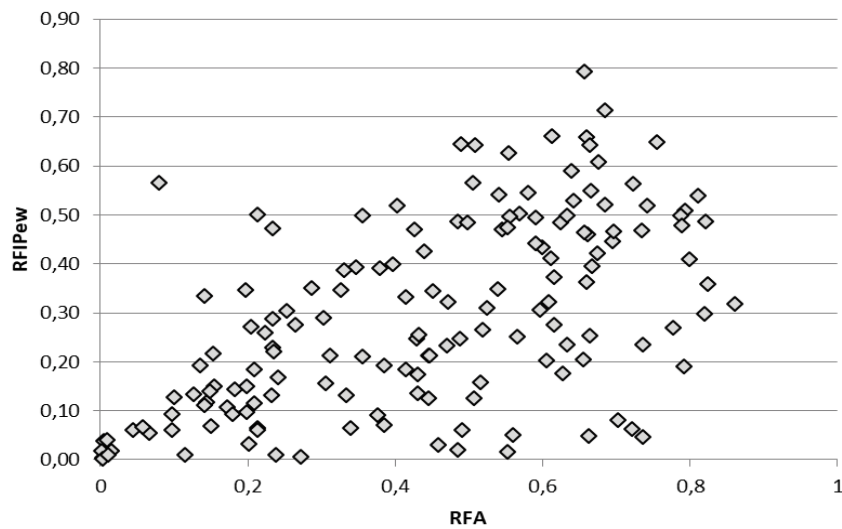


Figure 1: The relationship of the RFA and RFIPew religious fractionalisation indices.

Table 7: Regression statistics, high-income countries, model fit with VIF<5. Note: Beta is the standardised coefficient of the variable, sign(p) indicates the p-value of significance for Beta.

Model	1		2		3		4	
Dependent	LogGCI		LogGCI		HDI		LogGNI	
Independent	Beta	sign (p)	Beta	sign (p)	Beta	sign (p)	Beta	sign (p)
RFA								
RFIPew	-0.068	0.432	-0.128	0.127	-0.126	0.691	0.121	0.293
EFIA	-0.239	0.033	-0.213	0.055	-0.126	0.185	-0.266	0.070
LDI	0.447	0.000	0.423	0.000	0.197	0.031	0.480	0.001
<b>Controls</b>								
Pop%	0.227	0.003	0.249	0.001	0.002	0.977	0.072	0.465
Area %	-0.016	0.840	-0.015	0.843	0.044	0.515	0.102	0.329
Ind Year	-0.166	0.036	-0.164	0.034	-0.092	0.173	-0.042	0.678
Lit	0.076	0.427	0.092	0.329	0.120	0.148	0.075	0.549
PrimEd %	0.105	0.225	0.077	0.363	0.103	0.171	0.047	0.681
SecEd %	0.111	0.213	0.117	0.178	0.298	0.000	0.314	0.009
TertEd%	0.062	0.571	0.033	0.753	0.403	0.000	0.118	0.412
EcFre	0.657	0.000	0.69	0.000	0.287	0.000	0.26	0.032
<b>AdjR<sup>2</sup></b>	<b>0.72</b>		<b>0.73</b>		<b>0.792</b>		<b>0.514</b>	
F	15.029		15.727		21.771		6.77	
df1	11		11		11		11	
df2	49		49		49		49	
sign (p)	0.000		0.000		0.000		0.000	

income and quality of life of countries. The second objective was to compare the effects of diversity indicators on all countries to that of high-income countries. The analysis applied the same set of control variables.

Four model versions were set up, for 3 different dependent variables. The models were applied for 129 countries of a database of 155 countries - limitations were due to missing data of some of the control variables. A subset of high-income countries - having higher GNP per capita in 2014 than USD13000 - was analysed separately, too. All the models showed a medium to strong value of adjusted R<sup>2</sup> indicating a strong relationship. The diversity indices used in the present analysis were based on data about the language diversity of the world in 2014, religious diversity in 2010 and in 2001, and ethnic diversity based on data from 1985-2000. This list shows, that while

language and religious diversity data were relatively new, ethnic diversity was measured by data of 20-30 years before.

The results of the present research show the following facts.

### Effects of language diversity

Linguistic diversity showed a significant positive effect on competitiveness, income and quality of life, regardless of the model setup and control variables. This is fully in line with DiRienzo et al. [23], who also found a significant positive impact of language fractionalisation on competitiveness for 2005. Our results show, that these relationships still hold 10 years later.

The positive impact of language diversity is in contrast with several other analyses establishing negative effects of language

diversity on growth of GDP, government transfers, public spending and its various components [27,30]. Bacsi et al. [25] also found negative impacts of linguistic diversity on the Travel and Tourism Competitiveness Index in 2014.

The negative effects could be explained by the higher costs of communication and transactions, the needs for some kind of standardisation, i.e. establishment of a common language and the related institutional system. However, varied language skills may provide access to neighbouring or farther foreign countries, and provide a richness in culture. It also motivates a large proportion of the population to learn at least one second language, which increases flexibility of the society and more openness towards strange experiences. These positive impacts are more influential on creativity, innovation, and the generation of new ideas measured by GCI, than on traditional production processes measured by GNI, and are least visible in the quality of life measured by HDI.

It is worth noting, that high-income countries benefited more from linguistic diversity regarding competitiveness, income and quality of life alike, as is shown by the magnitude of Beta parameter values for LogGCI, LogGNI and HDI.

### Effects of religious diversity

The present paper found no significant impact of religious diversity on competitiveness, income or HDI value.

The effects of religious fractionalisation on many other economic indicators were found to be different by other researchers. Although no impact of religious fractionalisation was found on the Travel and Tourism Competitiveness Index [25] or on growth of GDP per capita [28], positive effects were established on HDI and GNI per capita [17], negative impacts on HDI for all countries and positive impacts on HDI for high-income countries [20]. These results are rather contradictory, and also differ in the year of the data used for computing religious fractionalisation indices. Desmet et al. [27] pointed out, when analysing the effect of the proportion of population of Muslim origin on GDP growth, that the impact of religious diversity is often rather an issue of population dynamics, than of religious differences. People of different religious background may follow different family patterns, which leads to different population structures influencing labour and other productive resources.

The present analysis also assessed the change of diversity effects by time, by using religious diversity data of 2005 and 2010. The magnitude of the effects of these two variables did not show any considerable difference. It is also worth emphasising that the cross country analysis did not reveal any negative effects attached to religious diversity, regardless of what indicators were used for measuring it.

### Effects of ethnic diversity

The present paper found no significant impacts of ethnic diversity on any of the output variables for all the analysed countries, but established negative impacts for high-income countries. In contrast to these results, DiRienzo et al. [23] found significant negative effects of ethnic fractionalisation on competitiveness in 2005. Thus, as the present research shows, the negative impacts seem to have disappeared during the last decade except for high-income countries.

Looking at earlier results about the effects of ethnic diversity on economic performance, no impacts were found on GNI per capita or HDI by Bacsi et al. [17], negative impacts on growth of GDP per capita were established by Alesina et al. [5], Desmet et al. [27,30]. Negative

effects were established on the Travel and Tourism Competitiveness Index [24,25] and on public spending and government transfers [12,27,30].

The results on the high-income countries are surprising, as relying on Easterly et al. [7] one would expect, that ethnic diversity is more of a problem in low-income countries. However, our results show significant negative impacts in high-income countries, except for HDI as output variable. Patsiurko et al. [10,11] also found negative effects of ethnic diversity on the growth of GDP in the group of highly developed countries.

Developed countries can handle language diversity and the associated pool of varied human resources, but they seem not to tolerate ethnic differences well. This raises the issue of how ethnic diversity is revealed: it may be revealed by language, which is a resource, as long as the majority language is spoken by all. However, ethnic identity emphasised separate from language may work as a discriminating factor.

These disturbing results deserve more concern, as data availability is a problem in assessing ethnic diversity. Most of the ethnic, or ethnolinguistic data series heavily rely on linguistic differences, some studies directly use linguistic data for estimating them. The currently used datasets that consider not only language differences but racial traits and cultural traditions - i.e. inherited and learned features - go back to the 1985-2000 period. Little is known about the true changes of ethnic patterns ever since.

### The impact of control variables

All our model versions used the same set of eight control variables. Their effects differed according to the dependent variables LogGCI, HDI and LogGNI. The effects of control variables also showed different patterns in high-income countries from the all-countries analysis. Population had an important positive effect for LogGCI, for all the countries, and for the high-income countries, separately. This means that more populous countries tend to be more competitive. However, this was not an advantage in the quality of life and in the income level of countries. Area, the other measure of country size, was not an advantage for competitiveness, but a benefit for quality of life and income. Strangely, this positive impact disappeared in high-income countries. The larger area may provide better natural resources, but this is obviously not an important factor in affluent countries. The negative effects of the date of independence indicate that the longer history of independence is an advantage in competitiveness, but less important for quality of life and not important at all for income. This latter effect may be explained by the fact, that colonialisation might have created global trade relationships, which may be lost with independence, hindering the growth of per capita GNI.

Either literacy rate or primary school enrollment had a positive effect in the all-countries models, indicating the importance of basic education, but their relevance disappeared in high-income countries. Obviously, in these countries basic education is so general that its minor differences cannot have any effect on development. Secondary and tertiary school enrollment rates are also of positive impact in the all-countries models, but they do not have any impact on competitiveness in high-income countries. The higher levels of schooling enhance the quality of life and the income level, but they do not create a competitive advantage in affluent countries.

The impact of economic freedom was positive in every model version, greater economic freedom increases competitiveness, quality

of life and income alike, but being a composite indicator, in many aspects are related to these development indicators this relationship is not surprising at all.

## Conclusions and Further Research Questions

Our analyses showed, that diversity can have significant impacts on the level of development. The most general conclusion is the positive effect of language diversity, which is valid for all aspects of development and for rich and poor countries alike. Religious diversity did not present any effects, but in spite of this, its impacts may be manifested through other variables - as population size, education level, or language and ethnic affiliation. The effects of ethnic diversity are rather controversial, neither negative or positive overall effects were detected, but in rich countries negative effects were identified on competitiveness and income levels. Therefore in rich countries ethnic conflicts may create animosity which makes exchange of ideas and cooperation more difficult. In less affluent countries this impact is not noticeable - probably because more severe problems make it less visible. Another point is, that our results are based on ethnic diversity measured more than 20 years ago - so what we can only say, that ethnic diversity of the society creates negative impacts on the economic performance two decades later, i.e. for the next generation. This fact points to the need for further research about the ethnic cleavages of societies. More precise results could not be expected without establishing newer datasets for ethnic structures, that are based not only on language but on true ethnic affiliation, taking into account the similarities and differences between ethnic groups.

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