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**The Impact of Ethnic Diversity on Institutions
and Economic Development in Former
Yugoslavia**

Bachelor thesis

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Abstract

The aim of the thesis was to conduct a research on impact of ethnic diversity on the economic growth of the countries of ex-Yugoslavia. The main hypothesis was that ethnic diversity affects economic growth. The research was done by using two different methods: a) calculating ethnic fractionalization index and GDP per capita; b) analyzing institutions as channels through which ethnic diversity effects economic growth.

The results obtained within the first model demonstrated that diversity negatively influences economic growth. Still, no reliable conclusions could be made, due to low variability in data, short time frame considered and lack of regular data collection. Therefore, the second method reviewed institutions as a channel through which ethnic diversity affects economic growth. The conclusion of this model was that, ethnic diversity mainly has negative impact on the indicators reviewed, which then results in slower economic growth.

The results of the research showed that ethnic heterogeneity is an important element in economic, political, institutional and social life of a country. It can be concluded that ethnic diversity is an important factor that should be taken into consideration when doing economic planning in a country as it has direct and, very often, strong impact on economic growth.

Abstrakt

Cílem této práce bylo vést výzkum o vlivu etnické diverzity na ekonomický růst zemí bývalé Jugoslávie. Hlavním předpokladem bylo, že etnická diverzita ovlivňuje ekonomický růst. Při výzkumu byly použity dvě rozdílné metody: a) výpočet indexu etnické frakcionalizace a HDP na obyvatele; b) analýza institucí jako spojky, přes které etnická diverzita ovlivňuje ekonomický růst.

Výsledek získaný prvním modelem ukázal, že etnická diverzita negativně ovlivňuje ekonomický růst. Jenže žádné věrohodné závěry nemohly být stanoveny kvůli nízké variabilitě souborů dat. Z toho důvodu druhá metoda zhodnotila instituce jako spojky, přes které etnická diverzita ovlivňuje ekonomický růst.

Výsledky výzkumu ukázaly, že etnická heterogenita je důležitým prvkem v ekonomickém, politickém, institucionálním a společenském životě státu. Může být usouzeno, že etnická diverzita je důležitým faktorem, který by měl být brán v potaz při vytváření ekonomického plánu státu, protože má přímý a velice často silný vliv na ekonomický růst.

Keywords

ethnic diversity, economic growth, fractionalization index, ex-Yugoslavia countries, institutions, econometric model

Klíčová slova

etnická diverzita, ekonomický růst, index frakcionalizace, země bývalé Jugoslávie, instituce, ekonomický model

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Declaration of Authorship

1. The author hereby declares that he compiled this thesis independently, using only the listed resources and literature.
2. The author hereby declares that all the sources and literature used have been properly cited.
3. The author hereby declares that the thesis has not been used to obtain a different or the same degree.

Prague 31.07.2019.

Miran Kaltak

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Description

The main research question of the thesis is the impact of ethnic diversity on institutions and economic development in former Yugoslavia. The purpose of this research is to investigate an ethnically diverse region as a whole, then focus on each subject country. By doing so, by the end of the thesis, it would be possible to conclude whether ethnic diversity has a positive, negative or any impact, at all, on economic development and growth in these countries under current circumstances.

This thesis will be built on the existing theories and literature of the relationship between ethnic diversity, institutions and economic development. The obtained results shall be embedded into a conclusion which could contribute to understanding the relationship between economic development and ethnic diversity. The results of this research could serve as a basis for further analysis of some specific development aspects of the region with particular focus on economic sector, which would further facilitate development of the region.

Hypothesis:

Main hypothesis: Ethnic diversity affects economic growth.

Other hypothesis: Ethnic diversity has impact on institutions.

Ethnic heterogeneity of a country has impact on political and social life.

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1. Introduction

The thesis aims to conduct a research on impact of ethnic diversity on economic growth in the region of ex-Yugoslavia. The main hypothesis is that ethnic diversity affects economic growth. Many researches have been conducted on this topic across the globe. However, the region of ex-Yugoslavia countries remained unexplored. Ex-Yugoslavia region is composed of the following countries: Bosnia and Herzegovina, Croatia, Montenegro, North Macedonia, Serbia and Slovenia. In the 1990s, Yugoslavia collapsed after the disastrous war caused mainly by the ethnical heterogeneity of ex-Yugoslavia. Newly established countries, that were economically and infrastructurally destroyed, started their journey of independence, by establishing the new political system, rebuilding infrastructure and pursuing economic development in the new modern world. Diversity of the region that was one of the main causes of the war, continued having actual impact on economic growth of the countries.

When calculating the level of economic growth of a country, the most common way is to use GDP per capita, McDowell (2012). Furthermore, in the past studies, economic variables are the only ones considered to be worth accounting as an influencing part of GDP per capita, Harrod (1939), Solow (1956). Nevertheless, Alesina et al. (2003) suggested that it is not necessarily accurate to consider economic variables as the only ones influencing economic growth of a country.

This is why the thesis has aim of focusing on non-economic variable that indirectly has an impact on a country's economic growth. More precisely, this research will focus on impact of ethnic diversity on economic growth, as one of the important social factors. Whether ethnic diversity really has an impact on GDP per capita became a spotlight question of recent debates, Bove and Elia (2016). The specific aim of this research is to find out the relationship between economic diversity and economic growth in countries of former Yugoslavia in terms of GDP per capita. The sample reviewed includes six countries of the region in the period between 1995 and 2017. The thesis assesses a short period of time, due to the fact that the countries have been recently established. For that reason, only two fractionalization indices have been obtained which are indicative, but scientifically not sufficient to obtain reliable results. Therefore, after conducting econometric models, the thesis will proceed by analyzing the case study of the countries of former Yugoslavia, focusing on channels through which ethnic diversity affects economic growth.

The result can be of assistance to economists, politicians and policy-makers in decision-making process. Even though well over two decades have passed from ex-Yugoslavia disastrous war, the countries established after the war still suffer from its consequences in many aspects of political, social and economic life. Identifying the essence of the problem and its correlation with the prosperity of the countries may be used as a lesson learnt in future planning processes, whereby negative effects of the heterogeneity of the society can be taken care of and diminished in advance.

2. Theoretical background

2.1 Literature review

This section will provide an overview of previously researched topics related to impact of ethnic diversity on economic growth. The findings to be presented show cases of both positive and negative impacts of ethnic diversity on economic growth. The research papers mostly do not focus on ex-Yugoslavia region due to the lack of relevant sources; therefore, other available world examples will be reviewed. Nevertheless, the idea, methods and findings may be useful while constructing econometric model and conducting analysis for the case of ex-Yugoslavia countries.

With the increased globalization, the world has become more diverse. It is argued that diversity is increasing potential for production and innovation as information are shared amongst people with different backgrounds that bring along a variety of knowledge, skills and experience. Diversity can be broken down into different categories of diversity such as religious, language, racial or ethnic diversity. All of these categories can be reviewed and assessed separately, or all together as one unit. This depends on the topic of interest and the type of diversity that is relevant for that topic, and as such is considered in a particular case study.

In this thesis the focus will be on ethnic diversity because in the region as ex-Yugoslavia is, ethnicity plays an important role in all aspects of life of the countries that ex-Yugoslavia consisted of. The issue of ethnic diversity and whether and how does it affect economic growth

is coming into focus of a number of discussions and researches nowadays. Many argue that ethnic diversity has negative impact on economic growth. The first research published on this topic was the one conducted by Easterly and Levine (1997). In their work they elaborated how ethnic diversity influences economic growth in African countries. Their findings indicate that ethnic diversity is negatively correlated with economic growth. This is, as they argue, due to close connection between high level of ethnic diversity and low quality of education, poorly organized financial systems, bad infrastructure, distorted foreign exchange markets. Ethnic diversity negatively influences these segments because, in ethnically diverse societies, it is difficult to reach consensus about priorities and directions of a country and therefore, while searching for compromises, very often bad solutions are found and implemented. This leads to bad quality or malfunctioning of the above-mentioned components of social and economic life, which affects level of overall economic growth. Africa was popular ground for research of this topic for many years, due to the high level of its ethnic diversity. However, some researchers, such as Patsiurko et al. (2012), thought that the findings on low level of economic development in Africa is not only related to the ethnic diversity, but also to the fact that this is the continent with the largest concentration of poor countries. Therefore, they decided, unlike many previous researches that focused on Africa, to conduct a research that included only Organization for Economic Cooperation and Development (OECD) countries. However, the results they got were similar to those obtained in previous researches in African region: the hypothesis that there is a negative relationship between ethnic diversity and economic growth has proven to be relevant for OECD countries as well.

But not all researches came to that conclusion. The research of Ager and Brückner (2013) displayed different results. They focused on a period in American history that witnessed a large influx of immigrants to the United States (1870-1920). It is interesting is that the results obtained on the US country level show a positive correlation between cultural diversity and GDP per capita in that period. Moreover, the positive correlation between the two was also found by other researchers. Ashraf and Galor (2011) were investigating the correlation between the two during the industrialization period in the US and came to the similar conclusions. More recent paper by Bove and Elia (2016) finds out that, in the long run, ethnic diversity is positively correlated with economic growth. As argued by them, it is thanks to technological innovation and the theory that the more diverse a community is, the more diverse production of goods and services will be. In case of immigrations it is concluded that immigrants bring along new range of fresh ideas, perspectives and skills which drives ahead technological

innovation and stimulates economic growth. They used migration stocks data for the period between 1960 and 2010 to compute index of fractionalization and polarization. Through positive effect of both indices on real GDP per capita, authors concluded that diversity has more consistent effect in the countries that people immigrated to.

Further studies confirmed the positive correlation on micro-level as well. Lazear (1999) and Hong and Page (2001) show that groups that are diverse ethnically and culturally have potential to outplay non-diverse groups of individuals. They found out that the reason behind this outcome lies in ability of diverse groups to share their wide spectrum of knowledge and combine it to come to the best possible outcome, thus increasing economic growth. Another recent study was conducted by Alesina et al. (2016) where it was found that on micro-level, more ethnically diverse teams are more preferred than ethnically homogeneous ones when considering efficiency and output.

What followed the past papers were empirical studies of the topic. The most important question here was which measure would be the right one to use in empirical studies for ethnic diversity? Garcia- Montalvo and Reynal- Querol (2002) dedicated their paper to this issue and they reduced the choice to the best fitted two measures. The first one is ethnic fractionalization. This measure calculates the probability of two individuals chosen from a population to belong to two different ethnic groups. The range of values is between zero and one - zero and one being theoretical maximum and minimum. Index that equals to one characterizes a population which is perfectly heterogeneous. In other words, every person randomly chosen belongs to a different ethnic group.

Another way introduced in their paper to measure ethnic heterogeneity is polarization. This measure achieves maximum when two same sized groups are confronted.

Even though both measures may be used in the research, the results might differ when using one or another.

After expanding the hypothesis to other regions in the world, researches began to question what may stand in between ethnic diversity and economic growth? More clearly, what are the channels through which ethnic diversity influences economic growth? Many new papers were published based on this question. Canning and Fay (1990), Mauro (1995) and La Porta et al. (1999) argued how ethnic diversity influences institutional as well as governmental activity.

Alesina and Easterly (1999), Alesina and La Ferrara (2000), Goldin and Katz (1998), Costa and Kahn (2002) continued building up on previous researches on ethnic diversity influencing institutions and government activity and then economic growth. They conducted researches in the US and presented the results that show negative relationship between ethnically diverse areas and public goods provision, social trust as well as economic growth. They show how ethnically diverse areas in the US have higher spending and deficit/debt per capita which is mostly financed by higher federal transfers and not by local taxes. Yet, spending on public issues such as education and roads in these areas is low. Therefore, this affirms theory that, in ethnically diverse areas, public goods are less valued and there is a lack of fiscal discipline, which slows down economic growth.

In his work Bjørnskov (2007) considered social trust, and at which level it can be affected by ethnic diversity. He, moreover, considered channels through which social trust may affect economic growth. The two channels he found to be influencing growth were schooling and governance.

In this paper it is mentioned how post-communist countries exposed to radical institutional change and already low level of trust have failed to provide security and stability for their society. Empirical results showed that schooling and investment rate are positively correlated, which then improve labor productivity, altogether leading to a higher growth rate. As for the other channel, governance, Bjørnskov (2007) concluded that it directly affects growth rate, probably because of the effect on transaction costs. This effects total factor productivity and increases overall growth. As social trust influences both schooling and governance, it is evident how it also affects economic growth.

Easterly (2001) found an interesting relationship between institutions, growth and ethnic diversity. He argued that countries with poor institutions and high level of ethnic diversity tend to suffer more adverse effect on economic policy and growth. On the contrary, in countries that have good institutional framework, level of ethnic diversity does not influence economic growth. Therefore, Easterly (2001) concludes that good institutions in ethnically diverse countries are key to peace and prosperity of that particular country.

Easterly (2001), in his conclusion, points out that the institutions might be proxy variable for safety and prosperity of ethnic minorities. He says that more case studies should be prepared by economists in order to be able to decide on real impacts and bring solution to ethnic conflicts and bad economic performance that comes with it.

Contrariwise, Barro & Sala-i-Martin (2004) conclude how impact of ethnic diversity on economic growth is rather insignificant and is not worth considering.

2.2 Channels connecting ethnic diversity and economic growth

Ethnic diversity can indirectly influence economic growth, using different types of channels as elaborated by Easterly & Levine (1997), Alesina et al. (2003), Montalvo & Reynal-Querol (2005) Dincer (2011) and Alesina et al. (2016). Finding that ethnic diversity can influence economic growth by affecting social-economic factors, that have a direct impact on economic growth, connects all of these researches. Some of the social-economic factors, mentioned in their findings are: social trust, infrastructure, allocation of labor, investment, political and general internal stability, institutional quality and policy decision-making process.

To understand the concept of indirect effect of ethnic diversity on economic growth through channels related to socio-economic factors, the example of ex-Yugoslavia before breakout of the war, has been considered.

When there is more than one ethnic group living in a country, all, by law, having equal rights and when one group takes over majority of high level positions and majority of decision-making power, it may (and in case of ex-Yugoslavia it did) lead to social and political instability, jeopardize economic growth and, in the worst case scenario, end up in the war breakout (what happened in ex-Yugoslavia). It is important to underline that, in order for that to happen, the level of diversity does not need to be extremely high and that the ethnic groups have to be sufficiently large in numbers in order to be able to create pre-conditions for conflict. This theory has been empirically supported by Collier (2001) and Garcia-Montalvo and Reynal-Querol (2005b). In case of ex-Yugoslavia, the ethnic composition of the population fulfilled requirements for a conflict. In that country it became obvious that conflict among

ethnic groups had a negative impact on economic growth. Economy of the countries established after collapse of ex-Yugoslavia still suffer from the war wounds the consequences of which are felt even nowadays in many aspects of lives of the population living in the area.

There are also other consequences the societies ending up in conflict caused by ethnic diversity are faced with. As pointed out by Garcia-Montalvo and Reynal-Querol (2005b) flow of ideas is disturbed in societies where ethnic groups are in conflict. This kind of atmosphere creates business functioning almost impossible, which decreases economic development, as concluded by the same authors. Here, conflict negatively influenced political stability and business functioning, which are channels that caused ethnic diversity to influence economic growth. Barro (1991) and Abadie & Gardeazabal (2003) also noted that conflict negatively effects economic growth.

Investment, is another important channel through which ethnic diversity may influence economic growth. Ethnically diverse countries have more probability for rent seeking activities by different ethnic groups. This leads to difficulties on designing and implementing policies on public goods such as government policies, education and infrastructure (Easterly and Levine (1997). Investment may also be inhibited through decreased investment in productive sectors due to ethnic division of society. The mechanism for this is that individuals with capital may invest in gaining political power thus hindering investment in productive sector (Garcia-Montalvo and Reynal-Querol (2005). Ethnically diverse environments may likely have uncertain political environments, which may lead to high investment sensitivity, as concluded by Anette (2001). Anette (2001) also focused on government consumption, as a channel between ethnic diversity and economic growth. Using neoclassical growth model, it has been concluded that ethnic diversity causes higher political instability and imposes additional cost on government. This environment puts government in instable situation, forcing it to increase expenditures to be able to stay in power and appeal popularity for following elections.

2.3 Ethnic fractionalization within economic growth framework

The model that takes into account all variables explaining growth is the neoclassical growth model. As stated by Romer (1996) this model is used as a ground point for most of the growth analysis. Neoclassical growth model represents a simplified version of real-world examples, yet it is composed of every crucial variable for observation. The model advantage is the ability to consider all variables that are able to correctly explain economic growth. In this model, the variables have previously predicted coefficient signs and the expected magnitude of impact on economic growth. Moreover, these variables serve as robust control variables. In this research Solow model will be used as a groundwork for econometric analysis. Its simplicity allows to easily notice when something goes wrong with the model.

Hence, Cobb-Douglas production function as given by Jones (2016) is the following:

$$Y_t = A_t K_t^\alpha L^{1-\alpha}$$

Furthermore, let Y_t denote output, A_t economy's stock of technology or knowledge. Let K_t denote capital and L_t stand for human capital, where α is between 0 and 1.

To provide clear explanation of how ethnic fractionalization influences aggregate output of economy with provided resources, A_t should be considered first. It will be composed of foreign direct investment and ethnic fractionalization index. Foreign direct investment (FDI) represents a kind of innovation and inflow of knowledge and improvements into a country.

Furthermore, FDI can improve overall output influencing A_t by bringing foreign technological achievements to the country of investment.

Ethnic diversity is linked with the low provision of public goods (Alesina, Baqir and Easterly 1999) which in turn causes low level of quality education. The low level of quality education in turn affects development and implementation of technological achievements, resulting in lower level of aggregate output. Therefore, ethnic fractionalization index will be contained under A_t . For K_t , gross capital formation variable is used as explaining capital in an economy. L_t in Cobb-Douglas production function assumes labor. In this particular thesis, a total number of people in labor force will be used as a determinant of L_t .

By modifying Jones (2016) production function, dividing it by L_t (denoting aggregate population) and then taking logs the following is obtained:

$$y_t = \beta k_t + h_t + z_t$$

All of the variables are in the form of natural log, y_t denoting GDP per capita, k_t physical capital per capita, h_t human capital per capita (average number of years of education), while z_t represents growth in labor-augmenting TPF.

The general model is modified according to this specific case. By modifications to the original model, and renaming variables, the following OLS estimator is obtained:

$$\text{GDP_per_capita}_{it} = \alpha_1 k_{it} + \alpha_2 \text{Labor}_{it} + \alpha_3 \text{FDI}_{it} + \alpha_4 \text{Formation}_{it} + \alpha_5 \text{Urban population}_{it} + \alpha_6 \text{FRAC}_i + \varepsilon_{it}$$

The following has been obtained: decomposed model by total labor force, foreign direct investment, gross capital formation, urban population and ethnic fractionalization. The term ε stands for any unobserved variable that may not be included in the analysis and yet influence GDP per capita. α_i coefficients are points of interest and can reveal how each of the variables is connected to GDP per capita. The coefficient may be either positive or negative, indicating positive or negative impact on GDP per capita. Furthermore, as the coefficient increases in absolute value, its impact on GDP per capita increases. Of course, these are not the only indicators of the final results. When drawing conclusions, one has to pay attention to errors, which tell if the model is well described by the variables considered.

3. Background

3.1 Definitions

To be able to go deeper into the topic of impact of ethnic diversity on economic growth, it is important to define what ethnic diversity is. People can be grouped and/or categorized based on their gender, race, place of birth or nationality, or on the combination of some or all of those. Since there exist no unique rule under which ethnicity can be clearly defined, error and limitation in the hypothesis may easily arise. One of the ways to define ethnicity is to group people based on their birthplaces, or to group them according to similarity of their characteristics. Sometimes surveys are a way of gathering information on ethnic background. Neither way is incorrect, however it is necessary to stick to one when conducting a research like this one. In this thesis, nationality orientation will be chosen as a variable for ethnic diversity. The data on ethnic diversity will be included in the model through fractionalization index. The reason why this particular index will be used to measure ethnic diversity is because trusted previous researches including Alesina et al. (2003) and Montalvo and Reynal-Querol (2005), suggested that it is suitable to use fractionalization index when calculating ethnic diversity. The following sections will be dedicated to explanation of fractionalization indices since its definition and measure are then combined in econometric analysis, influencing the final results of the thesis.

3.2 Measuring Diversity

Following is the formula used to calculate fractionalization index:

$$FRAC = 1 - \sum_{i=1}^N \pi_i^2$$

Let i represent ethnic groups ($i= 1,2,3,4,\dots,N$) within total population be π , and let N be the number of ethnic groups. And let π_i be share of an ethnic group i within a country.

Table 1:

| Country | Structure of population | FRAC |
|---------|-----------------------------------|------|
| A | Perfectly homogenous | 0 |
| B | 2 groups (0.5, 0.5) | 0.50 |
| C | 3 groups (0.55, 0.30, 0.15) | 0.59 |
| D | 4 groups (0.25, 0.25, 0.25, 0.25) | 0.75 |

Table 1 is a theoretical example of fractionalization index values. To interpret the information from the *Table 1*, it is necessary to focus on country B. Structure of population reveals a number of different ethnic groups in a country. Country B is said to be composed of two equally distributed ethnic groups. This implies that 50% of population belongs to ethnic group 1 and 50% to ethnic group 2. The last column in the table finally reveals fractionalization index (FRAC) of a country. This index is calculated using previously introduced ethnic fractionalization formula. The value of fractionalization index for country B is 0.5. This means that, if a person is randomly chosen from this country, there is 50% probability that the person will belong to ethnic group one and 50% probability that the person will belong to ethnic group

two. For country D, there are four equally sized ethnic groups and fractionalization index is 0.75. This implicates probability of 75% that two individuals randomly chosen will belong to two different ethnic groups. This probability can be used to interpret fractionalization index values calculated in this thesis.

3.3 Development of ethnic fractionalization indices

This section will be dedicated to development of indices used to measure ethnic diversity. The ethno-linguistic fractionalization index was one of the first to be used in researches to calculate ethnic diversity. It was widely used in the past to measure level of national heterogeneity, Fearon (2003), Montalvo and Reynal- Querol (2005). Easterly and Levine (1997) used this index in their assessment of African region. The source of data, as they outlined, was Atlas Narodov Mira from 1964 provided by Soviet cartographers. This index was used by generations of economists; however, its accuracy became a topic of discussion due to its reliance on linguistic origin. Because of this, as argued by Alesina et al. (2003), ethnolinguistic fractionalization index may lead to biased results in many cases. For example, the US is home to many people belonging to different racial, cultural and nationality origin. However majority of them consider English to be their mother tongue language. If index, such as ethnolinguistic one is used, it can result in misleading outcomes due to its reliance on irrelevant variable of interest. Even though, people from different Yugoslavia countries understand each other, in terms of language, there are several different official languages. Therefore this measure might be useful in further analysis.

However, as its name says, ethnolinguistic index groups together linguistic and ethnic differences, which may produce misleading results. For that reason, in this research new approach, invented by Alesina et al. (2003) will be followed. Following is a presentation of fractionalization index which is based on ethnolinguistic index, only modified in its definition. Old ethnolinguistic index is measured by subtracting Herfindahl index of ethnolinguistic group from one. The result is probability of two individuals from a population to belong to two different ethnic groups. The values of index are ranging between zero and one. If the FRAC value equals to zero it implies purely homogeneous population, whereas if it equals to one, the population is considered to be heterogeneous. The new ethnic fractionalization index which is called ethnolinguistic index, in contrast to the old one, allows separation of linguistic and ethnic

characteristics. It is, therefore, more accurate to use it when calculating ethnic diversity in a country in which one language is spoken by people with different ethnic backgrounds. In addition, there is one more set of indices that need to be discussed. Back in 2003, Alesina et al. published a paper in which they reviewed ethnolinguistic fractionalization index and concluded that it can be misleading while researching many regions in the world. They formulated three new independent indices based on ethnicity, language and religion. In this way, the possibility was created to analyze and research impact of each of the indices on ethnic diversity and consequently, on economic growth. In their paper, they proved better efficiency of new indices on real-world examples. Establishment of new indices allowed more thorough and precise researches to be conducted. Ethno-linguistic fractionalization, mainly language based, included only 112 countries. It was successfully replaced by the new index, which included between 190 and 215 countries. By separating language, ethnicity and religion, a more realistic picture of diversity can be demonstrated.

3.4 Limitations to indices

One of the possible limitations and source of biased results at the end could be that there is no single source from where all the data could be collected. Instead, different sources had to be used when collecting data. These are, namely, statistical agencies on a country level that provide information on population classification based on a population census. The population censuses are usually conducted in a ten years cycle. The problem which arises is that population censuses are not conducted simultaneously in all of the countries in the region. For example, in Croatia the last two population censuses were conducted in 2001 and in 2011. On the other hand, in Serbia the last population censuses were held in 2002 and in 2011. Furthermore, in Bosnia and Herzegovina the last census in the country was conducted in 2013, while the one before that was done in 1991. Because of this, it is possible to use population census data from 1991 to calculate fractionalization indices for Bosnia and Herzegovina until 2013, when the index can be updated with data from the new population census. This can, in turn, influence robustness of the index. Also, due to the fact that the countries have been relatively recently established, and the data is available for only a bit over two decades, only two to three population censuses may be observed which decreases the chances of index to change over such a short period of time. In general, it takes more time for demographical picture of a population in one country or a region to change.

3.5 Updating the Index by Alesina et al. (2003)

As stated in the previous section, ethnic fractionalization index by Alesina et al. (2003) represents one of the paths to follow in this research. One limitation to their index values is that it has information on ethnic groups in the period between 1979 and 2001. Therefore, by observing their index, one could mostly observe period before collapse/war of Yugoslavia and could barely tell anything about post-war period. Because of that and because from 2001 until this research almost two decades have passed, it is necessary to revise their index and to update it. In the process of updating the index, the same intuition and definition of ethnicity will be used as in Alesina et al. (2003) only with updated data. The sources used to update ethnic fractionalization index are statistical agencies in each of the countries of ex-Yugoslavia region. These values are then plugged in the formula of fractionalization index explained in one of the previous sections.

The results have been obtained based on the population censuses data published by statistical agencies on a country level and plugging them into fractionalization formula. By using ethnicity fractionalization, Bosnia and Herzegovina has 63.8% ethnic fractionalization index. This implies that there is 63.8% chance that two individuals randomly chosen from the population will belong to different groups if ethnically classified. This value increased slightly compared to pre- 2001 period level (63.0%). Therefore, Bosnia and Herzegovina has become slightly more ethnically diverse country. Montenegro is on almost the same level with 69.8% ethnic fractionalization index. Serbia is at 30.3% and North Macedonia at 52.2%. Croatia has fractionalization index of 18.5%. The least ethnically diverse country in the region is Slovenia. This country index was 22.2% in the pre-2001 period, then decreased to 16.7%. The values are also sorted up in *Table 3*.

4. Empirical framework

4.1 Data Collection

Source of data for economic factors has been collected mostly from The World Bank. Data on the ethnicity has been collected from the country level statistical agencies. These data have been then plugged into fractionalization formula earlier introduced to obtain indices. Data on variables that act as a channel connecting ethnic diversity and economic growth have been collected from World Governance Indicators, a project led by The World Bank.

4.2 Deeper look at Neoclassical model and variables

As announced in previous sections, neoclassical growth model will serve as a basis for this analysis. Therefore, it is important to thoroughly explain it in order to be able to interpret results in the following sections of this paper. The model consists of two kinds of variables: dependent and independent variables. Both of them will be presented in the following subsections. Following is the formula showing relationship between dependent and independent variables:

$$\text{GDP_per_capita}_{it} = \alpha_1 k_{it} + \alpha_2 \text{Labor}_{it} + \alpha_3 \text{FDI}_{it} + \alpha_4 \text{Formation}_{it} + \alpha_5 \text{Urban population}_{it} + \alpha_6 \text{FRAC}_i + \varepsilon_{it}$$

4.2.1 Dependent Variable

Dependent variable is usually variable of interest, the one that needs to be explained in a particular model. In this analysis it will be income. There is a question that needs to be answered: How to choose correct measure of income? Findings of the previous work by Easterly and Levine (1997) and Alesina et al. (2003) indicate that GDP per capita seem to be suitable measure of income. GDP per capita adjusted for inflation serves as predicted variable in this study.

4.2.2 Independent Variables

Independent variables are often referred to as explanatory variables since they are used to explain dependent variable. In theoretical model they consist of labor, capital and human capital. In this analysis, work by Montalvo and Reynal-Querol (2005), Gören (2014), Bove and Elia (2016) and Gatykaev and Voronetsky (2018) will be followed. Labor will be defined by total number of laborers, capital by gross formation of capital and human capital by average years of education. However, variable for human capital is time invariant, therefore it will be automatically disregarded by Fixed Effects Model (FEM).

Additional control variables have to be included as well. Control variables will be useful in econometric model because they decrease unobserved error effect. In other words, the model should consist of as many variables as possible, which can be economically significant in the model. In this particular model, control variables will be foreign direct investment (FDI), which will enable control of level of investment. Motivation for introduction of this control variable has once again been found in the previous relevant papers, Montalvo and Reynal-Querol (2005), Bove and Elia (2016). The following control variable is urban population. This variable has been taken as a proportion of people living in urban areas and people living in rural areas. This variable is then used to control development disparity on a country level. It has been proven by Bloom et al. (2008) that increase in urban population is associated with positive economic growth of a country. This is the reason why proportion of urban population has been chosen to be included in the thesis.

4.3 Descriptive statistics:

Table 2:

| Variable | Observation | Mean | St. Deviation | Min | Max | Skewness |
|------------------------|-------------|----------|---------------|----------|----------|----------|
| GDP per capita | 135 | 7490.0 | 6397.423 | 485.6 | 27500.0 | 1.442 |
| Gross capital form | 133 | 5.32e+09 | 4567094934 | 2.29e+08 | 2.22e+10 | 1.059 |
| Labor force total | 133 | 1516000 | 935969.275 | 244500 | 3394000 | 0.732 |
| Foreign direct inv | 133 | 9.44e+08 | 1093183128 | 1.00e+03 | 5.19e+09 | 2.007 |
| Avg years of schooling | 138 | 10.63 | 1.106 | 9.00 | 12.10 | -0.271 |
| Urban population | 138 | 0.540 | 0.056 | 0.408 | 0.665 | -0.130 |
| Ethnic FRAC Alesina | 138 | 0.479 | 0.142 | 0.222 | 0.630 | -0.680 |
| Ethnic FRAC New | 138 | 0.419 | 0.212 | 0.167 | 0.698 | 0.150 |

Table 2 summarizes first results after first data analysis. From this descriptive statistics Table, unbalanced panel data can be observed. This is due to randomly missing values for some of the countries, as well as due to the fact that majority of the countries are newly established, which is specifically relevant for Montenegro, where certain data are unavailable for period between 1995- 1999.

Another interesting thing is maximum of GDP per capita which is relevant for Slovenia. Therefore, a particularly careful approach should be applied when analyzing this table. It is reasonable to argue that countries grow over time. Observing panel data of the sample throughout the entire timeframe allows removal of the potential problems caused by extreme values.

Descriptive analysis helped to realize how GDP per capita, Gross Capital Formation as well as Foreign Direct Investment variables are skewed to the right. To avoid discrepancies in further analysis, logarithms are taken on these variables in order to bring their distribution closer to normal.

Since the fractionalization index is the most interesting in this piece of work, it is reviewed with special attention. It is easy to conclude that, after the war, the region as a whole became less diverse. Most likely, the decrease of diversity might have been caused by the war itself, which resulted in aspiration of people to concentrate amongst the same ethnic groups. However, since countries are analyzed individually later on in the thesis, it useful to consider change in fractionalization indices for each individual country. *Table 3* provides list of countries and the two indices of ethnic fractionalization. This list is helpful in final analysis of the results.

4.4 Correlation matrix

Correlation matrix is a method used to collect all variables in one table and demonstrate their mutual correlation. In this thesis correlation matrix can be found in Appendix, *Table 4*. From the correlation matrix it can be seen that average years of schooling variable is potentially problematic because it has high correlation with dependent variable (logged GDP per capita), which is over 0.7. It also has high negative correlation with ethnic fractionalization indices (above 0.60 and 0.70). These results have high potential to be interpreted as if average years of schooling and the fractionalization indices in fact explain the same economic outcome. These high correlation values are also addressed as multicollinearity. Multicollinear variables need to be tested for significance and then dropped based on the results of that test. High negative correlation between logged GDP per capita and ethnic fractionalization indices can be noticed from the correlation matrix.

4.5 Model selection

To progress with the research, it is necessary to use econometric analysis of collected data. Econometric analysis involves introduction to regression models. These models are used to determine relationship between dependent variable and independent variables. And it is exactly what is needed in this analysis. There is no one single model that is strictly suitable for the analysis, but it is rather a choice amongst available models. The following models suitable for this kind of data, panel data, will be tested: Pooled OLS regression, Random effects model (REM) and Fixed effects model (FEM).

The first model to test the collected data is Pooled OLS. The dependent variable in Pooled OLS is logarithm of GDP per capita. Control variables are: logarithm of gross capital formation, labor force, logarithm of foreign direct investment, urban population, average years of schooling and ethnic fractionalization index as variable of interest.

Then, after conducting Pooled OLS test, what follows is REM that considers the same variables as Pooled OLS does. To distinguish which model is more suitable for the analysis, Breusch-Pagan LM test is used. Random effects model is expected to be in favor over Pooled OLS due to nature of data.

The next step is running data on FEM and finally distinguishing between REM and FEM using Hausman test. Null hypothesis supports random effects model while alternative supports fixed effects model. FEM is favored by Hausman test and relevant results can be found in Appendix 4. However, this is not the only factor in favor of FEM. When deciding between FEM and Pooled OLS it is important to outline that FEM is useful in commenting on differences between countries, whereas Pooled OLS regression does not have this feature.

As just concluded, FEM is favored by Hausman test and these results can be found in Appendix. However, this is not the only factor in favor of FEM. When deciding between FEM and Pooled OLS it is important to outline that FEM is useful in commenting on differences between counties, whereas Pooled OLS regression does not have this feature.

5. Analysis

5.1 Analysis of Econometrics Models

After running regression on the model in R studio, results can be found in Appendix 4. There are several different points important to be outlined. The first one is based on ethnic diversity values. When comparing ethnic fractionalization values collected by Alesina et al. (2003) to the new ones collected and calculated specifically for this analysis, the value has changed over time. Bosnia and Herzegovina, Montenegro and North Macedonia became more ethnically diverse countries whereas Croatia, Serbia and Slovenia experienced decrease in ethnic diversity. This outcome is mostly the consequence of the war that happened in the 1990s in the countries of ex-Yugoslavia. Massive migrations caused by the war significantly affected values of fractionalization. After the war, the new countries were established when former Yugoslav Republics declared independence. During the war many people forcefully left their countries of origin or migrated by their own will to other countries where they felt more comfortable due to their ethnic background. The most probable reason why Croatia and Serbia became more ethnically homogenous countries after the war is that, even before the war, these countries had high concentration of one nationality, ethnicity and religion. In case of Croatia, large majority of population had always been Croats of catholic religion, while in case of Serbia majority had been composed of Serbs of orthodox religion. Therefore, many Croat people that had lived in other ex-Yugoslavia countries before the war, moved to Croatia in and after the war, as the country with the biggest number of Croats, where they felt more secure and comfortable. The same had been done by Serbs from all over ex-Yugoslavia moving to Serbia.

Unlike Croatia and Serbia, Bosnia and Herzegovina and North Macedonia became slightly more ethnically diverse according to the ethnic fractionalization index. These countries had been ethnically diverse in recent history during ex-Yugoslavia and even before in far history. Generations of ethnically diverse people had been living together in these countries and therefore ethnic diversity is deeply rooted in both Bosnia and Herzegovina and North Macedonia. During the recent war in Bosnia and Herzegovina, internal displacement of people was happening, but overall ethnic diversity was retained at the country level and even slightly increased. The slight increase of diversity in some of the countries can be explained by the fact that some of the people that, in the pre-war censuses, stated to be Yugoslavs, changed their statements in the post-war censuses and stated that they are Macedonians, Bosniaks, Slovenians, etc. Significant increase in diversity index was noted in Montenegro. The increase

of the number of inhabitants in Montenegro is rather insignificant, but structural change of population is significant, which is a result of the independence of the state of Montenegro and consequent possibility for the population to state that they belong to a certain nationality/ethnicity group. Index was calculated using population censuses. According to the last census, the percentage of Montenegrins fell by more than 20% while percentage of Serbs increased by almost 20%. Besides this major change, there was a change in the structure among groups that share smaller percentages, as well as in the entrance of new ethnicities that became significant enough to be accounted into calculation and alter ethnic diversity in Montenegro.

Table 3:

| Country | FRAC by Alesina | FRAC Updated |
|------------------------|-----------------|--------------|
| Bosnia and Herzegovina | 0.630 | 0.638 |
| Croatia | 0.369 | 0.185 |
| Serbia | 0.574 | 0.303 |
| Montenegro | 0.577 | 0.698 |
| North Macedonia | 0.502 | 0.522 |
| Slovenia | 0.222 | 0.167 |

Moving on to econometric analysis and regression of different models, in the model selection section it has been explained why FEM is the most relevant for this analysis. After running the model with variables already introduced in this analysis, there are some interesting points to outline. Even though variable for ethnic diversity is statistically significant, variation in ethnic diversity shown by the two presented values for this variable is not huge, but it still clearly shows negative impact of ethnic diversity on GDP per capita of the countries in this region. Only two values were presented (one from early 1990s and one from the period after the war) because, due to the dramatic structural, political and institutional changes that ex-Yugoslavia countries went through in recent past, coupled with terrible violent war some of the countries were affected by, no regular and/or reliable data collection could have been done, including regular census, as the most relevant source of necessary information.

5.2 Analysis of Channels Connecting Ethnic Diversity and Economic Growth

Due to a lack of variability as well as a lack of regular data collection over a longer period of time, the thesis will consider and focus on institutions as a channel connecting ethnic diversity and economic growth. Until 1990s, it was considered that the factors that have largest influence on the economic growth were physical and human capital and trade of technology transfers, Hall and Jones (1999). These were traditional factor-endowments under neoclassical growth frameworks. This method seemed to work fine in the decision-making process for a long period of time. It used an increase in investment, training, education and innovation to spur economy and increase growth. However, in 1989 when new reform of Structural Funds was put in place in the European Union, it had almost no impact, Boldrin and Canova (2001). Therefore, many researchers, as well as university students were encouraged to look for factors that go over the borders of well-established growth theories, Rodríguez- Pose and Storper (2006). After completing the researches, many concluded that institutions are those that influence economic growth as much as, if not more than traditional factor - endowments. Moreover, both formal and informal institutions may have important role in affecting economic growth. Rule of law and property rights are formal institutions that were found to be the most influential, Rodrik et al. (2004), whereas social capital and trust are playing the most important role among informal institutions, Knack and Keefer (1997) and Putnam (1993).

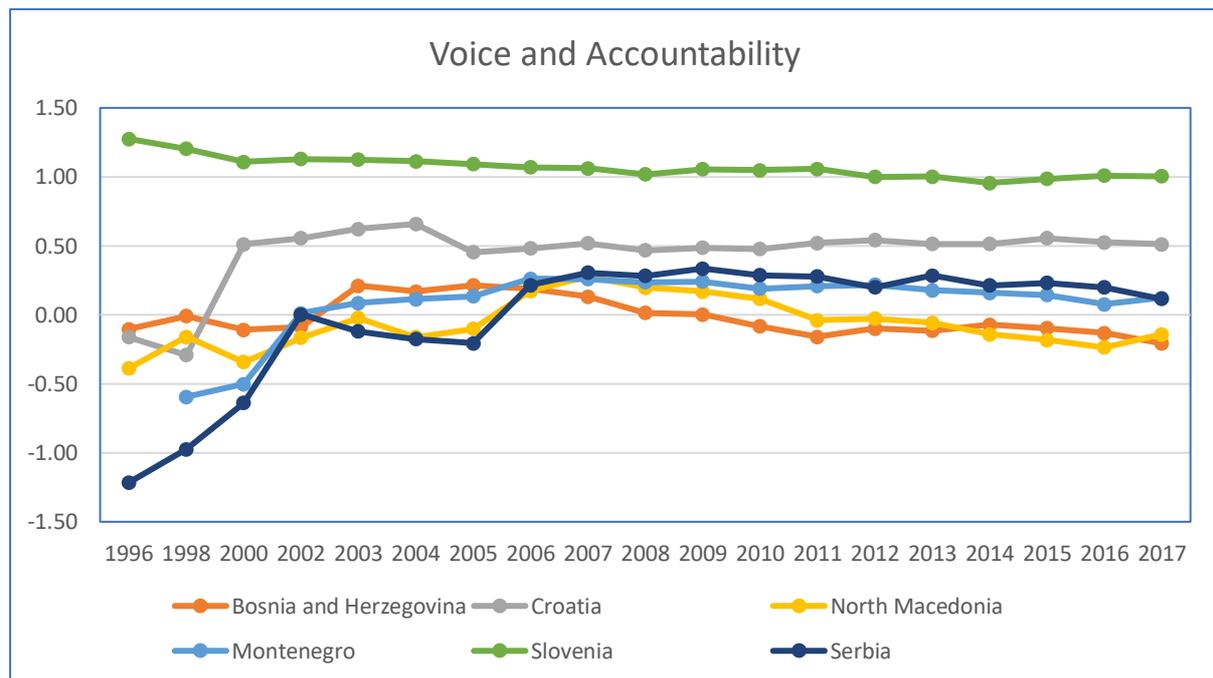
It has become clear that institutions have impact on economic growth. This conclusion lead to the next question: Can productivity and efficiency of institutions be influenced by some other factor? It has been also concluded that ethnic diversity can influence institutions. Furthermore, it has been found out that social trust is negatively affected by high level of ethnic diversity, Dinesen and Sønderskov (2015). Moreover, social capital seems to be negatively affected by ethnic diversity as well. Social capital comprises interpersonal relationships, shared identity, norms and values. In a society which is ethnically diverse it is expected to have negative effect on social capital. This is, according to Putnam (2007), due to “pull in like a turtle” effect in society that is ethnically diverse. It means that people belonging to the same ethnic group get together which inhibits increase in components of social capital explained above.

All of these factors are part of institutions, therefore can be taken into consideration when commenting channels through which ethnic diversity influences economic growth. As previously explained, countries of ex-Yugoslavia faced change of regimes in the past two decades and some segments of institutions are still young and/or fragile due to the recent

turbulent past. Voice and accountability, political stability and absence of violence/terrorism, government effectiveness, regulatory quality, rule of law and control of corruption are factors under institutions for which values for the period between 1996 and 2017 are provided by the World Governance Indicators for the countries of former Yugoslavia. Therefore, these values will be compared to ethnic fractionalization indices and some basic conclusions on effect of ethnic diversity on institutions and economic growth will be outlined. The expected relationship between ethnic diversity and quality of institutions would be negative.

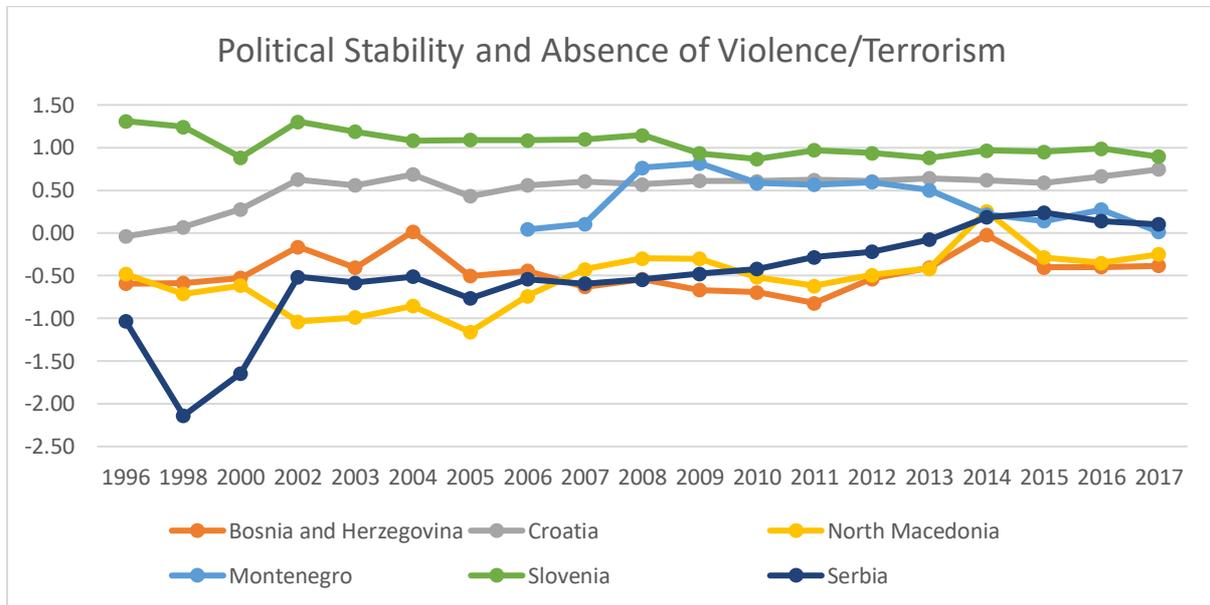
Definitions of indicators are taken from the World Bank. Voice and accountability express magnitude of freedom of citizens in government selection, freedom of expression and association as well as free media. Holland et al. (2009), concluded that voice and accountability are key part in reduction of poverty. They outline how governance of a country have important role in improving prospects for poor people.

Graph 1:



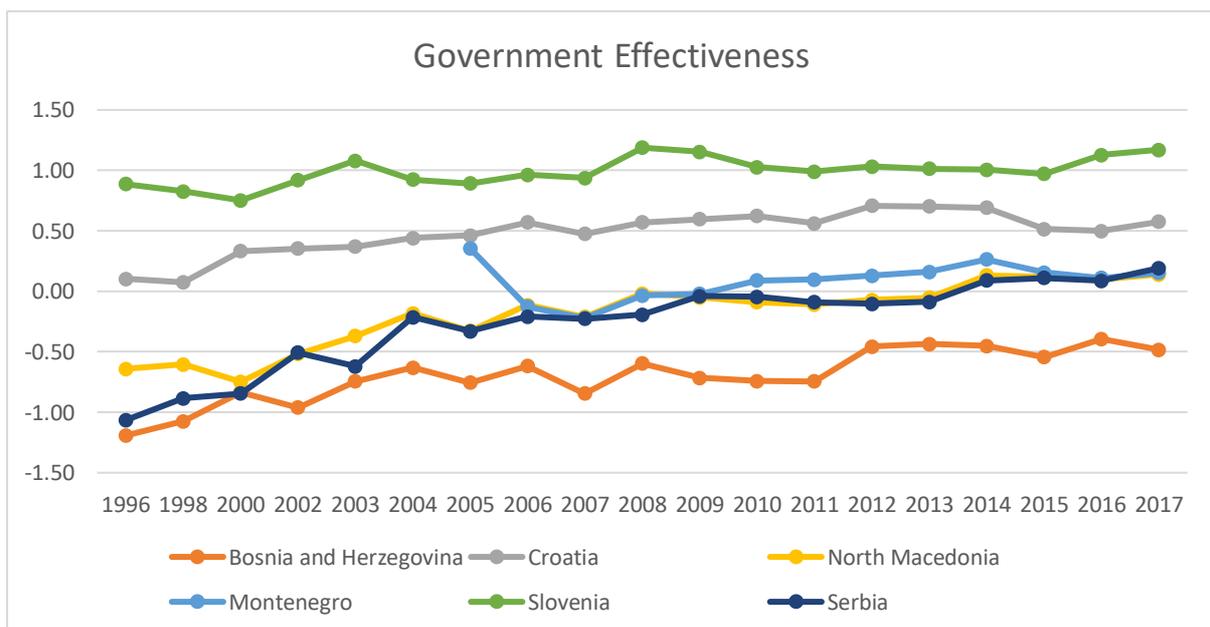
Political stability and absence of violence/terrorism is defined by the World bank as likelihood of political instability, or violence/ terrorism motivated by political party.

Graph 2:



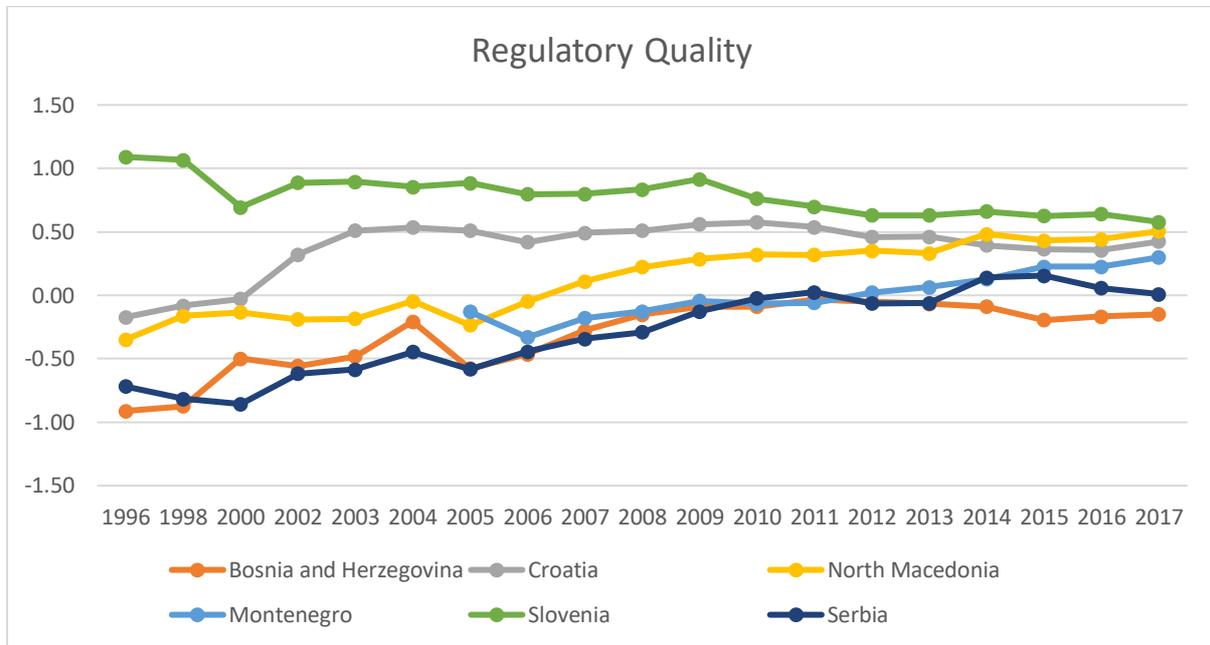
Government effectiveness is defined by the reflection of quality of public and civil services, and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.

Graph 3:



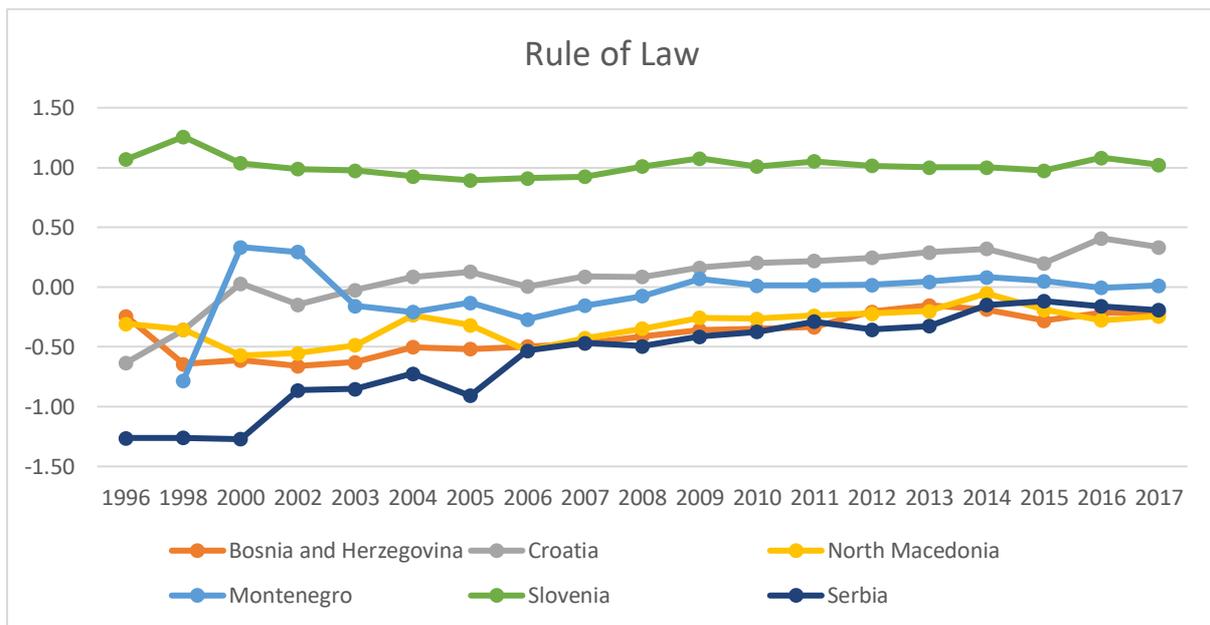
On the other hand, regulatory quality reflects ability of government to promote and implement policies that support development of private sector.

Graph 4:



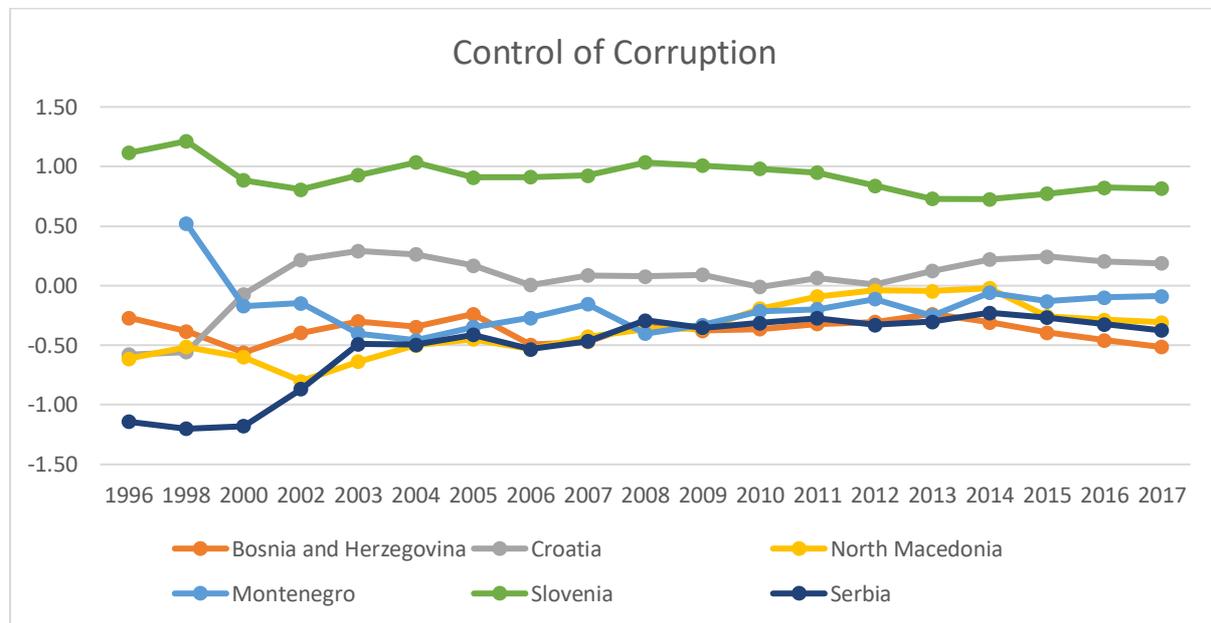
Rule of law is indicating to what extent people have confidence in and obey rules of society, such as property rights, the police, the courts.

Graph 5:



The last but not the least is the control of corruption which shows how much is public power exercised for private gain.

Graph 6:



Most of these indicators are intercorrelated, for example political instability can cause decrease in government effectiveness. This in turn decreases ability of formulation and implementation of good public policies, which is in effect government effectiveness. Some of these policies may well include promotion of development private sector, causing destabilization of regulatory quality. Political instability is also fertile ground for corruption and behavior which is not in line with societies rule of law. Therefore, it is very difficult to speak about the effect of a single indicator because all of them are intercorrelated in certain ways.

The level of fractionalization index is different in each of the ex-Yugoslavia countries. It is the lowest in case of Slovenia and Croatia and highest in case of Montenegro, Bosnia and Herzegovina and North Macedonia. In majority of cases the direct inter-link between the fractionalization index and quality of institutions and level of economic growth can be found. Although the law, in the majority of the countries, guarantees equal rights to all people living in those countries when it comes to their involvement in institutions functioning, as well as to access to economic development opportunities, majority of the countries or parts of the countries that have high heterogenous population lag behind in terms of the quality of institutional framework and level of economic development.

Croatia and Slovenia are the two countries that have the lowest ethnic fractionalization index which is below 0.2. This makes them relatively ethnically homogeneous countries when compared to other ex- Yugoslavia countries, but relatively heterogeneous when compared to some EU countries such as Italy (index 0.04) or Germany (index 0.095). They are also the only two countries in the sample that are members of the European Union. Their membership into EU required many reforms and adoption of rules and laws in accordance with the EU ones. Slovenia is the EU member since 2004, while Croatia joined EU in 2013. These two countries have the highest values in all considered indicators. Furthermore, Slovenia tops Croatia in all of them. This may be explained by longer membership in the Union. This theory has been based on Talpos, Donath and Milos who, in their work, found positive trend in relationship between EU membership and institutional quality. The highest value of Slovenia in all indicators can also be explained by the lowest ethnic fractionalization index which contributes to stability in government functioning, excellence in institutional framework and inhibits potential difficulties in knowledge sharing in society. Furthermore, Slovenia did not suffer infrastructural war destruction as did the other countries in former Yugoslavia. Croatia, on the other hand, suffered severe destructions in the war in certain parts of the country and still has taken second place after Slovenia in all indicators included. However, while Slovenia has had stable high levels of indicators over the past 20 years, Croatia, that had difficulties at the beginning, has stable and constant increase in indicators over the same period of time. In this period, ethnic fractionalization index in Croatia decreased by half and the country was able to form stable government and integrate into European Union. As a result, Croatia is now a country advancing towards the other well- developed EU countries. It can be concluded that both Croatia and Slovenia are countries with lowest ethnic fractionalization index in the region and stable economic growth. This contributes to the affirmation of theory that low ethnic diversity encourages development of institutions and their high quality, which in turn results in stable economic growth.

In contrast to Slovenia and Croatia, none of other countries from the region reviewed in this paper, is a member of the EU. All of the countries are in different phases of EU membership accession process. However, there are many challenges they are faced with on that path and many factors that are slowing down this process. One of the most important challenges can be connected with ethnic diversity. Ethnic fractionalization index is much higher in majority of these countries than in Slovenia and Croatia. Most of the countries of former Yugoslavia have adopted good laws related to their ethnic diversity, by which all the rights have been given to

ethnic minorities in those countries. However, implementation of the laws and their application in practice is at the low level in majority of cases. The ethnic diversity has impact on the governance of a country which further, in majority of cases, has negative impact on policies and decisions that are influencing economic growth.

Serbia is on the third place when ethnic fractionalization index is in question. Twenty years ago, Serbia had the lowest values in all indices except government effectiveness and regulatory quality. Now, it is among the countries that have significantly high ethnic fractionalization index. As reported by the EU observers, media in Serbia has been under threat in the period between 2013- 2017. This has been evident in voice and accountability index that has been decreasing in this period. This index may well be correlated with the control of corruption. In the same period level of control of corruption has also been decreasing, which was another indicator of degradation of Serbia. This poor performance of Serbia, when it comes to governance indicators, may be due to ethnic diversity, but also due other above-mentioned factors, as well as to the transition from one regime to another and size of the country. Serbia is the biggest country in the region and does not have sufficiently developed industries to support all of its citizens. Political instability of Serbia and recent protests against the government probably contributed to this negative trend of certain factors more than ethnic diversity.

North Macedonia, Bosnia and Herzegovina and Montenegro all belong to a group with the highest ethnic fractionalization index which is over 0.5. Even though, North Macedonia has lower ethnic fractionalization index (0.522) than Bosnia and Herzegovina (0.638), the two have similar values for most of the governance indicators taken into consideration (voice and accountability, political stability and absence of violence/ terrorism, rule of law and control of corruption). They have similar trends of growth in government effectiveness and regulatory quality, but North Macedonia has significantly higher values as well as starting point than Bosnia and Herzegovina. The low values of indicators of governance are partially result of high ethnic diversity in these two countries. For more than twenty years North Macedonia had difficulties in their relationship with Greece in defining and adopting the official name of the country, which presented the main obstacle in EU integration process. New name was finally accepted in 2019. In addition to that, due to the highly heterogenous society, Macedonia has been faced with a number of internal problems related to the political and institutional functioning, particularly related to its population belonging to Albanian nationality, who are

pretty large in number (25.2 %), who fought for higher level of rights, including Albanian language that became the official language in North Macedonia (besides Macedonian) as of the beginning of 2019. Due to the government instability, partly caused by the high ethnic diversity, they had to wait for the situation to stabilize for more than two decades, which is hopefully happening now when the disagreements with Greece and internal ethnic difficulties have been settled down. There are already some signs that this stabilization will positively affect the World Governance Indicators, that should lead to positive trends related to economic growth of the country.

Bosnia and Herzegovina is the most specific country in the region with the most complex political and institutional framework. It is a country with three constituent nations represented by the three members presidency. The Dayton Peace Agreement stopped the war in Bosnia and Herzegovina in 1995, and the Annex IV of the agreement has been accepted as the Constitution of the country. It is a document the purpose of which was to bring peace to the country and temporarily establish regulatory and institutional framework until better and more functional constitution is developed. However, the Dayton Peace Agreement that did stop the war actually frozen the inter-ethnic conflict in the country and the constituent people of Bosnia and Herzegovina did not manage to move forward from that time. This means that the country is, to the largest extent, misfunctional due to the heavy government apparatus that was established by the Agreement in order to keep “happy and peaceful” the three main ethnicities, Bosniaks, Croats and Serbs living in different parts of the country. The country is still struggling with the over-seized, mis functional institutional structure that has proven to be one of the main obstacles for its economic growth. The country is composed of two entities Republic of Srpska and Federation of Bosnia and Herzegovina that is further broken down into 10 Cantons. The country has 3 members presidency at the State level, and the two more presidents, one for each of the entity. It has 14 parliaments and 136 ministries. As such, it represents the most complex government with the most complex institution framework not only in Europe, but most probably on Earth. Such a complex structure was made and maintained because of the high level of ethnic diversity in the country to enable all the constituent people have voice at different level of authorities. But this heavy, complex and expensive structure resulted in extremely poor economic performance. Governance indicators, as stated above, are the worst in this country. Under such complex circumstances it is extremely difficult to pass laws and policies and even more difficult to implement them so that they can serve to the well-being of people. Bosnia and Herzegovina, as well as North Macedonia and Serbia, are the countries with

the highest level of corruption in Europe. La Porta et al. (1998) as well as Shleifer and Vishny (1993) concluded that ethnic diversity contributes to higher level of corruption. The results of this high level of corruption in Bosnia and Herzegovina, as well as in North Macedonia are unproductive policies caused by weak institutions. Corruption in a country is connected with other governance indicators such as government effectiveness, political stability, voice and accountability.

The last country to be discussed, which is also very much diverse is Montenegro. This country represents an outlier because, when looking at its high ethnic diversity level, it should have the lowest governance indicators. However, its indicators can be grouped in the same basket with other non- EU countries in the sample. This similarity may arise from the definition of ethnicity and expression of people according to ethnic groups in Montenegro. More specifically, in Montenegro there are two largest ethnicity groups: Montenegrins and Serbs. Even though they are regarded as two different ethnic groups, they have the same religion and tradition, as well as the same views on many important decisions to be made in that country. Therefore, even though ethnic fractionalization index shows presence of high ethnic diversity, a closer look has to be made when making conclusions on why a specific country has certain trends of governance indicators.

After the discussion, a general conclusion is that ethnic diversity is definitely influencing institutions. This, in turn, has an effect on economic growth through level of political stability, corruption, behavior in accordance with the law, development of private sector and formulation and implementation of policies that altogether contribute to an increase of economic growth of the country. From the analysis it can be concluded that Slovenia and Croatia, as the EU member states and states with the lowest level of ethnic diversity, are the most stable countries, having continuous and healthy economic growth. All other countries have similar ethnic diversity index and similar indicators of institutional quality. Therefore, it may be concluded that EU membership requires a certain level on institutional quality to be achieved and maintained and each and every country in the sample, in the process of EU integrations, is gravitating towards higher levels of indicators related to institutional quality. It can also be concluded that, in majority of cases, ethnic diversity can have negative impact on institutional quality leading to lower level of economic growth.

6. Limitations

There are several limitations to this paper that need to be considered. The first and the most important one is embedded within the measure of fractionalization index. As it has been set up at the beginning of this thesis, measurement of ethnic diversity has been based on the definition of ethnic group. This implies that methodology of updating index should be identical as in Alesina et al. (2003) in order for it to be comparable to the original index. It further indicates that exactly the same sources, as well as division of country population into exactly the same ethnic groups is necessary for the results to be comparable. Methodology used by Alesina et al. (2003) included analysis of data from three separate sources. After index has been calculated they would then cross-check the results to the ones obtained by other sources to match up to three decimal places. Even though Alesina et al. (2003) used Encyclopedia Britannica as one of their sources, it was not possible to use the source in this analysis due to limited access. Sources used to access data for this thesis were statistical agencies of the countries, more specifically data related to population censuses. Moreover, index was updated solely based on this source and was not cross-checked with two other different sources as Alesina et al. (2003) did. This may result in divergence from results that would have been obtained if Alesina et al. (2003) methodology was strictly adhered to.

Another type of limitation lies behind the type of diversity that could possibly influence economic growth. Types of diversity that slightly differ from ethnic diversity, but at the same time could be closely correlated to it are religion and language diversity. Including religion and language diversity may alter the results and give an insight of alternative ways of analyzing impact of diversity on growth. Inclusion of these variables would inevitably result in alternation of setup of original model, since religion and language diversity may account for different control variables, while the ones used in this model could lose their significance.

After running econometrics model, it was concluded that even though there is some statistical significance, it is not fully sufficient to draw some solid conclusions. This leads to another limitation in this thesis and it is time frame considered due to the “young” age of the countries and low frequency of variables. If there were more population censuses from which fractionalization index could be calculated and if there was wider time frame in order to observe more significant change in variables such as urban population, average years of education,

change in GDP, fixed effects model would then provide results from which solid conclusions could be drawn.

Another possibility how to improve the thesis is to test for stationarity of variables. This test is meaningful when working with time- series data in order to check whether mean, variance and autocorrelation are constant over time. Augmented Dickey- Fuller test is usually used to test whether a variable is stationary or not. If this test shows that the variable is non- stationary, it needs to be differentiated in order to bring it closer to stationary data.

To wrap up, the limitations to this paper provide potential towards future researches of this topic using different approaches and methodologies.

7. Conclusion

The aim of the thesis was to define effects of ethnic diversity on economic growth in countries of ex-Yugoslavia. It was done through studying relationship between ethnic fractionalization index and GDP per capita. The time frame considered was the period from 1995 to 2017 – post-war recovery period and later transitional and development period. At the beginning of the thesis, the task was to present the theoretical background of the relationship between ethnic diversity and economic growth, whereby both negative and positive correlations have been discussed based on earlier researches conducted on this topic.

Ethnic diversity has been measured by calculating the fractionalization index. The two ethnic fractionalization indices have been used in this analysis. The first one was taken from Alesina et al. (2003) giving an overview of relationship between ethnic diversity and economic growth. Another ethnic fractionalization index has been calculated based on the version of index by Alesina et al. (2003). The index has been updated using data on ethnicity extracted from the most recent population censuses. After constructing Simple Pooled OLS estimator, Random effects model and Fixed effects model, Breusch-Pagan and Hausman tests were used to conclude that Fixed Effects Model is the most suitable one. The results showed statistical significance and supported theory that ethnic diversity negatively influences economic growth. Still, no reliable conclusions could be drawn, due to low variability in data, small time frame and lack of regular data collection.

Therefore, the remaining part of the thesis dealt with institutions as a channel through which ethnic diversity effects economic growth. In this part, the World Governance Indicators were introduced and compared with ethnic fractionalization index and GDP per capita. Conclusion after comparison of these indicators is that, in majority of cases, ethnic diversity has negative impact on the indicators reviewed, which then results in slower economic growth. It is evident that Croatia and Slovenia, EU member states and most ethnically homogeneous countries have the best values of World Governance Indicators and the highest economic growth. Bosnia and Herzegovina and North Macedonia, that have been for the longest period of time struggling with the negative aspects of their ethnic heterogeneity and political, economic and social challenges related to them, are, due to that, lagging behind in institutional and economic growth

development. Montenegro, with its specific heterogeneity (same nation and same religion, but different ethnicity), has managed to retain positive development trends.

It can be concluded that ethnic heterogeneity has an impact on political, institutional and social set up of a country, as well as its economic growth, regardless to the specificities and particular circumstances of that country. The thesis that analyzed one of the most complex region in Europe, can instigate taking into consideration the important factor of ethnical heterogeneity when entering country based or regional planning and development processes.

9. Appendices

Table 4:

| Correlation matrix | GDP pc | log GDP pc | GCF | log GCF | Labor | FDI | log FDI |
|--------------------|-----------|------------|-----------|-----------|------------|-----------|-----------|
| GDP pc | 1 | | | | | | |
| log GDP pc | 0.9004273 | 1 | | | | | |
| GCF | 0.7273363 | 0.729346 | 1 | | | | |
| log GCF | 0.0705784 | 0.231001 | 0.0392131 | 1 | | | |
| labor | -0.170199 | -0.144931 | 0.3496493 | 0.0576380 | 1 | | |
| FDI | 0.2326271 | 0.3541628 | 0.6821794 | 0.0907662 | 0.46601387 | 1 | |
| Log FDI | 0.2880064 | 0.4358821 | 0.4833367 | 0.1021151 | 0.17393014 | 0.6403335 | 1 |
| Urban population | 0.0503352 | 0.2196531 | -0.084821 | 0.2944717 | -0.3176868 | 0.0802479 | 0.0655683 |
| Schooling | 0.7005749 | 0.7216069 | 0.5333245 | 0.2362139 | 0.00449144 | 0.2678571 | 0.2547716 |
| Ethnic FRAC | -0.819790 | -0.756434 | -0.598428 | -0.129241 | 0.17902856 | -0.090188 | -0.149148 |

| Correlation matrix | Urban population | Schooling | Ethnic FRAC |
|--------------------|------------------|-------------|-------------|
| GDP pc | | | |
| log GDP pc | | | |
| GCF | | | |
| log GCF | | | |
| labor | | | |
| FDI | | | |
| Log FDI | | | |
| Urban population | 1 | | |
| Schooling | 0.3632938 | 1 | |
| Ethnic FRAC | -0.0576671 | -0.72006709 | 1 |

Table 5:

| Code | Variable and kind of variable |
|----------------------|---|
| $\log GDP_{pc_{it}}$ | Logarithm of GDP per capita (dependent variable) |
| $\log GCF_{it}$ | Gross capital formation (independent variable) |
| $\log FDI_{it}$ | Foreign direct investment (independent variable) |
| $Urban\ pop_{it}$ | Urban population (independent variable) |
| $Labor\ force_{it}$ | Labor force (independent variable) |
| AYS_i | Average years of schooling (independent variable) |
| $Diversity_i$ | Ethnic index of fractionalization (variable of interest) |
| ε_{it} | Error |
| μ_{it} | Unobserved random effect |

Regression 1 (Pooled OLS Estimator):

```
## Call:
## lm(formula = log_GDP_pc ~ Labor_force_total + log_FDI + log_Formation + Urban_population +
FRAC.MIX, data = my_data)
##
## Residuals:
##   Min    1Q  Median    3Q   Max
## -0.61423 -0.20941  0.02263  0.16801  0.66362
##
## Coefficients:
##           Estimate Std. Error t value Pr(>|t|)
## (Intercept)   -1.111e+01  7.928e-01 -14.009 < 2e-16 ***
## Labor_force_total  -4.550e-07  2.243e-08 -20.283 < 2e-16 ***
## log_FDI           3.969e-03  1.195e-02  0.332  0.74030
## log_Formation     7.501e-01  3.339e-02  22.467 < 2e-16 ***
## Urban_population  2.324e+00  3.780e-01  6.146  9.8e-09 ***
## FRAC.MIX         4.757e-01  1.797e-01  2.647  0.00916 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.2008 on 125 degrees of freedom
## (6 observations deleted due to missingness)
## Multiple R-squared:  0.9441, Adjusted R-squared:  0.9415
## F-statistic: 352.2 on 6 and 125 DF, p-value: < 2.2e-16
```

Regression 2 (Fixed Effects Model):

```
## Oneway (individual) effect Within Model
##
## Call:
## plm(formula = log_GDP_pc ~ Labor_force_total + log_FDI + log_Formation + Urban_population +
FRAC.MIX, data = my_data, model = "within", index = NULL)
##
## Unbalanced Panel : n = 6, T = 16-22, N = 111
##
## Residuals:
##   Min    1Q  Median    3Q   Max
## -2.9200 -0.3360  0.0754  0.4600  2.3200
##
## Coefficients:
##           Estimate Std. Error t value Pr(>|t|)
## Labor_force_total  0.70779  0.01824  38.81 <2e-16 ***
## log_FDI           0.20060  0.01984  10.11 <2e-16 ***
## log_Formation     0.20060  0.01984  10.11 <2e-16 ***
## Urban_population  0.20060  0.01984  10.11 <2e-16 ***
## FRAC.MIX         0.20060  0.01984  10.11 <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Total Sum of Squares:    71.548
## Residual Sum of Squares: 56.835
## R-Squared:    0.20563
## Adj. R-Squared: 0.1262
## F-statistic: 5.17728 on 5 and 100 DF, p-value: 0.00028835
```

Regression 3 (Random Effects Model):

```
## Oneway (individual) effect Random Effect Model
(Swamy-Arora's transformation)
## Call:
## plm(formula = log_GDP_pc ~ Labor_force_total + log_FDI + log_Formation + Urban_population +
FRAC.MIX, data = my_data, model = "random", index = NULL)
##
## Unbalanced Panel : n = 6, T = 16-22, N = 111
##
##Effects:
##          var      std. dev  share
##idiosyncratic  0.036615 0.191349 0.894
##individual     0.004343 0.065900 0.106
##theta:
##   Min   1Q  Median   3Q   Max
## 0.4126 0.4821 0.4736 0.4821 0.4821
##
## Residuals:
##   Min   1Q  Median  Mean   3Q   Max
## -0.5960 -0.1289 0.0257 -0.0006 0.1170 0.6420
##
## Coefficients:
##           Estimate Std. Error t value Pr(>|t|)
## (Intercept) 2.141315  0.561496  3.8136 0.000137 ***
## Labor_force_total 0.2141315  0.561496  35.18 0.000731 ***
## log_FDI      0.142057  0.022629  6.1775 3.440e-10 ***
## log_Formation  0.091850  0.040481  2.2689 0.023272 *
## Urban_population  0.24556  0.01894  10.33 <2e-14 ***
## FRAC.MIX     -1.262593  0.310529 -4.0659 4.784e-05 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Total Sum of Squares:    9.8646
## Residual Sum of Squares: 4.6266
## R-Squared:    0.53148
## Adj. R-Squared: 0.52041
## Chisq: 143.783 on 3 DF, p-value: < 2.22e-16
```

Test 1:

Studentized Breusch- Pagan test

Data: log_GDP_pc ~ Labor_force_total + log_FDI + log_Formation + Urban_population +
FRAC.MIX

BP = 56.356, df = 5, p-value = 1.681e-11

Test 2:

Hausman test

Data: log_GDP_pc ~ Labor_force_total + log_FDI + log_Formation + Urban_population +
FRAC.MIX

chisq = 0.2962, df = 1, p-value = 0.5863

alternative hypothesis: one model is inconsistent

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