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THE IMPACT OF INSTITUTIONS ON ECONOMIC GROWTH AND INCOME INEQUALITY IN THE WESTERN BALKAN COUNTRIES

June 2024, Sarajevo JURDAL ČAKAL-VELAGIĆ

DECLARATION OF AUTHENTICITY

I, the undersigned, student of the third (III) cycle of studies, index number 194-Phd-e/17 in the Economics program, herewith declare that my doctoral thesis, under the mentorship of Prof. Dr. Sabina Silajdžić, titled:

THE IMPACT OF INSTITUTIONS ON ECONOMIC GROWTH AND INCOME INEQUALITY IN THE WESTERN BALKAN COUNTRIES

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ABSTRACT

The relationship between income inequality and economic growth has attracted a lot of attention among scholars and policy makers. This dissertation revisits inequality - growth nexus by investigating the complex relationship in the specific context of Western Balkan (WB) Countries. Specifically, we add to the recent literature by incorporating financial market development and quality of institutions to the empirical model, using up-to-date data covering WB countries and employing comprehensive methodological approaches. This study contributes to previous studies by employing various methods of investigation while paying attention to endogeneity issues addressed in previous literature and analyzing the interplay between these variables in an integrated empirical framework. We use four methodological approaches (panel regression analysis, instrumental variable, two-stage least squares and simultaneous-equation models) and compare the results obtained relying on different econometric techniques. Through rigorous analyses and empirical investigation, our findings shed some light on the impact of financial market development and quality of institutions on economic growth and income inequality relationship in selected WB countries.

Our estimates generated three key results. First, there is evidence of a positive relationship between GDP per capita growth and income inequality. Thus, we found no evidence of trickle-down effect over the course of transition, as economic growth goes hand with hand with growing income inequality. Second, we find strong evidence that income inequality spurs economic growth, indicating highly unbalanced economic growth pattern, and persistent dual-economy over the course of transition. These findings suggest that income inequality has played important role in stimulating economic growth in the WBC, plausibly due to persistent structural weaknesses of WB economies. Third, our results support the proposition that financial market development proxied by credit and bank branches have positive impact on income per capita while simultaneously improving distribution of income. Additionally, institutions are found to have a dual effect, they enhance GDP per capita while simultaneously reducing inequality. Specifically, the results obtained from different methods of investigation including FE, IV, 2SLS, FE2SLS and FE3SLS regressions indicate that the rule of law and credit growth positively impact economic growth while simultaneously reducing income inequality.

Key Words: *economic growth, income inequality, Western Balkan countries, endogeneity, financial market development, institutional quality, simultaneous-equation models.*

SAŽETAK

Odnos između nejednakosti prihoda i ekonomskog rasta privlači veliku pažnju među istraživačima i kreatorima politika. Istraživanje u ovom doktorskom radu usmjereno je na analizu neksusa nejednakosti i ekonomskog rasta osvrčući se na složene odnose u specifičnoj strukturi zemljama Zapadnog Balkana (ZB). Konkretno, doprinosimo novijoj literaturi uključujući razvoj financijskog tržišta i kvaliteta institucija u empirijski model u zemljama ZB koristeći najnovije podatke i sveobuhvatne metodološke pristupe. Oslanjajući se na adresiranu endogenost u empirijskoj literaturi i analizirajući međuovisnost varijabli, ova disertacija pruža znanstveni doprinos prethodnim studijama koristeći različite metodološke pristupe. Koristeći četiri metodološka pristupa (panel regresijsku analizu, metodu IV, dvoetapnu metodu najmanjih kvadrata i model simultanih jednačina) uspoređujemo dobijene rezultate uz pomoć različitih ekonometrijskih tehnika. Kroz rigorozne analize i empirijska istraživanja rezultati pokazuju uticaj finansijskog tržišta i kvaliteta institucija na odnos nejednakosti prihoda i ekonomski rast u odabranim zemljama ZB.

Rezultati empirijskog istraživanja dovode nas do tri ključna zaključka. Prvo, postoje dokazi o pozitivnoj vezi između BDP-a po glavi stanovnika i nejednakosti prihoda. Kao rezultat, nismo uočili dokaze koji upućuju na trickle down efekat tokom tranzicije u okolnostima gdje privredni rast raste zajedno sa nejednakosti prihoda. Drugo, nalazimo snažne dokaze da nejednakost u prihodima potiče gospodarski rast, što ukazuje na vrlo neuravnotežen obrazac privrednog rasta i persistentnu dualnu ekonomiju u toku tranzicije. Rezultati sugeriraju da je nejednakost prihoda igrala ulogu u stimuliranju ekonomskog rasta u zemljama ZB u ranim fazama tranzicije zbog strukturnih slabosti ekonomija. Kao treće, istraživanje podržava pretpostavku da razvoj finansijskog tržišta putem kredita i bankarskih filijala ima pozitivan učinak na dohodak po glavi stanovnika, dok istovremeno poboljšava distribuciju prihoda. Pored toga, ustanovljeno je da institucije imaju dvostruki efekat, povećavaju BDP po glavi stanovnika dok istovremeno smanjuju nejednakost. Temeljem rezultata provedene ekonometrijske regresijske analize putem FE, IV, 2SLS, FE2SLS i FE3SLS potvrđuje se da održavanje vladavine prava i pristup kreditima pogoduje visokom dohotku po glavi stanovnika nudeći nove mogućnosti uz istovremeno smanjenje Gini koeficijenta.

Ključne riječi: *ekonomski rast, nejednakost prihoda, zemlje Zapadnog Balkana, endogenost, razvoj financijskog tržišta, institucionalna kvaliteta, modeli simultanih jednačina.*

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LIST OF ABBREVIATIONS

2FE - two-way fixed effects model

2SLS – two-stage least squares

3SLS – three-stage least squares

BANKBR - commercial bank branches

CEE - Central and Eastern Europe

CORR - control of corruption

EF - Economic Freedom Index

FD - first differencing

FDI - foreign direct investment

FE - fixed effects

FE2SLS - fixed effect two-stage least squares

FE3SLS - fixed effect three-stage least squares

GE - government effectiveness

GMM - generalized method of moments

HIEF - historical index of ethnic fractionalization

i.i.d. - independent and identically distributed

ILS - Indirect Least Squares

IV – Instrumental Variable

KKZ -Kaufmann, Kraay and Zoido-Lobaton

LIML - Limited Information Maximum Likelihood

LM - Lagrange multiplier

LMI - labour market institutions

M2 - ratio of broad money to GDP

NIE - new institutional economics

OIE - old/original institutional economics

OLS - ordinary least squares

PS - political stability and absence of violence/terrorism

PWT - Penn World Tables

RE - random effects

RL - rule of law

RQ - regulatory quality

SEM - simultaneous equations models

SWIID - standardized world income inequality database

TC – transition countries

TCE - transaction cost economics

VA - voice and accountability

WB - Western Balkan

WBC - Western Balkan countries

WDI - World Development Indicators

WGI - Worldwide Governance Indicators

1. INTRODUCTION

1.1. Research Background

Income inequality as a global phenomenon has garnered a lot of attention among scholars and policy makers in both advanced and developing countries. Since Kuznets pioneering work (1955) numerous researchers have endeavored to analyse determinants of inequality and its consequences in complex economic environment. Although economists have long been interested in the idea that a country's level of development could help determine its level of inequality, Simon Kuznets, a Russian-American economist born at the beginning of the 20th century was the first who claimed that inequality follows the natural path as economies move away from the agricultural sector to industrialization (Keeley, 2015). Kuznets claimed that in democratic societies the political power of lower urban income groups grows over time and led to various protective laws aiming to offset bad effects of industrialization and to support demands of broader masses in order to increase income shares of these groups. Collecting taxes and increasing distribution to lower income groups leads to narrowing income inequality in developed countries. Thus, Kuznets assumed a long momentum in the inequality that characterizes it first as an increase in the early stages of economic development when moving from agricultural to industrialized societies, becoming stabilized for a while and then narrowing in the later phases. This relation between growth and income inequality is known as Kuznets hypothesis or inverted U curve and he expected this to be most pronounced in the older countries although it can be found in the younger countries like the United States where industrialization is in the phase of greater maturity. Since Kuznets pioneering work on expecting inequality to initially increase with economic growth and then fall over time, tracing inverted U shape, empirical studies have revealed mixed evidence on relation between income inequality and economic growth (Acemoglu and Robinson, 2002). As there are studies claiming that income inequality is bad for economic growth (Alesina and Rodrik, 1994; Atem and Jones, 2015), there is also widely held belief that inequality is necessary for economic growth (Li and Zou, 1998; Forbes, 2000).

However, many studies have investigated 'mechanical relationship' between income inequality and level of development implying that inequality will decrease after some certain degree of development is achieved. Nevertheless, many researchers analysed determinants of growth and inequality separately. Factors influencing both inequality and economic growth simultaneously have not been investigated in details. However, join estimation of inequality and growth leads to different results than analysing casual factors affecting income inequality and economic growth separately. Lundberg and Squire (2003) have argued that exploring casual effects of certain policies cannot be understood properly without analysing growth and inequality simultaneously since they are a consequence of the same processes. Moreover, policies need to balance growth and inequality to achieve optimal results.

On the other hand, Davis and Hopkins (2011) claimed that inconclusive result over income inequality and economic growth relationship debate is due to the omitted variable bias and the key omitted variable in this relationship is the quality of institutions. There exists consensus on the issue that institutions matter for growth and accordingly for income inequality. However, which institutions foster economic growth and which one reduce income inequality and whether there is a trade-off between them have not been established in the literature.

Motivated by this holistic approach of Lundberg and Squire (2003) that casual effects of certain policies on growth and inequality should be analysed simultaneously together with Davis and Hopkins (2011) claiming that omitted variable in inequality growth nexus is the quality of economic institutions we re-examine income inequality and economic growth relationship in the Western Balkan countries (WBC) from the point of institutions. Countries belonging to the Western Balkans are Albania, Bosnia and Herzegovina, Kosovo, Montenegro, The Republic of North Macedonia and Serbia (European Cluster Collaboration Platform, 2019). However, due to data unavailability for certain variables we do not include Kosovo in this thesis. Since, except Albania, the WB countries formed independent successor states from the breakup of Yugoslavia there are many similarities between these countries in terms of institutional arrangements, income inequality and their path of transition to market economies. Conflicts and wars contributed to shrinking the economy and increasing income disparities. In general, established institutions as well as capacities for new states and formed policy governance systems have led to fragmented systems unable to generate sufficient economic growth, create jobs and reduce income inequality. It has been criticized that these countries have not undergo adequate structural transformations aiming to develop market-based institutions. On the other hand, many authors have acknowledged that institutional framework and chosen economic policies have impact on economic growth, real GDP per capita as well as in determining the pattern of inequality. In this context, analysing institutions and their impact on economic growth as well as on increasing income disparities in the WB is essential. Countries in transition are particularly vulnerable to inequalities in income as they have faced deep structural transformation from state led economies to market economy. Although, income inequality has risen in these countries every country did not take the same path to market economy. In order to assess larger growth, to open economy and attract foreign direct investment each country adapted its institutions. Implemented policies that differed from one country to another as the political process from which macroeconomic policies emerged were specific to each country. For these reasons, the aim is to re-assess economic growth income inequality relationship in the Western Balkan countries by including institutions to the equation. The work on income inequality is especially important in the context of transition countries due to effects it can have to these fragile economies.

1.2. Research Questions

Previous studies have found positive impact of stock markets and banks on economic growth (Beck and Levine, 2002; Huang, Lin and Yeh, 2009; Durusu-Ciftci, Ispir and Yetkiner, 2017), but also there exists research claiming that finance affects positively economic growth up to a point and beyond the threshold its effect vanishes (Beck, Georgiadis and Straub, 2014). Further, literature investigating effects of institutions on economic growth has reached to consensus that political institutions with limited government lead to economic growth (Knack and Keefer, 1995; Hall and Jones 1999; Acemoglu, Johnson and Robinson, 2001; Rodrik, Subramanian and Trebbi, 2002). On the other hand, there is growing literature on the relationship between institutions and income inequality. A literature review reveals that while some aspects of finance decrease income inequality some other indicators can increase it or there can exist threshold effect where after a certain threshold level is achieved financial market development reduces income inequality. Moreover, studies on financial market development reveal that it increases the income inequality in low and middle-income countries while in high- income countries it leads to improvement of it. On the other hand, institutions are often viewed as a key determinant of economic growth in literature and they may exacerbate or reduce inequalities.

Specific research questions to be explored in this thesis are:

- What is the impact of financial market development on economic growth in the Western Balkan countries?
- What is the impact of financial market development on income inequality in the WBC?
- What is the impact of institutions on economic growth in the WBC?
- What is the impact of institutions on income inequality in the Western Balkans?
- What is the interaction between economic growth, institutions and income inequality in the WBC?

1.3. Research Aim and Objectives

The purpose of this thesis is to explore the income inequality economic growth relationship in an integrated theoretical and empirical framework, in which the role of financial and institutional development is specifically taken into account, as an underlying mechanism, which could help in comprehending the mechanisms at work. Essentially, these factors are assumed to be important forces related to (non)equal disbursement of income over time and along dynamic economic growth patterns which is of relevance amid distinctive

transitional context of the WB countries. Specific research objectives include, but are not limited to:

1. Presentation and critical evaluation of the theoretical framework of the research with a special reference to Simon Kuznets` hypothesis regarding economic growth and income inequality relation over time.
2. Critical evaluation of the existing theoretical assumptions regarding the importance of institutions in understanding economic growth and income inequality nexus, and complex empirical results that followed.
3. To identify institutions and explain aspects of institutional development that can have significant impact on understanding relationship between economic growth and income inequality.
4. Investigate the effects of various institutions on economic growth and income disparities for the Western Balkan countries, with specific reference to financial market development and institutions impact to economic growth and income inequality phenomenon.

2. THEORETICAL AND EMPIRICAL OVERVIEW ON GROWTH AND INCOME INEQUALITY

Greater income inequality is viewed as harmful to major socioeconomic and political objectives. Analysing the link between income inequality and growth is very complex and despite decades of research and extensive body of empirical literature this question continues to be debated among economists. In an attempt to understand this relationship in the WBC, we start with theoretical background and provide review of existing theories on these topics.

In the first section, growth theories proposed throughout history are briefly summarized. Since these different economic approaches have implications on income inequality they have been at the cross-road to many theories. Hence, Classical, Neo-classical, Marxist, Keynesian and Post-Keynesian income distribution theories are presented. Most widely used income inequality measures are presented along with causes of income inequality. Then, underlying transmission channels through which effect of income inequality on economic growth is realized is theoretically investigated. Final section reviews existing literature on this well-developed topic with special emphasize on transition countries.

2.1. Growth Theories

Main factors that have influence on long term economic growth have been extensively studied since the time of Adam Smith. Throughout history various models have been proposed to explain economic theory of underlying key features that have impact on growth. Many of the fundamental ideas that emerge in modern growth theories were first provided by classical economists including Adam Smith, David Ricardo, Thomas Malthus

and later Frank Ramsey, Allyn Young, Frank Night and Joseph Schumpeter (Barro and Sala-I Martin, 2004). According to Barro and Sala-i Martin (2004), Ramsey's (1928) work on treatment of household optimization and Fisher's (1930) work where optimality condition is introduced to economists were starting point for modern growth theories. Then, Harrod (1939) and Domar (1946) independently developed Keynesian economic growth model where savings and investments were main sources of growth.

In his book "The General Theory of Employment, Interest and Money", published in 1936, Keynes argued against the classical economists, claiming that there may be equilibrium below the full employment level. The main factor that causes the economy to operate below full employment is defined as 'insufficient effective demand' (p.23). According to Keynes (1936) while total real income increases with the increase in employment, the volume of employment is determined by the investment rate and the propensity to consume.

Keynes assumed employment as a function of national income. Domar (1946), on the other hand, considered this assumption as a function of the ratio of national income to productive capacity. Thus, he criticized Keynes for failing to take into account the fact that investment increases productive capacity.

According to Solow (1956), the key parameters of the Harrod-Domar growth model have been determined as the saving rate, capital-output ratio and the increase rate of labour. In case of any shift in these parameters, the economic balance will deteriorate; unemployment and long-term inflation will increase. "A Contribution to the Theory of Economic Growth" article by Solow published in 1956, describes one of the most important neoclassical growth theories stating that total output is produced by capital and labour factors of production. Additionally, changes in technology are effective in increasing the total output level. Thus, the Solow model of economic growth, also known as exogenous growth model focuses on long-run growth where saving rates and population growth rate as well as state of technology determines output level of a country. Further, model implies that in the long run economies converge to their steady state equilibrium and permanent growth is achievable only with technological advances. Main deficiencies of this model are the law of diminishing returns, convergence of income level among countries (Barro, 1989) and that technology as main component is unmodelled. Implicitly, as poor countries converge to rich countries model predicts decrease in global inequality and poverty but theoretical framework focuses on aggregate growth instead of income distribution (Cerra, Ruy Lama and Loayza, 2021).

Even though growth theory has proved to be useful tool in identifying determinants of economic progress, empirical studies demonstrate that a significant portion of growth is still not explained by total factor accumulation. In growth models, total factor productivity are related to technology advancement which is modelled exogenously (Bluhm and Szirmai, 2011). With the purpose of understanding the source of technological changes, in the 1980s approaches that fall apart from neoclassical theory were developed (Sredojević,

Cvetanovic and Gorica, 2016). Greenhalgh and Rogers (2010) besides neoclassical growth model classified these heterogeneous groups of theories as endogenous growth theories and evolutionary-institutional economic growth theories.

Endogenous growth models determine the growth rate from within the model and eliminate the assumption of diminishing returns. These models highlight the importance of external effects on human capital, such as 'learning by doing' and knowledge spillovers (Romer, 1990) as well as the Schumpeterian paradigm of innovation (Aghion and Howitt, 1992). Bluhm and Szirmai (2011) discuss how the inclusion of technological changes in new growth theory and evolutionary theory shifted focus towards understanding what governs the rate of technological changes. This perspective paved the way for institutional analysis.

As a matter of fact, importance of institutions in economic analysis has been known for long time and early institutionalists criticized neoclassical growth theory for emphasizing tangible assets while undervaluing intangible assets. According to Hodgson (1996) although many different institutionalist theories exist, there is a conceptual framework that connects all institutional analysis. Thorstein Veblen was one of the first theorists who proposed using the biological analogy of evolution in economics. Considering economic development as evolutionary process, institutions are outcomes of this process 'in which novel rules becomes populations, populations become structures and the process-structures are only deemed to be institutions when they become evolutionary stable' (Potts, 2007, p. 343). In predicting the level of economic development across countries many studies assess evidence in favour of institutions referring specifically to property rights, rule of law and political instability.

Overall, throughout history of economic thought emphasize has been on different growth determinants. In summary, a defining aspect of classical approach was that production requires labour, manufactured means of production and natural resources (Kurz and Salvadori, 2003). Yet, the production function of early neoclassical growth models stressed the importance of capital accumulation. On the other hand, endogenous growth theories incorporated factors as innovation, financial resources, education-related elements and public policies as main characteristics that can lead to endogenous growth (Gomez-Caicedo *et al*., 2022).

As Conceicao (2018, p.456) put it:

> The formalization of the process of economic growth as a predetermined path in the direction of steady state (as stated in Solow's, the New Classical and in the New Keynesian models) or its understanding as an unstable, sinuous and uncertain process (as is seen by the Institutionalists, Neo Schumpeterian and Post Keynesians) does not put an end on the analytical possibilities of this complex theme.

In conclusion, we consider that new frameworks of economic theory include richer understanding of growth dynamics, institutions and policy implications on economic growth. In this dissertation, beside key macroeconomic determinants that are significantly correlated with economic growth, factors that have received much attention in recent new institutional economics have been incorporated to the growth model.

2.2. Theories of Income Distribution in Historical Perspective

Since different economic theories have implications on income distribution it has been at the crossroads to many theories throughout history. Starting with classical economists like Adam Smith and David Ricardo, functional distribution of income has been analysed in terms of profits, rents and wages. Even though economic growth was the prime goal for Smith (1776a) his 'invisible hand' mechanism has indicated automatic pricing and income distribution in free markets without government intervention. Smith in his book "The Wealth of Nations" states that individuals use their capital to support the country's industry in order to secure themselves. Individual only considers his own earnings. Acting in this direction individual strives for the benefit of his society. Thus, taking care of his own interests, he also takes care of the interests of the society (Smith, 1776b).

David Ricardo (1817) argued that the value of the product depends on the quantity of labour needed to manufacture it. In his theory rent is defined as 'that portion of the produce of the earth which is paid to the landlord for the use of the original and indestructible powers of the soil' (1817, p.33). Similarly, Ricardo divided distribution of income between capitalists earning profit, landlords earning rent and workers earning wages. He emphasized concept of rent in income distribution and the increase in rent after population growth indicating that as the population increases planted productive land will be insufficient in the long run. In this case, less productive lands will be used for planting. The difference between productive lands and unproductive lands will increase the rent; in this case the income distribution will change in favour of the landlords. In fact, classical economists viewed profit as the interest rate plus the premium based on capital's nature, however, they were not concerned with the ownership structure and as such their income distribution theory within the capitalist class is insufficient (Sandmo, 2013). They have refined theory of functional income distribution but their personal income distribution theory was limited.

According to Marx (1867) worker works for the capitalist and the product he produces is property of capitalist. There are two separate concepts; the value of the labour power owned by the worker and the value created by this power. Capitalist are concerned with the difference between these two values. When an added value is created process involves creating surplus value which is defined as capitalist process. Struggle between workers and a capitalist is related to the increase of workers share from this surplus value. Marx stated that unemployment is permanent characteristic of capitalist system and it is essential for understanding income distribution (Sandmo, 2013). He stressed the fact that labour is

primary factor of production since all non-labour inputs are result of past labour but workers are paid bare existence wages for their work. This surplus value defined as 'exploitation' represents capitalist's benefit and is Marx's main idea in analysing income distribution (Sandmo, 2013). Marxist theory especially emphasizes unequal distribution of the means of production between capitalists and workers (Nilsson, 2020).

Neoclassical distribution theory is related to the production and value theories. It expresses the view that incomes are earned in the production process as well as that production factors' value shows its contribution to the final output. Neoclassical economists by introducing concepts such as marginal productivity theory, opportunity cost and production function have expanded a perspective on income distribution. According to this theory functional distribution of wages and profits are determined by the market where demand intersects supply of labour (Bhattarai, 2016). Besides land, labour and capital, Alfred Marshall (1890) included the entrepreneurship to the factors of production. According to Marshall, factors of production such as labour, capital, land or the value of any product are determined by supply and demand. While demand determines the value of product in the short run, production costs form product value in the long run. Factors of production (profits, rents, interests, and wages) get distributive shares from national income in line with their contribution to process. When one of the factors of production gets a larger share of the total income, the share of the other factors of production in total income will decrease (Marshall, 1890). Neoclassical economics is closely related to classical liberalism and provides framework for neoliberalism. Ha-Joon Chang (2003, p. 47) explains that 'neoliberalism was born out of an unholy alliance between neoclassical economics and Austrian-Libertarian tradition'.

Even though Keynes did not particularly address the issue of income distribution in "The General Theory", he made a number of recommendations regarding the impact of income distribution on employment levels and specifically on the level of aggregate demand and its composition (Kregel, 1978). Keynes (1936, p.124) believed that economic system has an exceptional feature; although being prone to significant output and employment oscillations, it is not 'violently unstable'. Contrary to the classical economics, Keynes rejected the view of equilibrium at full employment level. Further, he stated that market system can create underemployment, hence 'full or approximately full employment is of rare and short-lived occurrence' (Keynes, 1936, p.124). If effective demand is insufficient equilibrium may occur below full employment. Change in employment leads to the relatively small changes in wages in the same direction, which is a condition of the stability of prices. The relationship between income and consumption is determined by the propensity to consume. However, the increase in consumption is not in the same proportion to increase in income level. The marginal propensity to consume is central to Keynes' focus on aggregate demand and spending. Although Keynes identified prices, taxes, wealth, interest rates, the distribution of income and expectations of future income as factors affecting the propensity to consume, only 'the distribution of income' factor has been ignored by mainstream economists. Aggregate consumption increases when income

is redistributed to lower classes as their propensity to consume is higher. Therefore, Keynes argued for high tax rates for all types of income that are disproportionately obtained by the wealthy such as unearned income, capital gains and inheritance (Pressman, 1997).

Relation between growth and income distribution has received a lot of attention from post-Keynesian economists. Due to environmental concerns and a low-carbon economy, rather than accelerating economy many economists investigate methods to achieve zero growth or degrowth in pursuing full employment. For this purpose, ecological economists are using post-Keynesian models (Lavoie, 2022). From the point of division of national income, Keynes followers as Joan Robinson, Nicholas Kaldor and Richard Kahn went on to research broader inferences of Keynes' employment theory for the analysis of income distribution (Kregel, 1978). Post-Keynesian theories of income distribution differ from other theories with respect to following three assumptions; investment plays a significant role in determining profits, investment is independent of saving and saving adjusts to investment over a large range of feasible values, people are more likely to save from profits than from wages. The most popular theories of post-Keynesians have been those of Kalecki, Kaldor and Passinetti. Post-Keynesian income distribution theories suppose two class in a society; profit earners (interest, rent, dividends and retained earnings) and wage (salary) earners with each class having his own propensity to save (Asimakopulos, 1975). They emphasize the role of investment, growth, employment and prices in income distribution contradicting to unequal incomes based on differential productivity explanations of mainstream theory (Kregel, 1978). In particular, Kaldor (1956) asserts that while total income consists of wages and profits, savings are equal to the savings of the working class and the savings of the capitalists. He points out that if the share of profit in total income increases, then the share of real wages decreases and vice versa. Wage and profit earners have a different marginal propensity to save. The ratio of investment to income changes the ratio of profit and wage share in total income.

2.3. Sources of Income Disparities

In analysing the causes of income disparity, a variety of approaches have been highlighted. Literature review demonstrates globalization, especially trade and financial globalization as major factors driving income inequality. Also, technological change, redistributive policies, changes in labour market institutions (LMI) and education are recognized as sources of inequality (Dabla-Norris *et al*., 2015). Cornia and Court (2004) suggested that one has to separate between so called 'traditional' causes of inequality and 'new' causes. Traditional causes are factors such as arable land area, urban bias and inequality in education. New causes are said to be linked to the liberal economic regimes and policies implemented in large scale in developing countries in the 1980s and 1990s such as new technology, trade liberalization, financial liberalization, privatization and distribution of industrial assets, changes in LMI etc. The traditional causes are explained to be responsible for the initial level of inequality in different countries, but the recent increase in inequality

in some countries is said to be due to the new causes corresponding to the rapidly changing liberalizing economic regimes. Therefore, traditional causes are claimed not to be responsible for the worsening situation but new causes are rather crucial. Guidetti and Rehbein (2014) summarize eight different views in explaining potential roots of income inequality.

Human capital

Human capital is principal theoretical foundation used by neo-classicists to demonstrate individuals' different earnings. In 1964, Gary Becker constructed human capital theory where he considered two different types of skill formation; schooling and learning on the job are factors that influence wages. Human capital refers to skills that a person possesses that can generate income for him or her. However, in both cases there is a decreasing rate of investment to human capital over the course of a lifetime cycle (Weiss, 2015). People invest in education for as many years as it takes for this investment to yield a return that exceeds alternative investment. The extent of this investment is significantly influenced by individual ability and characteristics such as gender, family background and income (Guidetti and Rehbein, 2014). Meanwhile, Becker considered analysis of skill formation between specific and general training in companies (Weiss, 2015). He established the crucial distinction between specific and general training and demonstrated that while it may be practical for employers to contribute to investment in specialized training, the burden of general training is on the shoulders of the employees due to the risk in valuing general training by other employers (Guidetti and Rehbein, 2014). Authors conclude that from both perspectives' skill development is the root cause of income disparity. Inequality arises from decisions made by both employers and employees when it comes to training activities in businesses. In the analysis of individual educational choices, inequality depends on the amount of time invested in education, which in turn is related to background and individual characteristics.

Skill biased technical change

This view highlights how the advances in new technologies and the corporate reorganizations due to these technologies have influenced the demand for high-skilled individuals compared to middle-skilled workers. Goldin and Katz (2007) hypothesized that since new technologies enhance the work of high-skilled individuals they can eliminate middle-skilled labour. Jobs related to both cognitive and non-cognitive repetitive tasks are the most adversely impacted by these dynamics, leading to a significant reduction in middle-class workers (Guidetti and Rehbein, 2014).

Internalization of production

It is acknowledged that effects of globalization on income disparities are divergent. New institutional framework of international trade supports outsourcing and offshoring which has significant impact on the new global labour division. Generally, companies maintain

high-skilled activities with a small number of highly compensated employees in developed countries while reducing employment and wages for medium-low paid workers whose jobs are more likely to be exported to developing countries (Guidetti and Rehbein, 2014). Thus, although effects of trade globalization on unskilled workers in advanced countries are mixed, income inequality may decrease in emerging and developing countries with abundant lower-skilled workers (Dabla-Noris *et al.,* 2015).

Labour market institutions

According to the study by OECD (2011) three different types of institutions are considered as main factors influencing income disparities. First of all, the varieties of employment agreements and regulations that govern them have an impact on workers' bargaining power. Second, the level of labour unionization is very important. Thirdly, existence of collective bargaining plays important role. These three elements have had a significant effect in the dynamics of income inequality, affecting the power dynamics in wage negotiations. The recent liberalization of the labour market has undermined collective bargaining which has likely been one of the main contributing elements to the recent rise in inequality that has been observed in the majority of European nations. Calderon and Chong (2009) discovered that in many developing countries, the mix of strict hiring and employment protection legislation, along with poor income protection regimes, frequently promotes informality which in turn increases income inequality. Labour market rules such as minimum salaries, unionization, and social security contributions appear to improve the income distribution.

Role of the welfare state

IMF study (2014) shows that cash transfers have become a crucial instrument for targeting resources toward the bottom of the distribution. However, Dabla-Norris *et al.* (2015) argues that the extent to which redistributive policies has impact on the country depends on the size and rate of progress of these transfers.

Inequality

According to this approach inequality is considered as an autoregressive process where the level and magnitude of past inequality determines current inequality. Brunori, Ferreira and Peragine (2013) research showed that a significant proportion of income inequality could be explained by exogenous factors such as birthplace, gender, race and family background. Their study accentuates the importance of inequalities in opportunities and rigidness of social hierarchy. Similarly, Milanovic (2015) argues that income is determined by the place where individual lives. Specifically, for the middle-class key factor in determining the income level is country of residence.

Models of capitalism and institutional complementarities

Guidetti and Rehbein (2014, p.10) summarize this approach in accordance with theoretical framework based on the concept of 'institutional complementarity' developed by institutional economists in 1990s. According to this theory, institutions interact among each other generating institutional equilibrium which in turn influence functioning of all economic agents involved in the market. Even though market performance is determined in large part by demand and supply forces, the network of interacting institutions has significant impact on it. Therefore, institutional structures influence individual decision-making at both the company level and the employee level. This analytical framework specifically highlights how an individual's propensity to invest in human capital is determined by LMI.

The governance of firms

According to Stiglitz (2012) this approach is linked to the microeconomic management of the market, leading to a lower degree of competition among firms which results in emergence of oligopoly. Another strand of research done by Atkinson, Piketty and Saez (2011) on rise of top management and their incomes is also related to this approach.

2.4. The Measurement of Income Inequality

The measurement of inequality is an issue over which researchers have been discussing and different measures of inequality have evolved throughout history. In general, main axioms that are required for inequality measures are The Pigou-Dalton transfer principle, income scale independence, principle of population, anonymity and decomposability (Litchfield, 1999). The Pigou-Dalton transfer principle requisite changes in inequality if income is taken form poorer person to richer person or vice versa. Litchfield (1999, p.2) states that 'this axiom requires the inequality measure to rise (or at least not fall) in response to a mean-preserving spread'. Thus, the Gini index, Atkinson and Generalized Entropy class of measures conform to this axiom. On the other hand, income scale independence principle requires inequality to be constant for fixed amount increases in households or individuals' incomes (Charles-Coll, 2011). As cited in Litchfield (1999), according to the principle of population forwarded by Dalton (1920) inequality does not change if population is replicated, therefore, inequality remains same when combining same distributions of income. While anonymity is related to inequality measure being solely connected to individuals´ income other than any different characteristics, decomposability principle requires components of distribution to be associated with overall inequality (Litchfield, 1999). Most widely used income inequality measures along with their principal properties are provided together with advantages and shortcomings of each these measures.

The Gini Index

Today most known and widely used measure for aggregate inequality of income distribution, the Gini index was first published by Corrado Gini in 1912, a book in Italian under the name "Variabilità e Mutabilità" (Ceriani and Verme, 2012). In his book Gini introduced 13 various formulations of his index defined as 'the mean difference from all observed quantities' and suggested that the aim of the research will lead to the best choice of formulation. The Gini coefficient takes values from 0 to 1 where 0 represents a society of every person having the same income and 1 represents a society where only one person owns all of the income thus a society of maximum inequality (Keeley, 2015).

Moreover, the Gini coefficient can be represented by Lorenz curve which makes it quite easy to interpret and explain. The Lorenz curve on y axis plots the proportion of total income while on x axis is the amount that each quantile of population gets (Charles-Coll, 2011). The Gini index is defined as the area between the Lorenz curve and the 45° line of absolute equality. In equally wealthy society the poorest 20% of the population earns 20% of the entire income while the poorest 50% earns 50% of the total income. Thus, the Lorenz line follows perfect equality. Ease of understanding as well as availability of inequality datasets made this index accepted among scholars. The Gini coefficient conforms to The Pigou-Dalton transfer principle, income scale independence, anonymity and principle of population.

As already mentioned, various formulations for calculating Gini coefficient exists and literature suggest that most widely used is (Charles-Coll, 2011, p.25) ;

$$G = \frac{1}{2n^2\mu}\sum_{i=1}^{n}.\sum_{j=1}^{n}|y_i - y_j| \qquad \text{Equation (1)}$$

The main benefit of using Gini index for inequality is to explain income distribution with single measure (Sitthiyot and Holasut, 2020) as well as ease of comparison between different countries or groups (Charles-Coll, 2011). However, Charles-Coll (2011) explains that main drawbacks of this measure is that diverse set of income distributions may give same Gini coefficient value and it does not reflect the lifetime earnings of an individual which apparently changes overtime.

Rankings

Income shares and quantiles are common inequality measures used for comparing income between different groups previously ranked by income quantiles or deciles. The share of quantile is expressed as the percentage of total income shared by the population allocated to a specific quantile (Kovacevic and Yung, 1997). For example, to show the striking inequality, the income earned by the top 10% of population is divided by the income earned by the poorest 10% of population. Before more sophisticated measures emerged

income shares and income quantile ratios were popular measures of inequality in the early inequality-growth relationship literature because of their simplicity of calculation and ease of interpretation (Charles-Coll, 2011).

Although rankings do not give clear information whether inequality has increased or not, they are telling us something interesting about income distribution (Cowell, 2009). As they are easy to calculate and interpret usually lower and upper decile ratios or quartiles are compared. De Maio (2007) argues that benefit of this measure is ease of comparing different decile ratios such as 20:80, 30:70 or 40:60 with specific issues of interest; for example correlations of decile ratios with health of society in order to analyse which part of income distribution is sensitive and should be considered as an important factor of population health.

Moreover, the Quintile Share Ratio described as the ratio of the total income earned by the richest of 20% of the population relative to that earned by the poorest 20% commonly known as 20/20 along with the Gini index in 2001 by the European Council are accepted as two indicators of income inequality that member states will use (Langel and Tille, 2011). Using these combinations allows researchers to analyse where income is most concentrated.

The Coefficient of Variation

Characteristic of the coefficient of variation is that it is responsive to changes in income at any level and this property makes it an interesting choice to use as a measure of inequality (Charles-Coll, 2011). However, drawback of this measure is that it depends on the average of income while other measures such as Gini coefficient calculate income differences between people in the population. The formula of coefficient of variation is given as (Charles-Coll, 2011, p.22):

$$CV = \frac{\sqrt{V}}{\mu} \qquad \text{Equation (2)}$$

Thus, using the coefficient of variation is common measure in research to estimate the dispersion (Ehrlich and Overman, 2020). The Coefficient of Variation is smaller when the distribution is more equal but the disadvantage of this measure is the absence of upper limit which makes interpretation difficult (De Maio, 2007).

The Variance and Standard Deviation of Logarithms

Logarithmic transformation of income eliminates scale effect and other problems with raw data. The variance is calculated with these substituted values of the mean and actual income as follows (Charles-Coll, 2011, p.23):

$$V = \sum_{i=1}^{n} \frac{(logy_i - log\mu)^2}{n}$$ Equation (3)

And standard deviation of logarithms is calculated as:

$$SD = \sum_{i=1}^{n} \sqrt{\frac{(logy_i - log\mu)^2}{n}}$$ Equation (4)

While this measure underlies income variability at bottom distribution, the drawback is that it is subject to mean income level (Charles-Coll, 2011).

The Atkinson Index

The feature of Atkinson index is the capacity to investigate effects of inequalities in different parts of income distribution which empowers computation of subjectively different inequalities (De Maio, 2007). General formula for the Atkinson class of index is (Litchfield, 1999, p.4);

$$A_\varepsilon = 1 - \left[\frac{1}{n}\sum_{i=1}^{n}\left[\frac{y_i}{\mu}\right]^{1-\varepsilon}\right]^{\frac{1}{1-\varepsilon}}$$ Equation (5)

Atkinson created a new index in the measurement of income inequality claiming that the Gini coefficient did not include social judgments. This index, which was created by including the concept of social justice in the measurement of injustice in income distribution, can take values between 0 and infinity. A value of 0 indicates that the society does not care about income distribution, and a value towards infinity indicates that the society is only interested in the low-income group. In addition, the Atkinson index is more sensitive to changes at the bottom of the income distribution as the ε value gets higher (De Maio, 2007).

The Generalized Entropy Index

The Generalized Entropy Index is a more sensitive index in measuring income inequality. It can take zero and infinite values.

A value of zero means that there is no inequality in income distribution, and a high value means that inequality in income distribution is high (De Maio, 2007). The general formula is shown below.

$$GE\ (a) = \frac{1}{a\ (a-1)}\left[\frac{1}{N}\sum_{i=1}^{N}\left(\frac{y_i}{\bar{y}}\right)^{a} - 1\right.$$ Equation (7)

The a coefficient in the equation is the sensitivity coefficient. It reflects the weight of inequality between the incomes of different groups in the income distribution (Haughton

and Khandker, 2009). The main advantage of the Generalized Entropy Index is its property of decomposability which enables to break index to its elements; population subgroups (De Maio, 2007).

The Theil Entropy Index

The Theil index is a measure of overall inequality linked to the entropy class of measures (Charles-Coll, 2011). Formula for the Theil index which measures general disproportionality (Cowell, 2009, p.54) is given as follows:

$$T = \frac{1}{n}\sum_{i=1}^{n}\frac{y_i}{\mu} log\left(\frac{y_i}{\mu}\right) \quad \text{Equation (6)}$$

Compared to Gini coefficient Theil index takes into consideration the variation within and among the groups which can be more suitable in studies of social inequality (Sokolovska, Zolt and Tomasevic, 2015). Charles-Coll (2011, p.) explains that main advantage of this measure is to satisfy decomposability principle where 'decomposing inequality to measure both between region elements of inequality as well as within regions in order to obtain a more in-depth view of the phenomenon' is possible.

2.5. Theoretical Mechanisms

Theoretical analysis has proposed various channels through which inequality can affect economic growth. Subsequently, empirical research has attempted to investigate between these channels in order to distinguish impact and consequence of each. As a result of enormous attention and numerous studies by economists on economic growth and income inequality relationship positive, negative and inconclusive outcomes have emerged. The complexity of income inequality and economic growth relationship challenges researchers taking into account different perspectives. First of all, institutional quality as an important channel linking inequality to growth will be explained. In theoretical framework distinct mechanisms exists; the political economy, the credit market imperfection, the socio-political stability and endogenous fertility theories (Perotti, 1996; Barro, 2000; Chen, 2018, Mdingi and Ho, 2021) are dominant within mainstream economics which will be briefly discussed.

2.5.1. Institutions

In the early 1990s the empirical growth literature has included a number of factors such as financial market development, trade openness and institutional quality to the growth equation (Cingano, 2014). Since then, empirical studies on growth-institutions nexus has grown rapidly. Researchers have investigated effects of various institutional indicators where emerging role of institutions for development and economic stability has been recognized. Moreover, growth in institutional economics involved analysis of institutions'

impact on various processes such as innovation, human capital and sustainable development. As mentioned previously, extensive research in this area assumes very broad definition of institutions. Alternatively, the increasing acknowledgment of the importance of institutions on growth and inequality has resulted in a large number of studies that indicate how different types of institutions via financial flows can shape income disparities.

However, prior to Stanley Engerman and Kenneth Sokoloff economic inequality was not a prominent theme in institutional literature (Bluhm and Szirmai, 2011). Their most significant contribution is in proving that economic inequality in the age of colonial era has impact on current schooling, banking and different institutions. In this way, factor endowments, institutions and inequality are linked to long run economic growth. Further, Engerman and Sokoloff (2002) in seminal paper "Factor Endowments, Institutions and Differential Paths of Growth among New World Economies" describe that there did not exist any significant differences in income levels across America in the first quarter of millennium after the arrival of Europeans. Moreover, some parts of Caribbean and South America had higher incomes per capita compared to colonies that would later become United States and Canada. Thus, parts of America that were initially colonized by Europeans were ones that are left behind.

Within this frame of reference, Acemoglu, Johnson and Robinson (2001) used settler mortality rates observed by European colonialists to examine how institutions affect economic growth. According to this hypothesis, Europeans would not settle in the colony if mortality rates were high which in turn resulted in extractive and worse institutions within that colony. Their empirical research has found that when current institutions are instrumented by settler mortality rates in 17^{th}, 18^{th} and 19^{th} centuries institutions have significant impact on income per capita. Moreover, institutions are persistent and estimates indicate that three quarters of differences in income per capita are explained by differences in institutions. Acemoglu, Johnson and Robinson (2001) discuss that the colonies settled by Europeans had institutions that protected property rights and prospered while others drained and extracted resources and remained mainly relatively poor. The choice of institutions reflects the distribution of political power in society.

In literature there is consensus on institutions role for growth, but there is also debate to what degree are certain institutional arrangements crucial for growth and which particular institutions have larger impact to economic outcome (Bluhm and Szirmai, 2011).

As a matter of fact, Acemoglu, Johnson and Robinson (2004) distinguish between three different theories trying to explain backwardness; cultural factors, geography and economic institutions. Rodrik, Subramanian and Trebbi (2002) states that three strands of thought on income differences are geography, international trade and institutions. Gallup, Sachs and Mellinger (1999) argue that diseases and agricultural output, location and climate through their impacts on transportation costs have significant implications on income levels and growth. Morever, economic policy decisions also appear to be

influenced by geography. There are solid theoretical and empirical grounds for thinking that the interaction of institutions, policy, and geography in the development process is complicated (Sachs, 2003). However, Acemoglu, Johnson and Robinson (2004) theorize that economic institutions govern economic outcomes, shape motivations as well as limitations of economic actors and as such are fundamental determinants of long run growth. Appropriate theoretical framework is dynamic involving both political and economic institutions. Conflict over benefits from economic institutions between different groups settles in favour of groups with more political influence. Political institutions play a major role in determining how political power is distributed in a society. Political systems distribute de jure (institutional) political power whereas economic groups often have greater de facto political influence (Acemoglu, Johnson and Robinson, 2004).

In this regard, Acemoglu and Robinson (2012) in their book "Why Nations Fail" establish a theory for global inequality where political and economic institutions determine whether country is rich or poor and explain how different sets of institutions emerged in countries around the world. Their main argument is that even though economic institutions are long term determinants of economic growth, actually politics and political institutions govern economic institutions.

An alternative view by Coatsworth (2005) explains that based on standardized measures such as GDP, until 1750 Latin America was not undeveloped. The regions conquered by Europeans owing to new technologies in mining, ore processing and agriculture gained miraculous levels of productivity during the colonial era. When the effects of Spanish conquer over the long run diminished European technology bringing up cane sugar and African slaves to process it enabled even greater productivity gains. Places like Caribbean islands where sugar exports exceeded 30-40% of GDP, had higher GDP per capita than European countries. Historians describe three transformations that lead to raised GDP per capita in America; opening the trade with the rest of the world, transmission of technology, organization, flora and fauna and the demographic catastrophes like migration of African slaves and destruction of local population. It is argued that although they had abundant natural resources, Iberian colonialism was not successful in creating societies that produce technology. Between 1750-1850 most of the Latin American countries begin to lag behind North America. Institutional changes adopted by Anglo-Americans related to market transactions and securing property rights was seen as the reason for the differences in GDP. Acemoglu, Johnson and Robinson (2001) explain that Latin America's difficulties was the result of the 'extractive institutions' imposed by European colonialism on subject populations.

Bennet and Nikolaev (2016) empirically tested Engerman-Sokoloff's hypothesis that factor endowments affected the rule of law and this in turn caused income inequality. This hypothesis states that factor endowments more advantageous for grain and wheat led to multiple family owned farms compared to products as sugarcane that resulted in development of larger farms and plantations from which emerged dominant elite class, economic and political power on one hand and middle class on other side. This defined

initial distribution of economic and political power which generated structural income inequality. However, authors to existing hypothesis add 'the rule of law' and investigate that factor endowments through the rule of law influence income inequality. Their argument is that elite class established institutions of law in order to protect their economic interest leading to weak legal institutions whereas middle class established strong institutions of rule of law. According to authors, these events explain the differences in income inequality across countries. Their findings show that elites' efforts to impact on the rule of law whenever possible have led to increase in income inequality.

2.5.2. The Political Economy Channel

This theory states that inequality is harmful to growth and at the macro level political economy works via political and economic mechanism (Chen, 2018). The link of political mechanism is based on median voter theorem proposed by Meltzer and Richard in 1981. According to this theory, in highly unequal societies when people are ranked based on their market incomes, the median voter (with the median level of income) is relatively poorer. Compared to the mean income, his or her income is smaller. When income disparities are larger, the median voter gains more from the combination of taxes and transfers, and the more likely he will vote for greater taxes and transfers if net transfers are progressive. If this theory is taken as the determining mechanism through which impact of income inequality on economic growth is theoretically expressed then more unequal countries will choose greater redistribution (Milanovic, 2000). The second link is related to economic mechanism. When addressing the need for redistribution, policymakers may impose a proportionate tax on an individual's physical and human capital. However, this will reduce the after-tax return on individual investments. Hence, decrease in aggregate capital accumulation would obstruct future economic growth (Chen, 2018). Alesina and Rodrik (1994) linking endogenous growth model with median voter theorem have studied the relationship between growth and income inequality. Their empirical evidence indicates that disparities in land and income ownership have negative impact on subsequent growth. Thus, greater inequality in wealth and income leads to higher tax rate which in turn lowers growth. Furthermore, they demonstrate that the relationship between growth and inequality is not different in democracies and nondemocracies. In addition, authors suggest that growth is not faster or slower between democratic and nondemocratic regimes. Milanovic's (2000) empirical results confirm that more unequal countries redistribute more. However, Milanovic (2000, p.41) argues that the median voter theorem may not explain the 'collective-decision making rule' due to the fact that not all issues are subject to direct voting. Thus, it is not clear if and to what extent representative policy decisions for a given subject reflect the views of the median voter.

2.5.3. The Credit Market Imperfections

The alternative view is that income inequality impacts growth through the credit market imperfections channel. In the presence of credit market imperfections higher inequality reduces growth. This approach is first proposed by Galor and Zeira (1988, 1993) and is also known as 'human capital accumulation theory' (Cingano 2014, p.12). In relatively more equal societies, when skilled labours' wages increase individuals are more inclined to invest in human capital. Nevertheless, in poor countries with high income inequality economic benefits of innovation are modest due to low investment in human capital (Galor and Zeira, 1993). Individuals' decision on human capital investment depends on his/her income or wealth level and in presence of financial market imperfections even though the rate of investment on human capital is high, the poor may leave the school if they cannot pay the fees (Cingano, 2014). Hence, initial distribution of income has adverse effect on technological developments (Galor and Zeira, 1993). Barro (2000) argues that this channel mirrors existence of asymmetric information and constraints of legal institutions in a society. However, within this framework author (2000, p.5) asserts existence of a 'threshold size' of investment which can generate positive impact on growth. As an example of this threshold level is investment in human capital where secondary education compared to primary education has more effect on economic growth. Similarly, a business to become productive needs to go beyond some threshold size. Capital market imperfections are more critical in poor economies than rich one (Barro, 2000).

Also, Mdingi and Ho (2021) discuss that in the presence of imperfect markets poor have not access to finance due to asymmetric information which limits them from high return investments. In the long run, high inequalities lead to the lack of investment in human capital which in turn has detrimental impact on economic growth of a country.

This theory has sparked another line of research into the credit market imperfection approach; an impact of inequality on intergenerational mobility and allocation of talents (Galor, 2009).

2.5.4. Socio-Political Instability

This mechanism likewise predicts negative link between income inequality and economic growth. Barro (2000) describes that high inequalities in wealth and income trigger the poor to commit crimes, start riots and participate in other illegal activities. Also, revolution may threaten stability of political institutions resulting in uncertainty for laws and regulations. Involvement in crime and similar actions against stability represent a waste of resources, threat to the property rights and discourages investments. More inequality tends to lower an economy's output through these numerous aspects of socio-political turmoil. In keeping with this, economic growth slows down, especially during the transition to the steady state. Still, Barro (2000) claims that even in nondemocracies leaders would choose income-equalizing transfers if they were to decrease the likelihood of political instability.

High income and wealth inequality lead to societal unrest which in turn results in increased level of criminal activities and strikes. Uncertainties have impact on trust in government, discourage investment and hinder economic growth. Therefore, political instability threatens prospects for growth (Mdingi and Ho, 2021).

Cingano (2014) points out that this theory is linked to the inequality at lower end of the income distribution. The following hypotheses have been tested by Alesina and Perotti (1996) on a sample of 71 nations over the years 1960–1985. Empirical evidence suggests that by fostering societal unrest, income inequality exacerbates socio-political instability. Further, socio-political instability discourages investment by generating uncertainty in the political-economic climate. Therefore, investment and income inequality are negatively related.

2.5.5. Saving Rates

Classical economists believed that since rich have higher marginal propensity to save, inequality directs resources toward people who have higher marginal propensity to save, thus increases aggregate savings as well as capital accumulation which results in economic growth (Galor, 2009). Barro (2000) have claimed that some economists probably motivated by Keynes' "The General Theory" hold the view that individual saving rate increases with income level. In this case, redistribution of wealth from rich to the poor reduces aggregate savings in an economy. Hence, in partially closed economies investment depends on national savings where greater inequality would be desired in order to promote economic growth. In "The Economic Consequences of the Peace" Keynes (1920, p.54) wrote: 'The immense accumulations of fixed capital which, to the great benefit of mankind, were built up during the half century before the war, could never have come about in a Society where wealth was divided equitably'.

Similarly, Kaldor (1956) advanced the hypothesis that income inequality has positive impact on economic growth through saving rates. Given that the wealthy should theoretically devote a much smaller portion of their income to consumption and are therefore able and likely to save a relatively higher amount than lower income individuals, the Kaldor hypothesis contends that the rich have a higher marginal propensity to save than the poor.

Shin (2012) explains that in developed countries redistributing income from rich to the poor hinders economic growth through lower saving rates and distortions in incentives to work hard. Further evidence suggests that redistribution through increases in income taxes does not necessarily improve income distribution. In this case income inequality negatively effects economic growth.

According to Barro (2000) this mechanism is correlated with previously mentioned credit market imperfections channel. It is important to note that this channel is essential when

setup costs are high or large investments require high sunk costs (Ferreira, Gisselquist and Tarp, 2022).

2.5.6. Endogenous Fertility Channel

This approach investigates how decisions about fertility and human capital investment are related to income distribution (Perotti, 1996). When per capita income, human and physical capital is increasing married women participate in labour force whereby fertility decreases (Becker, 1992). Hence, growth affects fertility rates and in turn inequality through fertility channel impacts growth. If initial inequality is large, high income families invest more on each child whereas low income families can invest little. De la Croix and Doepke (2003) argue that inequality impacts growth through fertility channel. They develop a theoretical framework of overlapping generations in which initial investment in human capital differ between families. In their model high initial inequality lowers the growth rate of average human capital. Since poor families can invest relatively little in education, they make up a large proportion of the population in the next generation. Empirical evidence based on this model demonstrates that the fertility disparity effect is quantitatively significant.

Therefore, income inequality negatively influences economic growth through fertility channel where poor have more children and cannot afford to invest in children's education (Mdingi and Ho, 2019). In contrast, the rich are investing significantly more on children's education and health. If inequality is high fertility decreases stock of human capital which in turn reduces economic growth prospects.

2.6. Literature Review on Growth and Inequality Relationship

Despite a large number of empirical studies on impact of income inequality to economic growth evidence remains inconclusive. Although many theoretical and empirical researches suggest that high income inequality has adverse effects on growth (Alesina and Rodrik, 1994; Atem and Jones, 2015; Berg and Ostry, 2017), there is widely held belief that inequality is necessary for economic growth (Li and Zou, 1998; Forbes, 2000). Research by Banerjee and Duflo (2003) using non-parametric methods has provided evidence for inverted U curve. Kuznets' hypothesis, in the form of inverted U seemed to fit reasonably well with the facts at that time when inequality was high in the beginning of the 20th century, fell during world wars until it began to rise since 1970s and now it seems that inequality follows U-shape (Keeley, 2015).

Previous IMF studies (2015) have shown that income inequality affects growth and sustainability in a negative way. Empirical results obtained in a study by Berg and Ostry (2017, p. 792) support the hypothesis that inequality may be hazardous to economic growth as 'periods of strong, healthy, per capita growth' are related to equality in income distribution implying that in order to achieve sustainable economic growth countries

should avoid excessive inequality. Also, Deininger and Squire (1998) have found a strong negative relationship between initial inequality in the asset distribution and long-term growth. Atems and Jones (2015) employing a comprehensive cross-country panel find that a shock to the Gini coefficient leads to permanent increase in income inequality. However, some authors argue that inequality is harmful to growth in the presence of imperfect capital markets (Aghion, Caroli and García-Peñalosa, 1999).

From the point of view that income inequality has negative impact to growth it is believed that because access to resources and education are restricted, inequality is hindering growth. For example, Panizza (1999) using regional data confirms negative relationship between inequality and economic growth for US states. Li and Zou (1998) by including public consumption in utility function finds evidence which is in contrast to Alesina and Rodrik (1994) and show that income inequality is positively associated to economic growth. Also, Forbes (2000) reported that an increase in income inequality has positive effects on subsequent growth. The Galor and Zeira model predicts that the impact of rising inequality on GDP per capita is negative in rich countries but positive in poor countries.

Brueckner and Lederman (2015) use a panel of 104 nations from 1970 to 2010 to quantify the impact of income inequality on real gross domestic output per capita. Their results suggest that income inequality negatively affects long-term and transitional GDP per capita growth, but the effect varies depending on economic development. In underdeveloped nations, it significantly boosts GDP per capita.

Alternatively, Hailemariam and Dzhumashev (2020) using broad panel of countries and covering period from 1965 to 2014 estimate nonlinear relationship between economic growth and income inequality where threshold effects is present. The empirical findings demonstrate that inequality hinders growth above certain threshold level. Threshold effect of Gini coefficient is 24 for developed countries and 41 for developing countries. Thus, result implies that heterogeneity in data should be encountered in growth inequality relationship since threshold effect is higher for developing countries.

On the other hand, many liberal economists hold the view stated by Arthur Okun in 1975 that countries cannot have perfect equality and perfect efficiency, there must be a trade-off between equality and efficiency. Thus, proponents of this view argue that income inequality is necessary for economic growth because inequality increases savings which in turn boost investments. With increasing growth, even those at the bottom of income distribution will be better off and inequality will eventually decrease. Since inequality increases investments through accumulation some degree of inequality has been seen as necessary to growth.

Due to inconclusive results over economic growth income inequality relationship, Shin (2012) theoretically examined this nexus with optimal growth model. Disagreement about inequalities influence on growth is explained in a single model where in the beginning of economic development increase in inequality delays growth. Further evidence suggests

that redistribution through increases in income taxes does not necessarily improve income distribution. Specifically, in the early stages of economic growth income taxes do not decrease income inequality. However, in a near steady state growth higher taxes can improve income inequality.

The casual relationship between income inequality and economic growth indicates that also economic growth may affect inequality which is widely acknowledged and empirically researched in the literature (Aghion, Caroli and García-Peñalosa, 1999; Atems and Jones, 2015).

Voitchovsky (2012) argues that researches estimating overall effect of income inequality on economic growth using cross country data find inconclusive results and this should not surprise us considering numerous transmission channels in this relationship. She argues that literature on inequality and growth suggests that inequalities in different parts of the distribution are related to growth differently and therefore statistics that are overly sensitive to changes in specific parts of the distribution involve alternative mechanisms to growth. Thus, having small number of upper and lower-income groups but large middle-income class will show different form of inequality-growth relation than having large numbers of poor. She further argues that large numbers of poor people allude to lower education and health levels, increasing crime and violence. On the other hand, if middle income class is shrinking and stagnating demand for goods and services will be low and spending will decline.

Nevertheless, as income rises average propensity to save increases. Proponents of the view that inequality is good for growth assure that upper income groups are able to save and their accumulation of wealth will lead to investments that will boost the growth of a country. According to Voitchovsky (2012) when inequality is represented by a single index (Gini or various share ratios) relation with growth is not significant but when the measure of the top-end inequalities is simultaneously added to a regression with the measure of inequality of the lower end or total inequality, the top-end inequality seems to be positively associated with growth, while inequality in the lower distribution is negatively related to growth.

Overall, when cross-sectional OLS estimates are used for long-term relationship between growth and inequality the observed impact of inequality tends to be negative. However, when employing panel estimates for shorter growth periods, a positive or mixed effect is often found.

However, Lundberg and Squire (2003) has argued that literature studying inequality and growth relationship is divided into two strands; on one hand studies investigating ‘mechanical relationship’ between income inequality and level of development and on the other hand studies analysing determinants of growth and inequality separately. Thus, authors draw attention to the point that factors influencing both inequality and economic growth simultaneously have not been investigated in details. Moreover, they argue that

exploring casual effects of certain policies cannot be understood properly without analysing growth and inequality simultaneously since they are a consequence of same processes.

In the context of economic development literature two broad approaches exist. Glaeser *et al*. (2004) summarize these views; first approach underlining democracy and check balances on government as essential for securing property rights which in turn will lead to political institutions that enable human and physical capital investment in the manner that growth is expected. On the other hand, second approach holds the view that human and physical capital accumulation initiates the process of institutional improvement which will lead to economic growth. As cited in Glaeser *et al*. (2004), literature investigating effects of institutions on economic growth has started with Knack and Keefer (1995) and Mauro (1995), reaching to consensus by Hall and Jones (1999), Acemoglu, Johnson and Robinson (2001), Easterly and Levine (2003), Rodrik, Subramanian and Trebbi (2002) and Dollar and Kraay (2003) that political institutions with limited government lead to economic growth. Authors state that institutional approach views investment policies as a result of political constraints on government while development approach sees that growth leads to good political institutions.

According to Easterly (2007), the reason for inconclusive results on economic growth and income inequality relationship is confusion in theoretical as well as empirical analysis on structural and market inequality. While structural inequality is linked to historical events and elites were generated by non-market mechanisms, market inequality is related to inequalities in free markets. Brazil and South Africa are examples of former inequality and China for latter. Author states that structural inequality has negative effects for growth whereas effect of market-based inequality is ambiguous. Author cites Engerman and Sokoloff claiming that main cause of structural inequality are factor endowments which in turn determines bad institutions, human capital and underdevelopment. Therefore, as natural instrument to address structural inequality 'the exogenous suitability of land for wheat versus sugarcane' was selected.

Nevertheless, inconclusive results over growth inequality relationship could be related to intergenerational mobility as Aiyar and Ebeke's research reveal (2020). Since it is hard to measure equality of opportunity, intergenerational mobility has not been intensively studied in the growth-inequality context until recently. Inequality of opportunity is represented by the level of intergenerational immobility which is usually estimated focusing on father-son relationship. This measure is reflected in either elasticity of son's education to father's education or how person's income is related to the parents' income. Study confirms inconclusive results on growth inequality relationship when growth is regressed only to income inequality, but including interaction term of Gini and intergenerational mobility demonstrates a negative impact of income inequality conditional on intergenerational mobility. Policy implications of this study suggests providing equal opportunities for all individuals will smoothen income inequalities negative impact on economic growth.

Many academic research and policy evaluations agree that the 'Kuznets hypothesis' does not reflect the important features characterizing new patterns in the relationship between economic growth and inequality but Korzeniewicz and Moran (2005) claim that Kuznets work successfully captures two aspects of growth in the economy that can be used to set a useful framework for comprehending historical and current trends in inequality. First argument is that nature of economic growth processes involves population shifts between current and new sectors of production which eventually changes the structure of income distribution. Second, 'institutions and collective social forces on power arrangement' determines the distributional character of these shifts. On the other hand, solution for the increasing income inequality trends due to population shifts from rural to urban lies in Kuznets´ answer of compositional effects and political and sociological dynamics of production that lead to institutional transformations (Korzeniewicz and Moran, 2005, p.278). For example, the urban-rural income differentials through demographic transitions described by Kuznets were significantly smaller in East Asia than in most other developing countries. It is noted that in South Korea and Taiwan even though income in the last half of the 20.century rose over 700 percent; Gini coefficient has not increased significantly. Contrary to inverted U curve, this 'growth with equity' (p.287) demonstrates that fast growth does not necessarily require constraint on inequality.

Even though it is shown that inflation has negative impact on economic growth (Barro, 1990), research on the link between inflation and income inequality has produced mixed results, with some studies indicating a non-linear relationship resembling the Kuznets U-curve, particularly over the long term, as noted by Siami-Namini and Hudson in 2019.

Also, summary of previous literature has acknowledged that economic development level of a country is an important factor in determining growth inequality relationship. Shen and Zhao (2023) in a dynamic panel threshold model taking into account different income levels and different mechanisms has examined how income inequality impacts economic growth. Although negative effect of inequality in growth framework is observed, when fertility rates and country differences are added to the model this effect becomes less significant. Furthermore, testing an important hypothesis related to this question they demonstrate that in low income countries income inequality negatively affects growth while in high income countries this effect is not significant. Thus, from a theoretical point of view exploring this relationship in heterogeneous samples and deriving overall conclusions is not appropriate. The study addresses several further questions on the main channels through which income inequality influences economic growth in low income countries. Findings reveal that investment is not significant channel, however, inequality tends to impede economic growth reducing human capital accumulation and political stability in low income countries. As the authors note, differences in religiosity and saving habits may entail various mechanism of impact in low income countries where fertility channels influence is more pronounced. Policy implications of this study suggest that governments should create policies considering heterogeneity of country characteristics

and level of development taking into account negative impact of inequality by reducing human capital accumulation.

A closer look to the literature review on income inequality and economic growth relationship is provided by Mdingi and Ho (2021). Transmission mechanisms through which inequality and growth are linked are identified as: the level of economic development, the level of technological development, social-political unrest, the political economy, the savings rates, the imperfection of credit markets, institutions and the fertility rate. Given this comprehensive literature review authors state that the level of economic development, the level of technological development and social-political unrest channels reveal inconclusive results. The savings rates mechanism demonstrates positive while other channels lead to negative relationship. Therefore, this relationship depending on the channel explored may be positive, negative or inconclusive. On the other hand, as authors note, positive relationship between growth and inequality is mostly found in developed countries whereas in developing countries this relationship is negative. For these reasons important issue in growth inequality nexus research is taking into account country differences in terms of development along with various transmission channels. A more systematic and empirical analysis is required to determine transmission mechanisms influence on growth inequality nexus both in high- and low-income countries.

Meta-regression analyses reveal that cross sectional studies consistently tend to report stronger negative impact compared to panel data studies. Furthermore, inequality has a negative impact on growth which is more prevalent in less developed countries. However, Neves, Afonso and Silva (2016) claim that estimation method, the quality of income distribution data and the growth regression specification do not have significant impact on effect sizes.

2.6.1. Growth and Inequality in Transition Economies

Transition economies in Europe and the former Soviet Union changing from a centrally planned to a market economy experienced a period of rapid political and economic changes. The main components of transition process defined by IMF (2000) were liberalization of prices and trade, macroeconomic stabilization, restructuring and privatization of state enterprises and legal and institutional reforms in these countries. In the beginning of the market transition most transition countries (TC) faced severe difficulties and constraints; they experienced hyperinflation, declined growth accompanying with increasing unemployment. Milanovic (1998) in his book shows that before the transition the composition of household income was mainly derived from the state and social transfers, as share of gross income were higher compared to market economies. Thus, the Gini coefficient was below OECD countries and countries at similar development level. He shows that average change in GDP growth rate during 1987-1996 in Eastern Europe was very high; in 1991 fell to -14,7 and each country experienced the post-Communist depression. Drawing parallels between this period and Great Depression of

1929, the author points out that the major difference was how wages and employment have adjusted in these depressions. While during the Great Depression unemployment grew and real wages remained stable in all major countries, during the post-Communist depression in East European transition countries wages dropped by one-fourth and unemployment grew from zero to 12-15 percent. Along reforms to market economy output fell dramatically, on average by 40 percent (IMF, 2000). These changes in the initial market transition period caused sizeable reallocation of labour which led to increasing inequality. Milanovic (1998) reports that in TC comparing 1993-1995 to 1987-1988 the average Gini coefficient rose sharply from 24 to 33. Following liberalization of prices in early transition average inflation was 450 percent a year in Central and Eastern Europe (CEE) (IMF, 2000).

Despite the fact that economic growth has steadily risen in the WBC between 2004 and 2008 at an average annual growth rate of 5.8 percent, this growth occurred with high unemployment rates (Sanfey and Mijatovic, 2018) and industrial production in these countries have barely reached its previous levels.

As noted by previous literature, in terms of living standards and GDP per capita huge gap exists between Western Balkan and European Union. This has also been explored in prior studies by Berthomieu, Cingolani and Ri (2016). If the growth rate of 6% per year is achieved in the WBC compared to growth rate of 1% in EU, at least 20 years are required to catch the GDP per capita level of EU-15. Furthermore, this study suggests that development focus should be on infrastructure since average per capita physical capital stock is less than 30% of EU average. To achieve rapid growth substantial investment is essential and this should be led by public investment. Authors state that high growth is also required for reducing high unemployment rates, which in turn is closely related to structural weaknesses and institutional reforms of region.

In developing countries entrepreneurs face barriers while starting a business in terms of financing, high taxes and fees, number of required licences and bribes. In addition to structural economic weaknesses, the WBC growth strategies created under the major influence of international financial organizations have led to policies that neglected issues of economic integration in these countries (Uvalic and Bartlett, 2022). Steady growth performance at the beginning of transition was accompanied by persistent high unemployment rates, and growing income disparities. WB countries were hard hit by the outbreak of financial crisis in 2008 from which they are still recovering. These developments have left many deprived from employment opportunities, while unbalanced growth pattern is linked to prolonged de-industralisation (Damiani and Uvalic 2014; Uvalic 2014; Uvalic and Bartlett, 2022) and seemingly associated with growing income inequalities.

Therefore, critics argue that macroeconomic policies adopted after the fall of communism have produced neither significant growth nor expected prosperity in CEE countries. Poor

macroeconomic policies have been identified as main determinant of deteriorating income distribution. How macroeconomic indicators changed the pattern of inequality in transition period is an issue of interest for academics and policy makers. When we compare the changes in income inequality sharp increase is very obvious since the communist period. Moreover, Brzezinski`s (2018) empirical research reveals that during the Great Recession (2008-2012) income inequality increased in Bulgaria, Estonia, Hungary and Slovenia. According to him main driver of inequality in Central and Eastern Europe was falling full time employment.

While income inequality and its impact to economic growth have been investigated in developed western economies extensively, studies on their relationship in transition economies were limited due to constrains in availability and quality of data. Compared to other transition countries most of the research has been done on members of Visegrad Group which joined European Union in 2004. Therefore, in the context of transition economies the causality of income inequality in terms of macroeconomic indicators in Central and Eastern Europe has not been fully investigated.

Heyns (2005) in her review on inequality in Central and Eastern Europe stated that inequalities have increased by age, education, region of the country and health status whereas it has decreased by gender in these countries. Also, review confirms that as expected urban – rural and regional inequalities and suicides have increased whereas output, production and jobs declined dramatically in CEE countries. She argued that even these countries have recorded positive growth their objective to close the income gap with the West has failed so far. Finally, the author concludes that economic development and poverty reduction depend on macroeconomic policy choices not invisible hand.

Data reflects that in initial transition period while economic output dramatically decreased inequality increased in CEE countries. Empirical evaluation of GDP and inequality relationship assessing four factors; labour market institutions, control of market power of companies, social benefits and taxes in Eastern Europe during the transition to market economy from 1990 to 2011 reveals that in countries with high taxes, high labour rights and effective control of market power inequality declined over the course of economic growth (Jovanovic, 2015).

Bandelj and Mahutga (2010) find that economic growth is not related but privatization increases income inequality. Aghion and Commander (1999) show that the policies selected in Central Europe has led to relatively rapid increase in inequality with a Kuznets curve but if inequality in private sector is relatively high it will be persistent.

A number of papers investigate the effect of foreign direct investment (FDI) on inequality in transition economies (Bhandari, 2007; Bandelj and Mahutga, 2010; Franco and Gerussi, 2013; Mehic, Silajdzic and Babic-Hodovic, 2013). Some authors argue that transformations after the collapse of communist system accelerated globalization, increased foreign capital inflows and that increasing FDI and inequality simultaneously

shows that it may not be coincidence (Bandelj and Mahutga, 2010). In the theoretical literature FDI increases inequality by increasing wage premium for workers in the foreign sector. If considered as a single variable FDI does not seem to be relevant in inequality (Bhandari, 2007; Franco and Gerussi, 2013), however trade especially imports from developed countries are positively correlated with income inequality (Franco and Gerussi, 2013).

Mehic, Silajdzic and Babic-Hodovic (2013) confirm the positive relationship between FDI and economic growth in TC of southeast Europe, but the impact of FDI on income inequality remains unclear, according to both theoretical and empirical evidence. While Tsai's (1995) influential study suggests that FDI has a negative impact on unemployment in traditional sectors, Hemmer, Krüger and Seith (2005) do not find any significant effects on income inequality overall.

The structure of foreign direct investment in the Western Balkan countries is very important in the context of economic growth and development. Botric (2010) discusses that major component of FDI is financial intermediation, then telecommunications and trade sector. Thus, FDI in manufacturing lags behind service sector in every country of WB. Although most of the FDI comes from EU countries it is usually associated with the privatization process especially privatization in service sector. Greenfield investments share in FDI are very low. Author suggests that privatization cannot be used as a strategy to attract FDI since there are not many remaining available projects in the region. Further evidence supports the hypothesis that FDI is biased toward service sector instead of increasing productivity of each country.

Despite perception that remittances positively influence economic growth in the Western Balkan countries, empirical research reveals that their relative weighs are not so strong since they are workers' salaries and personal remittances (Bajra, 2021). On the contrary, FDI has three times larger impact on growth than remittances. Similarly, remittances reduce income inequality in the Western Balkan countries but this effect is not so large. In the light of reported, it is conceivable that remittances serve for consumption purpose increasing purchasing power of individuals without affecting production capacities of a country.

Nevertheless, studying inequality and poverty in the Western Balkans have been interesting for many economists, but empirical research on income inequality have been limited due to lack of or poor quality of data. In general, focus on the studies of poverty and income inequality in these countries has been because of visible inequality manifestations. The articles and reports examining inequality and poverty in the WBs have mostly been published by international organizations. There are some studies on topic of income inequality in the WB countries; for example, El Ouardighi and Somun-Kapetanovic (2009) analysed the inequality convergence process of GDP per capita in five Balkan countries and compared with EU-27 countries for the 1998-2008 period.

On the other hand, Jovanovic (2015) argued that differences in inequalities between the WB countries can be attributed to the differences in the patterns of economic growth considering that the initial conditions were similar for these countries and emphasizes the importance of redistributive institutions in the context of macroeconomic policies and found that countries with stronger redistributive institutions had lower inequality in CEE countries.

Velkovksa, Trenovski, and Kozheski (2020) finds strong evidence to support the persistence of the Kuznets curve hypothesis in selected Balkan countries, attenuated to the slow growth dynamics over the last decade in these countries. The Kuznets curve for this sample is in flatter shape in the beginning of economic development. The countries included in the sample Croatia, Slovenia, Greece, Bulgaria, North Macedonia, Bosnia and Herzegovina, Albania and Serbia have huge differences in terms of per capita income levels. The findings suggest EU member states have lower income inequality than EU candidate countries of Albania, Bosnia and Herzegovina, North Macedonia and Serbia implying that redistribution may play unique role in reducing income inequality in EU member countries.

The importance of redistributive institutions for income inequality has been emphasized by many scholars. Bandelj and Mahutga (2010) argue that states with historically active redistributive role managed to mitigate negative effects of transformation to income inequality. They refer to Czech Republic and Romania as two different examples. While Czech Republic was able to preserve redistributive capacities of the state, in Romania social transfers declined steadily from 1989 making country with the highest inequality among CEE countries. Their results show that countries with higher government expenditures have lower inequality.

Koczan (2016) takes a different view for examining poverty and inequality for the WB countries and argues that transition process has been more traumatic for people in WBs. Analysing poverty perceptions on household levels author attempts to explain dissatisfaction of people even in years with high growth and acknowledges subjective perception as the reason behind feeling poorer than actually are by definition.

The institutional framework in these countries was very important both for small and middle firms to enter and grow in the economy, however, adopted institutional framework directed entrepreneurs to the informal economy (Bartlett, 2009). Lack of proper institutional and legal framework and policies based on neoliberalism in the WBC created an unfavourable environment for inclusive growth (Uvalic and Bartlett, 2022). According to Bartlett (2009) entrepreneurs faced many difficulties in developing business; lack of finance being among the most important one. Since loans were channelled to larger companies, small businesses needed high collateral for higher interest rates which in turn enabled only few small companies to develop into competitive medium sized companies. Moreover, while larger companies were linked to economic and political elites and

established their monopoly positions in the market, they also affected economic policy in a way that harms development of small businesses for many years in most WB countries. Although author describes transition process in ex-Yugoslavian countries in depth it lacks empirical evaluation about claims. The impact of financial market development and institutions in the context of economic growth and income inequality has not been empirically analysed for these countries.

In depth analysis of Western Balkan economies reveals four different structural problems these countries face; 'severe external imbalances, jobless growth, process of deindustrialization and slow income convergence with the more developed EU' (Uvalic, 2014, pp.2-3). First of all, all of these countries have huge trade deficits and discrepancy is caused by high imports which is often twice as large as exports. Secondly, the WBC experienced fast growth until Great Recession but this growth was not followed with high employment rates. Thus, large informal economy and high unemployment rates have been highlighted as serious social and economic problems for this region. Unemployment is characterized by low employment rates and high youth unemployment rates. Uvalic (2014) states that average manufacturing value added as a proportion of gross domestic product for seven countries in the WBs is around 12% which is much lower than EU average. Third key structural problem is deindustrialization caused by decline in manufacturing specifically industry and agriculture. Meanwhile the services share of GDP has increased across all countries which include primary sectors such as banking, telecommunications, retail and real estate. Substantial FDI inflows enabled these countries to achieve higher investment rates, while trade liberalisation underpinned massive growth of trade related service sector. Although globalization has contributed to these structural problems in the region, Uvalic (2014) argues that they have accrued over long period of transition. Compared to relatively moderate transition period in CEE, the WBC have not managed smooth transformation of economy leading to structural weaknesses.

3. THE NEW INSTITUTIONAL ECONOMICS

The New Institutional Economics (NIE) is an emerging interdisciplinary field that seeks to explain economic problems from a perspective incorporating cultural phenomena, law, political science, sociology and anthropology. Despite the fact that there are no clear links between old and new institutionalism, some similar features which exists in both approaches along with the historical evolution of NIE is discussed in first part of this chapter.

The purpose is to briefly present origin of study on institutions throughout history, concept of institutions, differences between two main strands of economic thought on institutions and main theories that attempted to explain it. On the one hand, the overview of the empirical literature that analyse the relationship between economic growth and institutions and on the other, the relationship between income inequality with the related financial and

institutional indicators are given. Further, existing literature on growth-inequality-institutions nexus in transition countries with special focus on the WBC is summarized. Final part addresses definition of institutional indicators and provides review of articles regarding critical and constructive analysis in the field.

3.1. Historical Evolution of NIE

Thorstein Veblen, American economist and sociologist, Wesley Mitchell and John R. Commons are known as founders of 'old/original institutionalist economics (OIE)', also known as 'American institutional economics' or 'institutional economics (Rutherford, 2001, pp.173-174).

Veblen had huge impact on this early institutionalism. Veblen's institutionalist approach involved evolutionary and social thinking with elements of criticizing neoclassical theory. His view highlights institutional change based on 'cumulative and path-dependent nature' and on new technology by changing living and thinking habits (Rutherford, 2001, p.174).

On the other hand, Commons in his book (1924) "The Legal Foundations of Capitalism" based his perspective on distributional problems, legislature and courts trying to solve conflicts and advancing law as a result of these on-going processes. Generally, institutionalist linked law and economics on following subjects: the development of property rights, law on transactions, intellectual assets, evaluation of public services, collective bargaining, consumer protection etc. (Rutherford, 2001).

Besides highlighting habits and routine, original institutionalists such as Veblen paid importance on economic agent and change. Thus, from OIE to development of evolutionary economics some neoclassical assumptions are abandoned or relaxed. In particular, the difference between two approaches is related to economic agent's characterization, broad frame of governance and dynamic or adaptive efficiency (Stanfield, 2006).

Beside Veblen, North (1992) acknowledges contribution of Mitchell, Ayres and Commons on the subject of institutions. According to North, these old institutional economists provided us with creative insights, perceptive explanations and quantitative estimations. Especially emphasize is put on John R. Commons for predicting evolving research on New Institutional Economics. However, theory which is a necessary frame for discipline's growth and progress was lacking in practitioners of old institutional economics.

Despite the diversity of writings by Thorstein Veblen, John R. Commons, Wesley C. Mitchell, Clarence Ayres and other original institutionalists, their work is characterized by several common subjects; focus is on collective activity rather than individual behaviour, instead of mechanistic view of economy 'evolutionary' approach is preferred and accent is on empirical analysis as opposed to deductive reasoning (Klein, 1998).

However, wide range of approaches resulted in different philosophical and psychological propositions in Institutionalism. The rise of positivism, behaviourism in the period of 1900-1930 contributed to a crisis in institutionalism's identity (Conceicao, 2018). Despite the importance of institutions, after World War II they lost popularity due to their inability to provide tools and answers to cope with Great Depression. To be specific, original institutionalists could not build a theory and NIE emerged from this failure. Hence, there are two approaches in the field of Institutionalism; Original Institutional Economics and New Institutionalist Economics. Until 1960s institutionalists lost their dominance and were replaced by orthodox neoclassical economics. Only the rise of NIE in the late 1960s and early 1970s returned institutions to economics (Rutherford, 2001).

3.2. Definition of Institutions

Owing to the complexity and diverse setting in which institutions operate, there is no common definition of institutions. According to Commons (1931), the uncertainty of meaning of institutions was the main challenge in identifying a field of institutional economics. To fully comprehend institutions, we need to understand what they are, how they emerge and change and what implications they have. Since used in various contexts, there exist multiple definitions. Broadly defined, the term 'institutions' refer to 'a self-sustaining system of shared beliefs about a salient way in which the game is repeatedly played*'* (Aoki 2001, p.10), 'the prescriptions that humans use to organize all forms of repetitive and structured interactions*'* (Ostrom, 2005, p.3). According to Potts (2007, p.342):

> Institutions are coordinating mechanisms between the individual and social process of the creation of economic value, and that these process-structures of coordination are just as important in explaining economic activity as relative endowments of factors of production or the particular array of prices.

However, the most common definition is given by North (1992, p.74):

> Institutions are the rules of the game of a society or more formally are the humanly devised constraints that structure human interaction. They are composed of formal rules (statute law, common law, regulations), informal constraints (conventions, norms of behavior, and self-imposed rules of behavior); and the enforcement characteristics of both.

3.3. Main Theories of NIE

The founders of New Institutionalist Economics are Coase, North and Williamson. North (1992) explains that unlike earlier attempts to overthrow or replace neoclassical theory, new institutional economics builds, changes and extends neoclassical theory in order to address a wide range of issues previously beyond its reach. Hence, fundamental

assumption of scarcity and competition which underlies microeconomics is retained and developed. However, the instrumental rationality assumption that makes neoclassical theory free of institutions is abandoned. Further, he asserts that despite advances in cognitive science fully understanding how the human mind works is still difficult and therefore a theory of institutions should begin with a modification of instrumental rationality assumption.

The theory of New Institutionalism acknowledged by Douglass North could be summarized with two propositions; institutions shape outcomes since they are affected by norms, beliefs and actions and institutions are endogenously determined as their work depends on the conditions they appeared and endured (Przeworski, 2004). Main argument stemming from this analysis is how one can differentiate the effect of these conditions from the effect of institutions considering that conditions shape institutions and they just communicate the causal effects of these conditions. In light of this discussion, the main challenge whether conditions or institutions matter remains. As an example, Mukand and Rodrik's analysis is given. They notice that China and India have done better than Latin American countries which adopted orthodox reform agenda. Thus, in order to reform institutions starting point should be divergence of existing conditions not the blueprints that were successful somewhere else.

Hodgson (2006) argues that institutions constrain and enable behaviour. Although rules imply constraints such restrain may allow choices and actions that would not otherwise be possible.

Transaction cost approach, property rights approach; public choice theory, economic contract theory and new institutional approach to economic history are explained to be part of NIE (Richter, 2005).

The next section briefly explains the main theories of NIE; transaction costs theories, property rights and agency-principal approach.

Transaction Costs Theories

This theory dates back to Ronald Coase's article "The Nature of the Firm", published in 1937 where he has introduced bounded rationality even before it was used in theoretical framework (Sykuta and Chaddad, 1999). However, Williamson coined the term 'transaction cost economics' (TCE), which has since become distinctive with bounded rationality and the new institutional economics. In the TCE theory, contract incompleteness is a result of transaction costs and bounded rationality. Because individual decision makers are incapable of considering all potential situations, bounded rationality argues that it is impossible to establish a totally complete contract. Thus, there is always a possibility of opportunism resulting from contractual incompleteness. To find solution, one might conclude that the remedy is to construct the most comprehensive contract feasible but more comprehensive contracts are more expensive to draft.

North (1992) explains that the processing of information by actors as a result of the high transacting cost supports the development of institutions. Not only the rationality assumption but also the special characteristics of transactions can prohibit the actors from obtaining the zero-transaction cost model. The transaction costs occur because information is expensive and asymmetrically owned by the parties to trade. Underlying transaction costs are the costs of estimating different dimensions of the commodities or services exchanged or of the performance of agents, as well as the costs of enforcing agreements.

Transaction costs include 'information costs, agency costs, costs of shirking and opportunism, costs arising from uncertainty, costs of measuring quality of the goods and quality of the output, costs of enforcement of property rights, costs of compliance and costs of detecting violations' (Parada, 2002, p.47).

Furthermore, North (1992) assures that efficient markets of neoclassical theory occur only when transaction costs are free. Institutions are important when transactions are costly. As a matter of fact, transaction costs are so expensive since they consume a considerable portion of national wealth. For instance, a study by Wallis and North (1986) showed that 45% of national income was devoted to transacting in 1970.

The Property Rights Theory

North (1992) argued that institutions and especially property rights are essential for efficient markets. However, the most important issue is how 'the rules of the game' are structured since polity determines rule that change economy (North, 2005, p.74). Polity defines the legislature and enforces property rights. North (2005) used 'property rights' not only in terms of rules of property being owned, but also meaning effectiveness of contract enforcement. He (1992) further discussed that the reason behind very few efficient economic markets is due to the nature of path dependence. Once an economy is on an 'inefficient' path that creates stagnation it will continue. Acemoglu (2005) confirms that individuals will lack the motivation to invest in physical or human capital or adopt more efficient technologies in the absence of property rights.

The Principal-Agent Approach

This approach contributes in comprehending relations and conflicts between principal and agent, such as; buyer-seller, owner-manager, employer-employee, shareholder-manager. It is associated with agency costs, resource allocation in the market and is very helpful when analysing the internal organization of the firm. In common agency problem, the principal delegates some task to the agent but does not know agent's performance (Klein, 2000). Incentive-compatible mechanism requires evaluating how much the outcome is due to agent's performance and how much of it is beyond agent's control. To reduce agency costs and agent's potential moral hazard the optimal incentive contract should be given. Klein (2000) explains that in this theory firms is boundary issue and emphasize is on which extent these contracts can resolve conflictual situations.

3.4. The Nexus between Finance, Institutions, Growth and Inequality

The increasing acknowledgment of the role of finance and institutions on growth has integrated this field into mainstream economic theory. There is large number of studies trying to identify the impact of institutions on overall economy as well as to explain through which mechanisms they shape income disparities. However, extensive research in this area employs wide range of political, economic, social and legal institutions. The overview of empirical literature on growth-inequality-finance-institutions nexus demonstrates the broadness of this research area. A growing body of empirical research examines channel through which financial market development matters for growth in terms of access to capital for firms. More broadly, effects of governance institutions that shape the laws, regulations, ensure property rights and contract enforcement are extensively researched as determinants of long run growth. On the other hand, there is a broad agreement about the impact of institutions on the rising income inequality across countries. Main conclusions in these fields along with the most important and relevant researches are presented below.

3.4.1. Financial Market Development and Its Effect on Growth-Inequality Relationship

A great deal of research has been devoted to understanding the role and importance of financial system in the long run economic growth process. The endogenous growth models developed by Romer (1986, 1990), Lucas (1988) and Aghion and Howitt (1992) offered new framework for exploring various factors influencing economic growth (Levine, 2021). Finance was included into the endogenous growth models in order to understand how financial markets and intermediaries influence overall development. Since then finance growth nexus has been extensively studied by researchers.

This thesis focuses on financial market developments' contribution in the WBC since literature suggests its positive effect on growth (Greenwood and Jovanovic, 1990; Levine, Loayza and Beck, 2000; Beck and Levine, 2002; Durusu-Ciftci, Ispir and Yetkiner, 2017). However, some authors argue that certain aspects of financial market development are positively related to growth up to a point (Beck, Georgiadis and Straub, 2014; Huang *et al*. 2010).

A study by Levine, Loayza and Beck (2000), using cross-section, instrumental variable and dynamic panel data techniques, show that financial intermediary development is positively associated with economic growth. Furthermore, the data demonstrates that differences in financial market development across countries are due to the differences in legal and accounting systems. These results indicate that the growth in the economy can be achieved through the financial system by strengthening creditor rights, contracts enforcement and accounting practices.

This view is in line with findings of Durusu-Ciftci, Ispir and Yetkiner (2017) showing that debt from credit markets and equity from stock markets are two long run determinants of GDP per capita in panel data analysis of 40 countries over the period 1989–2011. Authors point out specifically credit market contribution to growth with policy implications for institutional and legal measures for the purpose of strengthening creditor and investor rights and contract enforcement.

Banking sector's role lies at the heart of the discussion on the impact of finance on economic growth. In light of these studies, it seems reasonable to expect positive impact of banks and stock markets on overall economic growth. To eliminate potential biases, omitted variables and unobserved country effects Beck and Levine (2002) have used generalized method of moments (GMM) technique on a panel dataset for the period 1976-1998. Their results suggest that stock markets and banks positively influence economic growth.

Silva, Tabak and Laiz (2019) using bank and loan specific characteristics test differences in finance growth relationship across Brazilian municipalities. They use unbalanced panel data of 5,555 Brazilian municipalities over the period 2003-2014. Results show that compared to general and other credits, special purpose credit has larger positive impact on economic growth rates. This research seems to validate the view that domestic private banks credit matters more for economic growth than state-owned and international banks credits. Nevertheless, this changed after the financial crises in 2008 and state-owned banks played more important role in growth. As a result, authors state that financial development increases economic growth rates of Brazilian municipalities through credit from domestic private banks.

Financial market development is associated both with businesses and individuals, thus having dual effect on economic growth through human and physical capital accumulation. Depending on causal links from financial systems to growth two different views among economists exist (Strahan, 2003). Schumpeterian view asserts that financial intermediaries are vital for innovation and growth whereas Joan Robinson suggested reverse causality that is as economy grows institutions develop and provide funds to boost existing outcomes. Hence, first view implies that financial market development spurs growth while in second view finance follows growth. Yet, this disagreement divided the opinions of two Nobel Prize laureates at that time; Miller who believed that financial systems obviously contribute to growth and Lucas who claimed that finance is ‘overstressed’ in growth (Strahan, 2003).

Considering the threshold effect in finance growth relationship Botev, Egert and Jawadi (2019) investigate the relationship between financial development and economic growth in a broad sample of developing, emerging and advanced countries covering 10 years and on a separate panel covering OECD countries for 30 years. In order to capture nonlinearities threshold regressions are used. Hypothesis of nonlinearity between finance and growth is not confirmed by this research. Obtained results evidence that higher credit to GDP ratio is

associated with higher per capita income for OECD countries. Banking and financial markets enhance each other positive impact on economic growth. Only when small countries are excluded from analysis stock market capitalisation has positive impact on GDP per capita levels. Research provides evidence that beneficial effects of finance is more pronounced in developed countries and countries with high trade openness.

According to Beck (2012) empirical evidence reveals that financial developments' impact is higher in middle income countries whereas this effect declines as countries get richer. Summarizing literature on the reasons for nonlinearities between finance and growth Beck states that proxies used for financial depth and intermediation may not capture complexities and advancements in financial development. Next, intermediation services over time has lost importance in the financial sector and traditional measures are less in line with the realities of today's finance. As explored by Beck *et al.* (2012) the recipient of credit may also be the cause of nonlinearities, since the effect of household credit on economic growth is different compared to the effect of enterprise credit (Beck, 2012). This may be the reason behind insignificant relationship between finance and growth in developed countries. Additionally, uncontrolled growth of financial sectors may lead to financial fragility.

Along similar lines, Ioannou and Wojcik (2020) revisit the finance and growth nexus at the level of cities in a sample of developed and developing economies. The underlying argument in favor of using sub-national data rather than national aggregates is that these estimates are more precise and take into consideration the fact that finance is unevenly dispersed over country's economy. The foregoing discussion implies that unlike cross-country studies sub-national scale analysis of a single country provides comparable law and social environment. On the basis of empirical analysis, research provides evidence of an inverted U-shaped curve between finance and growth. At the beginning financial development spurs growth, after the critical threshold is reached finance hurts growth. Further evidence supporting this argument lies in the findings that smaller cities in a country benefit more from financial development but are more affected from this negative impact.

Reason for employing financial and governance indicators in the studies relies on capital market imperfections. As Seven and Coskun (2016, p.39) summarized Galor and Zeira`s work (1993) on financial market imperfections:

> When financial markets and institutions work well, they provide opportunities for all market participants to take advantage of effective investment by diverting funds to more productive use, hence boosting economic growth. It may be expected that this framework would also reduce income inequality and poverty. On the other hand, if financial markets do not work well, opportunities for growth are missed and inequalities persist. In the case of the existence of financial market imperfections, the least wealthy, and the smallest enterprises may be the

most affected by information asymmetries, contract enforcement costs, and transaction costs, namely lack of finance.

Legal rules are closely related to the funds i.e. finance. The differences in legal rules protecting investors determine corporate finance and their willingness to fund firms. Research on law protecting investors and corporate ownership patterns explains differences in legal rules among countries. La Porta *et al*. (1998) from an historical point of view summarizes roots of commercial laws used in countries based on two broad traditions; common law which has English origin and civil law of Roman origin. Further, modern commercial laws are derived from only three major families within the civil tradition: French, German, and Scandinavian. Through conquering, imperialism, colonialism, borrowing and imitation these laws have spread around the world. Empirical evidence by La Porta *et al.* (1998) indicates that countries whose legal rules are derived from common law have strongest while countries whose legal rules originate in French civil law tradition have weakest protection of investors.

Levine (2021) reports that financial systems function in economy in the way that effective resource allocation is done based on sectors and activities that are eligible for investment, they exercise control on governance through the funds they provide to businesses and individuals, offer mechanism to trade, feature risk management, promote savings and enable exchange. Further claim is that financial intermediaries may promote economic growth through increase of available data on companies, business and economic activities. The author brings some historical information about the financial innovation and economic growth. For instance, problems in financing railroad expansion in 19th century lead to innovation of new accounting and reporting systems where investment banks and fund providers mobilized savings from investors and allocated capital to railroad operations that they could monitor. Information technology revolution in the 20th century lead to venture capital companies where venture capitalists owned large portion of equity stakes and governed as board of directors in these enterprises. Biotechnology revolution of the 21st century was not appropriate in the context of venture capitalist modality since wide range of scientists from engineers, geneticists, chemists, to bio-roboticists are required to monitor these companies. Thus, financiers again innovated a way to screen biotech companies. Pharmaceutical companies entail large scope of scientists, have experience in regulations of drugs and are linked to medical products deliveries. All these innovations addressed weaknesses in financial systems which in turn spurred economic growth.

There is growing support for the claim that finance differently influences economic growth in different countries, regions, economic and financial development levels and time periods. In light of previous literature, Chu (2020) re-evaluates financial structure economic growth relationship for a large panel of 99 countries over the 1971–2015 period employing the generalized method of moments estimation. For this purpose, various financial structure indicators and macro-economic variables are included in the regression. The results provide confirmatory evidence that financial structure activity and efficiency is important for economic growth, however, the size of financial structure does not have

impact on it. In addition, banking crises and macro-economic volatility decreases economic growth. Empirical findings also offer a vital insight: advancement of financial sector increases the role of stock market over banks. If the financial structure is unbalanced namely advancements in stock markets relative to banks are larger, the positive effect turns to negative. A perspective of policy implications is to balance financial structure for long run economic growth.

Despite decades of work on finance growth nexus, the research exploring relationship between finance and inequality cannot be considered as conclusive. Studies on financial market development and income inequality nexus reveal mixed results. It is expected that as financial market development increases economic growth in every segment of population, this will lead to a decrease in income inequality. Research by Beck, Demirgüç-Kunt and Levine (2007) confirms the importance of financial market development to poor, increasing income of the poorest quintiles and decreasing overall income inequality. Nevertheless, some studies confirm nonlinear regression between financial development and income inequality (Greenwood and Jovanovic, 1990; Dong-Hyeon and Shu-Cin, 2011; Law, Tan and Azman-Saini, 2014).

Three significant theories on the link between financial development and income inequality exist. Also known as Greenwood-Jovanovic hypothesis, claim based on the Kuznets curve suggest that estimation in nonlinear regression between financial market development and income inequality may show that there exists threshold effect. Similar to Kuznets theoretical approach in the early stages of economic development financial markets grow slowly and only rich have access to credit markets. As financial markets grow, aggregate savings and economic growth increases from which rich people benefit more. This process increases disparities among rich and poor. Finally, in maturity phase of development as financial markets are accessible also to poor income inequality begins to decrease drawing inverted U curve. However, Seven and Coskun (2016) do not empirically confirm this hypothesis for emerging countries.

As noted earlier, the second view is based on the expectation that as financial market development increases economic growth in every segment of population, this will lead to a decrease in income inequality. Ben Naceur and Zhang (2016) study investigating the link between financial market development and income distribution demonstrates that financial depth, access, efficiency and stability significantly reduces income inequality while domestic and external financial liberalization exacerbates it. Thus, increasing the number of bank accounts per 1000 adults, ratio of private credit to GDP and ratio of stock market total value traded to GDP reduces income inequality. Also, net interest margins and stock market turnover ratio reduces Gini coefficient and poverty gap. The ratio of regulatory capital to risk – weighted assets decreases Gini coefficient and poverty gap by 0.375 and 0.342 percentage points, respectively.

Weychert's (2020) study explores the influence of different financial dimensions on the Gini level in the short and long run by using dataset from 2003 to 2014. Findings of this

research suggest that financial access reduces income inequality as there is a significant relationship between financial depth, financial access and income inequality. An importance of this study stems from the fact that income inequality is proxied both in terms of Gini coefficient and quintiles. Evidence indicates that number of ATMs and income inequality relationship is significant. Hence, all financial dimensions except liberalisation reduce income inequality. Also, the level of financial inclusion is shown to decrease income disparities (Omar and Inaba, 2020; Demir *et al.,* 2022).

Focusing on bank regulations, Delis, Hasan and Kazakis (2014) examine whether banking liberalization policies have influence on income distribution. They evaluate the connections between credit control, interest rate control and tightening banking supervision with income inequality proxied by Gini coefficient from SWIID database and Theil index from the University of Texas Inequality Project. Empirical analysis demonstrates that liberalizing banking markets reduces income inequality enabling poor access to credits. This result holds only for market-based economies with higher level of economic and institutional development. Credit control and interest rate control are the liberalization policies that have biggest impact on reducing income inequality. Additionally, privatization as well as liberalization of capital flows improves income distribution whereas liberalization of securities markets increases income inequality.

Third view is related to existence of asymmetric information and legal constraint for poor where they are affected by lack of finance. Thus, research by Seven and Coskun (2016) does not confirm income reducing hypothesis indicating that even though last two decades financial systems have developed in terms of size and liquidity, poor in emerging countries did not benefit from it. Similarly, research done by Jauch and Watzka (2016) and De Haan and Sturm (2017) contradicts theoretical models.

Using panel data on 138 developed and developing countries over 1960-2008 period and controlling for fixed effects to encounter potential endogeneity issues Jauch and Watzka's (2016) findings suggest that financial market development worsens income inequality. Throughout their analysis, they use credit to GDP to gauge the level of financial development.

The influence of financial inclusion to GDP growth and income inequality relationship has been explored by Jong- Hee Kim (2016) for sample including both high- and low-income countries. This empirical analysis demonstrates that in low income countries income inequality negatively impacts GDP growth and this impact is especially emphasized in fragile countries. Financial inclusion represented as financial accessibility helps to transform this relationship from negative to positive. This impact is more emphasized for high fragile countries.

Besides examining economic institutions impact on finance inequality relationship, researchers have also examined how this nexus is conditioned on the quality of political institutions. For example, De Haan and Sturm (2017) construct a panel that consists of data

for 121 countries over the period 1975–2005 and uses five-years averaged Gini coefficient based on gross household income from SWIID database as dependent variable. Financial liberalization, financial inclusion and banking crises are three different dimensions of finance considered in this research. A number of authors have recognized that both quality of economic institutions and political institutions may have impact on how finance influences income inequality. Besides investigating this link, authors also explore how financial development influences relationship between financial liberalization and income inequality. De Haan and Sturm (2017) find that financial liberalization, financial development and banking crises worsen income inequality. In addition, contrary to the quality of economic institutions, quality of political institutions conditions financial liberalizations' influence on income inequality. Also, this relation is conditioned on financial developments impact. Their evidence suggests that financial liberalization increases income inequality in higher levels of democracy. These findings are in contrast to previous studies that have analyzed the relationship between financial development and income inequality.

Literature review on finance-inequality nexus suggests that financial institutions affect income inequality through different channels. Claessens and Perotti (2007) state that entrepreneurial activities are important for growth since researches have revealed that small and medium companies are feature of successful economies. However, in developing countries entrepreneurs face barriers while starting a business in terms of financing, high taxes and fees, number of required licences and bribes. Particularly, financial barriers account for biggest obstacle that limit economic participation and deepens inequality.

Research on the relationship between financial market development, economic growth and income inequality in Central and Eastern Europe countries and specifically in WBs remains under researched. This has been previously assessed only to a very limited extent because of insufficient data and explored in regards to institutional transformation after joining EU. While evidence on these countries suggests that stock markets' contribution to growth is limited, banking sector has positive effect (Caporale *et al.,* 2014). On the other hand, study on Central and South Eastern Europe demonstrates that the bank credit to private sector and interest margin are negatively related to growth (Petkovski and Kjosevski, 2014).

Existing studies on the WBC show that various indicators of financial market development such as gross savings, domestic credit to private sector (Fetai, Mustafi and Fetai, 2017), domestic bank deposits to GDP and private credit to GDP (Murgasova *et al.,* 2015), broad money stock ratio (Naqeeb and Eglantina, 2021) have positive impact on economic growth proxied by GDP per capita.

A study of the Western Balkan countries with a panel data model was conducted by Vangjel and Mamo (2022) for the period 2005 -2019 emphasizing that efficiency of the banking sector is indicator of economic growth. While the efficiency of banking sector is represented by interest-spread and non-performing loans, size and depth are proxied by

broad money to GDP and ratio of credit allocated to private sector to GDP. Findings reveal that broad money and credit are not significant for growth for selected countries in the sample. Compared to banking sector efficiency, size and depth of banking system is less relevant for economic growth for this period.

Research on financial market development and economic growth in Western Balkans for the period 2005-2019 demonstrate that when private credit is used as proxy for financial market development it has positive impact on overall economic growth (Vangjel and Babu, 2022). On the other hand, Abazi and Aliu (2015) taking into account different measures of financial deepening in the countries of WB over the period of thirty years have found mixed results; interest spread rate has negative impact on growth whereas stock market capitalization effect is positive. However, as authors recognize model and estimations suffer from insufficient data for the countries which later dissolved from Serbia and Montenegro. Treating this region as the unit of analysis thus makes sense. Also, certain underlying factors that impact the whole region, such as climate change and the urge to join the EU, mean that these countries act in similar ways despite inherent contradictions among them.

Using a panel data set covering 2000-2020 period Smolo (2020) explores finance-growth-institutions relationship for the Western Balkan countries. Empirical estimates reveal that finance and institutional quality do not impact economic growth for the countries in the sample; Albania, Bosnia and Herzegovina, Montenegro, North Macedonia, and Serbia. However, interaction term of finance and institutions increase economic growth for the WBC. Further evidence suggests that relationship between finance and growth is nonlinear and there exists threshold. However, these findings are conditioned on institutional quality and proxies used.

The role of financial development and institutional environment on growth process of the Western Balkan countries is investigated by Stanković, Petrović and Denčić-Mihajlov (2018) using indicators from World Bank database. As previously reported sustainable growth in the region is conditioned on saving and investment rates. Lack of financial resources leads to low levels of investment which in turn is major factor determining economic growth rates of these countries. Delayed reforms in terms of institutional framework, banking and financial market regulations had impact on transition process. Authors argue that although each country has specific economic characteristics, in general financial markets in the region rely on banking sector while underdeveloped stock markets has little contribution on financial flows. Therefore, investments and growth in these countries became heavily dependent on FDI inflows which have increased after 2000s (except Bosnia and Herzegovina). Findings demonstrate unidirectional causality between growth rate of money supply and economic growth as well as causality between credits allocated to private sector and economic growth. Next, results based on panel data regression reveal positive impact of financial development on economic growth. However, authors suggest that banking sectors' role is overly emphasized in financial sector

development in a way that harms stock markets, insurance sector and mutual funds. Therefore, policy makers should consider other aspects of financial system that would enable sustainable economic growth.

Imeraj (2018) analysed financial market development and FDI influence on economic growth in Albania, Bosnia and Herzegovina, Kosovo, Macedonia, Montenegro and Serbia where financial market development was proxied with credit to private sector, liquid liabilities and commercial bank assets to total assets in a period of 2000-2016. Empirical results suggest that there exists random effect of three financial indicators whereas FDI inflows do not have significant impact on growth. Research on financial sector of the WB is mainly related to the small-middle companies' constraints in access to finance (Musta, 2016; Moder and Bonifai, 2017, among others).

Another research (Bilalli, Beka and Gara, 2023) exploring financial developments impact on economic growth for the Western Balkan countries reveals that domestic credit to the private sector has positive impact on economic growth for the period 2010-2020. Using fixed effect technique, it is demonstrated that while trade and inflation have positive impact on growth for the selected countries, government consumption is negatively related to growth.

The role of FDI institutional set up and policy choices in attracting FDI which is very crucial in transition countries has been acknowledged by Silajdzic and Mehic (2022). Their research suggests that institutional proxies such as FDI regulation, FDI policy, transparency and privatization policy significantly increases FDI flows in selected South East European countries. It is important to note that significance of this relationship appears with considerable time lag in institutions highlighting time dynamics involved in FDI policy effects.

As Uvalic and Cvijanovic (2018) argue an important limitation for the reforms in the Western Balkans countries are limited to available funds for investment. Faster growth requires more funds than increase in public sector investments. EU financing IPA II funds remains quite small and inadequate to ensure rapid economic growth.

In spite of consensus on financial markets positive influence to growth, aspects of financial market development contributing to decreasing income disparities are controversial. Moreover, it is important to distinguish between bank-based indicators and aspects of stock markets on developing countries. For instance, evidence from emerging countries indicate that neither banks nor stock markets reduce poverty implying that financial market development fails to reach poor individuals (Seven and Coskun, 2016). In addition, it seems more appropriate to use bank-based indicators when proxying financial market development in emerging countries. To this end, instead of using Gini coefficient and when data is available, researches based on quintiles or other measures for income inequality may be more appropriate in distinguishing effects of financial intermediaries.

On the other hand, to our knowledge, research investigating the impact of financial market development on income inequality in the WBC has previously never been addressed. Even though reasons mainly concern data insufficiency in general, inconsistency and lack of data for income inequality was primary problem of researching income inequality in the WBC.

3.4.2. Impact of Institutional Quality on Growth and Inequality

Currently dominant view in the literature is that institutions determine economic growth. A vast literature has empirically found that different aspects of institutions affect long run economic growth. For this purpose, various governance indicators such as voice and accountability, regulatory quality, property rights, black market and regulation, rule of law, government effectiveness, control of corruption and other governance indices as determinants of quality of economic institutions have been used.

In particular, political institutions with limited government lead to economic growth (Knack and Keefer, 1995; Hall and Jones 1999; Acemoglu, Johnson and Robinson, 2001; Rodrik, Subramanian and Trebbi, 2002). Acemoglu and Johnson (2005) unlike the literature that clusters institutions and emphasize them as most important determinants of economic growth, try to unbundle this cluster of institutions and compare the relative importance of property rights institutions to contracting institutions. Using multiple IV strategy they attempt to isolate property rights and contracting channels. Therefore, property rights are instrumented with settler mortality rate and population density which do not affect legal formalism while the legal system imposed by colonial powers i.e. legal formalism is used as instrument for contracting institutions. Authors acknowledge limitation regarding property right institutions; that they may reflect some other political and non-political institutional attributes. The result reveal that countries with strong property rights institutions have higher long run economic growth, investment, more private credit/GDP and advanced stock markets. However, legal formalism has no effect on these variables and is associated with less developed stock markets. The results are robust to chosen instruments.

Rodrik, Subramanian and Trebbi (2002) have estimated impact of geography, trade integration and institutions on income levels around the world. Their empirical evidence shows that when institutions are included in the income equation, geography has weak effect and integration is almost always insignificant. Authors suggest knowing that geography is not destiny and primacy of institutional quality over other factors may be helpful, but changing the perceptions of investors' ratings on institutional quality is not an easy task.

Holmberg and Rothstein (2010) states that since the late 1990s many theories that draw attention to technology, skills and infrastructure for economic development turned to institutional factors arguing that dysfunctional government and social institutions play an

important role. Although their study shows that there is positive but weak link between levels of democracy and degrees of economic equality for thirty OECD countries, the same is not true for mostly poor non-OECD countries. Thus, separate analysis among OECD and non-OECD countries has been done analysing quality of government and economic equality. Results show that after controlling for democracy the quality of government indicators are more strongly correlated with the Gini index than with the income of the poorest 20%. Beside empirical analysis covering large sample of countries they strengthen their conclusion comparing two cases of Jamaica and Singapore. Jamaica has high score of democracy applied by various international organizations but low quality of government while Singapore is just opposite with authoritarian state but high quality of government.

Although studies have been conducted by many authors, studies on broad aspects of institutions have been bundled as quality of institutions which sometimes may lead to confusion in the literature. Thus, study on relationship between governance indicators and economic growth has been examined by Pere (2015), where results reveal that not all aspects of governance indicators have the same impact on economic growth. While political stability, absence of violence and law enforcement has impact on growth in the same period, governance accountability affects future growth.

Protection of property rights is acknowledged as vital institutional dimension in understanding the institutional mechanism through which growth and inequality are related. Davis and Hopkins (2011) argue that inconclusive result over income inequality and economic growth relationship debate is due to the omitted variable bias and the key omitted variable in this relationship is the quality of institutions. Both cross country and panel data estimations show no direct effect of inequality on growth in the long-run. However, the research indicates that the protection of property rights raises growth rates while at the same time reduces income inequality. Hence, the findings suggest that there is a strong negative relationship between the protection of property rights and income inequality. The results are robust to all instruments used and various control variables. Moreover, when institutional variables are added to inequality and growth relationship with OLS estimation negative effect is lost while with panel data estimation technique positive relationship exists in the short run but not in the long run.

Ferreira, Gisselquist and Tarp (2022) describe that through effect on political instability and policies, inequality impacts savings, investment incentives as well as the quality of institutions with implications on property rights and law system. Thus, governance affects growth both directly and indirectly. Accordingly, empirical analysis by Keefer and Knack (2002) highlights the negative effect of social polarization (based on inequality or ethnic tension) on growth. Social polarization in a society leads to significant changes in policies within a variety of institutional structures. Uncertainties in property rights or security of contract legislation obstruct growth.

A recent article by Kovac and Verbic (2023) examines relationship between institutional quality and wealth inequality. For this purpose panel dataset for 2010-2016 using dynamic

panel data models is employed. Econometric analysis based on Credit Suisse and World Bank data indicate that quality of institutions represented by control of corruption and government effectiveness do not impact wealth inequality. However, domestic credit (percentage of GDP) as a measure of financial development has statistically significant positive effect in wealth inequality. Policy implications of these results suggest that financial intermediation policies should be re-evaluated in a way that financial institutional framework would not trigger an endless accumulation wealth.

The causal relationship between income inequality and institutional quality has been investigated by Chong and Gradstein (2004). Authors argue that it is possible that income inequality may result in undermining institutions by rich elites while it is also possible that poor institutional quality may lead to a greater income inequality. Thus, with dynamic panel VAR method using panel data set of 121 industrial and developing countries with time span depending on the dataset used both impact and predictability of one variable to another have been tested. Gini is used as a measure of income inequality whereas Kaufmann, Kraay and Mastruzzi`s six dimensions of governance, International Country Risk Guide: government stability, corruption, law and order, democratic accountability, bureaucracy quality indicators, the Freedom House index of civil liberties and index of political rights as well as Gastil Index and Magazine Institutional Investor - country ratings of the institutional environment for investment are used for measures of institutions. Regardless of the income inequality indicator or the sample of countries used results show that there is bi-directional causality between institutions and income inequality. The casual direction from income inequality to institutional quality dominates the causality from institutional quality to inequality. Moreover, the direction of causality from inequality to institutions is more dominant for developing countries compared to industrial countries. Also, their findings suggest that political stability indicator has the largest contribution to decreasing Gini coefficient while rule of law and corruption have the smallest effect. Beside Gini coefficient, income share of the top to bottom quintiles, The Theil and the Atkinson inequality indices have been tested and identical results are found. However, as authors argue the biggest limitation of the data is time interval since both institutions and income inequality are persistent and change little over time.

Amendola, Easaw and Savoia (2013) have shown that property rights influence income inequality in developing countries using cross-section and panel data methods on sixty-three developing countries defined as low and middle-income economies in South and Central America, sub Saharan Africa, North Africa and the Middle East and Asia. Results suggest that property rights increase income inequality in the majority of developing countries and particularly in low democracies implying that relevant institutions in these countries favour minorities. Although, democracy can balance this negative effect it has limited impact since political equality i.e. inclusive political institutions are required.

Bennet and Nikolaev (2016) using net income Gini from the Standardized World Income Inequality Database as a measure of inequality and the mean legal institutions and property

rights index from the Economic Freedom of the Word index as a measure of the rule of law empirically tested Engerman-Sokoloff`s hypothesis that factor endowments affected the rule of law and this in turn caused income inequality. Dominant elite class emerged from production of products such as sugarcane where larger farms and plantations developed. On the other hand, factor endowments more advantageous for grain and wheat led to multiple family owned farms which resulted in middle class. According to authors, these events explain the differences in income inequality across countries. Findings show that elite's efforts to impact on the rule of law whenever possible have led to increase in income inequality.

The influence of economic growth and institutional quality on poverty and income inequality in Asia has been investigated by Perera and Lee (2013) employing five subjective measures of institutions. Government stability, corruption, law and order, democratic accountability and bureaucratic quality indicators have been used.

Study specifically investigates whether recent economic growth has led to reduction in inequality in East and South East Asia and in this context how institutions impacted income inequality. Findings reveal that overall institutional quality measure decreases poverty levels but when looking to impact of each specific indicator on poverty levels results are mixed. Thus, while overall institutional quality, government stability and law and order are insignificant in explaining income inequality, control of corruption, democratic accountability and bureaucratic quality indicators are positive and statistically significant with the Gini index. Also, these indicators lead to higher poverty levels. Authors describe that although findings of this study are interesting, other studies also revealed positive relationship between control of corruption and poverty or income inequality in Latin American countries reporting large informal sector in these countries where poor are employed. Therefore, it is further argued that fighting corruption requires understanding and analysing characteristics of individual countries before adopting anti-corruption strategies and policies. However, according to their opinion (p.27) `in the long term whether corruption is degenerative or developmental` it will decrease economic growth and negative effects will counteract positive effects it has to poverty and income inequality.

A lot of study has been devoted to analyse skill-biased technical change as an important source of income inequality. To understand determinants of wage differentials different theories emerged over time. Thus, in demand and supply model wage differentials change according to demand and supply of workers with a high school education relative to workers with a tertiary education. However, Fortin and Lemieux (2011) argue that this model is not sufficient in explaining wage differentials and state that institutional changes have contributed to surge in inequality in US. Authors investigate impact of wage inequality on the real value of the minimum wage, deuninonization and changes in economic regulation in US during the 1980s claiming that a third of the increase in wage inequality is due to these institutional changes. They explain that while deunionization has increased male wage inequality, the minimum wage has affected women more.

The acknowledged importance of corruption rest on the premise that both in developed and developing countries cost of corruption is very high. Gyimah-Brempong and Munoz (2006) summarize the literature related to influence of corruption and how it pulls incentives thus decreases economic growth; given the practices of corruption human capital is lead to rent seeking activities. Corruption can be seen as the tax that increases the cost of production and transaction costs, it deteriorates the quality of resources such as education and health care, especially decentralized corruption increases uncertainty regarding investment decisions and decreases human and physical capital investments. Furthermore, the corruption may increase income inequality when it decreases growth, i.e. the income share of the poor decreases. Citing Hendriks, Keen and Muthoo (1998) it is described that corruption changes tax system in favour of the rich which in turn makes larger portion of burden to fall to the poor. In terms of education, more funds can be set for tertiary education than primary and secondary education favouring again the rich. Also, whether capital intensive or labour-intensive development strategy will be adopted is affecting income inequality which is important strategy in case of African countries where policy of subsidizing capital and heavily taxing labour redistributes income from the poor to the rich. On the other hand, literature suggests that large government sector, lower public wages, low bureaucratic quality increases corruption. Although growth equation is estimated with dynamic GMM, in the absence of panel observations for Gini coefficient OLS, IV and Limited Information Maximum Likelihood (LIML) estimators are used. Coherent with the literature mortality rate of the colonial settlers and ethno-linguistic fractionalization index are used as an instrument for corruption. Results show that corruption has large negative and significant effect on growth rate for African countries. No matter which instrument is used for corruption or which estimation method is employed findings reveal that corruption has negative impact on income inequality in African countries. Thus, all things equal one unit increase of corruption leads to 4-7 units increase in income inequality depending on the estimation method. However, besides this direct effect corruption can increase income inequality indirectly when it decreases economic growth. Authors suggest reducing fund allocation role of bureaucracy, changing development strategy that subsidizes capital leading to rent seeking activities, reducing indirect taxation and institutional reforms are just few of policies that will have positive overall effect in reducing corruption in African countries.

Similarly, Gupta, Davoodi and Alonso-Terme (2002) investigate how corruption affect income inequality and poverty and discuss that corruption through growth, biased tax systems, poor targeting of social programs, impact on asset ownership, human capital formation and education inequalities influences income inequality and poverty. Authors argue that corruption decreases growth and slows rate of poverty reduction.

Further, as shown by Alesina and Rodrik (1994), Persson and Tabellini (1994) income inequality has negative effect on growth and corruption increases income inequality growth will be reduced, which in turn will slow poverty reduction. Income inequality can increase when corruption is used for tax evasion or exemption thus reducing the tax base.

Poor targeting social programs can be affected by corruption when programs that benefit relatively wealthier groups are extended or funds for poverty reduction programs are drained by people with good connections. Authors in their paper summarize that asset ownership if concentrated in the hands of small elite can increase income inequality since rich will lobby for policies favourable to them like trade policies, spending programs, tax programs etc. that will provide higher returns to their assets and decrease returns to low income earners. Additionally, they suggest that corruption affects income inequality and poverty via its impact on human capital formation and social spending. As discussed above corruption can lower returns from taxes reducing tax base intended for public services such as education and social spending. Following the increase in operating costs of government because of corruption, it decreases resources available for other purposes. However, they argue that if there is uncertainty toward the poor regarding corruption, they face risk in their investment decisions and therefore will lose confidence to invest in land, physical or human capital. They estimate effect of corruption on income inequality and poverty using cross-country data over the 1980-1997 period with OLS and IV techniques. The initial Gini coefficient for land ownership, education inequality, education stock, capital stock to GDP ratio, national resource endowment, corruption social spending, expenditure dummy, recipient dummy and net income dummy are used as explanatory variables which is similar to Atkinson`s model. Considering that differences in measured inequality can be related to differences in the type of survey data, authors add survey type dummies. OLS results show that the explanatory variables explain 73% of cross-country variation in income inequality and beside other variables survey type dummies also have expected signs, higher corruption means higher income inequality where corruption has substantial impact on income inequality. Given the findings on the impact of corruption on income inequality and poverty in this study, authors suggest that negative influence of corruption can be reduced by considering management of natural resources, growth based on labour, spending on education and health, decreasing education inequality and efficiently addressing social programs.

Dobson and Andres (2010) argue that literature review reveals inconclusive results related to corruption and income inequality. Studies showing positive relationship between corruption and income inequality argument that corruption favours higher income groups and increases income inequality. On the contrary, studies that find negative relationship state that corruption in the form of tax evasion and exemption is usually advantageous for rich and the poor are deprived from social programs. This paper investigates income inequality and corruption relationship with four-year panel data for the period 1982-2002 for nineteen Latin American countries and finds out that trade-off between corruption and inequality exists. In other words, corruption reduces income inequality in selected Latin American countries. This result leaves in the difficult position policy makers when tackling with inequality. However, authors state that this result is not surprising as the informal sector is very large in many Latin American countries where lower income groups are employed and most of these people lack characteristics necessary to find a job in the

formal sector where discrimination and institutional barriers prevent employment opportunities for this group of people.

Along the lines of empirical evidence on institutions-inequality nexus more weight has been given to labour market institutions as crucial features increasing unemployment and accelerating income inequality. Calderon and Chong (2009) for a large sample of countries for 1979 – 2000 have analysed how LMI influence income inequality with GMM-IV method and have found that both de jure and de facto regulations compress income inequality, especially trade union membership, social security contributions and maternity leave contribute most whereas minimum wage as well as government employment less to reducing income inequality. Authors state that minimum wages affect income inequality following income is redistributed from skilled to unskilled, from the poorest to low-middle income shares and cause unemployment. Although union membership may provide higher wages, it has different effects depending on country development level. Literature is inconsistent considering studies that have shown rigid market governance on job security to lower market demand in India and Zimbabwe (Fallon and Lucas, 1991) and countries supporting ILO labour standards, higher minimum wages and expanding government employment have not reduced inequality (Rama, 2003).

Checchi and Garcia-Penalosa (2008) determined by the absence of consensus on concept of inequality, study the framework that will unify inequality for labour economists, policy makers and macro economists and investigate its connection to labour market institutions. Labour economist study inequalities in earnings, macro economists are related to inequalities in wage share while policy makers are concerned for household income inequalities. Authors investigate how LMI affect these inequalities because these institutions are binding element for these three different inequality measures and literature has reported that strong institutions are prone to increase unemployment, decrease wage differentials between high and low skill employees thus influencing household income inequality. However, they state that overall effect is not obvious following that unemployment rates will increase and reduced wage differentials will decrease income inequality. The argument is that institutional framework in which workers and companies operate is important for market outcomes which in turn will influence household income distribution. This is a channel through which institutions have influence on income inequality. Authors (pp. 4-5) define this institutional framework consisting of `employment protection legislation, labour taxation, minimum wage, the unemployment benefit, union density and coverage and the degree of centralization/coordination of wage bargaining`. On the other hand, sources of inequality are between labour and capital, across wages of workers and inequality related to employment versus unemployment. Thus, Gini coefficient is estimated as a function of labour share, wage inequality, the unemployment benefit and the share of each group in population. They estimate the correlation between institutions and household income inequality for 21 OECD countries for period 1969 - 2004 using OLS, 3SLS and reduced form estimation. OLS gives an overview of

correlations while 3SLS is employed regarding mechanisms through which LMI affect inequality. In contrary, reduced form estimation gives overall effect.

Further, the results reveal that LMI are correlated to income distribution across countries and over time. Except tax wedge, institutions are negatively correlated to inequality. In order to establish `a set of inequality minimizing institutions` (p.27) and suggest policies, authors evaluate factor analysis and depict two clusters of institutions first consisting of `wage setting institutions` and the second group describing measure of `employment security`. This clustering makes it possible to depict regional patterns in terms of inequality, namely North America does not have strong institutional framework, Nordic countries have the strongest institutional set-up regarding wage bargaining and European countries has the strongest employment security. Following that wage share has vague effect while unemployment has insignificant effect on inequality; wage dispersion mechanism is left for reducing inequality. Estimations indicate that wage setting institutions have more impact on reducing inequality than employment protection.

According to Barro's (1990) study, it is expected that government consumption-to-GDP ratio will have a negative impact on economic growth. Meanwhile, the traditional theories propose that government social spending can reduce income inequality, but the extent of this effect is influenced by the size and composition of government spending.

In the context of left-right political spectrum the perception is that left governments are more prone to reduce income inequality. Scheve and Stasavage (2007) tested the hypothesis whether wage bargaining centralization and partisanship are related to changes in inequality. In fact, three different hypotheses have been considered. Given the perception that left governments are more inclined to reduce income inequality relationship between two variables have been investigated. Authors argue that government partisanship can affect income inequality through redistributive policies but labour market institutions can have a direct effect on pre-tax income inequality. The empirical findings show that there is no relationship between centralized wage bargaining, government partisanship, electoral rules with measures of income inequality for a full time series. Only, relationship between income inequality and trade unionism is robust. Authors compare US and Sweden which have very different income inequality levels at the present but used to have similar top income shares in 1950s and 1960s and conclude that centralized bargaining rather is an outcome that evolved over time to address political and economic process.

Studies on impact of institutional quality to growth and income inequality in transition countries and particularly in the WB countries remain seriously under researched.

Empirical research by Sachs (1996) on structural and institutional reforms suggest that after the first five years of transition Eastern Europe and the former Soviet Union transformed quickly to market economy. To this extent, he used the European Bank for Reconstruction and Development indices. While some Eastern European economies have

seen quick reforms experienced strong development, many former Soviet Union countries were trapped in stabilization crises.

How institutional reforms influenced income inequality in post transitional countries of CEE is researched by Josifidis, Supic and Bodor (2020). Specifically, the impact of institutional environment on income shares in post transition period from 1990 to 2014 for the new EU countries is explored. Based on the econometric analyses institutional changes has resulted in decrease of below average income shares of post transition EU countries. Authors claim that reason for share decline is low degree of labour market flexibility of this group. Certainly, job losses during privatization and slow increase of wages for below average income groups identified this income group as short and long term losers of transitional period. On the other hand, top income shares has increased due to 'institutional vacuum and distortions during the first year of transition' (Josifidis, Supic and Bodor, 2020, p.325). Although this income group is short term winner, after institutional reforms they lost political and economic power they had over long run. According to empirical findings long term winners of post transition period are above average income group since they are more educated, flexible in labor markets owing to adaptability to technological changes. Policy implication stemming from this research is that institutional reforms are important for income distribution in post transition EU countries and can be important tool in mitigating increasing income inequalities.

Differences in inequalities between the WB countries can be attributed to the differences in the patterns of economic growth considering that the initial conditions were similar for these countries (Jovanovic, 2015). Therefore, Jovanovic (2015) argues that emphasizes should be put on the importance of redistributive institutions in the context of macroeconomic policies since countries with stronger redistributive institutions had lower inequality in CEE countries. He empirically evaluated GDP and inequality relationship assessing four factors; labour market institutions, control of market power of companies, social benefits and taxes in Eastern Europe which includes five WB countries during the transition to market economy from 1990 to 2011 and found that in countries with high taxes, high labour rights and effective control of market power inequality declined over the course of economic growth.

Efendic and Pugh (2015) have investigated institutions and economic growth relationship using dynamic panel analysis in 29 transition countries. Their result suggests that institutional reform has impact on GDP per capita and that GDP per capita adjusts to new institutional changes. Existing level of GDP per capita is improved by institutional change over the medium term which provides new baseline for future GDP per capita. However, this effect is realized once and does not multiply over time.

EU Balkan members' states catching up process both in terms of income level and institutional reforms require time and effort. Due to the prospects of joining EU countries the Western Balkans have made significant progress on economic and political fields since 2000 and income level convergence with EU happened to a limited extent, however, after

the Great Recession this process weakened (Dabrowski and Myachenkova, 2018). Financial crises set back reforms and goals which in turn had negative impact on business climate and microenvironment. Overall, these factors contributed to the EU accession process. According to Dabrowski and Myachenkova (2018), controlling corruption in the WBC is major challenge and meeting EU access conditions requires reforms in legacy, human rights issues, protection of ethnic, religious, minority rights, strengthening the rule of law, fighting organized crime, efficient public administration and modernization of judiciary.

Qerimi and Sergi (2012) investigating economic freedom and corruption link in the WB show that countries with higher scores of economic freedoms are more successful in fighting corruption as an important measure of institutional performance.

Additionally, there are studies comparing institutional indicators of EU countries with potential candidate countries stating that structural reforms are required for WBs in order to achieve sustainable economic growth and convergence to EU standards (Orviz and Savelin, 2017).

Quality of governance's influence on economic growth for the Western Balkan countries between 2006-2016 is explored by Muja and Gungor (2019). For this purpose, governance indicators published by World Bank are used as proxy for quality of governance. Specifically, voice and quality, political stability and absence of violence, government effectiveness, regulatory quality, rule of law and control of corruption are six different indicators used to construct the composite index of governance quality. Findings indicate that quality of governance is strongly associated with GDP per capita in the countries of WB. On the other hand, analyses of each indicator alone demonstrate varying influence on growth. Thus, strengthening rule of law, government effectiveness and regulatory quality promote economic growth. Based on the correlation analysis institutional quality is related capital formation in the WBC.

The role of institutional environment on growth process of the Western Balkan countries is investigated by Stanković, Petrović and Denčić-Mihajlov (2018) using governance indicators from World Bank database. For empirical estimates government effectiveness, regulatory quality and control of corruption is employed. Findings indicate that there is no statistically significant relationship between institutional development and economic growth from 2006 to 2016.

A recent study by (Roy-Mukherjee and Udeogu, 2021) concluded that institutional framework is inversely related to income inequality in the WB countries, suggesting that improving institutional quality as well as level of unionization will reduce both within and income inequality across countries.

It is well acknowledged that different aspects of institutions produce different effects on economic growth. Nedic *et al.* (2020) find that government effectiveness and regulatory

quality are most important institutional indicators for GDP per capita in WBC. Second greatest impact has control of corruption and rule of law. Additionally, control of corruption is negatively related to FDI for the countries in the sample of an 11 year period, from 2006 to 2016.

Even though empirical research on institutions and economic growth in TC's has increased, Efendic and Pugh (2007) argue that transmission mechanisms through which institutions affect national income, relationship between size of institutional framework and economic performance and quality of institutions in the context of EU integration requires further research.

3.5. Financial and Institutional Indicators

The present thesis seeks to contribute to this much researched field of knowledge by investigating the impact of financial market development and institutional quality to economic growth and income inequality. First of all, this thesis attempts to addresses impact of financial market development to growth in the WBC since this question is of central interest as much recent research have investigated this link both in the context of emerging and developed countries.

In the light of reported literature overview, it is conceivable that various financial aspects spur growth in transitional economies. There is a wide choice of financial indicators used in literature. Most used financial indicators are related to either financial institution development or financial market development and measure dimensions such as financial access, depth, stability, efficiency and liberalization. Hence, the number of bank accounts per 1000 adults, ratio of private credit to GDP, ratio of stock market total value traded to GDP, net interest margins and stock market turnover ratio, private sector credit issued by financial intermediaries, bank credit spread out by banks to the private sector and number of commercial bank branches (WDI), commercial bank branches per 100,000 adults, borrowers from commercial banks per 1000 adults, depositors with commercial banks per 1000 adults, and domestic credit to GDP ratio are employed in empirical analysis. Historically, most popular and widely used variable of financial market development is rate of broad money to GDP. On the other hand, some researchers prefer to utilize indices constructed by Sarma in 2008 and 2012, by Amidžic, Massara and Mialou (2014) and Camara and Tuesta (2014).

In this thesis, the choice of financial indicators is dictated by the availability of data for the WB countries. The Development Indicators Database of World Bank contains annual data starting from 1960 through 2019 for various financial indicators measuring depth and access of financial systems. Due to data unavailability, we are not able to include indicators evaluating efficiency and stability of financial systems. Similarly, late development of stock markets results in lack of stock markets data for these countries. Thus, we employ number of commercial bank branches per 100,000 adults, domestic credit

to private sector by banks (% of GDP) and broad money (% of GDP) as proxy for financial market development. This data captures access to financial institutions and a dimension of depth. More comprehensive description of employed financial indicators from World Bank (https://data.worldbank.org/indicator) can be found below.

Table 1. Measurement of Financial Indicators

Financial Indicator	Definition
Commercial bank branches (per 100,000 adults)	Commercial bank branches are retail locations of resident commercial banks and other resident banks that function as commercial banks that provide financial services to customers and are physically separated from the main office but not organized as legally separated subsidiaries.
Domestic credit to private sector by banks (% of GDP)	Domestic credit to private sector by banks refers to financial resources provided to the private sector by other depository corporations (deposit taking corporations except central banks), such as through loans, purchases of nonequity securities, and trade credits and other accounts receivable, that establish a claim for repayment. For some countries these claims include credit to public enterprises.
Broad money (% of GDP)	Broad money (IFS line 35L..ZK) is the sum of currency outside banks; demand deposits other than those of the central government; the time, savings, and foreign currency deposits of resident sectors other than the central government; bank and travellers checks; and other securities such as certificates of deposit and commercial paper.

Source: World Bank Development Indicators

On the other hand, there have been numerous studies to investigate the relationship between growth and institutions with the view that institutional quality can enhance growth. Interest in measuring and evaluating performance of government has led to evolution of various indicators. Nevertheless, many indicators published by various organizations and institutions have made possible to conduct empirical analyses and explain certain features of indicators as well as draw casual inference from this data. It is

stated that institutional measures differ based on aspect of the quality of governance, specificity, in terms of their demonstrated links to development, data coverage across countries, data coverage over time, method of data collection, transparency, quality and accuracy (Kaufman, Kraay and Mastruzzi, 2010). It is also argued that more than 30 different institutional indicators covering country's complete formal institutional environment can be categorized into three groups of formal institutions; political, legal and economic (Kuncic, 2014).

A further question in this thesis concerns whether institutional quality contributes to economic growth in the WBC. After the wars that followed Yugoslavia's collapse, new formed states had to modify existing institutions that suffered erosion and build new ones. Still, building institutions capable of overcoming new challenges and institutional reforms remain the main task in the process of joining EU. Furthermore, institutions impact on income inequality is arguably an interesting question to be addressed as inequality has sharply risen in these regions. These questions are of central interest in this dissertation. To this end, different governance indicators have been investigated.

Governance indicators used in literature are various; however, the most widely used are Worldwide Governance Indicators (WGI) released by World Bank in 1996, sometimes referred as KKZ (Kaufmann, Kraay and Zoido-Lobaton, 1999) or KKM (Kaufmann, Kraay and Mastruzzi). These indicators have been constructed from 31 various sources, including ICRG, Business Environment Risk Intelligence, Freedom House and others, provided by 25 organisations. Six dimensions of governance are measured; Voice and Accountability, Political Stability and Absence of Violence, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption. Indicators cover 212 countries and territories (Kaufman, Kraay and Mastruzzi, 2010).

Also, Fraser Institute`s Economic Freedom Index has been used in numerous studies. This index captures different aspects of economic freedom and data goes back to 1970. Freedom House index assesses political freedoms and civil liberties and have been used in cross-country studies well before any other indicator. International Country Risk Guide indicators are generated by PRS Group of Syracuse for sale to investors because of wide coverage across countries and over time, they are widely used by researchers and take into account corruption in government, law and order, tradition and bureaucratic quality aspects of a country whereas Heritage checks for property rights, black market and regulation. "Corruption Perceptions Index" by Transparency International is collecting corruption ratings reported by experts and from surveys.

In order to address questions outlined above, we employ governance indicators released by WGI. Governance description by World Bank (2023) is given as:

> consisting of the traditions and institutions by which authority in a country is exercised. This includes the process by which governments are selected, monitored and replaced; the capacity of the government to effectively formulate

and implement sound policies; and the respect of citizens and the state for the institutions that govern economic and social interactions among them.

Each aspect of governance indicators and their long definitions are provided below (Kaufmann, Kraay and Mastruzzi, 2010, p.4).

Table 2. Measurement of Governance Indicators

Governance Indicators	Definition
Voice and Accountability (VA)	Capturing perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.
Political Stability and Absence of Violence/Terrorism (PS)	Capturing perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism. (b) The capacity of the government to effectively formulate and implement sound policies.
Government Effectiveness (GE)	Capturing perceptions of the quality of public services, the quality of the civil service 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.
Regulatory Quality (RQ)	Capturing perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. (c) The respect of citizens and the state for the institutions that govern economic and social interactions among them.
Rule of Law (RL)	Capturing perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.
Control of Corruption (CORR)	Capturing perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private

interests.

Source: Worldwide Governance Indicators

Additionally, labour market institutions have been explored in order to understand which specific features contribute to improving income distribution and make distinction between these features. Even though, it would be interesting to explore impact of LMI on income inequality in the WBC considering that they have changed a lot, due to data unavailability of certain variables labour market indicators have not been investigated in this thesis.

3.6. Concerns over Measuring Institutional Indicators

This section points out some of the critics encountered regarding the governance indicators. Financial indicators are objective performance measures used to reflect progress over time or between countries. These quantity indicators are traditional aggregate measures used in research. In this dissertation, we use only objective information on the financial aspect that each country in the sample confronts. On the other hand, critics regarding the WGI state that these indicators are inappropriate for comparing over time and across countries (Kaufmann, Kraay and Mastruzzi, 2007). Comparisons may be constrained further by the fact that indicators are scaled to generate the same world average in each period. Because commercial organizations give some of the data, the outcomes are skewed in favour to corporate elite interests. They also have 'halo effects,' meaning that they are strongly affected by a country's latest economic performance and overall level of advancement. Moreover, they are not transparent enough, some of the data used to create the indicators are not available to other researchers.

The most criticized issues in this growing amount of empirical work have been the measurement of institutional quality and the direction of causality between institutional indicators and economic growth or income inequality measures (Zhuang, Dios and Lagman-Martin, 2010). Critiques related to governance measures or its components is that they are subjective reflecting country expert's opinion (Williams and Siddique, 2008; Glaeser *et al*., 2004), aimed to international investors, indices for smaller countries are likely to suffer from measurement error because while compiling data more resources are given to rich countries and countries that investors are interested to invest (Williams and Siddique, 2008). Also, problem is the data availability. Chong and Gradstein (2004) argue the biggest limitation of the data is time interval since both institutions and income inequality are persistent and change little over time.

According to Davis and Hopkins (2011, p.6) many of the institutional quality measures are in fact `measures of the equality of institutional rights and protections`. As a measure of political institution in case of democracy equality is obvious, but also for measures of economic institutions such as protection of property rights, it indicates equality before the law. Thus, they highlight distributional role of institutional quality claiming that low quality is related to increased income inequality in terms of economic and political rights.

They critique that existing institutional measures do not measure unequal distribution of protection of property rights but assume that low levels of this measure indicate the same.

Voigt (2013) argues that some institution indicators are too broad and an indicator showing effects of relevant institutions mixed all together cannot be precise while attributing certain effects to those institutions that have impact on certain process from those having marginal effects, therefore each indicator should refer to specific institution. He also criticizes subjective measures and states that objective indicators should be preferable to subjective indicators. Moreover, he suggests to differentiate between *de jure* and *de facto* institutions and to take into account both when measuring institutions because assessing scores for only *de jure* institutions will not help in the real world. Thus, before ascertaining weather `institutions matter` they should be measured properly not just measuring formal rules but also their 'factual enforcement' (p.7). Informal institutions play important role in almost every country which makes the task of measuring institutions more difficult as factual enforcement is based on informal institutions.

Glaeser *et al.* (2004) discuss that most frequently used institutional indicators in economic growth literature, such as ICRG measures and the Governance Indicator of World Bank have conceptual flaws in the measurement of institutions since they measure outcomes and being subjective measures makes these indicators even worse. For example, risk of expropriation by the government and government effectiveness are measuring outcome rather than quality of political institutions and they do not score differently between dictators who secure property rights from the democratic leader securing property rights. Measuring outcome is contradictory to the definition of institutions made by North since these are not permanent characteristics. Moreover, these indicators are subjective measures and with economic growth their quality rises implying causality running from growth to them. It is similar for measures of political institutions as they are not associated with the constitutional constraints on government.

Similar to previous critics, Williams and Siddique (2008) point out that critiques related to ICRG measure or its components is that they are subjective reflecting country experts' opinion and aimed to international investors, indices for smaller countries are likely to suffer from measurement error because while compiling data more resources are given to rich countries and countries that investors are interested to invest. Also, measure of corruption indicates political risk associated with corruption but researchers often use it confusingly.

It is said that Business Environment Risk Intelligence and Business International which has been incorporated into the Economist Intelligence Unit cover a smaller range of countries and is usually used to test the robustness. World Bank`s Country policy and institutional assessment also covers smaller range of countries and only data from 2005 onward is released. On the other hand, `corruption perception index` produced by Transparency International uses various sources to construct index and dataset for large range of countries exists only after 1998 and are not comparable over time as the data

sources they use have increased. Governance indicators cover a broad range of governance indicators and are divided to six categories, so that researchers can either choose to use one category or combine them. Authors acknowledge that they are widely used due to their impact on policy decisions and aid donations by governments. Weakness of these indicators is that they are inappropriate for time series analysis and that they are prone to measurement errors owing to the fact that they may be affected by other individual datasets.

Benefits of Fraser Institute`s Economic Freedom Index aiming to capture different aspects of economic freedom and constructed by Gwartney, Lawson and Block (1996) is that data goes back to 1970. However, it is criticized for combining governance measures with outcomes of institutions like monetary policy or price stability and as such cannot be a good indicator of governance. Moreover, technique used to generate data backwards from 1970 to 1995 is problematic. However, De Haan, Lundström and Sturm (2006) have critically discussed EF index and concluded that it is stable and efficient, allows for disaggregation and assessment of each category.

Kaufmann, Kraay, and Mastruzzi (2007) in "The Worldwide Governance Indicators Project: Answering the Critics" article, argue that the aggregation process effectively combines different data sources into equivalent units. Because there is minimal evidence of broad changes in world governance levels across time, re-scaling WGI averages to produce a 'zero mean' for each period does not restrict comparison. They admit that a variety of non-commercial data sources support business data, but business people's opinions differ little from those of other groups. On the evidence for halo effects authors claim it is limited and may simply reflect the causal relationship between economic growth and strong institutions. Given the nature of governance evaluation, some definitional ambiguity is unavoidable, but it does not impede data analysis. Also, the majority of the data used in the WGI is public domain. Finally, authors believe that even though the public has limited access to the Country Policy and Institutional Assessment scores, broader critiques of the WGI's transparency are overstated.

4. EMPIRICAL ANALYSIS

4.1. Key Theoretical Premises

Review of the existing empirical literature on economic development as well as on income inequality demonstrates different methods of estimation. The selection of estimation method is conditional on many factors such as the data availability, period under consideration as well as purpose of the research. Different methods span from ordinary least squares (OLS), two-stage least squares (2SLS), fixed effects (FE), random effects (RE), three-stage least squares (3SLS) to generalized method of moments and auto regressive distributed lag. Voitchovsky (2012) summarizes that among several reasons for inconclusive results regarding the impact of inequality on economic growth are data

reliability and econometric methods used. Also, these mixed results may be due to the model specification of study. Many of the relevant theoretical papers use cross section estimation methods (Alesina and Rodrik, 1994; Person and Tabellini, 1994; Perotti, 1996) and usually negative impact of inequality on growth is derived from these estimations measuring variables on 20-30 years interval. Yet researchers using alternative methods (Li and Zou, 1998; Forbes, 2000; Scholl and Klasen, 2019) claim that there exists positive relationship between these variables.

According to Voitchovsky (2012) studies utilizing short growth spells with FE and first-difference GMM estimator demonstrate positive impact of inequality on economic growth. Most of the cross-section studies use OLS whereas studies using panel data employ various estimators such as FE, RE, GMM etc. Controlling for the time invariant observable variables in panel data may lead to these different results. Although many studies use GMM estimator to handle endogeneity issue Hansen (2008) states that GMM is large sample estimator and thus is not suitable for our small sample data set. In summary, standard regression reveals consensus on the negative impact of inequality on growth in cross-sectional regressions while panel specifications do not lead to any consensus.

In contrast to single-equation regressions, results from studies that use simultaneous equations models (SEM) differ from studies employing independent estimation techniques. Fielding and Torres (2006) using 3SLS demonstrate that lower inequality leads to improvements in social and economic indicators. Huang, Lin and Yeh (2009) using GMM in simultaneous equations shows that faster growth worsens inequality and in turn higher inequality harms growth. Using both cross-country and panel data specifications in estimating growth and inequality simultaneously, Davis and Hopkins (2010) find no direct effect of inequality on growth in the long-run but that the protection of property rights simultaneously raises growth rates and reduces income inequality. Hung *et al.* (2020) using 3SLS have found that economic growth can increase income inequality in Vietnam. From the literature review it is evident those specific determinants have effect on both variables and that the reverse causality between economic growth and income inequality requires applying system approach to this complex interaction.

Bourguignon (2015) states that growth and inequality result from primary inequality factors such as inequality of wealth and education. Lundberg and Squire (2003) also claim that growth and inequality may be outcome of the same processes.

4.2. Methodological Approach to Analysing Economic Growth and Income Inequality

An important empirical issue that arises in estimating growth – inequality model is endogeneity. Endogeneity is a serious problem in econometrics. It may arise from reverse causality, omitted variables, measurement errors, sample selection or other reasons (Baltagi, 2021). Many methods, including the GMM, ML, 2SLS and 3SLS can be used to

estimate instrumental variable (IV) models. Every method still requires justification of the instrumental variable and identifying the cause of endogeneity(s).

To restate the information presented earlier in the literature review and based on the aforementioned reasons, in this dissertation both economic growth and income inequality are considered endogenous influencing each other. Hence, cause of endogeneity in inequality-growth nexus is reverse causality. Hausman specification test is utilized for the purpose of testing endogeneity.

Some researchers argue that under certain circumstances (if the variables do not influence one another simultaneously, that is if the study design includes a time lag) simultaneity does not produce endogeneity (Hill *et al.*, 2020). In this case, one can account for past occurrences if past X_{t-1} influences the present Y_t, and the present Y_t affects the future X_{t+1}. Many studies address income endogeneity by fitting inequality equations conditional on lag income. However, we adopt the same strategy with Fielding and Torres (2006). In order to fully understand how inequality interacts with income and other development indicators both inequality and income are modelled at the same time. We address this issue by using 2SLS and 3SLS to avoid bias introduced by potential reverse causality between two variables.

Moreover, institutions should be treated as endogenous for several reasons. While investigating mechanisms of institutions, regulations may be adopted with the aim to reduce income inequality in countries. Although there is a large body of literature suggesting that institutions affect growth, causation may be from growth to institutions as well. Hence, strong institutions can promote growth and increase GDP by providing a stable and predictable environment for investment, innovation and trade. Effective institutions can also help to reduce corruption, protect property rights and enforce the rule of law. However, reverse causality suggests that growth also contributes to institutional quality. Higher levels of GDP can also lead to the development of stronger institutions. As countries become wealthier, they can afford to invest more in legal systems and regulatory bodies, which may create a virtuous cycle of growth and institutional development in a feedback loop.

Therefore, the direction of causality between institutions and growth, as well as institutions and inequality, is subject to criticism. Especially after 2000, the WB countries entered a period of accelerated growth which had impact on institutional quality in these countries. On the other hand, it is possible that income inequality deteriorated institutional quality, not vice versa.

Additional reason for treating institutions as endogenous is the possibility of systematic measurement error in institutional measures obtained from expert opinions and surveys. These measures are susceptible to the biases and perceptions of experts, and if experts believe that institutions are better in countries with rapid economic growth, this can result in measurement errors. Our sample consists of relatively smaller countries, which are more

likely to be affected by such measurement errors. Also, the omission of variables that are simultaneously correlated with institutions and growth/inequality could bias coefficient estimates. According to Greene (2003), the problems that this endogeneity bias creates for econometric analysis are statistically equivalent to those created by omitted variables and measurement errors in the independent variables.

Due to the fact that all these issues may be present in both single and system equation models, methods avoiding potential bias are investigated. We address this issue by instrumenting for economic growth, income inequality and institutional quality. Instruments that have been previously used in the empirical growth-inequality literature are examined. An IV approach is necessary because institutional indicators in OLS regressions are potentially afflicted by endogeneity biases stemming from correlation of institutions with the error term due to measurement errors, reverse causality and omitted variable bias.

Identification of the causal effect of GDP per capita on income inequality is complicated by the endogeneity of the growth variable. However, identification of inequality on GDP is even more complex since income inequality may be influenced by countries' GDP per capita as well as other variables related to geographical and historical inequalities. We address this issue by estimating a panel model with country fixed effects. Next, we instrument both GDP per capita and income inequality with life expectancy at birth and urban population variables, respectively.

However, we cannot rely on instruments for contemporary institutions that have been previously used in the empirical growth literature. The most common instruments used for institutions are settler mortality rate from Acemoglu, Johnson and Robinson (2001), language and geography variables from Hall and Jones (1999), legal origin from Beck Beck, Levine and Loayza (2000) and the historical index of ethnic fractionalization. Lack of data for certain instruments for the WB countries prevented inclusion of these instruments to the estimation. Moreover, Eicher and Leukert (2006) argue that for OECD countries the instruments representing European languages can only be justified if they show enough exogenous identifying variation and have comparable explanatory power as in the global sample. Geographical instruments are time invariant variables and FE model does not allow for time invariant variables. On the other hand, historical index for ethnic fractionalization is correlated with GDP per capita and is not appropriate to use as an instrument for institutions. Therefore, lag value of selected indicator is taken as an instrument when addressing endogeneity of institutions.

The objective is for these instruments to induce exogenous variation in endogenous variables, variation that is in principle uncorrelated with the error term and then to use this exogenous variation to estimate the parameters for income per capita, Gini and institutional indicator.

Several panel data studies employ internal instruments, such as lagged values of inequality, to instrument inequality empirically (Forbes, 2000; Panizza, 2002; Banerjee and Duflo,

2003; Voitchovsky, 2005). However, none of these studies tackle the crucial issue of whether the instruments utilized for inequality are relevant. IV regressions that rely on weak instruments result in inconsistent estimates.

4.2.1. Advantageous of Simultaneous Equations Models

Due to nature and complexity of economic relations along with its dependence on numerous factors simultaneity arises among variables for variety of economic issues. Haavelmo's (1943) celebrated paper on "The statistical implications of a system of simultaneous equations" introduced this qualitative aspect into econometric modelling. According to Havelmo (1943) if one assumes that the economic variables considered satisfy simultaneously several stochastic relations it is not a satisfactory method to try to determine each of the equations separately from the data, without taking into account the constraints that the other equations may impose upon the same variables. When first introduced heavy computational burden was the biggest barrier to applying SEM (Klein, 1960). However, developments in the computer technology have enabled applying these models. Hence, in addition to Keynesian macroeconomic models, supply and demand models, production and consumption models are constructed in the form of a set of simultaneous equations models by economists. In these models, some of the explanatory variables are jointly determined with dependent variable. In single equation models, changes in regressors lead to changes in dependent variable. However, in simultaneous equations models, variables are jointly determined by the equations in the system indicating simultaneity between regressors and response variables.

Our starting point for estimation is determining variables in growth and inequality relationship. Theory determines not only the statistical model and the relevant variables for each equation but the potential endogeneity of variables as well. Empirical review suggests that inequalities have direct impact on growth. Moreover, bidirectional relationship between income inequality and economic growth has been identified by researchers (Lundberg and Squire, 2003; Fielding and Torres, 2006; Huang, Lin and Yeh, 2009; Davis and Hopkins, 2010). Evaluating impact of institutions on growth and inequality raises both a theoretical and empirical issue. Empirical literature that investigates effect of institutions on growth and inequality suggest that institutions exhibit endogeneity. Treatment of the potential bias is essential for robustness of results. Besides single equation models, we set up a system of 3-equations taking into account back and forth causation between regressors and response variables. Thus, to assess the role of financial market development and institutional quality on growth and inequality system of 3-equations is constructed. In order to account for the possible sources of endogeneity of right-hand side regressors different IV estimators are tested.

In this dissertation aim is using SEM to provide an alternative modelling system that more adequately describes the growth-inequality relationship than the usual single equation models. Instrumental variables are introduced directly into SEM while avoiding the

estimation problems of previous studies not treating endogeneity. While empirically testing both single-equations and system equations size and significance of parameters between the alternative estimation techniques are explored.

SEM more accurately describes relationships than the usual single equation models when variables are interrelated in complex interactions. Thus, SEM compared to single equation methods holds a greater advantage as it leverages complete information and estimates all the equations in the model simultaneously, using all the available information in the model. Mitze (2012) states that SEM, as opposed to the single-equation approach, can also define feed-back simultaneities among the system's specified endogenous variables and establish the direct and indirect effects of policy variables. Also, when outliers are present in the data, system estimators outperform single equation estimators (Adepoju and Olaomi, 2012).

Apart from many studies that focus on cross-country comparisons, assessment of the impact of income inequality on growth in system equations provides additional explanations on the pathway through which income inequality can impact economic growth. The most prominent difference between these estimation methods is that in SEM the equation cannot be solved independently without considering the other equations of the system. In SEM identification is required before solving the equations whereas in the single equation model there is no need to identify an equation since the functional form of the equation is specified.

4.3. The Context of Investigation: Modelling Growth and Income Inequality in the Western Balkan Countries

The general form of the aggregate production function in neoclassical growth theory is modelled as a function of physical capital, human capital, labour force and technology. Rodrik (1999) states that price reforms in product, labour markets and taxation were main focus of neo-classical economic analysis in 1980s. The drawbacks of these reforms became more and clearer by the 1990s. Neo-classical economics' engagement in developing countries helped to reveal the institutional framework of market economies. Thus, in mainstream economics in addition to the traditional variables of production institutions are also taken into consideration in explaining income differences.

Modelling the relationship between economic growth and income inequality from an economic perspective of TC requires the proper understanding of the factors that affect differences in regional economic growth. Treating this region as the unit of analysis makes sense in terms of econometric modelling.

Analysing data on the WB countries it is clear that this region has seen increase in GDP per capita along with soaring Gini coefficients in the selected period. Hence, economic growth may have led to income inequality where some individuals and groups have benefited more than others leading to a widening income gap between the rich and

poor. Further, increasing income inequality through concentration of wealth and power in the hands of few reduced the number of people who can participate in economic activity.

Specification for growth is typical of that used in literature. Although it is possible to include a number of additional determinants in growth model, we focus on most relevant and significant variables associated with positive growth performance under period of investigation 1996–2019.

It should be emphasized that there is no standard regression equation used to analyse the effect of income on inequality. Ideally, using data on the distribution of wealth rather than income would be more appropriate. Wealth inequality is the relevant measure in theoretical models with credit market imperfections. In addition, land Gini which is highly positively correlated with income inequality is frequently used in empirical literature. Unfortunately, data on wealth inequality and land Gini are not available for countries in our sample. Instead we use agricultural land (% of land area) data which refers to the share of land that is arable. Essentially, it shows land area that is arable, under permanent crops and under permanent pastures. This variable may serve as determinant in inequality equation since increasing inequality promotes agricultural expansion.

Measures of government risk of expropriation, rule of law, bureaucratic excellence and corruption, government enforcement of contracts, civil rights and openness to trade are frequently related to the types of institutions that have been linked to economic success.

In terms of financial market development, we estimate regressions with domestic credit to private sector by banks (% of GDP). Next, we check the influence of broad money and number of bank branches variable. In terms of institutional quality, we first focus on rule of law measure and afterwards check for other indicators as well as average of six WGI.

The set of control variables for each equation is added following commonly accepted cross-country growth and income inequality literature as well as Barro`s (1990) growth equation and Lundberg and Squire`s (2003) SEM estimation. Thus, government consumption shares in GDP, trade as a ratio of GDP, FDI net inflows (% of GDP), agricultural land, fertility rate, unemployment rate and gross capital investment (% of GDP) are considered. Also, a critical component of economic development recognized as human capital proxied as average years of education is considered.

4.4. Empirical Strategy

The first wave of empirical literature (Alesina and Rodrik, 1994; Persson and Tabellini, 1994; Perotti, 1996) using cross-country OLS regression observed negative impact of inequality on long-term economic growth. Second wave of research with more comprehensive, higher-quality dataset explored new panel data estimation techniques and obtained positive as well as mixed results (Li and Zou, 1998, Barro, 2000; Forbes, 2000).

Empirical literature review suggests that estimates on growth and inequality relationship are inconclusive due to the quality of data, sample selection, model specification (omitted variable bias), estimation techniques and numerous transmission channels linking inequality to growth. Moreover, an important empirical issue that arises in estimating growth - inequality model is endogeneity. As previously mentioned, bidirectional relationship between inequality and growth has been identified meaning that causality can run both ways.

The conventional approach in the literature to address potential omitted variable bias stemming from time invariant country-specific characteristics has been to use fixed effects. Alternately, to avoid endogeneity issue empirical literature has adopted an IV approach.

To address these concerns and with the purpose to gain better understanding into complexities of this relationship and at the same time controlling for potential endogeneity third approach is simultaneous-equation models.

Above all, we focus on comprehensive empirical framework that involves various estimation methods. We carry out three different approaches to answer the research questions proposed in this thesis. In our setting, the choice of empirical approach is dictated by the time and cross-sectional dimension of our panel dataset as well as by the potential endogeneity of the regressors which demands an instrumental variable approach.

Briefly, first we estimate panel data regressions. Next, IV technique is adopted to overcome potential endogeneity. Finally, the effect of financial market development and institutions on economic growth income inequality relationship is tested simultaneously in system of equations.

Our estimation strategy starts with linear static panel data models where fixed effects and random effects models are utilized. We estimate two separate panel regressions for growth and inequality. In addition to financial market development and institutional quality indicators, standard control variables are included in models to be estimated. Control variables for economic growth equation are from Barro (2000). To decide between panel data models diagnostic test such as the Breusch-Pagan test, Hausman test, Wald test, modified Bhargava et al. Durbin –Watson statistic and Baltagi Wu LBI test and Pesaran (2004) CD test are performed in sequence for each specification. In table 3 column (1-8) and table 4 column (1-5) we report findings of economic growth and income inequality equations, respectively.

Next, due to the fact that endogeneity may be present we investigate single equation models using instrumental variable technique. Thus, second approach incorporates IV technique where proxies for economic growth, income inequality and institutional quality are assumed to be endogenous. This estimation strategy appears to be appropriate in our setting as Durbin Wu Hausman test shows the presence of endogeneity. Since the set of instruments used for identifying the model will affect the IV estimation, we recognize that

neither instrument is perfect. To address this concern, 2SLS/Limited Information Maximum Likelihood estimator is employed. 2SLS and LIML estimates are identical under just identified equation (Baltagi, 2011). In equation-by-equation 2SLS, we separately estimate the growth and income inequality equations.

To capture complexities of growth inequality relationship third approach adopts simultaneous equations model. Our main empirical strategy is system of simultaneous equations consisting of three-equations. Rather than estimating solely with simultaneous equations, we chose comprehensive analysis incorporating several methods examined in the empirical literature. In this way the performance of alternative estimators in relation to SEM and the robustness of SEM estimates across different specifications and methods are assessed.

Initially, in SEM impact of income inequality on economic growth and the effect of growth on inequality are estimated with fixed effect two-stages least squares (FE2SLS). Different tests for determining the significance of the results and validity of the utilized estimators are provided. Same simultaneous equations model is estimated with fixed effect three-stages least square (FE3SLS) estimator which is often more efficient than other methods.

Then, we extend our findings for different financial and institutional indicators. In particular, we consider how bank branches, broad money and average of selected governance indicators affect growth inequality relationship.

SEM provides an alternative modelling system that more accurately describes the growth-inequality relationship than the usual single equation models because variables are interrelated in complex interactions. This is essential for our analysis where variables are jointly determined. SEM compared to single equation methods holds a greater advantage as it leverages complete information and estimates all the equations in the model simultaneously, using all the available information in the model. Mitze (2012) states that SEM, as opposed to the single-equation approach, can also define feed-back simultaneities among the system's specified endogenous variables and establish the direct and indirect effects of policy variables. Also, when outliers are present in the data, system estimators outperform single equation estimators (Adepoju and Olaomi, 2012).

Although every simultaneous equation technique has some beneficial asymptotic properties and these properties appear to be useful for large sample size, in reality most of the samples that researchers have access to are small. Gujarati and Porter (2009) argue that 2SLS and 3SLS estimates may not satisfy small sample properties and it is important to cautiously interpret obtained results.

Adepoju and Olaomi (2009) discuss that the choice of best estimator cannot be made based on certain criteria as much depends on the question researched and the type of relationship being investigated. However, in Monte Carlo simulations Mitze (2012) analyses the performance of different estimators in dynamic specification and show that simple

estimators like FEM using 2SLS/3SLS with valid instruments scores highest in terms of bias and exhibits strong performance in terms of comparative efficiency. In two-sided small samples, the FE3SLS likewise exhibits acceptable small sample performance.

To sum up, we employ a comprehensive empirical strategy that systematically involves different methods of estimation used in literature given the potential endogeneity between variables in growth-inequality-finance-institutions nexus. Consistency obtained through different methods and model specifications suggests robustness and enhances credibility of these results. Additionally, consistency across these variations reduces concerns on misspecifications of the model. In regard to aforementioned, we opt for FE3SLS as most reliable estimator considering nature of our data, underlying endogeneity assumption and the results from this estimation are most reliable for our analysis.

4.5. Econometric Analysis

System of simultaneous equations consists of partial equations for economic growth and income inequality. Initially, analysis of institutions' impact on economic growth and income inequality are tested separately. All analyses are performed using statistical program Stata version 17.0. Model specifications include standard equation for economic growth, income inequality equation as well as equation of institution. Also, in this section various tests for determining the significance of the results and validity of the utilized estimators are provided.

First of all, it should be emphasized that working with panel data has many advantages; it allows us to examine cross section effects variation across time. As a result of using time series and cross section data at the same time, number of observations and hence the degree of freedom increases. Moreover, pooling data creates a source of variation which enables parameters to be estimated efficiently (Baltagi, 2011). Some main advantages of panel data over pure time series and cross-sectional data is that individual/country variability and unobserved heterogeneity can be added to the model (Tatoglu, 2018).

The general regression equation used in panel data estimations is shown in Equation (8).

$$y_{it} = \alpha + \beta X_{it} + u_{it} \qquad \text{Equation (8)}$$

The dependent variable in the equation is denoted as Y, α is the constant, β is the slope coefficient and u_{it} defines the error term. The letter *i* denote cross sections and *t* indicates time periods (Tatoglu, 2018).

Under the error component model, Baltagi (2011) defines disturbances in the form;

$$u_{it} = \mu_i + v_{it} \qquad \text{Equation (9)}$$

Depending on the error term assumptions, either one-way or two-way panel data modelling can be estimated (Tatoglu, 2018). In the one-way error model, μ_{it}'s are cross-section

spesific components and v_{it} are remainder effects (Baltagi, 2011). In the two-way error component model, disturbances take following form;

$$u_{it} = \mu_i + \delta_t + v_{it} \qquad \text{Equation (10)}$$

where μ_i's are unobserved unit components, $\delta_t$are unobserved time component and v_{it} are remainder effects. Assumptions on disturbances term define whether the model will be estimated as one-way or two-way error model (Baltagi, 2005).

The model specifications first estimate two models separately and next as a joint system of equations. Some common estimation issues that arise in empirical analysis relate to the potential endogeneity of institutional variables. Apart from investigating the effect of financial market development institutions in separate equations, in empirical framework we check this impact simultaneously considering its effect on economic growth and income inequality in system of equations. The method Gujarati (2004) suggests when there is simultaneity and the OLS estimators are not consistent is two-stage-least-squares or IV technique that will give consistent and efficient estimators. However, finding appropriate instrument is a very difficult task. Therefore, researchers usually apply estimation technique such as Arellano and Bond`s (1991) Generalized Method of Moments. This method estimates linear dynamic panel data models where lags of the dependent variables are included as instruments. Roodman (2009) argues that even though the difference and system GMM estimators developed by Holtz-Eakin, Newey, and Rosen (1988), Arellano and Bond (1991); Arellano and Bover (1995) and Blundell and Bond (1998) are very popular. They are suitable for "small T, large N" where sample consists of few time periods but many panels. These new techniques emerge to overcome difficulties related to find appropriate instruments. In addition, 'independent variables are not strictly exogenous meaning they are correlated with past and possibly current realizations of the error; fixed effects; and heteroskedasticity and autocorrelation within individuals' (Roodman, 2009, p. 86).

Although concerns about finding exogenous instruments lead to new techniques, all these institutional indicators lack the time component which makes inference conclusions difficult. Moreover, our data´s time dimension is relatively small and for the WB countries we have only few panels which makes using GMM inappropriate. On the other side, Muinelo-Gallo and Roca-Sagales (2013) argue that seemingly unrelated regression estimation has advantage allowing empirical inter-dependence between variables but does not take into account influence of endogenous variables on the right-hand side of each equation while in SEM endogenous variables are taken into account and added as explanatory variables.

4.5.1. Panel Data Estimation Approaches

Panel data models have become widely used in social science and economic research. As explained above, a panel data set has cross-sectional and time series dimension and follows

the same identities across time. Therefore, these datasets provide more information and variability. However, when same identities are followed through a period of time it cannot be assumed that observations are independent (Wooldridge, 2013). This is different from pooling independent cross sections across time. Though using panel data series has advantages in terms of controlling the effect of omitted variables and measurement errors, detecting dynamic relationships, testing complex behavioural hypotheses, providing prediction based on micro-equations, there exist challenges in panel analysis and methodology (Hsiao, 2007). It is important to control for unobserved heterogeneity or individual specific effects to get valid parameters. Hsiao (2007) states that individual specific effects can be random or fixed. For estimating unobserved effects both estimators can be employed (Wooldridge, 2013).

The Fixed Effects Model

If the μ_i 's are considered fixed parameters to be estimated, equation takes the following form (Baltagi, 2011):

$$y_{it} = \alpha + \beta X_{it} + \sum_{i=1}^{N} \mu_i D_i + v_{it} \qquad \text{Equation (11)}$$

The restriction on the μ_i's is that $\sum_{i=1}^{N} \mu_i = 0$ and the v_{it}'s are independent and identically distributed (i.i.d.). In the case of the two-way fixed effects model (2FE), μ_i´s as unobserved unit components and δ_t´s as unobservable time effects are fixed, v_{it} are independent and equally distributed error terms.

In order to eliminate fixed effects, first differencing (FD) method is also used. According to Wooldridge (2013) FD requires strict exogeneity of regressors and if one explanatory variable is subject to measurement error it is worse method than pooled OLS. When T=2 both fixed effects and FD methods are same, but if μ_{it} are serially uncorrelated then fixed effect is more efficient than FD (Wooldridge, 2013).

The Random Effects Model

In the random effects model μ_i's are assumed random. In this way too many parameters to be estimated as in fixed effects model and loss of degrees of freedom is avoided (Baltagi, 2011). μ_i and v_{it} are i.i.d. random variables with 0 mean and variance δ^2. Also, the μ_i's are independent of the v_{it}'s. Moreover, X_{it}'s are independent of the μ_i and v_{it} for all *i* and *t*. Baltagi (2011) explains that if we draw randomly sample of N individuals from large population, then random effects model is appropriate for our data.

Diagnostic Tests

In single equation regression models the F test is very flexible and it can test a variety of hypotheses such as if individual regression coefficients are significant, if partial slope coefficients are zero, whether two or more coefficients are statistically equal and if there is structural stability of the regression model (Gujarati and Porter, 2009). First of all, in order

to avoid spurious regressions test of stationarity should be employed. Moreover, in order to find appropriate model heteroscedastic variances and autocorrelations in the error terms should be taken into account. This part briefly explains main tests that are conducted in panel data estimation.

Unit Root Tests

Nonstationarity or random walk are synonyms for unit root and when dealing with time series we should check for stationarity to see whether time series trend is deterministic or stochastic.

$$Y_t = \rho Y_{t-1} + \mu_i \qquad -1 \leq \rho \leq 1 \qquad \text{Equation (12)}$$

In the equation (12) when $\rho = 1$ we have unit root problem (Gujarati and Porter, 2009). There are several tests for testing stationarity. Depending on the presence of cross-sectional dependence two generations of unit root tests can be distinguished. While first generation of unit root tests assumes cross-sectional independence, second generation tests allow for correlations across residuals of panel units (Tatoglu, 2012). However, cross-sectional independence in macroeconomic data is not realistic and it is argued that this leads to size distortions. Thus, various tests relaxing this assumption have been proposed. Fisher type unit root test works well with unbalanced panel data. Since our data series is unbalanced, we use Fisher type unit root test where null hypothesis is that all panels contain a unit root.

The F Test

The F-statistic is widely used in econometrics since it can test different hypotheses. This test is employed to test the joint significance of the regressors (Baltagi, 2011). As there is important relationship between R-squared and F statistic, expressing F test in terms of R-squared is practical and researchers use this test when deciding to add new explanatory variable (Gujarati and Porter, 2009). According to Gujarati and Porter (2009) using F statistic we can test if partial regression coefficient is significant, whether all slope coefficients are jointly equal to zero, test the equality of two or more regression coefficients or test linear restrictions on regression coefficients and whether there is structural stability in the model. Consequently, in our panel series F test is employed to check whether data contains individual or time effects.

The Breusch-Pagan Test

Lagrange Multiplier (LM) test developed by Breusch and Pagan in 1980 (Baltagi, 2011) hypothesizes that there are no random effects. This test follows a chi-square distribution. In Stata after estimating model with random effect LM test is performed with *xttest0* command. As noted by Gujarati and Porter (2009) The Likelihood Ratio, Wald and LM tests are well known troika of hypothesis tests but in small samples usually F test is sufficient for researchers.

The Hausman Test

In fixed effect models, correlation between regressors and individual specific effect is allowed whereas in random effect models it is not. Thus, employing FE for estimating ceteris paribus effects by researchers seems more convincing (Wooldridge, 2013). Hausman in 1978 first suggested a test comparing the coefficients of two different estimators, in this case between fixed effect and random effect models where failure to reject null hypothesis leads to conclusion that differences between FE and RE estimates are not statistically different.

The Wald Test

Testing multiple hypotheses can be done with the Lagrange multiplier and the Wald test (Wooldridge, 2013). For detecting presence of groupwise heteroscedasticity in the residuals of fixed effects model Stata employs Modified Wald test with user written command xttest3 developed by C. Baum. Null hypothesis is that the variance of the error is same for all individuals.

Testing for Serial Correlation in Panel Data Models – Modified Bhargava et al. Durbin – Watson statistic and Baltagi Wu LBI test

There are many tests for detecting the existence of serial correlation in panel data model. While Bhargava *et al.* (1982) derived the Durbin Watson statistic to panel datasets, Baltagi and Li suggested LM statistic for first order serial correlation (Born and Breitung, 2016). Bhargava *et al.* (1982) enlarged their statistic to balanced panel sets whereas Baltagi and Wu improved their statistic for unbalanced and unequally spaced data (Stata, 2021). To detect presence of groupwise heteroscedasticity in the residuals these tests are used with xtregar command and lbi option in Stata.

Pesaran (2004) CD Test

Panel data models are likely to demonstrate cross section dependence in the errors. Hoyos and Sarafidis (2006) argue that reason for this interdependency between cross sectional units may be the economic and financial integration of countries. In this context, Pesaran (2004) has developed tests of cross section dependence of errors which are applicable even in heterogenous panel data models with multiple breaks, unit roots, with small T and large N. Hoyos and Sarafidis (2006) explain that command xtcsd in Stata test the existence of cross sectional dependence with many cross sectional units and few time series observations. Authors further state that if cross-sectional dependence is assumed to originate from unobserved common factors and the effect is anticipated through error term but not correlated with explanatory variables FE and RE estimators will be consistent however not efficient and standard errors will be biased. In this case FE/RE estimators with standard errors correction are possible with Driscoll and Kraay approach.

4.5.2. Instrumental Variable Estimation for Single Equation

Researchers very often come across with the problem of endogeneity. It may arise from reverse causality, omitted variables, measurement errors, sample selection or other reasons (Baltagi, 2011). As stated by Wooldridge (2013) if this problem is ignored, we obtain biased and inconsistent estimators. The use of IV technique is common in solving endogeneity issues. Selected instrumental variable should be uncorrelated with error term but correlated with endogenous variable. The key assumption in the IV method is that the instrumental variable affects the outcome only through its impact on the independent variable, and not through any other pathways. Hence, the first step is to identify an instrumental variable that meets the criteria of being correlated with the endogenous variable but not affected by it. Next, the first-stage regression is estimated; the IV is regressed on the endogenous variable to estimate the relationship between them. This produces an estimate of the effect of the endogenous variable on the instrumental variable. In the final step, the instrumental variable is used as a predictor in the main regression of interest where the endogenous variable is the outcome variable. This produces an estimate of the causal effect of the endogenous variable on the outcome variable.

However, finding strong instruments for endogenous variables is a challenging task and using weak instruments can worsen the performance of econometric model. As previously explained, IV technique is efficient in addressing endogeneity caused from reverse causality, measurement errors, selection biases or the presence of unmeasured confounding effects. For a variable to be instrument it should satisfy two assumptions:

a. Instrument should be uncorrelated with error term;

$$Cov(z, u) = 0$$

b. Instrument should be correlated with endogenous variable;

$$Cov(z, X) \neq 0$$

First assumption is also known as ***instrument exogeneity*** since requires z to be exogenous. Second condition is called ***instrument relevance*** and requires z to be positively or negatively related to endogenous variable. However, finding an IV is not an easy task (Gujarati and Porter, 2009). Moreover, testing the first assumption of covariance between instrument and error term is not possible, merely we have to rely on economic theory and researcher must provide conceptual arguments of the exogeneity of instrument. Wooldridge (2013) argues that it is important to pay attention both on sign and magnitude and not just significance of an IV candidate. A strong instrument is essential for obtaining accurate and reliable estimates in IV. To test whether chosen instrument is a strong instrument, the F-statistic and the Durbin Watson test is used. The F-statistic compares the variance in the endogenous variable that is explained by the instrument to the residual variation in the endogenous variable that is unexplained by the instrument in order to determine how strong the instrument is. A stronger instrument is one with a greater F-statistic. In addition to these tests, the theoretical and empirical relevance of the instrument and their ability to satisfy the exclusion restriction assumption is considered. The exclusion

restriction assumption requires that the instrument affects the outcome variable only through its effect on the endogenous variable and not through any other pathway.

Sanderson and Windmeijer (2015) report that in case of multiple endogenous variables inspection of the individual first-stage F -statistics is no longer sufficient. In this situation, the overall strength of the instruments can be assessed using the Cragg and Donald (1993) statistic. Stock and Yogo (2005) have tabulated critical values of the minimum eigenvalue of the Cragg-Donald statistic for testing instrument weakness. Angrist and Pischke (2009) propose an alternative first stage F statistic for the situation of multiple endogenous variables. They reformulated the estimation issue to a one-variable model after substituting the other endogenous variables with their reduced form predictions. On the other hand, Sanderson and Windmeijer (2015) estimated that F -statistics in a two-endogenous variables model gives the same results as the Cragg–Donald test statistic, unless the rank reduction is brought on by the fact that the instruments are not informative for one of the endogenous variables. Further, they argue that conditional F-statistics can offer additional information about the strength of the instruments for the multiple reduced forms when there are more than two endogenous variables.

The Stock and Yogo (2005) weak instrument critical values are used for the Cragg–Donald and conditional F-statistics. However, when heteroskedasticity and/or serial correlation is present, robust conditional F-statistics is computed and used as tests for underidentification but Stock and Yogo (2005) critical values does not hold for the robust statistic.

In accordance with Sanderson and Windmeijer (2015) recommendation, we report standard first-stage F-statistics, the Cragg–Donald (i.e. Kleibergen) statistic and the conditional F – statistics of Sanderson and Windmeijer.

On the other hand, the Sargan-Hansen or Sargan's J test is a test of overidentifying restrictions and can test the exogeneity condition when there are more instruments than needed. In order to test a validity of the instruments in estimation Sargan has developed a statistic where null hypothesis is that all instruments are valid; when null hypothesis is rejected, we conclude that at least one instrument is correlated with the error term (Gujarati and Porter, 2009).

While two-stage least squares is a commonly used method for IV estimation, other methods such as LIML estimation and GMM can also be used for IV-based estimation approaches.

4.5.3. Two-stage Least Squares

The general M equations model with M endogenous variables can be estimated using two approaches: single-equation methods and system methods. Single-equation methods are also known as limited information methods. This approach estimates each equation in the

model separately, using only limited information. Examples of single-equation methods include OLS, ILS and 2SLS.

System methods, on the other hand, are also known as full information methods. This approach estimates all the equations in the model simultaneously, using all the available information in the model. Although both approaches offer reliable parameter estimations, the system approach is more effective but sensitive to specification errors.

2SLS invented independently by Henri Theil and Robert Basmann utilizes instrumental variables that are not correlated with error terms in two successive steps using OLS. In first stage all the endogenous variable(s) are regressed on all the exogenous variables in the system whereas in second stage estimated values for endogenous variable(s) are replaced in the structural equations and OLS regression is performed.

In these models it is crucial to make distinction between exogenous and endogenous variables. Mutually or jointly dependent variables that occur in models are called endogenous variables. Therefore, variables in these models are either endogenous or exogenous and while endogenous variables are considered to be stochastic and determined within the model, exogenous variables are independent, nonstochastic and determined outside the model (Gujarati and Porter, 2009).

To see whether IV estimator is necessary or simultaneity problem exist, first test of endogeneity should be conducted. Hausman's specification error test or Hausman test of endogeneity (1978) is used to see if OLS and 2SLS estimates are statistically different from each other. Using these methods when there is no endogeneity leads to estimates that are consistent but not efficient (Gujarati and Porter, 2009). On the other hand, Wooldridge (2013) emphasize that in order to use simultaneous equations models it is not sufficient that two variables are determined jointly but also each equation in the model need to have a ceteris paribus explanation separate from the other equation(s).

System of two-equation model with panel data can be written as;

$$y_{it1} = \alpha_1 y_{it2} + \beta_1 z_{it} + u_{it1} \qquad \text{Equation (13)}$$

$$y_{it2} = \alpha_2 y_{it1} + \beta_2 z_{it} + u_{it2} \qquad \text{Equation (14)}$$

These are called structural equations where α and $\beta's$ are structural coefficients, y_1 and y_2 are endogenous variables, z_1 and z_2 are exogenous while u_1 and u_2 are structural error terms. To solve for endogenous variable y_2, right hand side of y_1 is plugged in equation.

$$y_2 = \alpha_2(\alpha_1 y_2 + \beta_1 z_1 + u_1) + \beta_2 z_2 + u_2 \qquad \text{Equation (15)}$$

where

$$(1 - \alpha_2\alpha_1)y_2 = \alpha_2\beta_1 z_1 + \beta_2 z_2 + \alpha_2 u_1 + u_2 \qquad \text{Equation (15a)}$$

solving for y_2 requires to make an assumption that;

$$\alpha_2\alpha_1 \neq 1 \qquad \text{Equation (15b)}$$

The variable z_1 stands for a set of exogenous variables that appear in the first equation, while the variable z_2 is the set of exogenous variables in the second equation and oftentimes z_1 and z_2 overlap. In this context, imposed exclusion restriction on model means that z_1 and z_2 contains different exogenous variables, i.e. certain variables emerge in first equation while others appear in the second equation (Wooldridge, 2013). Reduced form equations are derived from the structural equations.

Estimating the reduced form of y_2 leads to;

$$y_2 = z_1\pi_{21} + z_2\pi_{22} + v_2 \qquad \text{Equation (15c)}$$

The reduced form equation of y_1 and y_2 is expressed in terms of the exogenous variables and the error terms. Such parameters are called reduced form coefficients. Since they measure impact of a unit change in the value of exogenous variable on endogenous variable, they are also known as impact multipliers and procedure estimating the structural coefficients from the reduced form coefficients is called Indirect Least Squares (ILS). Briefly, this procedure removes the influence of the stochastic disturbance from endogenous variable; obtained values are replaced in the structural equation and estimated by OLS (Gujarati and Porter, 2009).

Gujarati and Porter (2009) argue that 2SLS is specifically intended for overidentified equations but when applied to just identified equations results are same for 2SLS and ILS. Further, 2SLS is similar to IV method in that linear combination of the exogenous variables serves as an instrument to endogenous variable. However, parameter estimation identification problem should be resolved before. In addition, 2SLS is only as good as the instruments. In the presence of weak instruments, the 2SLS estimator can actually produce worse results than simple OLS. So, the first step in testing must be to ensure that the instruments are strongly enough correlated with the potentially endogenous variables.

4.5.4. System of Simultaneous Equations Estimation Approaches

Thus far, we were concerned with single equation models where income inequality and economic growth were dependent variables on many explanatory variables. However, in economic theory many equilibrium mechanisms occur as reciprocal causality of certain variables and it can be deficient to explain two-way casual relations with single equation. In simultaneous relations distinction between dependent variable and explanatory variables becomes questionable (Gujarati and Porter, 2009). In many situations certain explanatory variables are jointly determined with the dependent variables. One of the models used to formulate economic relations with more than one equation is known as Simultaneous Equations Models. Behavioural equations such as investment, consumption, production as

well as demand and supply equations are estimated by economists usually jointly as system equations (Baltagi, 2011).

The general M equations model with M jointly dependent variables can be written in the following form (Gujarati & Porter, 2009);

$$Y_{1t} = \beta_{12}Y_{2t} + \beta_{13}Y_{3t} + \cdots + \beta_{1M}Y_{Mt} + \gamma_{11}X_{1t} + \gamma_{12}X_{2t} + \ldots + \gamma_{1K}X_{Kt} + u_{1t}$$

Equation (16)

$$Y_{2t} = \beta_{21}Y_{1t} + \beta_{23}Y_{3t} + \cdots + \beta_{2M}Y_{Mt} + \gamma_{21}X_{1t} + \gamma_{22}X_{2t} + \ldots + \gamma_{2k}X_{Kt} + u_{2t}$$

Equation (17)

$$Y_{3t} = \beta_{31}Y_{1t} + \beta_{32}Y_{2t} + \ldots + \beta_{3M}Y_{Mt} + \gamma_{31}X_{1t} + \gamma_{32}X_{2t} + \ldots + \gamma_{3K}X_{Kt} + u_{3t}$$

Equation (18)

……

$$Y_{Mt} = \beta_{M1}Y_{1t} + \beta_{M2}Y_{2t} + \cdots + \beta_{M,M-1}Y_{M-1,t} + \gamma_{M1}X_{1t} + \gamma_{M2}X_{2t} + \ldots + \gamma_{MK}X_{Kt} + u_{Mt}$$

Equation (19)

$Y_1, Y_2, \ldots . Y_M = M$ endogenous variables

$X_1, X_2, \ldots . X_K = K$ exogenous or predetermined variables

$u_1, u_2, \ldots . u_M = M$ stochastic disturbances

t =1, 2… T = T total number of observations

β's = coefficients of the endogenous variables

γ's = coefficients of the exogenous variables

System of equations shown above is referred as structural equations. From these equations reduced form equations and reduced form coefficients are obtained.

As discussed previously, the full information approach is more effective than estimation of equation by equation. Thus, Lundberg and Squire (2003) believe that exploring casual effects of certain policies cannot be understood properly without analysing growth and inequality simultaneously since they are a consequence of the same processes. Gujarati and Porter (2009) describe that in simultaneous equation models one cannot estimate parameters of single equation without considering information given in system of equations and application of OLS to these models results in simultaneous bias because the assumption of no correlation between explanatory variable and disturbance term is violated. Therefore, estimating the economic growth function in isolation of income inequality is likely to give biased and inconsistent estimates. SEM approach is more effective due to its ability to capture complex interactions, address issues of endogeneity

and simultaneity and provide efficient estimation. Another advantage is supporting policy analysis, facilitating prediction and forecasting which is particularly useful in situations where there are multiple dependent variables that are interrelated and where a holistic approach is needed to understand the dynamics of the system. Since in SEM more than one dependent/endogenous variable is involved, the variables that are endogenous in one equation are explanatory variables in another equation. System of SEM must have as many equations as the number of endogenous variables.

4.5.4.1. Estimation of SEM

According to Gujarati and Porter (2009) limited information method estimates each equation separately considering only restrictions imposed for that equation while system method takes into account all restrictions in the system and estimates all equations simultaneously. Further, authors explain that single equation may be estimated by OLS, ILS and 2SLS but 2SLS is most widely used method in practice since it is easy to apply. 2SLS can be used both in single equations and system equations. When applied to single equation it does not consider other equations in the system.

Nevertheless, Wooldridge (2013) argues that although each equation can be estimated by 2SLS, system estimation methods are more efficient than estimating each equation separately by 2SLS. Similarly, Baltagi (2011) describes that system estimation method considers the zero restrictions in every single equation and the residuals variance covariance matrix of the whole system. In system equations three-stage least squares is widely used method.

4.5.4.2. Identification in SEM

The identification issue reveals which conditions are required for parameter estimation in the model. Essentially, the problem of identification refers to the question of whether it is possible to derive distinct numerical values for the structural coefficients based on the estimated coefficients in the reduced form. Accordingly, SEM needs instrumental variables to identify the parameters in the model. Gujarati and Porter (2009, p.692) explain that identification problem is whether structural coefficients can be derived from reduced form coefficients since:

> different sets of structural coefficients may be compatible with the same set of data. To put the matter differently, a given reduced-form equation may be compatible with different structural equations or different hypotheses (models), and it may be difficult to tell which particular hypothesis (model) we are investigating.

In this regard, equation can be under identified, just identified or overidentified. When values derived for structural coefficients are unique it is said that equation is just identified.

If for some coefficients of structural equations more than one value can be obtained then equation is overidentified.

Gujarati and Porter (2009) suggest using following notations for order and rank condition:

M = number of endogenous variables in the model

m = number of endogenous variables in a given equation

K = number of exogenous/predetermined variables in the model including the intercept

k = number of exogenous/predetermined variables in a given equation

Equation is just identified if it excludes at least M-1 variables and over identified if it excludes more than M-1 variables appearing in the model.

Also, number of predetermined variables in the model minus the number of predetermined variables in an equation must be higher or equal to the number of endogenous variables included in that equation less 1 which is shown as:

$$K - k \geq \mathrm{m} - 1$$

Baltagi (2011, p. 261) describes that necessary but not sufficient condition for identification of any structural equation is that 'the number of excluded exogenous variables from this equation is greater than or equal to the number of right-hand side included endogenous variables'. Similarly, Wooldridge (2013) explains that in a two-equation system if the second equation involves at least one exogenous variable that is excluded from the first equation then model is identified.

However, this does not suffice condition for an equation to be identified. Rank condition of identification is defined as (Gujarati and Porter, 2009, p. 701):

> In a model containing M equations in M endogenous variables, an equation is identified if and only if at least one nonzero determinant of order (M − 1)(M − 1) can be constructed from the coefficients of the variables (both endogenous and predetermined) excluded from that particular equation but included in the other equations of the model.

Bound, Jaeger and Baker (1995) recommend that as an indicator for strong instrument first stage regressions' R^2or the F-statistic may be used. Stock and Watson (2003) as a rule of thumb use first stage F-statistic, if it is less than 10 points it shows that instruments are weak and using weak instruments will bias 2SLS estimates. Stock, Wright and Yogo (2002) suggest that in linear regressions weak instruments are weakly correlated with the endogenous variables. Furthermore, authors argue that many instruments and weak instruments issues are related because many strong instruments will lead to the first

regressions adjusted R squared to be close to 1 whereas low adjusted R-squared indicates the weakness of many instruments.

5. THE SAMPLE AND THE DATA

5.1. Data Description

The empirical analysis will be based on unbalanced panel dataset of the Western Balkans countries acknowledged as upper-middle income countries by the World Bank. This empirical research contains annual data spanning from 1996 to 2019. However, data coverage varies by country and by the variable considered. For the purpose of providing general overview regarding the size of the economy of the WB countries the most common indicators for measuring economic activity are given in the table 1.

Table 3. Main Economic Indicators of the Western Balkan Countries

Country	Pop.	Surface area	Gross National Income GNI Atlas Method	GNI per capita Atlas Method	GNI, PPP		GDP
	Millions	sq. Km (thousands)	current US$ billions	current US$ billions	Billions	per capita	% growth
Albania	2.8	28.8	17.2	6.110	43.8	15.590	8.5
Bosnia and Herzegovina	3.3	51.2	22.3	6.810	56.4	17.230	7.5
Montenegro	0.62	13.8	5.8	9.340	14.8	23.920	12.4
North Macedonia	2.1	25.7	18.8	6.190	36.2	17.520	4.0
Serbia	6.8	88.4	57.8	8.460	142.2	20.810	7.5

Source: World Bank, World Development Indicators: Size of the Economy
http://wdi.worldbank.org/table/WV.1#)

Both demographic and economic indicators of the WB countries reveal basic economic characteristics of relatively small economies. Data includes GNI, GNI per capita and GNI PPP measured with Atlas method as well as GDP for the 2021. In comparison to other countries Serbia is ranking first in terms of population, surface area and gross national income. However, Montenegro has highest GNI per capita and GNI PPP.

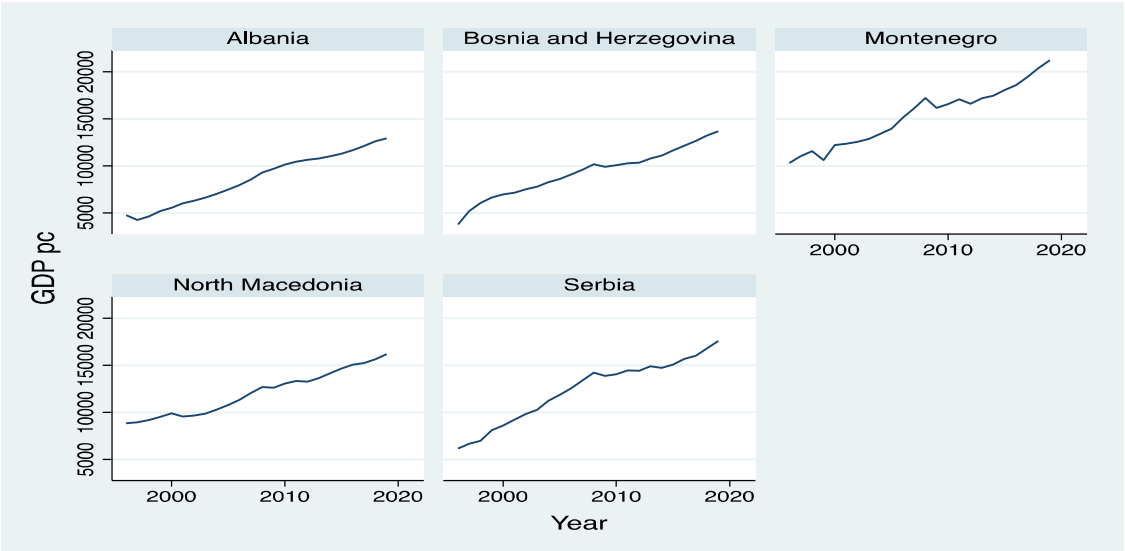
Since literature review reveals different results regarding to development stage of countries and in the sample, we have countries with similar backgrounds we expect selected institutional indicators to increase explanatory power in growth-inequality nexus. The

selection of countries was determined by the factors that GNI per capita, inequality and institutional indicators are within same range for these countries while the availability and frequency of data series are of similar quality. Thus, choice of the sample reduces the sample heterogeneity. Dataset with detailed definition, measurement and sources for each of the variable is listed in the Appendix 1.

We obtain the data from the Penn World Tables (PWT - version 10.01), the World Bank as well as Standardized World Income Inequality Database (SWIID). With this comprehensive dataset, we were able to perform different estimation techniques with annual GDP per capita and Gini coefficient as the outcome variable.

Consistent with most of the literature economic growth is proxied by the GDP per capita. GDP per capita is gross domestic product divided by population. The PWT is one of the most commonly used databases for real GDP per capita. It is a widely recognized source of national accounts data that provides measures of economic performance and well-being for over 180 countries. The PWT is produced by the University of Pennsylvania and is updated regularly to reflect the latest available data. Lundberg and Squire (2003) also use data from this resource. This source provides detailed data on real GDP at the country-level where aggregates are based on real GDP at constant 2017 national prices (in mil. 2017US$). Graph 1 shows clearly upward trends in GDP per capita for the WBC.

Graph 1. Real GDP per capita in the Western Balkan Countries



Source: Penn World Table (2023) and author's own calculation

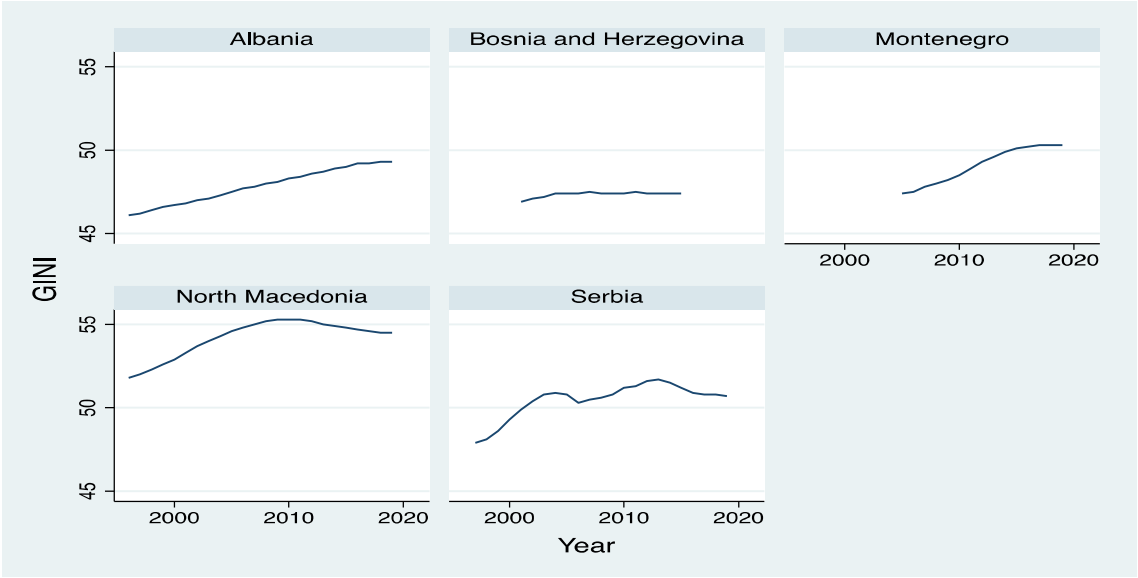
Although there are other measures of income inequality, Gini is most widely used in the literature. Moreover, this measure is available for a longer time period. The data on Gini coefficient we use here are new and improved high-quality data taken from the SWIID prepared by Frederick Solt (2020) version 9.1. This database incorporates data for 192 countries from various resources as the OECD Income Distribution Database, the World Bank, national statistical offices around the world and Eurostat where the data collected

from Luxembourg Income Study serves as the standard. Except that, it provides improved and longer panel data set for the WB countries than data set from the World Bank.

The following graph (2) demonstrates the level of market income inequality in the region starting from the data available for each country and represents increase of income inequality over the past few decades. Market Gini reflects the concentration of income without taking into account any redistributive policies or other interventions by the government. Using market Gini instead of disposable Gini index is more appropriate since the aim of this study is to estimate impact of income inequality and not consider redistributive policies.

The graph below for each country clearly shows steep upward curves denoting that market income inequality has risen for all countries in our sample and very distinctively North Macedonia has highest Gini coefficient. On the other hand, while Gini for Serbia demonstrates upward trend there is apparently fluctuations in 2006 and 2014.

Graph 2. Trends in the Gini Coefficient: Market Income Inequality



Source: Standardized World Income Inequality Database and author's own calculation

The choice of financial indicators is dictated by the availability of data for these countries. The Development Indicators Database of World Bank contains annual data starting from 1960 through 2019 for various financial indicators. Indicators measuring depth and access to financial systems are included whereas indicators related to stock markets; evaluating efficiency and stability of financial systems due to data unavailability are not taken into account. As previously mentioned, number of commercial bank branches per 100.000 adults, domestic credit to private sector by banks (% of GDP) and broad money (% of GDP) as are employed as proxies for financial market development. Data on financial indicators for the WB countries is unbalanced and mainly reason for this is formation of new states regarding to the date of disintegration. Depending on the financial indicator data for some countries backs even to 1994. It is worth noting that our model and estimations

suffer from insufficient data for all financial deepening variables, in particular for the newest countries of the region.

However, for many countries most of financial indicators start from 2003 and with the aim of creating larger sample as a proxy for financial market development we use domestic credit to private sector by banks (% of GDP) which is available from 1996. Moreover, this variable beside broad money is widely used in empirical literature as proxy for financial market development. Although larger time coverage is preferable while conducting analysis, we believe that sample covering over two decades is representative of history of new states, their financial markets and economic institutions and is sufficient to show structural formations and economic activities.

Data for governance indicators are sourced from Worldwide Governance Indicators compiled at the World Bank. They have been published every two years from 1996 and annually from 2002. Correlations among financial indicators and governance indicators are provided in the Appendix 2.

General government final consumption expenditure shares in GDP, trade as a ratio of GDP, investment and population are taken from the Penn World Table. Financial market development proxies, FDI net inflows shares in GDP, fertility rates, inflation, agricultural land, natural resources rent are taken from the World Development Indicators of the World Bank. Similarly, indicators for institutional quality are from World Governance Indicators. General government final consumption expenditure includes all government current expenditures for purchases of goods and services. Trade is the sum of exports and imports of goods and services measured as a share of GDP. Inflation rate is defined as an annual percentage change in the cost of a basket of goods and services. FDI net inflows shares in GDP series exhibit net inflows from foreign investors and is divided by GDP. Unemployment rates are taken from Eurostat database and represent unemployed persons as a percentage of the labour force. The empirical studies analysing income inequality take into account a proxy for asset inequality which in our case as available variable is agricultural land. Agricultural land (% of land) indicates the share of arable land area under permanent crops and can serve as collateral for financial services in developing countries.

5.2. Panel descriptive statistics

Empirical literature review demonstrates that to minimise the impact of short-term movements and possible measurement errors in the series, usually the annual data is converted to non-overlapping three, four or five-year averaged periods for different reasons. First, variability is assured in time resistance data that change were slow. Secondly, taking averages smoothens out short-term fluctuations in economic growth and minimizes discrepancy in variables. Additionally, the advantage of taking averages is when data is missing for certain year taking average with the available data will provide information on period when data are not available.

On the other hand, although averaging would clear discrepancy in the data and possible short-term fluctuations in the economic cycle, it cannot be assured that these cycles are correctly split because they might differ across countries. Additionally, taking averages might lead to loss of valuable information. Moreover, our sample size is already limited by the data availability. Since panel estimation requires a large number of observations, we keep simple specification with annual data for both equations to maximize the degrees of freedom. Besides, discrepancy problem is resolved by taking log transformation of the variables.

Table 2 presents summary statistics for the non-logarithmic forms of dependent and explanatory variables in the unbalanced 1996-2019 panel. It shows the wide range of per capita income levels in the sample - from just over $1464 (Albania in the 1997) to about $7684 (Montenegro in 2019). The overall samples mean is about $4345. Regarding inequality, the mean of the Gini coefficient equals 50.06, the maximum value (above 55.3) corresponds to Macedonia, and the minimum (below 46.1) corresponds to Albania in 1996.

Table 4. Descriptive statistics

Variable	Obs.	Mean	Std.	Min	Max
GINI	101	50.06	2.74	46.1	55.3
GDP	129	4345.09	1371.13	1464.29	7684.18
CREDIT	117	37.36	17.05	3.26	86.45
LAW	114	-0.36	0.29	-1.27	0.32
FDI	101	6.33	5.41	0.06	37.27
INVEST	126	24.94	6.65	7.11	42
TRADE	126	87.1.7	23.13	22.49	147.81
EDU	118	10.66	1.36	6.18	12.17
GOV	122	18.05	4.52	9.45	29.94
UNEMPL	130	21.77	7.27	9.01	38.8
FERT	122	1.61	0.25	1.24	2.51
CPI	112	95.41	27.80	5.05	152.24
AGRI	125	41.02	6.99	16.59	52.46
NATRES	121	1.34	17.05	3.26	86.45
M2	117	49.23	20.91	9.83	88.62
BANKBR	84	29.27	8.47	9.68	45.51

Source: Author's own calculation

Descriptive statistics on Gini coefficient show low variability of income distribution is present. Implications of low variability may result in high R squared value and large standard errors of coefficients thus reducing precision of estimates. We consider alternative models and critically assess goodness of fit to represent the complexity of inequality growth relationship. Low variability on inequality index of our sample is addressed by within country differences. Even though between country differences in Gini ranges from 48.6 to 51.4, within country differences are 46.9-55.4. The between-country

variation (standard deviation) is only approximately one-third as large as the within-country variation for the Gini coefficient (Appendix 2). Thus, yearly data on Gini from 1996 to 2019 covers considerable time span which allows us to compare changes in income inequality.

The mean value of the rule of law is -0.36 for the entire panel. Estimate range from approximately -2.5 to 2.5 and we did appropriate natural log transformation. Wicklin (2010) argues that although there are different ways to transform negative data values frequently used approach is to add constant before log transforming data (https://blogs.sas.com/content/iml/2011/04/27/log-transformations-how-to-handle-negative-data-values.html). Therefore, we choose a constant so that min(Y+constant) is very small positive number. Domestic credits to private sector by banks (% of GDP) values range from 3.26 to 86.45. The lowest and peak values of broad money are 9.83 (Serbia in 1997) and 88.62 (Albania in 2020) whereas mean value is 49.23. FDI net inflows share in GDP has the mean value of 6.33 while lowest value corresponds to North Macedonia in 2020. In addition, unemployment series with the sample mean 21.77 reflect high unemployment rates for the given period. Government expenditure shares mean value is 18.05 and it ranges from 9.45 (Albania in 1996) to 29.94 (Montenegro in 2005). We have 118 observations for average education level which range from 6.18 (Bosnia and Herzegovina) to 12.17 (Montenegro). The remaining independent variables in the descriptive statistics table seek to explain any remaining variations in GDP per capita and Gini coefficient.

Table 2 illustrates discrepancies in variables such as credit, FDI and inflation. Thus, a domestic credit to private sector by banks variable has high standard deviation suggesting greater variability. Similarly, wide range for FDI (% of GDP) suggests high discrepancy. Deep structural transformation from state led economies to market economy which led to severe changes in inflation and natural resources rent variables over time impacted consistency of these data. As addressing data discrepancy is important for reliable and valid estimates, dataset is thoroughly explored with visual inspections to identify possible measurement errors. Logarithmic transformation is widely used for equalizing the effects of extreme values, reducing skewness of variable and homogenizing variances across groups. In this context, we log transform our data to get normal distributions. Descriptive statistics for all key variables after data transformation are given in Appendix 2. As can be seen, the differences between minimum and maximum values and high standard deviation in credit, FDI, CPI and natural resources is compressed after natural logarithmic transformation of data.

All variables are in logarithmic forms where *i* denotes country and *t* stands for time. $Gini_{it}$ denotes the Gini coefficient, $Credit_{it}$ is proxy for financial market development, GDP_{it} is GDP per capita (constant 2017 US $) and LAW_{it} is proxy for quality of institutions. $AvIQ_{it}$ is vector comprising of six alternative proxies for institutional quality. Also, number of commercial bank branches (BANKBR) and ratio of broad money to GDP (M2) is used as proxy for financial market development.

X_{it} is a matrix of the following control variables: Gov_{it} denotes the government expenditure shares, EDU_{it} is average years of education, $Trade_{it}$ is trade to GDP ratio, FDI_{it} is the ratio of foreign direct investment net inflows to GDP, $UNEMPL_{it}$ is the unemployment ratio, $AGRI_{it}$ is agricultural land, $INVEST_{it}$ ratio of investment at constant national 2017 prices over GDP at constant national 2017 prices, CPI_{it} is inflation rate, $NATRES_{it}$ is natural resources rent and $FERT_{it}$ is fertility rate. Regarding governance indicators VA_{it} refers to Voice and Accountability, PS_{it} is for Political Stability and Absence of Violence/Terrorism, RQ_{it} for Regulatory Quality. $CORR_{it}$ refers to Control of Corruption and GE_{it} Government Effectiveness.

In addition to data transformation, we investigate other model descriptions and different approaches. The analysis involves comparing different estimate methodologies and empirically evaluating both system equations and single-equations. Accurate inferences and predictions regarding results require resistance to changes in the dataset. This guarantees both the stability of our findings and the robustness of the estimates.

5.3. Model Specification

The empirical literature review reveals that most frequently used procedure for estimation of economic growth and income inequality relationship is to use linear relationship between these variables. However, OLS estimation is biased due to correlation between independent variable and error term. As Banerjee and Duflo (2003) accentuate this problem could be solved by panel data and taking variables` period averages clears additive country fixed effects.

Following literature on growth - financial market development – institutional quality nexus econometric analysis is based on the model where real GDP per capita is a function of Gini coefficient, financial market development indicator, indicator of institutional quality and control variables denoted as Z. Next, income inequality is regressed on real GDP per capita, financial market development indicator as well as institutional indicator and different set of control variables denoted as W.

Our independent regression model for economic grow is presented below:

$$GDP_{it} = \beta_0 + \beta_1 Gini_{it} + \beta_2 FD_{it} + \beta_3 IQ_{it} + \beta_4 Z_{it} + u_{it} \quad \text{Equation (20)}$$

We estimate the following equation for income inequality:

$$Gini_{it} = \beta_5 + \beta_6 GDP_{it} + \beta_7 FD_{it} + \beta_8 IQ_{it} + \beta_9 W_{it} + u_{it} \quad \text{Equation (21)}$$

We estimate two separate panel regressions for growth and inequality. All variables are in natural log forms. First, economic growth equation is employed. While rule of law is one of the most used indicators for institutional quality, available indicator for financial market development is domestic credit to private sector by banks. Initially we begin with these

indicators and test separately above described explanatory variables. In terms of additional determinants, investment, FDI, government expenditure and trade are forward selected to the model. Next, education, fertility and inflation are included to determine whether they make a significant contribution. As far as income inequality equation is concerned, control variables such as government expenditure, agricultural land, unemployment and natural resources (% rent) are tested for the significance in different models.

The set of control variables for each equation is added following commonly accepted cross-country growth and income inequality literature as well as Barro`s (1990) growth equation and Lundberg and Squire`s (2003) SEM estimation. Thus, government consumption shares in GDP, trade as a ratio of GDP, FDI net inflows (% of GDP), agricultural land, fertility rate, unemployment rate, and investment variables are considered. Also, a critical component of economic development recognized as human capital proxied as average years of education is considered. However, using index of civil liberties for the sake of robustness cannot be performed since historical data for Montenegro is not available and therefore is omitted.

Literature on economic growth and development has emphasized the importance of institutions on economic growth (Knack and Keefer, 1995; Hall and Jones 1999; Acemoglu, Johnson and Robinson, 2001; Rodrik, Subramanian and Trebbi, 2002). Also, as previously reported in the literature, the level of financial market development has been identified as driver of economic growth. Nevertheless, evidence is not conclusive and there is a long-standing debate over whether financial market development or institutions cause growth or contrarily these institutions are outcome of growth.

In terms of a priori expectations, the ratio of government consumption to GDP, fertility rate and the inflation rate is predicted to affect growth negatively (Barro, 1990). The well-known traditional theories suggest that government social spending decreases income inequality. However, the effect depends on the size and mix of government spending. On the other hand, research on relationship between inflation and income inequality shows mixed results, even suggesting Kuznets U shaped nonlinear relationship in long run (Siami-Namini and Hudson, 2019).

Similarly, trade can have both positive and negative effect on income inequality while it is considered to enhance economic growth. Empirical evidence on 10 less developed Central-Eastern European countries indicate that higher trade volumes enhance economic growth but trade liberalization policies does not necessarily lead to positive economic performance under the period of investigation (Silajdzic and Mehic, 2018).

On the other side, it is acclaimed that FDI together with human capital development enhances income per capita through its impact on investments and domestic capital formation, by beneficially influencing productivity, exports, trade and creating employment in developing countries. Mehic, Silajdzic and Babic-Hodovic (2013) confirm that FDI is positively related to economic growth in transition countries of South East

Europe. However, the effect of FDI on income inequality is ambiguous from both theoretical and empirical point of view. Although prominent study of Tsai (1995) argues that FDI has negative impact on unemployment in traditional sectors, Hemmer, Krüger and Seith (2005) do not find significant implications for income inequality in general. Regarding the fertility variable, Becker, Glaeser and Murphy(1999) think that fertility issue is much more complicated than that established either in Malthusian, neoclassical or endogenous growth models.

Meanwhile, although economic theory suggests that growth decreases income inequality, results may vary depending on the development stage of a country. Also, a number of studies have shown inconclusive results and Voitchovsky (2012) explains that this is due to numerous transmission channels in this relationship.

6. RESULTS

6.1. Results of Panel Data Analysis

To avoid inefficient estimators, stationarity is checked for each variable. Result of Pesaran cross sectional independence test estimates (Appendix 3) show that lGOV, lFDI and lURBAN variables have cross sectional dependence. Next, given the nature of the data used in this dissertation, Fisher unit root test of unbalanced panel is performed for all variables (Appendix 3). All variables except unemployment are stationary. To decide between panel data models, we perform steps in sequence and estimate Hausman test, heteroscedasticity, autocorrelation and cross-sectional independence tests. Poolability test obtained by comparing fixed effect estimates and pooled regression is rejected indicating that country effects are present.

Table 5. The estimation of models with FE and RE for Economic Growth (Dependent variable lGDP per capita)

	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)
lGINI	3.857***	4.054***	2.047***	3.925***	3.329***	3.152***	3.031***	2.739***
	(0.798)	(0.604)	(0.072)	(0.647)	(0.572)	(0.356)	(0.460)	(0.540)
lCREDIT	0.181***	0.187***	0.018	0.176***	0.151***	0.161***	0.138***	0.121***
	(0.015)	(0.025)	(0.020)	(0.021)	(0.021)	(0.012)	(0.020)	(0.031)
lLAW	0.677***	0.672***	0.025	0.651***	0.461***	0.278***	0.697***	0.281*
	(0.066)	(0.151)	(0.061)	(0.548)	(0.081)	(0.091)	(0.080)	(0.152)
lFDI		0.011						0.007
		(0.013)						(0.012)
lINVEST			0.092***					0.043
			(0.025)					(0.033)
lGOV				-0.079				
				(0.136)				
lTRADE					0.232***			0.218***
					(0.056)			(0.064)
lEDU						0.684***		0.580***
						(0.156)		(0.108)
lFERT							-0.506***	0.001
							(0.103)	(0.145)
lCPI								0.025
								(0.033)
Constant	-6.853**	-7.695***	1.304***	-6.870**	-5.552**	-5.303***	-3.267*	-4.558*
	(2.991)	(2.378)	(0.029)	(2.709)	(2.305)	(1.449)	(1.791)	(2.322)
Obs.	91	82	86	91	91	91	90	79
Groups	5	5	5	5	5	5	5	5
R-squared	0.622	0.881	0.926	0.900	0.925	0.927	0.901	0.952

****, ** and * denote significance at 1%, 5% and 10% respectively. Heteroskedasticity corrected standard errors are shown in parentheses.*

Source: Author's own calculation.

Using the Baltagi–Wu (1999) GLS estimator of the RE model as well as FE Driscoll and Kraay standard errors through (1-8) equations significant effect of income inequality on economic growth is found. The estimates are very large in magnitude. Estimations regarding economic growth equation are given in Appendix 4. The estimation results from the table across all specifications suggest that there is positive and marginally significant (from 0.018 to 0.187) relationship between real GDP per capita and credit variable in our sample. Thus, there is an indication that financial market development goes along with increase in real GDP per capita. Growth is positively related to the extent of maintenance of the rule of law.

Growth is positively related to the ratio of investment to GDP but is not robust when other determinants are added to the model. On the other hand, relationship between growth and FDI is not significant. For a given value of income per capita, growth is negatively related to the ratio of government consumption to GDP but is insignificant. Fertility is found to lower growth whereas inflation increases GDP per capita. However, fertility and inflation does not exert a robust influence on economic growth when other determinants are taken into account. Also, evidence in the theoretical and empirical literature demonstrates that trade is one of the factors driving economic growth over the long run. The obtained result is supported by Barro (2000). For education, the results show that the coefficients on education are positive and significant. The R-squared values for different estimates span from 0.62 to 0.95.

Table 6. The estimation of models with FE and RE for Income Inequality (Dependent variable lGINI)

	Model (1)	**Model (2)**	**Model (3)**	**Model (4)**	**Model (5)**
lGDP	0.091***	0.069***	0.091***	0.085***	0.062***
	(0.017)	(0.020)	(0.016)	(0.015)	(0.009)
lCREDIT	-0.007	-0.001	-0.007	-0.005	0.002
	(0.004)	(0.004)	(0.004)	(0.003)	(0.002)
lLAW	-0.029**	-0.015	-0.029*	-0.020	-0.007
	(0.012)	(0.013)	(0.014)	(0.015)	(0.012)
lAGRI		-0.039***			-0.038***
		(0.008)			(0.005)
lGOV			0.003		0.004
			(0.009)		(0.001)
D.UNEMPL				0.002***	0.001***
				(0.001)	(0.001)
lNATRES					0.006***
					(0.001)
Constant	3.100***	3.424***	3.089***	3.145***	3.476***
	(0.165)	(0.178)	(0.115)	(0.123)	(0.098)
Obs.	91	91	91	89	89
Groups	5	5	5	5	5
R-squared	0.217	0.763	0.646	0.655	0.832

****, ** and * denote significance at 1%, 5% and 10% respectively.*
Heteroskedasticity corrected standard errors are shown in parentheses.
Source: Author's own calculation.

The relationship between GDP per capita and income inequality in the Western Balkan countries is a complex one, and the direction and strength of this relationship may vary depending on a number of factors. Regression results with Driscoll and Kraay standard errors demonstrate that GDP per capita causes income disparities in the WBC (Appendix 5). In accordance with literature review on inequality - finance nexus in TC, domestic credit to private sector by banks has negative effect on inequality, however, results are not significant. Coefficient estimates of rule of law improves income inequality in only model (1) and (3). Regarding control variables agricultural land is found to have a significant

negative impact on income inequality across models. Value of regression parameter for government expenditure presented in table 4 is not statistically significant. Unemployment and natural resources variables contribute to income disparities in the Western Balkan countries. In addition, mean years of education has been tested and results suggest that education has no significant effect on the Gini.

6.2. Results of Instrumental Variable Analysis

In order to control for potential endogeneity problems this part of dissertation employs IV regressions both for economic growth and income inequality equations. Researchers to identify instrumental variables usually use lagged variables (prior period data). Lagged variables are strongly correlated with potentially endogenous variables, yet they still must meet the requirements of instrument exogeneity and instrument relevance. It is easy to satisfy instrument relevance assumption since current value of a variable is related to lag of that variable. However, instrument orthogonality criteria that lagged variable is not correlated to error term is harder to meet. Another strategy is to use deeper lags in order to avoid IV's correlation with the residual but this might decrease the strength of the instrument with the endogenous variable.

Initially, based on a literature review life expectation for female and male (years) variables were checked against the IV assumptions for GDP per capita. The impact of life expectation on GDP per capita is assessed only indirectly via its effect on individual countries' GDP per capita and not directly as an additional determinant in the basic growth equation. Then, fertility which is expected to have correlation with economic growth is estimated. However, fertility variable has not passed diagnostic tests and therefore we use life expectation (male) as an instrument for income per capita.

Although many instruments for institutional quality are popular (settler mortality rate, ethnic fractionalization index, language and geography variables, legal origin etc.) the Western Balkan countries lack data for these variables. In this context, all variables that are correlated with endogenous variables but uncorrelated with error terms in each equation are examined. We focused on country-specific variables such as latitude of a country, landlocked status and historical index of ethnic fractionalization (HIEF). Since HIEF is strongly correlated with economic growth it is not appropriate to use as an instrument. Next, we examine whether geography variables can account for some of the variance in GDP per capita left unexplained by the basic determinants. Geography variables are time invariant and have demonstrated statistically non-significant results. Hence, we evaluate one period and two period lag values of selected institutional indicators an instrument carefully considering the quality of these instruments.

Table 7. IV Estimates for Economic Growth
(Dependent variable lGDP per capita)

	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)
lGINI	5.953***	5.120***	6.423***	4.574***	5.984***	5.982***	6.459***	6.829***
	(1.012)	(1.126)	(1.100)	(1.066)	(0.992)	(0.734)	(1.703)	(1.137)
lCREDIT	0.119***	0 .138***	0.092***	0.080***	0.057	0.125***	0.090***	0.103***
	(0.037)	(0.037)	(0.033)	(0.030)	(0.035)	(0.038)	(0.029)	(0.024)
lLAW	0.820***	1.118***	0.860***	0.628***	0.608***	0.316	0.850***	0.153***
	(0.171)	(0.233)	(0.173)	(0.189)	(0.188)	(0.167)	(0.296)	(0.288)
lFDI		0.016					0.012	0.019
		(0.013)					(0.014)	(0.013)
lINVEST			0.082				0.085*	0.076*
			(0.055)				(0.044)	(0.042)
lGOV				0.712***			0.284	0.332
				(0.178)			(0.358)	(0.255)
lTRADE					0.327***		0.389**	0.410***
					(0.070)		(0.154)	(0.099)
lEDU						0.477***		0.529***
						(0.176)		(0.149)
Obs.	79	73	79	79	79	79	73	73
R^2	0.724	0.722	0.713	0.828	0.810	0.776	0.832	0.885
Endog. Test	14.825***	14.539***	19.009***	6.603***	10.106***	18.400***	13.780***	15.861***
p-value	(0.0006)	(0.0007)	(0.0001)	(0.0368)	(0.0064)	(0.0001)	(0.0010)	(0.0004)
SW for Gini	68.53	63.55	68.03	73.87	64.18	63.32	46.74	49.11
SW for Law	31.94	64.16	31.22	31.59	31.60	12.78	38.10	24.25
K-P Wald F stat.	32.804	29.051	32.950	33.980	29.054	5.669	17.075	10.736

****, ** and * denote significance at 1%, 5% and 10% respectively. Heteroskedasticity corrected standard errors are shown in parentheses.*

Source: Author's own calculation.

Reduced form estimation results suggest that the log of urban population impacts income inequality significantly. Bound, Jaeger and Baker (1995) recommend using first stage regressions' R^2 or the F-statistic as an indicator for strong instrument. Furthermore, Stock and Watson (2003) claim that if F-statistic is less than 10 points it indicates that instruments are weak. In our models both adjusted R^2 and F statistic values are significant. However, as Sanderson and Windmeijer (2015) argue conditional F-statistics can offer additional information about the strength of the instruments for the multiple reduced forms when there are more than two endogenous variables. Hence, SW conditional F-statistics both for Gini index and rule of law are reported. On the other hand, when the i.i.d. assumption for error terms is dropped and Stata command ivreg2 is invoked with the robust or cluster options, the Cragg-Donald-based weak instruments test is no longer valid. Program instead reports a correspondingly-robust Kleibergen-Paap Wald rk F statistic.

Therefore, in addition to SW conditional F statistic we report K-P Wald F statistics which suggest that instruments are valid.

Columns (1) through (6) pair our baseline regression determinants with each variable individually. Essentially, in none of these regressions are the results qualitatively different from those reported in column (7) and (8). Only government expenditure becomes statistically insignificant while investment variable is significant at the 10 percent level. Across all specifications, there is one robust finding: increases in income inequality increases GDP per capita. The IV regressions show that, on average a 1 percent increase in real GDP per capita increases the Gini index by around 4.5-6.8 points. This confirms the Galor and Zeira (1993) model which predicts that the impact of rising inequality on GDP per capita is negative in rich countries but positive in poor countries. Column (1) shows that our baseline regression by itself explains over 72 percent of the cross-country variation in income per capita. The coefficient on the rule of law and credit has the expected sign. They have statistically significant positive impact on economic growth. While the corresponding effect of FDI on growth is insignificant, education and trade are important predictors of income per capita in the WBC. Overall, the results presented in table 5 are consistent with the hypothesis that the quality of institutions and financial market development play an important key role in determining the level of GDP per capita across countries.

World Social Report published by UN (2020) acknowledges effect of technological innovation, climate change, urbanization and international migration on trends in inequality. Chen *et al.* (2017) have found that city population size is positively correlated with city income inequality in China.

Empirical studies suggest that income inequality is frequently instrumented with variables concerning population structure as well as urban areas. It is also apparent that the WBC are facing rapid urbanization. Thus, we explored various statistics for the WBC representing the relation of income inequality and urbanization. Variables such as urban population (% of total population), urban population growth (annual %) and population in the largest city (% of urban population) are evaluated for instrument validity. In accordance with empirical literature and results from diagnostic tests we use urban population variable as an instrument to Gini. Table 6 follows the structure of table 5, allowing for deep roots of income inequality and indicators of institutions.

Reduced form estimation results indicate instrument relevance; variable is positive as well as statistically significant. First stage regressions' R^2 value is high and the F-statistic values are significant. Conditional F statistics of Sanderson and Windmeijer in first stage regression for Gini and rule of law is significant. Endogeneity test of endogenous regressors rejects null hypothesis that regressors are exogenous at 5% (in model (3) and model (5) at 10%) significance level.

Table 8. IV Estimates for Income Inequality
(Dependent variable lGINI)

	Model (1)	Model (2)	Model (3)	Model (4)	Model(5)
lGDP	0.124***	0. 159***	0.135***	0.134***	0.146***
	(0.040)	(0.043)	(0.036)	(0.042)	(0.035)
lCREDIT	-0.012*	-0.011	-0.019***	-0.015**	-0.015***
	(0.006)	(0.006)	(0.006)	(0.007)	(0.005)
lLAW	-0.088	-0.087	-0.093*	-0.041	-0.068
	(0.055)	(0.054)	(0.052)	(0.053)	(0.045)
lGOV		0.107***			0.070*
		(0.019)			(0.041)
lNATRES			0.007***		0.006***
			(0.002)		(0.002)
lEDU				-0.056*	
				(0.028)	
D.UNEMPL					0.001***
					(0.000)
Obs.	79	79	79	79	79
R^2	0.249	0.254	0.279	0.294	0.415
Endog. Test	4.820*	5.736*	6.475**	4.736*	6.649**
p-value	(0.0898)	(0.0568)	(0.0393)	(0.0937)	(0.0360)
SW for GINI	27.87	27.03	26.63	42.31	27.70
SW for Law	18.60	18.98	18.49	11.47	18.80
K-P Wald F stat.	9.696	10.163	9.631	5.892	10.133

****, ** and * denote significance at 1%, 5% and 10% respectively. Heteroskedasticity corrected standard errors are shown in parentheses.*

Source: Author's own calculation.

Columns (1) through (4) pair our baseline regression determinants with each variable individually. Across all specifications, income inequality and GDP per capita are lightly related. The IV regressions show that a 1 percent increase in Gini coefficient causes increase in real GDP per capita by around 0.12-0.16 points. When compared to impact of Gini index on real GDP per capita all values range between 0.124 and 0.159, significant at the 1% level. Credit and rule of law variables have expected sign, namely they are expected to lower inequality. Financial market development proxied by domestic credit is significant in all specifications (except model (2)). Hence, it can be an equalizer within society. Rule of law coefficients in four regression models are statistically nonsignificant. Because of model uncertainty regarding the proper specification of the inequality regression, we include additional control variables in columns (2) through (5). Based on the IV results government expenditure worsens Gini although statistically significant at the 10 percent level. Findings indicate that regression coefficients on unemployment and natural resources rent in accordance with our expectations is statistically significant and increases income disparities. In contrast to panel data estimation education variable is significant only at the 10 percent level. Overall, the results presented in table 6 are

consistent with the hypothesis that financial market development proxied by credit variable improves income inequality. However, the quality of institutions does not exert significant results in determining the level of income inequality across countries.

6.3. Two-stage Least Squares and Limited Information Maximum Likelihood

Conclusions based on the regression results reported above are subject to criticisms related to chosen instruments. It is possible to explicitly test the assumption that the instrumental variable Z influences X. However, the second criteria of exogeneity, which denotes that Z is uncorrelated with the outcome Y's residual u and that Z solely influences Y through X is not directly testable. Only if the researcher has more instruments than are required exogeneity criterion can be tested using overidentifying restriction tests like Sargan-Hansen or Sargan's-J.

Regression coefficients are affected by the instruments used in IV estimator. Hence, the set of instruments used for identifying the model will affect the IV estimation. Wooldridge (2013) argues that we will eventually arrive at different IV estimations with varying degrees of precision depending on the choice of the potential instruments we use and that this is not a very tempting alternative because it implies that we can come to various qualitative conclusions about the structural model depending on how we construct the IV estimator. Hence, to solve this issue the two-stage least squares method was developed. The technique of 2SLS was invented to combine several instruments to produce the single instrument needed to implement IV method.

To address the issues raised above we employ 2SLS and Limited Information Maximum Likelihood estimator. According to Staiger and Stock (1997), LIML confidence intervals often have higher coverage rates than 2SLS. LIML estimator typically exhibits less relative bias and is more robust to the weak instruments. However, under just-identification 2SLS and LIML are equivalent (Baltagi, 2011). In equation-by-equation 2SLS, we separately estimate the growth and income inequality equations. In addition to 2SLS/LIML estimates, OLS is employed and results are shown in column (1).

Table 9. 2SLS Estimates for Economic Growth
(Dependent variable lGDP per capita)

	(1)	(2)	(3)	(3)	(5)
	OLS	**2SLS**	**LIML**	**LIML**	**LIML**
lGINI	-0.196	3.221***	3.059***	2.775***	2.767***
	(0.260)	(0.492)	(0.600)	(0.559)	(0.720)
lCREDIT	0.135***	0.105***			0.089***
	(0.030)	(0.018)			(0.270)
lLAW	0.577**	0.424*	0.836***	0.558***	
	(0.230)	(0.239)	(0.314)	(0.212)	
lFDI	0.030*	0.014	0.029**	0.014	0.009
	(0.015)	(0.011)	(0.013)	(0.011)	(0.014)
lINVEST	-0.140**	0.069*	0.087**	0.039	0.077**
	(0.056)	(0.038)	(0.041)	(0.038)	(0.038)
lTRADE	0.386***	0.259***	0.288***	0.375***	0.213***
	(0.054)	(0.055)	(0.068)	(0.048)	(0.064)
lEDU	0.778***	0.602***	0.524**	0.478**	0.664***
	(0.093)	(0.154)	(0.228)	(0.169)	(0.135)
lM2			0.022		
			(0.090)		
lBANKBR				0.177***	
				(0.028)	
AIQ					0.274*
					(0.146)
Obs.	82	73	73	69	73
R^2	0.941	0.916	0.861	0.906	0.904
Endog. Test		4731*	9042**	6.450**	5.278*
p-value		(0.0939)	(0.0109)	(0.0394)	(0.0714)
Hansen J test		0.915	0.081	0.4715	0.9273
Kleibergen–Paap rk LM stat		13.154	15.694	13.977	14.288
Kleibergen–Paap rk Wald F-stat		7.923	10.043	7.985	6.007

****, ** and * denote significance at 1%, 5% and 10% respectively.*
Heteroskedasticity corrected standard errors are shown in parentheses.
Source: Author's own calculation.

Results from 2SLS/LIML technique compared to OLS estimates show that significance and magnitude of the Gini index is different. Results from 2SLS technique demonstrated in column (2) shows that our regression by itself explains over 94 percent of the cross-country variation in GDP per capita. The variables all have the expected sign. Heteroskedasticity-corrected standard errors are reported and used for inference throughout. Changing our proxy for the financial market development to M2 and number of bank branches demonstrates that M2 is not statistically significant while latter one has statistically positive impact on economic growth. Similarly, taking average of six sub-indices on quality of institutions significantly increases real GDP per capita at the 1 percent level. Hansen J test shows that instruments are valid.

In the same manner, income inequality equation is estimated with OLS, 2SLS/LIML. Since under just identification 2SLSL and LIML estimates are same results reported as LIML are shown in table 8.

Table 10. 2SLS Estimates for Income Inequality
(Dependent variable lGINI)

	(1)	(2)	(3)	(4)	(5)
	OLS	**2SLS**	**LIML**	**LIML**	**LIML**
lGDP	0.189***	-0.087	0.022	-0.012	-0.032
	(0.190)	(0.019)	(0.016)	(0.016)	(0.029)
lCREDIT	-0.039***	0.006			-0.004
	(0.011)	(0.005)			(0.006)
lLAW	-0.057	0.101***	0.088***	0.123***	
	(0.034)	(0.054)	(0.031)	(0.035)	
lAGRI	0.115***	-0.044***	-0.040***	-0.041***	-0.041***
	(0.020)	(0.008)	(0.005)	(0.005)	(0.007)
lNATRES	0.003	0.006***	0.006***	0.006***	0.007***
	(0.008)	(0.001)	(0.001)	(0.001)	(0.001)
D.UNEMPL	0.001	0.0007**	0.0006**	0.0003	0.0007
	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)
lM2			-0.018*		
			(0.010)		
lBANKBR				0.015***	
				(0.005)	
AIQ					0.104***
					(0.033)
Obs.	89	73	73	69	72
R^2	0.462	0.608	0.717	0.601	0.567
Endog. Test		15.450***	7.434**	17.698***	15.956***
p-value		(0.0004)	(0.0024)	(0.0001)	(0.0003)
Hansen J test		0.772	0.780	0.869	0.579
Kleibergen–Paap rk LM stat		14.544	17.698	16.364	14.146
Kleibergen–Paap rk Wald F-stat		6.105	6.552	8.277	3.112

****, ** and * denote significance at 1%, 5% and 10% respectively. Heteroskedasticity corrected standard errors are shown in parentheses.*

Source: Author's own calculation.

Results from 2SLS technique demonstrated in column (2) shows that our regression by itself explains over 60 percent of the cross-country variation in income inequality. While credit variable across all specifications has no impact on Gini, rule of law is increasing Gini and is statistically significant at the 1 percent level. Changing our proxy for the

financial market development to M2 and number of bank branches demonstrates that broad money is lowering while number of bank branches is increasing income inequality. Similarly, taking average of six sub-indices on quality of institutions significantly increases Gini coefficient at the 1 percent level. Hansen J test shows that instruments are valid.

6.4. Results for SEM

The simultaneous relationship between income inequality and economic growth in the WBC is expressed through simultaneous equations consisting of three equations as follows:

$$GDP_{it} = \alpha_{1t} + \beta_{12} Gini_{it} + \beta_{13} \mathrm{FD}_{it} + \beta_{14} \mathrm{lQ}_{it} + \gamma \mathrm{Z}_1 + u_{1t} \quad \text{Equation (22)}$$

$$Gini_{it} = \alpha_{2t} + \beta_{21} GDP_{it} + \beta_{23} \mathrm{FD}_{it} + \beta_{24} \mathrm{lQ}_{it} + \gamma \mathrm{Z}_2 + u_{2t} \quad \text{Equation (23)}$$

$$IQ_{it} = \alpha_{3t} + \beta_{31} GDP_{it} + \beta_{32} GINI_{it} + u_{3t} \quad \text{Equation (24)}$$

System of equations shown above is structural equations of our model. Since system of simultaneous equations must have as many equations as endogenous variables, there are three equations in this SEM. The vector of Z variables includes: log of unemployment, log of average education, log of government expenditure, log of foreign direct investment, log of investment, log of agricultural land, log of trade and log of natural resources. Z_1 and Z_2 contain different explanatory variables which implies that exclusion restriction is imposed. Certain variables are present in GDP equation which are absent from equation where Gini index is dependent variable. This enables us to distinguish three structural equations. Thus, equations where GDP per capita, Gini coefficient and institutional indicator are dependent variables were run simultaneously using 2SLS and 3SLS estimators. This allows endogenous variables to have impact on each other. GDP per capita is instrumented with the log of life expectation at birth and Gini index is instrumented with the log of urban population (% of total population). In addition to these instruments, exogenous variables in the first equation are the log of credit, education, trade, FDI and investment while in the second equation log of credit, unemployment, agricultural land and natural resources are regressors. Quality of institutions is regressed on its lag value, Gini and GDP per capita.

In estimating the system in equations (2) through (6) the identification condition needs to be satisfied. Using previously mentioned notation for order and rank condition we conclude that model has three endogenous variables M=3, number of endogenous variables in a given equation is m=2 in GDP, Gini and institutions equation. There are K=11 exogenous/predetermined variables in the model except the intercepts. GDP equation has k= 6 and Gini equation k=5 predetermined variables. Following the order condition of identification, $K - k \geq \mathrm{m} - 1$, where m is the number of right-hand side endogenous variables in a given equation and k is the number of excluded exogenous variables from a given equation when compared to other equations in the system, one can easily determine

that all equations in the system are identifiable using the order condition. In fact, order and rank conditions are tested in Stata with checkreg3 command and for three equations as well as simultaneous equations model system is identified.

When simultaneous equations models are employed Baltagi (2008) suggest using system estimators is better than single equation estimators. He further claims that 3SLS estimator is more efficient than 2SLS if equation is properly specified.

Results of the simultaneous relationship between economic growth and income inequality estimated with FE2SLS, FE3SLS estimator are presented in table 9 where panel 1 corresponds to growth, panel 2 to inequality and panel 3 to institutional indicator estimates.

Table 11. Simultaneous Equations Model Estimated

Equation 1. Dependent variable lGDP	**(1) OLS**	**(2) 2SLS**	**(3) 3SLS**	**(4) 3SLS**	**(5) 3SLS**	**(6) 3SLS**
lGINI	-0.191	4.782***	3.741***	3.894***	3.207***	3.346***
	(0.271)	(0.979)	(0.874)	(1.012)	(1.003)	(0.934)
lCREDIT	0.135***	0 .135***	0 .101***			0.077***
	(0.034)	(0.028)	(0.023)			(0.089)
lLAW	0.547**	0 .804***	0.998***	1.161***	0.990***	
	(0.239)	(0.213)	(0.160)	(0.196)	(0.178)	
lFDI	0.033**	-0.006	-0.001	0.008	0.004	0.003
	(0.016)	(0.016)	(0.011)	(0.012)	(0.012)	(0.009)
lINVEST	-0.143***	0.026	-0.001	0.002	-0.019	0.003
	(0.051)	(0.056)	(0.037)	(0.043)	(0.043)	(0.034)
lTRADE	0.403***	0.241***	0.117**	0.138**	0.164***	0.096*
	(0.079)	(0.079)	(0.055)	(0.063)	(0.063)	(0.057)
lEDU	0.778***	-0.194*	0.045	0.103	0.065	0.005
	(0.101)	(0.107)	(0.074)	(0.083)	(0.070)	(0.060)
lM2				-0.013		
				(0.062)		
lBANKBR					0.136***	
					(0.045)	
AIQ						0.659***
						(0.089)
Constant	6.055***	0.012	0.044***	0.062***	0.070***	0.039***
	(0.930)	(0.015)	(0.012)	(0.016)	(0.016)	(0.012)
Equation 2. Dep.var lGINI						
lGDP	0.200***	0.118***	0.164***	0.132***	0.161***	0.219***
	(0.032)	(0.025)	(0.021)	(0.017)	(0.021)	(0.032)
lCREDIT	-0.061***	-0.004	-0.012***			-0.012***
	(0.014)	(0.005)	(0.004)			(0.004)
lLAW	0.033	-0.081***	-0.147***	-0.102***	-0.138***	
	(0.093)	(0.036)	(0.030)	(0.032)	(0.032)	
lAGRI	0.124***	-0.030***	-0.021***	-0.027***	-0.027***	-0.017***
	(0.019)	(0.006)	(0.005)	(0.004)	(0.004)	(0.006)
lNATRES	0.006	0.006	0.001	0.001	0.001	-0.001
	(0.008)	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)
lUNEMPL	0.001	0.042***	0.038***	0.035***	0.040***	0.043***
	(0.002)	(0.009)	(0.007)	(0.008)	(0.008)	(0.111)
lM2				-0.009		
				(0.007)		
lBANKBR					-0.017***	
					(0.006)	
AIQ						-0.135***
						(0.027)
Constant	1.766***	-0.006***	-0.009***	-0.007***	-0.013***	-0.012
	(0.278)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Equation 3. Institutional Indicator						
lGDP	0.322***	0.378***	0.466***	0.503***	0.488***	0.876***
	(0.021)	(0.062)	(0.058)	(0.056)	(0.065)	(0.098)
lGINI	-0.166	0.379	0.511	-0.767	-0.491	-0.834
	(0.120)	(0.792)	(0.764)	(0.755)	(0.778)	(1.273)
Constant	-1.615***	-0.003***	-0.035***	-0.039***	-0.040***	-0.052***
	(0.423)	(0.009)	(0.009)	(0.009)	(0.011)	(0.015)
N	80	73	73	73	69	73
R2	0.913	0.873	0.886	0.893	0.838	0.887
Breusch-Pagan LM Diagonal Covariance Matrix Test						
OLS vs. 2SLS		0.0000				
OLS vs. 3SLS			0.0000	0.0000	0.0000	0.0000

****, ** and * denote significance at 1%, 5% and 10% respectively.*

Source: Author's own calculation.

We estimate Eq. 1, Eq. 2 and Eq. 3 jointly, using OLS, 2SLS and 3SLS estimators as a robustness check. Model (1) considers the OLS with robust variance estimates of the three equations, model (2) assesses equations through FE2SLS, while model (3) through (5) estimates the simultaneous equations using FE3SLS. Models (4), (5) and (6) estimate equations simultaneously using different proxies for financial market development and institutional quality. Using FE3SLS all the models are highly significant ($p < 0.001$) and have high explanatory power. Overall system R-squared is about 0.88 percent. In addition, we compute the Breusch Pagan LM diagonal covariance matrix to compare the coefficients obtained with OLS and 3SLS. Test results suggest that we consider 3SLS estimates for inference. These models estimated through 2SLS and 3SLS are well specified since the results are pretty much similar in sign and economic significance and both are different from the OLS. As previously explained, 3SLS estimators are consistent and asymptotically more efficient than single equation estimators.

These results show that equality adversely influences growth. Gini enters with a large and positive coefficient that is statistically significant in all of growth specifications. The estimated coefficient varies from 3.207 to 3.894, with 2SLS estimate being larger and OLS estimate insignificant. Taking the midpoint of this range, the results imply that a 1 percent increase in Gini goes along with growth by 3.55 percentage points, which is quite large. Rule of law and credit variable are statistically significant in all specifications. Growth is positively related to the extent of maintenance of the rule of law. Human capital, physical capital and FDI do not enter in a robustly significantly way, and their presence does not affect much the significance of GDP per capita. Tests in IV specifications always indicate that instruments are jointly significant in the first stage. In model (4), in line with Lundberg and Squire (2003) results broad money has negative sign but is not significant. Similar to model (3), the results found in model (5) show that both rule of law and number of bank branches is related with economic growth and the impact of latter variable on economic growth is higher than credit. Substituting rule of law with average value of institutional indicators and estimating with FE3SLS suggest that index is significantly positive although it has lower coefficient compared to rule of law alone. Compared to single equation estimates, LIML estimates are closer to SEM than single instrumental variable estimates. Thus, the results show a positive relationship between credit, rule of law, number of bank branches, average institutional index and GDP per capita, similar to the relationship found in previous studies (Beck and Levine, 2002; Huang, Lin and Yeh, 2009; Durusu-Ciftci, Ispir and Yetkiner, 2017).

Estimated results with 3SLS in income inequality equation show that GDP per capita diminishes equality. The estimated coefficient varies from 0.132 to 0.219, with 2SLS and OLS estimates having similar magnitude. Taking the midpoint of this range, 1 percent increases in GDP per capita leads to 0.17 increases in Gini. As expected, rule of law and credit lower income inequality. They are statistically significant in all specifications. As

expected, unemployment increases income disparities. The estimated coefficient of unemployment is positive and marginally significant (from 0.035 to 0.043). On the other hand, agricultural land improves income distribution. Its impact is robust across all specifications (from 0.017 to 0.027). Quantitatively, however this impact is small. In model (4) results indicate that broad money has negative sign but is not significant. Similar to model (3), the results found in model (5) show that both rule of law and number of bank branches is inversely related with income inequality and the impact of rule of law on Gini is higher. Substituting rule of law with average value of institutional indicators and estimating with FE3SLS suggest that index is significant and lowers Gini coefficient by 1.3 points. Overall, the results show a negative relationship between credit, rule of law, number of bank branches, average institutional index and income inequality, similar to the relationship found in previous studies of Chong and Gradstein (2004).

GDP per capita enters with a large and positive coefficient that is statistically significant in all of institutional specifications. The estimated coefficient varies from 0.466 to 0.876, with 2SLS and OLS estimates being smaller. There is no statistically significant linear dependence of Gini on rule of law.

Unbundling average institutional quality, we estimate FE3SLS for each indicator separately and results are presented in table 10 where panel 1 corresponds to growth, panel 2 to inequality and panel 3 to institutional indicator estimates.

Table 12. SEM for Institutional Indicators

Equation 1. Dep.var. lGDP	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
lGINI	0.976	2.592***	5.327***	5.925***	7.046***
	(0.966)	(0.872)	(1.241)	(0.886)	(0.920)
lCREDIT	0.104***	0.061***	0.154***	0.082***	0.138***
	(0.020)	(0.021)	(0.028)	(0.025)	(0.028)
lGE	1.626***				
	(0.158)				
lRQ		1.211***			
		(0.132)			
lCORR			0.299		
			(0.214)		
lPS				0.474***	
				(0.086)	
lVA					-0.711***
					(0.179)
lFDI	-0.009	0.006	-0.005	0.001	0.004
	(0.01)	(0.009)	(0.013)	(0.010)	(0.013)
lINVEST	0.101**	-0.003	-0.066	-0.007	-0.056
	(0.041)	(0.029)	(0.048)	(0.038)	(0.043)
lTRADE	0.076	0.062	0.243***	0.124*	0.260***
	(0.053)	(0.046)	(0.062)	(0.069)	(0.062)
lEDU	0.014	0.045	0.059	0.014	0.036
	(0.062)	(0.055)	(0.085)	(0.066)	(0.080)
Constant	0.026**	0.056***	0.024*	0.042***	0.050***
	(0.012)	(0.011)	(0.015)	(0.014)	(0.016)
Equation 1. Dep.var. lGINI					
lGDP	0.052**	0.164***	0.079***	0.138***	0.088**
	(0.024)	(0.019)	(0.012)	(0.013)	(0.009)
lCREDIT	-0.001	1.211***	-0.001**	-0.007**	-0.007**
	(0.005)	(0.132)	(0.003)	(0.003)	(0.003)
lGE	0.034				
	(0.035)				
lRQ		-0.147***			
		(0.029)			
lCORR			0.033		
			(0.022)		
lPS				-0.069**	
				(0.011)	
lVA					0.023
					(0.019)
lAGRI	-0.031***	-0.027***	-0.021***	-0.012***	-0.022***
	(0.005)	(0.005)	(0.005)	(0.004)	(0.004)
lNATRES	0.002	0.001	0.002	-0.001	-0.001
	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)
lUNEMPL	0.021***	0.028***	0.016***	0.023***	0.022***
	(0.007)	(0.006)	(0.006)	(0.005)	(0.005)
Constant	-0.002	-0.010***	-0.004***	-0.008***	-0.005***
	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)
Equation 3. Institutional Indicator					
lGDP	0.333***	0.557***	0.097*	1.084***	-0.132**
	(0.061)	(0.056)	(0.056)	(0.133)	(0.060)
lGINI	1.381*	-0.506	2.797***	-6.008***	1.634**
	(0.797)	(0.708)	(0.706)	(1.710)	(0.763)
Constant	(-0.019)	-0.041***	-0.001***	-0.073***	0.049***
	(0.001)	(0.008)	(0.008)	(0.022)	(0.009)
N	73	73	72	73	73
R2	0.895	0.918	0.843	0.891	0.822

****, ** and * denote significance at 1%, 5% and 10% respectively.*

Source: Author's own calculation.

Column 1 of panel 1, in table 10, shows that the effect of government effectiveness on our income per capita is statistically significant at the 1% level. It increases both GDP per capita and Gini index (significant at the 5% level). On the other hand, regulatory quality has positive impact on GDP per capita while simultaneously improving income disparities.

Column 3 of panels 1 and 2, reveal that the impact of corruption on our dependent variables is not statistically significant. Political stability has largest positive effect on income per capita and is statistically significant at 1% level. Further, it reduces Gini index for the period under investigation. Voice and accountability have large negative influence on income per capita at 1% level and no effect on income inequality. This result is not puzzling once we consider that the indicator which measures the degree to which citizens are able to participate in their government, along with freedoms of expression, association and media, has a greater influence on economic growth than other institutional indicators selected for the study. This sheds light on the political rights situation in the Western Balkan countries.

Compared to the findings in previous empirical research, the results are similar to Pere (2015), claiming that not all aspects of governance indicators have the same impact on economic growth; political stability, absence of violence and law enforcement has impact on growth in the same period. This pattern of results is consistent with the previous literature (Chong and Gradstein, 2004) dealing with the influence of political stability and rule of law on improving income disparities. However, our estimates show no effect of corruption on Gini, which is in contrast to Chong and Gradstein (2004) study. It is noteworthy that focusing on specific type of institutions when redefining the strategies related in each country in creating long-run growth strategies and improving income disparities is important. Effect of different aspects of governance indicators on growth may be direct as well as indirect through inequality impacting savings and investment incentives.

7. DISCUSSION OF THE RESULTS

Endogeneity that may appear in the empirical analysis of the relationship between economic growth and income inequality became subject of interest in this dissertation. Following empirical literature and in accordance with objectives of the dissertation as well as dataset profile we employed five various estimators in re-assessing economic growth income inequality relationship in the Western Balkan countries.

Table 13. Economic growth income inequality relationship assessing different estimators

Equation 1. Dependent variable GDP pc	**FE (1)**	**IV (2)**	**2SL (3)**	**FE2SLS (4)**	**FE3SLS (5)**
GINI	2.739***	6.829***	3.221***	4.782***	3.741***
	(0.54)	(1.137)	(0.493)	(0.979)	(0.874)
CREDIT	0.121***	0.103***	0.105***	0.135***	0.101***
	(0.03)	(0.024)	(0.018)	(0.028)	(0.023)
LAW	0.281*	0.153***	0.424*	0 .804***	0.998***
	(0.152)	(0.288)	(0.239)	(0.213)	(0.16)
FDI	0.007	0.019	0.014	-0.006	-0.001
	(0.012)	(0.013)	(0.011)	(0.016)	(0.011)
INVEST	0.043	0.076*	0.069*	0.026	-0.001
	(0.033)	(0.042)	(0.038)	(0.056)	(0.037)
TRADE	0.218***	0.410***	0.259***	0.241***	0.117**
	(0.064)	(0.099)	(0.055)	(0.079)	(0.055)
EDU	0.580***	0.529***	0.602***	-0.194*	0.045
	(0.108)	(0.149)	(0.154)	(0.107)	(0.074)
N	79	73	73	73	73
R2	0.952	0.885	0.916	0.873	0.886
Equation 2. Dependent variable GINI					
GDP pc	0.062***	0.146***	-0.012	0.118***	0.164***
	(0.009)	(0.035)	(0.021)	(0.025)	(0.021)
CREDIT	0.002	-0.015***	0.006	-0.004	-0.012***
	(0.002)	(0.005)	(0.006)	(0.005)	(0.004)
LAW	-0.007	-0.068	0.108***	-0.081***	-0.147***
	(0.012)	(0.045)	(0.037)	(0.036)	(0.03)
AGRI	0.038***	0.070*	'-0.044***	-0.030***	-0.021***
	(0.005)	(0.041)	(0.008)	(0.006)	(0.005)
NATR	0.006***	0.006***	0.006***	0.006	0.001
	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)
UNEMPL	0.001***	0.001***	0.0007*	0.042***	0.038***
	(0.001)	(0.000)	(0.000)	(0.009)	(0.007)
N	89	79	73	73	73
R2	0.832	0.415	0.586	0.873	0.886

****, ** and * denote significance at 1%, 5% and 10% respectively.*

Source: Author's own calculation.

In table 11 column 1 refers to fixed effects Driscoll and Kraay standard errors estimates. Column 2 and 3 reports the results of re-estimating same specification via instrumental variable technique and two-stage least squares for single equations. Column 4 and 5 show simultaneous-equation models using two-stage least squares fixed-effects and three-stage least squares fixed-effects estimators, respectively.

7.1. The Relationship between Economic Growth and Income Inequality in the WBC

System of equations estimated by FE3SLS which is found to be the most reliable estimator for modelling the relationship between economic growth and income inequality in the Western Balkan countries shows that value of Gini regression parameter of 3.741 is highly significant. Similarly, the findings based on the application of panel data regression in eight different equations, consistently reveal positive and highly significant parameter of Gini. IV and 2SLS estimates of income inequality in terms of sign and significance are consistent with this result. Overall, Gini enters with a large and positive coefficient that is statistically significant in all estimated growth specifications across different methods demonstrating that income disparities underpin economic growth in the Western Balkan countries. Obtained results are consistent with the previous findings of Li and Zou (1998), Forbes (2000) and Brueckner and Lederman (2015).

Bidirectional relationship between growth and inequality is further supported by the FE3SLS estimates showing that GDP per capita diminishes equality. In FE and IV regressions, across all specifications, there is one robust finding: increases in economic growth causes income inequality to rise in the countries of Western Balkans. Thus, economic growth has a role in the rise of income inequality.

Although differences in estimation methods affect the magnitude of both Gini coefficient and GDP per capita, each approach produces similar results. We find that the estimation technique and the specification of both growth and inequality regressions do not significantly influence the sign and significance of main variables, yet simultaneous-equation model corrects for differences in magnitude by controlling for simultaneous endogeneity.

Taken together, these findings highlight that rising inequality is an inherent component of GDP per capita growth in the WBC. The obtained result is consistent with a classical economists' view that inequality increases aggregate savings and capital accumulation directing resources toward people who have higher marginal propensity to save, thus leading to economic growth. Kaldor (1956) hypothesis states that income inequality has positive impact on economic growth through saving rates mechanism. Similarly, Arthur Okun (1975) and many liberal economists hold the view that countries trade-off between equity and efficiency. Saving rates mechanism is essential when setup costs are high or large investment requires high sunk cost (Ferreira, Gisselquist and Tarp, 2022) which is partly case with our sample consisting of fragile economies on their path of transition to market-oriented economies. The results provide supporting evidence that small group in the WBC accumulates savings and invest it, thus increase in income per capita is associated with substantial increase in Gini coefficient.

Overall, present findings render support to the hypothesis that growth and inequality go hand in hand in transition countries. Understanding of the observed phenomena requires in depth assessment of the character of structural transformation, and the sources of growth of

WB transition economies. Physical devastation of productive resources, economic isolation and stagnation has left far-reaching consequences on these countries' prospects for growth and integration into the European and global economic structures. Having said this, substantial FDI inflows enabled these countries to achieve higher investment rates, while trade liberalisation underpinned massive growth of trade related service sector. Moreover, international financing played a role in the rapid growth rates observed in the WBC up until 2008 and the outbreak of global recession. Rapid increase in overall credits was supported by foreign banks. However, growth pattern in the early and mid-transition phase was accompanied by massive and prolonged deindustrialisation. Substantial initial fall in productivity of the manufacturing sector, due to slow privatisation and low levels of FDI, has not recovered up until recent years. Pattern of economic growth was, and seemingly continuous to be characterized by static economies, and not by dynamic economies (Silajdzic and Mehić, 2015; Cengiz and Manga, 2023). The sharp drop in manufacturing on the one hand, and the rapid growth of service sector, foreign trade, and financial sector development on the other, resulted in unbalanced sectoral growth patterns, leaving many deprived from economic benefits of raising national income. As a consequence, economies' structural weaknesses in these countries have contributed to weakened economic resilience in the wake of the global recession. Following the 2008 financial crisis, observed weak growth recovery patterns in developing countries as well as less developed transition economies demonstrated that they are more susceptible to a worldwide recession (Llaudes, Salman and Chivakul, 2010).

From the theoretical point of view, the observed result indicating that economic growth underpins income inequality in the WBC clearly suggests that as there is no trickle-down effect, and that unbalanced sectoral growth leads to income disparities. Specifically, economic growth which is characterized by high unemployment, limited productivity growth and prevailing sectoral imbalances does not lead to more just distribution of income even after decades of transition. Uvalic and Cvijanovic (2018) argue that over the past 25 years, all transition countries have seen significant structural changes accompanied with a substantial drop in the share of value added from agriculture; deindustrialization with declining employment and output in all industries and significant growth in the services sector. However, serious deindustrialization in the Western Balkan countries has persisted into the 2000s, in contrast to East European countries where it began in the 1990s. A drastically decrease in share of manufacturing has exacerbated low competitiveness and insufficient export in these countries (Uvalic and Cvijanovic, 2018). There is little evidence so far to suggest that the WB countries have not benefited from globalization, where multinational corporations prioritize abundant resources and low-cost (Cengiz and Manga, 2023). Therefore, the WBC served solely as a marketplace in trade, telecommunications, banking and financial services for transnational corporations (Stanojevic, 2020).

Taken together, rise in inequality in the WBC strongly implies that globalisation and liberalisation policies serve as an important source of income inequality growth in the

context of WB countries, as opposed to 'traditional' causes of inequality. Apparently 'new' sources of rising income inequality are associated with unbalanced sectoral growth and systemic deindustrialization, along structural reforms and liberal market regimes which caused dismantling of labour market institutions, and poor social policies. The phenomenon of imbalanced growth where economic expansion has minimal effect on employment is directly linked to poverty and inequality. Excessive and high unemployment rates have been persistent for the countries in the sample. Although economic growth has steadily risen in the WBC between 2004 and 2008 at an average annual growth rate of 5.8 percent, this growth occurred with high unemployment rates and industrial production in these countries have barely reached its previous levels (Sanfey and Mijatovic, 2018).

The analysis of over two decades of transition suggests that industrialization and sector-balanced development are essential for inclusive growth. These economies are more fragile and will need suitable policy alternatives in the future due to low productivity, low employment rates, and insufficient investment in manufacturing and vital industries. When developing strategies for economic growth, addressing inequality should be integrated into policy framework. Equitable and inclusive growth should encompass balanced sectoral growth, labour market institutions along with skill development programs and progressive tax policies to ensure that the benefits of growth are shared within different segments of society.

Two other findings from this dissertation merits comment. First is the impact of financial market development and second institutional quality's effect on growth and inequality in the Western Balkan countries.

7.2. The Impact of Financial Market Development on Economic Growth and Income Inequality Relationship in the WBC

In terms of financial market development, domestic credit to private sector by banks (% of GDP) variable is used as a main proxy since it allows construction of longer panel dataset for the sample.

Value of regression parameter of 0.101 estimated with FE3SLS indicates significant positive relationship between economic growth and domestic credit to private sector by banks. Similarly, eight different specifications based on fixed effects estimates provide robust evidence supporting the notion that financial development is associated with increased growth. As reported in table 11 the results for financial market development are similar for alternative specification and estimation approaches.

Next, we check the impact of broad money (% of GDP) and number of bank branches to growth inequality relationship. Substituting our proxy with broad money ratio to GDP and number of bank branches implies that the former has no effect while the latter indicator has a statistically positive impact on economic growth. These findings are consistent with the

previous literature, such as Beck and Levine (2002) and Durusu-Ciftci, Ispir and Yetkiner (2017).

Using bank-based indicators when proxing financial market development in the WB countries seems more appropriate as stock markets are generally underdeveloped, with low market capitalization and turnover. Even though analysing the impact of stock markets on this relationship was not possible due to insufficient data on stock market indicators, findings based on banking sector indicators evidence that it has positive effect on income per capita which is in line with Beck and Levine (2002) and Caporale *et al*. (2014). This effect is relatively small in magnitude which may allude to the 'threshold effect' of Beck, Georgiadis and Straub (2014) claiming that finance influences positively economic growth up to a point and beyond the threshold its effect vanishes.

Second, our results support the idea that financial development proxied by credit has positive impact on income per capita while simultaneously improving income distribution. Effect of financial market development on income inequality is negative. FE3SLS based estimates show that value of regression parameter of -0.012 is significant at 1 percent level. This result is consistent with IV estimates in terms of sign, significance and magnitude. The present result is consistent with Beck, Demirgüç-Kunt and Levine (2007) that deals with effect of financial development on the income of the poorest quintile. Changing our proxy for the financial market development to broad money and number of bank branches indicates that broad money is lowering while number of bank branches is increasing Gini coefficient. Financial literacy, lack of knowledge about financial products and risks along with limited human capital on one hand, and imperfect capital mechanism on the other hand might contribute to these small marginal effects. Small companies and relatively poorer individuals face challenges in providing collateral which limits their ability to access credit and invest in productive activities which in turn have impact both on growth and inequality. Policy implication of this finding is that access to financial services contributes to economic stability and reduces income inequality.

7.3. The Impact of Institutional Quality on Economic Growth and Income Inequality Relationship in the WBC

Governance indicators used in literature are various; however, the most widely used are Worldwide Governance Indicators released by the World Bank. In terms of institutional quality, our main proxy is rule of law from the World Bank. This includes several indicators which measure protection of property rights, clear rules and regulations, effectiveness and predictability of the judiciary, enforceability of contracts and perceptions of crime and violence (Kaufmann, Kraay and Mastruzzi, 2010). We focus on rule of law measure since this is widely used in previous empirical literature and is very important in states which became independent more recently and tend to have a weaker legal system. All specifications are first calculated using the rule of law. Then, we individually check for each of the six World Governance Indicators in simultaneous-equation models.

System of equations strongly implies that growth is positively related to the extent of maintenance of the rule of law. The result of this dissertation supports a large body of literature such as Acemoglu and Johnson (2005) suggesting that institutions promote economic growth and increase GDP by providing a stable and predictable environment for investment, innovation and trade. Substituting rule of law with average value of institutional indicators and estimating with FE3SLS suggest that index is significantly positive although it has lower coefficient compared to rule of law alone. Overall, institutional quality proxied with rule of law increases GDP per capita across all specifications and different estimation methods.

It is acknowledged that effective institutions can also help to reduce corruption, protect property rights and enforce the rule of law. As column 5 of table 11 reports rule of law increases GDP per capita while simultaneously improving income disparities. The negative sign is consistent although in FE and IV estimation significance is lost. This finding offers valuable insight for policymakers as it provides supporting evidence that rule of law is critical for sustainable economic growth and social development. Changing proxy to average value of six sub-indices lowers Gini coefficient by 1.3 points.

Additionally, objective of this dissertation was to identify institutions and explain aspects of institutional development that can have impact on growth – inequality relationship. Literature review reveals that different aspects of governance indicators have different impact on growth and inequality. Therefore, effects of various institutional indicators are explored to enhance the comprehensiveness of the analysis. Unbundling average institutional quality, we estimated simultaneous equations model consisting of three-equations. SEM is separately estimated for government effectiveness, regulatory quality, political stability and absence of violence/terrorism, control of corruption, and voice and accountability.

Through examination of each indicator separately and considering long last implications for the economy, the contribution of specific indicator to development in transition countries is identified. Findings suggest the importance of implementing policy measures that improve regulatory quality which is found to be positively associated with economic growth and lowering income disparities, along suggested importance of political stability. Hence, political stability has largest positive effect on income per capita and is significant at 1% level. Further, it reduces Gini index for the period under investigation. Social conflict and ethnic tensions in WBCs may destabilise the region which may in turn lead to increases in income inequalities. The effectiveness of the government has a positive impact on both growth and inequality and is statistically significant at the 1% level. However, control of corruption does not appear to have a significant effect on either GDP per capita or income inequality. This result is not in sharp contrast with the existing literature on corruption. In countries with large informal sector and poor economic institutions, corruption allows avoiding inefficient rules and improving corruption worsens income inequality (Dobson and Andres, 2010; Perera and Lee, 2014). The suggested significant and adverse effect of voice and accountability variable on economic growth is worth

considering. First it is noteworthy that transparency and level of democratisation, captured by this variable, have no direct links to economic growth, while better or improved political freedoms do not have effect on income inequality distribution, from theoretical point of view. Therefore, we refrain from interpreting the obtained result in cause-effect manner. We rather be cautious and state that increases in the development of political culture in WBCs is not associated with growth or income distribution patters.

In conclusion, there are three key findings stemming from this dissertation. First, bidirectional relationship coexists between growth and income inequality in the Western Balkan countries. The main finding of this research is that income inequality and economic growth go hand in hand, with counter-reverse positive relationship. Secondly, financial market development proxied by domestic credit increases growth and improves income inequality. Third, institutional quality has dual effect; it enhances GDP growth while simultaneously reducing inequality. These findings have considerably profound social, political, and economic repercussions for the entire society and require further inquiry.

8. CONCLUSION

8.1. Introduction

This dissertation investigates the relationship between economic growth and income inequality in the Western Balkan countries in an integrated theoretical and empirical framework by incorporating up-to-date data and employing diverse methodological approaches. The goal is to re-estimate this relationship specifically taking into account the role of financial and institutional development as an underlying mechanism. To address research questions outlined in this dissertation, unbalanced panel data for the period 1996–2019 and comprehensive modelling approach utilizing different estimators were considered. Our sample consists of Albania, Bosnia and Herzegovina, Montenegro, The Republic of North Macedonia and Serbia.

First chapter provides introductory remarks regarding the topic along with the research aim, objectives and research questions. The focus is on growth income inequality relationship with particular reference on the impact of financial market development and institutional quality. Aim of assessing the interaction between these factors entails simultaneously examining the influence of these variables in single equations and in system of equations.

Theoretical and empirical overview on growth inequality relationship is reviewed in second chapter. Also, transmission channels such as credit market imperfections, institutions and political economy through which effect of income inequality on economic growth is realized are summarized here. This is followed (third chapter) by definition of institutions and main theories on new institutionalism, existing literature on growth-inequality-finance-institutions nexus with special focus on the Western Balkan countries.

Methodological approach to analysing growth inequality relationship given the observed endogeneity between variables, advantageous of using simultaneous equations models over other approaches are discussed in chapter four. The aim of this chapter is to understand different methods used in empirical literature and describe in detail our empirical strategy. Chapter five provides explanation for the sample and different variables used in empirical analysis.

Results of panel data analysis, IV technique, two-stage least squares and simultaneous-equation models are given in chapter six. This involves brief explanation of a number of tests performed to assess the robustness of these results. Additionally, estimates for different proxies on growth inequality relationship are presented in this chapter.

Chapter seven follows by discussing the most important results, with particular focus on implications in the context of transition countries of Western Balkans. Finally, the dissertation ends with concluding remarks.

8.2. The Relationship between Economic Growth and Income Inequality in the WBC

Simon Kuznets` hypothesis that there is an inverse relationship between economic growth and income inequality, which became known as the inverted U-shaped curve, still remains controversial. Despite intensive research among economists, the empirical studies conducted on this relationship have yielded mixed results. As there are studies claiming that income inequality is bad for economic growth there is also widely held belief that inequality is necessary for economic growth. The primary causes of the lack of consensus are the existence of different schools of thought and views on the direction of causality running from inequality to growth or vice versa. Empirical literature suggests that estimates are inconclusive due to the quality of data, estimation techniques and numerous transmission channels linking inequality to growth.

In this dissertation, in an attempt to overcome the weaknesses in prior studies and given the potential reverse causality between growth and income inequality, issues related to the choice of estimation method have been carefully examined. Following the theoretical overview three different approaches are carried out to answer the finance-institutions-growth-inequality nexus in the WBC. First linear static panel data models are used. Next, instrumental variable approach for single equation model where GDP per capita, Gini coefficient and institutional indicator are assumed to be endogenous are investigated. Finally, system of equations with two-stage least squares and three-stage least squares are employed.

Essentially, simultaneous-equation models explain the growth-inequality relationship more accurately than standard single equation models because variables are interrelated in complicated interactions. We opt for simultaneous-equation models since, in contrast to single-equation methods, SEM is also capable of defining feed-back simultaneities

between our endogenous variables. Due to nature and complexity of economic relations along with income inequality dynamics and their dependence on numerous factors simultaneity that arises among variables for variety of reasons requires using a comprehensive modelling approach. With respect to the aforementioned, the most trustworthy estimator for our analysis is fixed effect three-stage least squares.

FE3SLS estimates show that equality is adversely related to growth; income inequality measured as Gini coefficient causes economic growth of the small Western Balkan countries that are in the process of moving towards a market economy. Gini is statistically significant in all estimated growth specifications and enters with a large and positive coefficient. Therefore, findings indicate that the observed economic growth has been significantly influenced by income disparities.

The estimation results regarding Gini coefficients impact on income per capita which is persistently significant across all specifications demonstrates unbalanced growth phenomena which lies among core problems of transition countries. These economies are stuck in high unemployment, low competitiveness, low-income and low investment equilibrium despite high economic growth before global recession. Weak growth trends in the aftermath of 2008 financial crisis showed that emerging and developing economies relying on trade and finance were more vulnerable to global recession (Kose and Ohnsorge, 2021).

Furthermore, FE3SLS evaluations show that the WB countries' income discrepancies increase with higher GDP per capita. Both economic growth plays role in income inequality and the impact of Gini on GDP per capita is highly significant. As a consequence, due to structural weaknesses in economic structure growth worsens income disparities.

Overall, our results suggest that there coexists a dramatic link between GDP per capita and income inequality in the WBC, where the direction and strength of this relationship is determined by a wide range of factors. This bidirectional relationship between growth and inequality should be further expanded into a policy analysis as vital in addressing economic social issues. Implications of these findings have far reaching consequences for a society as a whole prompting the need to address emerging challenges. The stance of policymakers needs a holistic and yet flexible approach for structural transformation relying on evidence informed policy making in a complex political context of the Western Balkan countries. It is essential to design policies that consider manufacturing sector and promote balanced growth across diverse industries. This is crucial for inclusive growth and sustainable development in the Western Balkan countries.

8.3. The Impact of Financial Market Development on Economic Growth and Income Inequality Relationship in the WBC

Financial market development is assumed to have important role along dynamic economic growth patterns which is of relevance among transitional context of the WB countries. This mechanism includes unequal access to opportunities in the form of imperfect credit markets, with incentives favouring wealthier groups over poorer ones, through differential human capital accumulation rates and inefficient allocation of funds.

Through rigorous analysis and empirical investigation, our findings shed light on the impact of financial market development and quality of institutions on economic growth income inequality relationship in the WB countries.

FE3SLS results suggest that a well-developed financial sector plays a crucial role in fostering economic expansion in the Western Balkan countries. Findings demonstrate a positive and significant correlation between financial market development and growth. While the analysis reveals that financial market development has a positive effect on GDP per capita it exerts a negative impact on inequality. Therefore, a dual effect is at play; financial market development proxied by domestic credit enhances GDP growth while simultaneously reducing inequality. Overall, these findings highlight the importance of financial market development in shaping both economic growth and income inequality in the WBC.

8.4. The Impact of Institutional Quality on Economic Growth and Income Inequality Relationship in the WBC

Third significant outcome is that institutional quality is crucial both for economic growth and income disparities. Proxy for institutional quality rule of law includes several indicators which measure protection of property rights, clear rules and regulations, effectiveness and predictability of the judiciary, enforceability of contracts and perceptions of crime and violence (Kaufmann, Kraay and Mastruzzi, 2010). Rule of law is acknowledged as vital institutional dimension in understanding the institutional mechanism through which growth and inequality are related in the Western Balkan countries. Finding that institutions can simultaneously enhance GDP growth and reduce income inequality reflects the notion that well-designed and inclusive institutions are essential for sustainable and equitable economic development. This idea is further highlighted by the fact that rule of law has larger impact on GDP per capita than proxies for financial market development. Given the synergy between finance and institutional quality an efficient institutional framework should be established to facilitate access to finance and stimulate economic development. These findings provide strong evidence that access to finance and institutions is important in shaping both economic growth and income inequality, with institutional quality playing a crucial role in promoting equitable economic development.

In light of this evidence, financial markets and institutions when function effectively give all market participants an opportunity to benefit from effective investment by channelling resources toward more productive activities which spurs economic growth. At the same time, this framework is anticipated to mitigate income disparities in the countries of the Western Balkans.

A further question in this thesis concerns whether institutional quality contributes to economic growth in the WBC. Still, building institutions capable of overcoming new challenges, institutional reform processes and meet basic political and economic criteria remain the main task in the process of joining EU. Furthermore, institutions impact on income inequality is arguably an interesting question to be addressed as inequality has sharply risen in these regions.

8.5. Contribution to knowledge

This thesis contributes to various related strands of the empirical literature on the growth-inequality relationship. One important contribution is to provide a unified theoretical framework encompassing alternative theories of growth and income distribution. The second contribution is adopting comprehensive modelling approach in analysing economic growth and income inequality relationship. This approach confirms the reverse causality between main variables which is consistent with employed simultaneous equations model. It is claimed that inconclusive result over income inequality and economic growth relationship debate is due to the omitted variable bias and the key omitted variable in this relationship is the quality of institutions. Thus, third strength of the thesis is to add financial market development and institutional indicators as important omitted variables in growth-inequality nexus. In this way, emphasize is put on a holistic approach offering a more robust lens to understand this relation for the development of effective strategies. The last contribution of thesis is to pioneer research on analysing simultaneously growth inequality relationship in the WBC. Findings have important policy implications. It is essential to formulate policies considering manufacturing growth and balanced growth across sectors as priority. Further access to financial and banking services as well as institutional and legal measures for the purpose of inclusive growth and sustainable development in the Western Balkan countries is important.

8.6. Limitations and Recommendations for Future Research

Our research confronts the same limitations that have surrounded the empirical economics literature generally, and the inequality-growth literature in particular. When analysing the Western Balkan countries, several limitations and challenges that researchers and policymakers encounter are the issues surrounded by the lack of data and its quality. Although this thesis draws some significant conclusions and provides valuable insights into the dynamics between growth and inequality, it also has important limitations that need to be considered.

The most important limitation is data availability which limits the estimation period to 1996-2019 and to single inequality indicator. This has impact on financial development indicator and time interval used; both institutions and income inequality are persistent and change little over time. Another limitation is that although various potential instrumental variables have been tested, with available data collected over time more proper instruments can be exploited. Also, due to data limitations we use a single indicator for income inequality. The mayor improvement would be using Gini index with alternative measures for income inequality such as shares that will show how inequalities in different parts of the distribution are related to growth and if changes in specific parts of the distribution involve alternative mechanisms to growth.

Furthermore, restrictions on the availability of data result in limitations on the estimated model. If longer time periods can be covered, the time-series properties can be more clearly tested, and lags can be selected with IV and SEM which in turn will make model more comprehensive.

Limitations on data in the WBC requires full awareness of the need to pursue various inequality measures as this can yield substantially different results on growth-inequality-finance-institutions nexus. This relationship acts differently in the short and in the long-run. When dealing with inequality indicators it should be emphasized that effect of inequality varies across different transmission channels. Specifically, inequality at lower end of the income distribution is crucial in fragile countries of Western Balkans involving socio-political instability mechanism. Country specific effect that differ with the type of inequality and time period considered should be taken into account when pursuing a policy given that single pattern for all countries does not exist.

Even though obstacles in terms of data quality and availability exist when Western Balkan countries are empirically researched, several measures can be taken to improve research on growth-inequality nexus in the light of further work. First, longer periods of time will give better and more robust results. Also, time series properties can be more clearly tested and lags may be selected for instrumental variable technique and simultaneous equations models when covering longer periods of time. Given the available data we have explored a number of potential instrumental variables. When relying on an instrumental variable framework, we should always be skeptical about chosen instruments, however, creative choices of instruments that meet the instrument relevance and instrument exogeneity criteria are possible, even though the issue of identification still cannot be totally eliminated.

Employing Gini index along with additional measures of income inequality would be a major contribution in understanding this complex relationship in transition countries that are particularly vulnerable to inequalities in income as they have faced deep structural transformation from state led economies to market economy. Additionally, there exists potential for more through research to reveal impact of inequality by conducting research on different transmission mechanisms. Future work may incorporate deeper analysis

focusing on saving mechanism. The findings of the empirical research provided in this dissertation give ground for a further debate about appropriateness of policies during transition in the countries of the Western Balkan which may influence future work to achieve the best possible outcomes for society. Future research should also investigate how different political institutions affect the relationship between inequality and economic growth. Analysis could be expanded further by including another inequality indicator such as the top 10 shares, by including various measures of economic development and control variables.

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APPENDICES

Appendix 1: Variable definitions, sources and descriptive statistics

Table 1.1: Variable definitions, measurements and sources

Variable	**Definition of Variable**	**Measurement**	**Source**
GDP per capita	Real GDP at constant national prices, obtained from national accounts data for each country divided by population	Real GDP at constant 2017 national prices (in mil. 2017US$) divided by population.	Penn World Tables (PWT - version 10.01)
GINI	The Gini coefficient measures income inequality; min is 0; max is 100 percent, or 1.0	Gini index of inequality in equivalized household (pre-tax and pre-transfer) income.	SWIID (2020) version 9.1.
CREDIT	Domestic credit to private sector by banks (% of GDP)	Financial resources provided to the private sector by other depository corporations such as through loans, purchases of nonequity securities, and trade credits and other accounts receivable, that establish a claim for repayment.	IMF, International Financial Statistics and data files, and World Bank and OECD GDP estimates.
LAW	Rule of Law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.	Measure is constructed from diverse views on governance of many stakeholders worldwide, including tens of thousands survey respondents and experts. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5.	World Bank
FDI	Foreign direct investment, net inflows (% of GDP)	Data on equity flows are based on balance of payments data reported by the IMF. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments.	World Bank
INVEST	Gross capital formation (formerly gross domestic investment)	Consists of outlays on additions to the fixed assets of the economy plus net	World Bank

		changes in the level of inventories.	
TRADE	The sum of import and export of good and services of a country (% of GDP)	Exports at constant national 2017 prices + Imports at constant national 2017 prices/GDP at constant national 2017 price	Penn World Tables (PWT - version 10.01)
GOV	Government consumption of a country (% of GDP)	Government consumption at constant national 2017 prices/GDP at constant national 2017 price	Penn World Tables (PWT - version 10.01)
UNEMPL	Unemployment, total (% of total labor force)	Modeled ILO estimate	World Bank
CPI	Inflation as measured by the consumer price index	The annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly.	World Bank
AGRI	Agricultural land (% of land area)	The share of land area that is arable, under permanent crops, and under permanent pastures.	World Bank
NATRES	Total natural resources rents (% of GDP)	The sum of oil rents, natural gas rents, coal rents (hard and soft), mineral rents, and forest rents.	World Bank
FERT	Total fertility rate, (births per woman)	The number of children that would be born to a woman if she were to live to the end of her childbearing years and bear children in accordance with age-specific fertility rates of the specified year.	World Bank
URBAN	Urban population (% of total population)	People living in urban areas as defined by national statistical offices.	World Bank
LIFE	Life expectancy at birth, total (years)	The number of years a new born infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life.	World Bank
POP	Population	Population data by country from the World Bank and	Penn World Tables (PWT

		United Nations sources.	- version 10.01)
BANKBR	Commercial bank branches (per 100,000 adults)	Retail locations of resident commercial banks and other resident banks that function as commercial banks that provide financial services to customers and are physically separated from the main office but not organized as legally separated subsidiaries.	International Monetary Fund, Financial Access Survey
PS	Political Stability and Absence of Violence/Terrorism measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism.	Measure is constructed from diverse views on governance of many stakeholders worldwide, including tens of thousands survey respondents and experts. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5.	World Bank
VA	Voice and Accountability captures perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.	Measure is constructed from diverse views on governance of many stakeholders worldwide, including tens of thousands survey respondents and experts. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5.	World Bank
GE	Government Effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy	Measure is constructed from diverse views on governance of many stakeholders worldwide, including tens of thousands survey respondents and experts. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution,	World Bank

	formulation and implementation, and the credibility of the government's commitment to such policies	i.e. ranging from approximately -2.5 to 2.5.	
CORR	Control of Corruption captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.	Measure is constructed from diverse views on governance of many stakeholders worldwide, including tens of thousands survey respondents and experts. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5.	World Bank
RQ	Regulatory Quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.	Measure is constructed from diverse views on governance of many stakeholders worldwide, including tens of thousands survey respondents and experts. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5.	World Bank

Table 1.2: Data summary of income inequality and GDP per capita

Variable		mean	Std.dev.	Min.	Max.	Observations
Gini	overall	50.06	2.74	46.1	55.3	101
	between		0.75	48.6	51.4	
	within		2.65	46.9	55.4	
GDP	overall	4345	1371	1464	7684	129
	between		1074	2248	6080	
	within		886	2936	6077	

Source: authors estimation based on data

Table 1.3: Descriptive statistics for all key variables after natural logarithmic transformation

Variable	Obs	Mean	Std.	Min	Max
lGINI	101	3.911	0.054	3.830	4.012
lGDP	120	9.295	0.354	8.236	9.963
lCREDIT	117	3.455	0.678	1.181	4.459
lLAW	114	0.749	0.151	0.198	1.036
lFDI	101	1.518	0.924	-2.813	3.618
lINVEST	120	3.020	0.291	2.302	3.526
lTRADE	120	4.306	0.329	3.218	4.955
lEDU	118	2.298	0.282	1.821	4.573
lGOV	120	2.855	0.242	1.837	3.417
lUNEMPL	130	3.024	0.338	2.198	3.658
lFERT	122	0.467	0.147	0.215	0.920
lCPI	112	4.466	0.555	1.619	5.025
lAGRI	125	3.693	0.223	2.808	3.960
lNATRES	118	0.091	0.734	-2.659	1.835

Source: authors estimation based on data

Appendix 2: Correlations between variables

Table 2.1: Correlations between financial development variables

	BANKBR	CREDIT	M2
BANKBR	1		
CREDIT	0.6037	1	
M2	-0.4531	-0.0298	1

Source: authors estimation based on data

Table 2.2: Correlations between governance indicators

	CORR	GE	PS	RQ	LAW	VA
CORR	1					
GE	0.5228	1				
PS	0.4575	0.6388	1			
RQ	0.4731	0.7509	0.5672	1		
LAW	0.7501	0.6259	0.6402	0.6721	1	
VA	0.5717	0.5309	0.5932	0.3663	0.4842	1

Source: authors estimation based on data

Appendix 3: Unit Root Test Results

Panel data includes both time series and cross-sectional dimensions. To avoid inefficient estimators, stationarity must be checked for each variable. First of all, Pesaran cross sectional independence test is employed and results are summarized in table 3.1. Results show variables that have cross sectional dependence (lGOV, lFDI, lURBAN). Another important result is that the CD-test statistics are large so the null hypotheses of cross-sectional independence are strongly rejected.

Table 3.1: Pesaran cross-sectional independence test

Variable	CD-test	p-value	Corr	abs(corr)
lGDP	14.93***	0.000	0.964	0.964
lGINI	7.5***	0.000	0.548	0.665
lCREDIT	11.58***	0.000	0.786	0.786
lLAW	7.72***	0.000	0.510	0.534
lGOV	0.05	0.957	0.03	0.407
lFDI	1.06	0.291	0.087	0.206
lTRADE	9.58***	0.000	0.618	0.618
lINVEST	3.60***	0.000	0.233	0.318
lAGRI	-3.27***	0.001	-0.207	0.448
lCPI	13.12***	0.000	0.941	0.941
lEDU	11.26***	0.000	0.761	0.761
UNEMPL	8.77***	0.000	0.544	0.544
lFERT	10.67***	0.000	0.688	0.688
lURBAN	-1.24	0.215	-0.077	0.627
lLIFE	14.50***	0.000	0.940	0.940

****, ** and * denote significance at 1%, 5% and 10% respectively.*

Source: authors estimation based on data

Next, given the nature of the data used in this dissertation, Fisher unit root test of unbalanced panel is performed for all variables. Fisher's ADF test is a first-generation test that controls for the presence of unit roots assuming cross-sectional independence. While first generation of unit root tests assumes cross-sectional independence, second generation tests allow for correlations across residuals of panel units.First generation tests such as Fisher's ADF test can be transformed into second generation tests that take into account cross-sectional dependence. In the Stata program, the demean drift command is added to ensure that the test takes into account correlations. According to the Fisher ADF test results, the null hypothesis is rejected, indicating that the three variable series are also stationary (lURBAN p=0.0211, lGOV p=0.0060, lFDI p=0.0217). Hence, all variables except unemployment are stationary. While unemployment variable is not stationary the difference of this variable is stationary and we use D.unempl in equations.

Overall, to avoid spurious regression we use stationary (dependent and independent) variables.

Table 3.2: Fisher Unit Root Test

Variable	Inverse chi-squared (10)	p-value
lGDP	48.26	0.000***
lGINI	23.12	0.010***
lCREDIT	53.64	0.000***
lLAW	48.04	0.000***
lGOV	24.65	0.001***
lFDI	20.91	0.021***
lTRADE	30.19	0.001***
lINVEST	34.81	0.001***
lAGRI	18.14	0.050**
lCPI	58.49	0.000***
lEDU	42.77	0.000***
D.UNEMPL	70.32	0.000***
lFERT	32.55	0.000***
lURBAN	20.99	0.020**
lLIFE	37.00	0.000***

****, ** and * denote significance at 1%, 5% and 10% respectively.*

Source: authors estimation based on data

Appendix 4: Empirical Results for Growth Equation

Estimated models for economic growth with linear panel data methods are given below. The order of adding variables to regression equations is determined by the literature and kept in line with the research questions of this thesis.

Model 1

The baseline model (model 1) is of the following form:

$$lGDP_{it} = \beta_0 + \beta_1 lGini_{it} + \beta_2 lCREDIT_{it} + \beta_3 lLAW_{it} + u_{it} \quad \text{Equation (1)}$$

Model 1 aims to clearly illustrate impact of selected indicators on economic growth without including additional determinants. To check whether data contains country and/or time effects F test is employed. Results below show that there are significant individual effects and no time effects in model where growth proxied as income per capita is dependent variable.

Table 4.1: F test results based on individual and time effect

F- Individual	F (4, 83) = 93.50***
P – value	(0.0000)
F- Time	F (20, 67) = 1.16
P – value	(0.3168)

****, ** and * denote significance at 1%, 5% and 10% respectively.*

Source: authors estimation based on data

To decide between panel data models, we perform steps in sequence and estimate Hausman test, heteroscedasticity, autocorrelation and cross-sectional independence tests. Poolability test obtained by comparing fixed effect estimates and pooled regression where the null hypothesis that all fixed effects are jointly 0 is rejected indicating that country effects are present. Hausman test is performed to decide whether fixed or random effects models fit better. The null hypothesis stating that RE is preferred over FE cannot be rejected. Since individual effects exist pooled OLS is not appropriate method and we use one-way error component model with random effects as Hausman test suggests. Joint test for normality cannot reject null hypothesis that residuals are normally distributed at %5 significance level.

Then, we conduct Levene's heteroscedasticity test where null hypothesis that variances across entities is zero cannot be rejected. Levene, Brown and Forsythe test is for equality of variances. Levene's test W0 is robust under nonnormality. The two statistics proposed by Brown and Forsythe reported as W50 and W10 replace the mean in Levene's formula with alternative location estimators and are more robust when dealing with skewed data (Stata, 2021).

Modified Bhargava et al. Durbin Watson (DW) test statistics approximate value of 0.42 and Baltagi Wu LBI value of 0.82 indicates positive autocorrelation. Hence, we conclude presence of autocorrelation in our model.

Table 4.2: Model Specification Tests for Economic Growth Equation

	Tests	**Results**
Helps to choose between REM and FEM	Hausman test	chi2(3) = 0.00 (0.8302)
Heteroscedasticity	Levene's heteroscedasticity test	W0 =2.01* (0.0994)
Autocorrelation	Modified Bhargava et al. Durbin Watson (DW)	0.4171
	Baltagi Wu LBI	0.8249

Cross-sectional independence	Pesaran (2004) CD testi	3.352*** (0.0008)
	Friedman test	14.418*** (0.0061)
	Frees test	0.078

****, ** and * denote significance at 1%, 5% and 10% respectively.*

Source: authors estimation based on data.

The cross-sectional independence test is followed by random effects estimation. Pesaran (2004), Friedman and Frees's tests used for potential cross-sectional independence are used to detect whether the residuals are correlated across units. According to the result (except Frees test) we reject null hypothesis of cross-sectional independence. To conclude, our model where income inequality, rule of law and domestic credit to private sector by banks variables are included as regressors for income per capita has cross section dependency problem. When autocorrelation and cross-sectional dependence are present Hoechle (2007) suggests using Driscoll and Kraay standard errors. In table 4.3 the main results estimated with Driscoll and Kraay standard errors are presented.

Table 4.3: Driscoll and Kraay Standard Errors

Number of observations	91		
Number of groups	5		
Wald chi2(3)	599.47***		
Prob>chi2	0.0000		
R^2	0.6218		
	Coefficient	**T**	**p>|t|**
lGINI	3.857***	4.83	0.000
lCREDIT	0.181***	11.91	0.000
lLAW	0.677***	10.15	0.000
Constant	-6.853**	-2.29	0.033

****, ** and * denote significance at 1%, 5% and 10% respectively.*

Source: authors estimation based on data

In this baseline model, all variables have significantly positive effect on economic growth. One-point increase in Gini coefficient increases GDP per capita by 3.8 points.

Model 2

Besides main variables, other determinants of economic growth are included as control variables in the equation. Further, in model (2) FDI is added and as previously described model 2 is tested for country and time effects, heteroscedasticity, autocorrelation and cross-sectional dependency. Model 2 is of the following form:

$$lGDP_{it} = \beta_0 + \beta_1 lGini_{it} + \beta_2 lCREDIT_{it} + \beta_3 lLAW_{it} + \beta_4 lFDI_{it} + u_{it}$$ Equation (2)

F test results show that significant individual effects exist but there are no time effects. A Hausman test result indicates to use FE (chi2(4) = 51.56 and p-value=0.000). Jarque -Bera demonstrates that residuals are normally distributed (p = 0.21).

A test for heteroscedasticity available for fixed effects model is Modified Wald test for groupwise heteroscedasticity and results shows that heteroscedasticity is not present (chi2(5) = 8.81 and p-value = 0.12).

DW test statistics with approximate value of 0.39 and Baltagi Wu LBI value of 0.76 shows autocorrelation and Pesaran (4.757) and Friedman (15.520) test demonstrate cross sectional dependency (except Frees test). Regression results with Driscoll - Kraay standard errors demonstrate that foreign direct investment does not have significant contribution to growth. Financial and institutional indicator along with Gini has positive and statistically significant effect on economic growth in selected countries.

Model 3

The aim of the model (3) given below tests whether investment has impact on economic growth of the Western Balkan countries.

$$lGDP_{it} = \beta_0 + \beta_1 lGini_{it} + \beta_2 lCREDIT_{it} + \beta_3 lLAW_{it} + \beta_4 lINVEST_{it} + u_{it}$$ Equation (3)

Hausman's specification test indicates fixed effect estimation. Since heteroscedasticity and cross-sectional dependence is not present model is estimated taking into account serial correlation. In model (3), while rule of law and credit becomes statistically insignificant, investment is positively significant. Gini is statistically significant and have positive effect on growth.

Model 4

Next, model (4) includes government expenditure variable and takes the following form:

$$lGDP_{it} = \beta_0 + \beta_1 lGini_{it} + \beta_2 lCREDIT_{it} + \beta_3 lLAW_{it} + \beta_4 lGOV + u_{it}$$ Equation (4)

F test results suggest significant country effects but no time fixed effects. Hausman specification test results indicate that we reject the null hypothesis and fixed effect is preferred estimator. Heteroscedasticity is not present but Modified Bhargava et al. Durbin–Watson test (0.39) and Baltagi–Wu LBI (0.85) reveals autocorrelation. Pesaran, Friedman and Frees' tests show cross sectional dependence. Regression results taking into account autocorrelation and cross-sectional dependency demonstrate that except government expenditure all variables are significant. According to this model, Gini, credit and government expenditure have positive impact on economic growth.

Model 5

Model (5) where trade variable is added to the model takes the following form;

$$lGDP_{it} = \beta_0 + \beta_1 lGini_{it} + \beta_2 lCREDIT_{it} + \beta_3 lLAW_{it} + \beta_4 lTRADE_{it} + u_{it} \text{ Equation(5)}$$

In this model, country effects (F (4, 82) = 123.85 and p-value=0.0000) are present. Hausman specification test indicates that null hypothesis is rejected implying that FE is preferred. Null hypothesis of homoscedasticity cannot be rejected. In addition, Modified Bhargava et al. Durbin–Watson = 0.43 and Baltagi–Wu LBI = 0.81 suggest autocorrelation. Pesaran's cross-sectional independence test indicates that cross-sectional dependency is present. Taking into account only autocorrelation and cross-sectional dependency one-way fixed effect model is estimated. Estimates demonstrate that trade is important control variable in analysing economic growth in the Western Balkan countries. Signs of regression coefficients are as expected. Rule of law, credit and Gini are significant in this model.

Model 6

In model (6), education proxied by mean years of education is added to equation which takes the following form:

$$lGDP_{it} = \beta_0 + \beta_1 lGini_{it} + \beta_2 lCREDIT_{it} + \beta_3 lLAW_{it} + \beta_4 lEDU_{it} + u_{it} \quad \text{Equation(6)}$$

Hausman statistic`s p-value of 0.03 indicates that the preferred estimator is fixed effects. Modified Wald test shows that heteroscedasticity is present (Chi2(21) = 1.000 and p-value=0.000). Also, Durbin–Watson test and Baltagi–Wu LBI results suggest autocorrelation. Null of cross-sectional independence is rejected according to Pesaran, Friedman and Frees tests. Results demonstrate that estimated coefficients of education are significant implying positive impact on growth. According to regression results all variables have significantly positive impact thus, contributing to economic growth.

Model 7

Model (7) tests for fertility as additional control determinant. Thus, model 7 takes the following form:

$$lGDP_{it} = \beta_0 + \beta_1 lGini_{it} + \beta_2 lCREDIT_{it} + \beta_3 lLAW_{it} + \beta_4 lFERT + u_{it} \text{Equation (7)}$$

F test results suggest significant country effects but no time effects. Hausman specification results indicate that fixed effects is preferred estimator. Modified Wald test suggests homoscedasticity. Modified Bhargava et al. Durbin–Watson test (0.43) and Baltagi–Wu LBI (0.74) reveals autocorrelation of residuals. Null of cross-sectional independence cannot be rejected according to Pesaran, Friedman and Frees tests. Regression results with Driscoll - Kraay standard errors demonstrate that fertility is significant and has negative

effect on growth. Coefficients of domestic credit to private sector by banks, rule of law and GINI are significantly positive.

Model 8

This extended model checks for the previously tested significant determinants along with inflation. Thus, model (8) takes the following form:

$$lGDP_{it} = \beta_0 + \beta_1 lGini_{it} + \beta_2 lCREDIT_{it} + \beta_3 lLAW_{it} + \beta_4 lFDI_{it} + \beta_5 lINVEST_{it} + \beta_6 lTRADE_{it} + +\beta_7 lEDU_{it} + +\beta_8 lFERT + \beta_4 lINF_{it} + u_{it} \text{Equation (8)}$$

F test results suggest significant country effects while there are no time effects. Hausman test is performed to decide whether fixed or random effects models fit better. Since country effects exist pooled OLS is not appropriate method and we use one-way error component model with fixed effects as Hausman test suggests.

Next, heteroscedasticity test is conducted (chi2(5) = 3.07, p-value=0.68) and results indicate that homoscedasticity assumption cannot be rejected. Modified Bhargava et al. Durbin–Watson = 0.48 and Baltagi–Wu LBI =0.88 suggests autocorrelation. Pesaran CD test, Friedman and Frees test rejects null hypothesis of cross-sectional independence. As we suspect of autocorrelation and cross-sectional dependence in the data, one-way fixed effects model with standard errors is used. Results demonstrate that FDI, investment, fertility and inflation variables are not significant. Financial development indicator contributes to economic growth in model. Rule of law is significant at 10% significance level.

Using the Baltagi–Wu (1999) GLS estimator of the RE model as well as FE Driscoll and Kraay standard errors through (1-8) equations positive and significant effect of income inequality on economic growth is found. The estimates are strongly significant and very large in magnitude. The estimation results across all specifications suggest that there is significant relationship between real GDP per capita and credit variable in our sample. The estimated coefficient of financial development indicator is positive and marginally significant (from 0.018 to 0.187). Thus, there is an indication that financial development goes along with increase in real GDP per capita. Growth is positively related to the extent of maintenance of the rule of law. The obtained result is in line with Barro's findings (2000). Its impact on growth is robust in all specifications except model (2). It is worth noting that the coefficients of rule of law and credit are not significant when investment is added to the baseline model.

In addition, it has been debated that investment affects economic growth of a country. Growth is positively related to the ratio of investment to GDP but is not robust when other determinants are added to the model. On the other hand, relationship between growth and FDI is not significant. For a given value of income per capita, growth is negatively related to the ratio of government consumption to GDP but is insignificant. Fertility is found to

lower growth whereas inflation increases GDP per capita. However, fertility and inflation does not exert a robust influence on economic growth when other determinants are taken into account.

Also, evidence in the theoretical and empirical literature demonstrates that trade is one of the factors driving economic growth over the long run. Trade is the sum of exports and imports of goods and services, measured as a share of gross domestic product and has positive impact on growth. The obtained result is supported by Barro (2000). For education, the results show that the coefficients on education are positive and significant. The R-squared values for different estimates span from 0.62 to 0.95.

Appendix 5: Empirical Results for Income Inequality Equation

Next, we estimate the model where income inequality is dependent variable. Similarly, to previous estimation we start with baseline model. First, we estimate effect of GDP per capita, rule of law and credit. Baseline model for income inequality takes the following form:

$$lGini_{it} = \beta_1 + \beta_2 lGDP_{it} + \beta_3 lCREDIT_{it} + \beta_4 lLAW_{it} + u_{it} \quad \text{Equation (9)}$$

Table 5.1: F test results based on individual and time effect

F- Individual	F (4, 83) = 406.04***
P – value	(0.000)
F- Time	F (20, 67) = 0.11
P – value	(1.000)

****, ** and * denote significance at 1%, 5% and 10% respectively.*

Source: authors estimation based on data

Having country effects indicates that equation cannot be estimated by pooled OLS. Thus, the estimator should adjust for unobserved country-specific confounders. Further, estimation of the model takes into account the results of the assumption tests as heteroscedasticity, autocorrelation and cross-sectional dependence. Similar to previously estimated growth model, we test above mentioned statistical criteria and discuss the main results.

Table 5.2: Model Specification Tests for Income Inequality Equation

	Tests	Results
Helps to choose between REM and FEM	Hausman test	chi2(3) = 0.00 (0.595)
Heteroscedasticity	Levene's test statistic	W0=3.745*** (0.000)
Autocorrelation	Modified Bhargava et al. Durbin Watson (DW)	0.22160586
	Baltagi Wu LBI	0.59022228
Cross-sectional independence	Pesaran (2004) CD testi	13.852*** (0.000)
	Friedman test	20.007 (0.4575)
	Frees test	-0.768

****, ** and * denote significance at 1%, 5% and 10% respectively.*

Source: authors estimation based on data

According to Hausman specification test results null hypothesis cannot be rejected and model is estimated with RE. A Levene`s robust test statistic for heteroscedasticity rejects null hypothesis of equal variance (Prob>chi2 = 0.0000). Both modified Bhargava et al. Durbin Watson (DW) and Baltagi Wu LBI test statistic is lower than 2. This leads us to conclude that autocorrelation exists. While Friedman test and Frees test show cross sectional independence, Pesaran CD test reject null hypothesis of cross-sectional independence. As we suspect of heteroscedasticity, cross-sectional dependence and autocorrelation in the data, one-way random effects model with standard errors is used.

Table 5.3: Driscoll and Kraay Standard Errors

Number of observations	91		
Number of groups	5		
Wald chi2(3)	116.36		
Prob>chi2	0.0000***		
R^2	0.2171		
	Coefficient	**T**	**p>|t|**
lGDP	0.0913***	5.32	0.000
lCREDIT	-0.0071	-1.62	0.120
lLAW	-0.0299**	-2.31	0.032
Constant	3.1002***	18.71	0.000

****, ** and * denote significance at 1%, 5% and 10% respectively.*

Heteroskedasticity corrected standard errors are shown in parentheses.
Source: authors estimation based on data

Results show that in baseline model income per capita and rule of law are significant. Proxy for financial development is domestic credit to private sector by banks. Although estimated coefficient has negative sign it is insignificant.

Model 2

We re-run the analysis for the modified model (2) adding one control variable. Next, agricultural land (% of land area) data is used in determining the relationship between income inequality and agricultural land. The extended model takes the following form:

$$lGini_{it} = \beta_1 + \beta_2 lGDP_{it} + \beta_3 lCREDIT_{it} + \beta_4 lLAW_{it} + \beta_5 lAGRI_{it} + u_{it} \quad \text{Equation (10)}$$

To decide between panel data models, we perform steps in sequence and estimate F statistic, Hausman and heteroscedasticity test. Poolability test obtained by comparing fixed effect estimates and pooled regression where the null hypothesis that all fixed effects are jointly 0 is rejected indicating that country effects are present. In addition, F test suggest that time effect does not exist (Prob>F=0.999). Hausman test is performed to decide whether fixed or random effects models fit better. We use one-way error component model with fixed effects as Hausman test suggests.

Next, homoscedasticity assumption is rejected. Modified Bhargava et al. Durbin–Watson = 0.42 and Baltagi–Wu LBI = 0.91 suggests that autocorrelation is present. Pesaran CD test shows cross sectional dependence whereas Friedman and Frees test results indicate cross-sectional independence. As we suspect of heteroscedasticity, cross-sectional dependence and autocorrelation in the data, one-way fixed effects model with standard errors is used. Results demonstrate indicators for financial development and institutional quality are insignificant. Literature review on finance-institutions-inequality nexus provides different theories on finance and income inequality relationship where one strand suggests that financial development and inequality relationship is negative (Galor and Zeira, 1993) and the other hypothesizes that financial development benefits only rich. This result implies that both credit and rule of law although have negative sign are not significant in this model.

Model 3

We re-run the analysis for the modified model (2) substituting control variable. The effect of the size and type of government spending is important in determining the relationship between income inequality and government expenditure. The model takes the following form:

$$lGini_{it} = \beta_1 + \beta_2 lGDP_{it} + \beta_3 lCREDIT_{it} + \beta_4 lLAW_{it} + \beta_5 lGOV_{it} + u_{it} \quad \text{Equation (11)}$$

This variable is included in both equations since existing studies demonstrate its impact on growth and inequality. To decide between panel data models, we perform steps in sequence and estimate F statistic, Hausman and heteroscedasticity test. Poolability test obtained by comparing fixed effect estimates and pooled regression where the null hypothesis that all fixed effects are jointly 0 is rejected, hence country effects are present. In addition, F test suggest that time effect does not exist (Prob>F=1.000). Hausman test is performed to decide whether fixed or random effects models fit better. We use one-way error component model with fixed effects as Hausman test suggests.

Next, Modified Wald test for groupwise heteroscedasticity results indicate that homoscedasticity assumption is rejected. Modified Bhargava et al. Durbin–Watson = 0.22 and Baltagi–Wu LBI = 0.59 suggests that autocorrelation is present. Pesaran CD test and Friedman test cannot reject null hypothesis whereas Frees test reject cross-sectional independence. As we suspect of heteroscedasticity, cross-sectional dependence and autocorrelation in the data, one-way random effects model with standard errors is used. Credit and government expenditure variables are nonsignificant.

Model 4

Moreover, existing studies highlight the importance of unemployment on income inequality. Positive correlation between these two variables indicates that unemployment should be included in the Gini equation. Hence, in model (4), unemployment variable is

$$lGini_{it} = \beta_1 + \beta_2 lGDP_{it} + \beta_3 lCREDIT_{it} + \beta_4 lLAW_{it} + \beta_5 D.UNEMPL_{it} + u_{it}$$
Equation (12)

F test results show presence of individual effects. Hausman specification test indicates that null hypothesis is rejected and fixed effects model is preferred. In the presence of heteroscedasticity, autocorrelation and cross-sectional dependence model is estimated with Driscoll and Kraay standard errors. Results clearly demonstrate that rule of law and credit variables have negative sign but are not statistically significant. While coefficient estimate of unemployment has positive sign, its impact is small.

Model 5

This extended model checks for the previously tested significant determinants along with natural resources (% of rent). Model (5) takes the following form:

$$lGini_{it} = \beta_1 + \beta_2 lGDP_{it} + \beta_3 lCREDIT_{it} + \beta_4 lLAW_{it} + \beta_5 lAGRI_{it} + \beta_6 D.UNEMPL_{it} + \beta_7 lNATRES_{it} + u_{it}$$
Equation (13)

Poolability test obtained by comparing fixed effect estimates and pooled regression where the null hypothesis that all fixed effects are jointly 0 is rejected. This indicates that country effects are present. In addition, F test suggest that time effect does not exist (Prob>F=1.000). Hausman test is performed to decide whether fixed or random effects

models fit better. We use one-way error component model with fixed effects as Hausman test suggests. Next, Modified Wald test for groupwise heteroscedasticity results show that homoscedasticity assumption is rejected. Modified Bhargava et al. Durbin–Watson = 0.75 and Baltagi–Wu LBI = 1.05 suggests that autocorrelation is present. Pesaran CD test, Friedman and Frees tests cannot reject null hypothesis of cross-sectional independence. As heteroscedasticity and autocorrelation is present in the data, one-way fixed effects model with standard errors is used. Results imply that credit, rule of law and government expenditure variables are nonsignificant.

Value of regression parameter indicates a significant positive relationship between Gini and GDP per capita. Agricultural land is found to have a significant negative impact on income inequality. Positive impact of mean years of education suggests that it contributes to income disparities in the Western Balkan countries. On the other hand, coefficient of rule of law indicates insignificant relationship between Gini and institutional indicator. On the other hand, financial indicator becomes insignificant once education is taken into account.

In summary, the relationship between GDP per capita and income inequality in the Western Balkan countries is a complex one, and the direction and strength of this relationship may vary depending on a number of factors. Regression results with Driscoll - Kraay standard errors demonstrate that GDP per capita increases income disparities in the Western Balkan countries. In accordance with literature review on inequality - finance nexus in TC, domestic credit to private sector by banks has negative effect on inequality; however, results are not significant. Coefficient estimates of rule of law improve income inequality in only in model (1) and (3). Hence, for every one-point increase in rule of law indicator, income inequality is reduced by 0.03%. Regarding control variables agricultural land is found to have a significant negative impact on income inequality across models. Value of regression parameter for government expenditure is not statistically significant. Unemployment and natural resources variables contribute to income disparities in the Western Balkan countries. In addition, mean years of education has been tested and results suggest that education has no significant effect on the Gini.