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AN ASSESSMENT OF THE IMPACT OF INCOME INEQUALITY ON ECONOMIC GROWTH IN THE GROUPS OF EUROPEAN UNION COUNTRIES

Summary of Doctoral Dissertation
Social Sciences, Economics (04 S)

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Scientific supervisor:

Prof. dr. Zita TAMAŠAUSKIENĖ (Šiauliai University, Social Sciences, Economics – 04 S).

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Chairperson:

Prof. habil. dr. Zigmas LYDEKA (Vytautas Magnus University, Social Sciences, Economics – 04 S).

Members:

Prof. habil. dr. Ona Gražina RAKAUSKIENĖ (Mykolas Romeris University, Social Sciences, Economics – 04S);

Prof. dr. Mindaugas DAPKUS (Vytautas Magnus University, Social sciences, Economics – 04S);

Doc. dr. Rasa BALVOČIŪTĖ (Šiauliai University, Social Sciences, Economics – 04S);

Doc. dr. Mariusz DYBAL (Wroclaw University, Poland, Social sciences, Economics – 04S).

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Aidas Dilius

PAJAMŲ NELYGYBĖS POVEIKIO EKONOMIKOS AUGIMUI VERTINIMAS EUROPOS SĄJUNGOS ŠALIŲ GRUPĖSE

Daktaro disertacijos santrauka
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Mokslinė vadovė

prof. dr. Zita TAMAŠAUSKIENĖ (Šiaulių universitetas, socialiniai mokslai, ekonomika, 04 S).

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Pirmininkas

prof. habil. dr. Zigmas LYDEKA (Vytauto Didžiojo universitetas, socialiniai mokslai, ekonomika, 04 S).

Nariai:

prof. habil. dr. Ona Gražina RAKAUSKIENĖ (Mykolo Romerio universitetas, socialiniai mokslai, ekonomika, 04 S);

prof. dr. Mindaugas DAPKUS (Vytauto Didžiojo universitetas, socialiniai mokslai, ekonomika, 04 S);

doc. dr. Rasa BALVOČIŪTĖ (Šiaulių universitetas, socialiniai mokslai, ekonomika, 04 S);

doc. dr. Mariusz DYBAŁ (Vroclavo universitetas, Lenkija, socialiniai mokslai, ekonomika, 04 S).

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INTRODUCTION

Relevance of the theme. Throughout the world, the income inequality is becoming highly relevant because of its continuous growth. Income inequality is increasing in many countries of the world, and the countries with decreasing income inequality demonstrate a relatively high income inequality level. Increase of income inequality is relevant due to its relation with social economic phenomena. Income inequality determines poverty, migration, lower level of education, negatively impacts public health and conditions other social economic consequences at both micro- and macro-levels.

A special attention to income inequality was focused after the Great Recession in 2008. It is stated that exactly income inequality was the major cause for the Great Recession. The impact made by income inequality on economic growth is shown by various research studies throughout the world. The impact of income inequality on economic growth manifests in Lithuania and other states of the European Union.

Since income inequality as a dynamic phenomenon is constantly changing, its change may have diverse impact on economic growth. Therefore, stabilisation of the change of income inequality and its orientation to promotion of economic growth determine certain theoretical substantiations and practical solutions.

Scientific literature focuses on the following significant problems of income inequality in economics: how income inequality is measured; what factors determine increase of income inequality; what consequences of income inequality on consumption, investment, education, public health, poverty, migration, environmental protection etc. are observed. It is emphasised that research works continue discussing on the impact of income inequality on economic growth. Therefore, from a scientific point of view, it is purposeful to develop research on the impact of income inequality on economic growth.

Relevance of the impact of income inequality on economic growth is also based on income redistribution policy being implemented by the government with regard to the impact of income inequality on economic growth, aiming to decrease income inequality and stimulate economic growth.

Research studies on income inequality are being carried out in various scientific research institutes worldwide: Luxembourg Income Study (2017), Luxembourg Institute of Socio Economic Research (2017), Stone Center on Socio-Economic Inequality (2017), International Inequalities Institute (2017), Inequality.org (2016). Thus, the problem of the impact of income inequality on economic growth is relevant in both theoretical and practical approaches.

Scientific problem and level of its investigation. The increasing income inequality evokes discussions on the impact of income inequality on economic growth. Even though S. Kuznets (1955) assessed the impact of economic growth on the level of income inequality, other scientists stated that not the impact on economic growth on income inequality but rather the impact of income inequality on economic growth should be investigated (Charles-Coll, Mayer-Granados, 2017; Charles-Coll,

2013, 2010; Marrero, Rodriguez, 2012; Chen, 2003; Persson, Tabellini, 1991). Grounding on the results of conducted research, social economic inequality obstructs economic growth and increase of inhabitants' life quality (Rakauskienė et al., 2017).

Two groups of scientists who assessed the impact of income inequality on economic growth can be distinguished. The first group of scientists (Agénor, Canuto, 2013; Azevedo, Inchaust, Sanfelice, 2013; Brzeziński, 2013; etc.) investigated the direct impact of income inequality on economic growth. Results of analysis of their research works demonstrate that income inequality may make positive, negative or insignificant impact on economic growth. However, the mentioned scientists did not investigate in what way, through what channels this impact manifested. Other scientists (Castells-Quintana, Royuela, 2014; Gründler, Scheuermeyer, 2014; Halter, Oechslin, Zweimüller, 2013; etc.) investigated the impact of income inequality on economic growth through transmission channels.

The results of research studies conducted by a number of scientists (Guvenen, Kuruscu, Ozkan, 2014; Brzeziński, 2013; Markey-Towler, Foster, 2013; Heckman, Yi, 2012; Herzer, Vollmer, 2012; Hasanov, Izraeli, 2011; Rooth, Stenberg, 2011; Claessens, Perotti, 2007) who investigated the direct impact of income inequality on economic growth differ. The mentioned authors used different indicators of income inequality and different factors determining economic growth in their research.

Relatively a small number of research studies on assessment of the impact of income inequality on economic growth through transmission channels have been carried out worldwide. Scientists investigated the impact of income inequality on economic growth in the following aspects: the saving channel (Gründler, Scheuermeyer, 2014; Castells-Quintana, Royuela, 2014; Halter, Oechslin, Zweimüller, 2013; etc.); the credit-market imperfections channel (Gründler, Scheuermeyer, 2014; Castells-Quintana, Royuela, 2014; Halter, Oechslin, Zweimüller, 2013; Charles-Coll, 2012; Muinelo-Gallo, Roca-Sagalés, 2011; Malinen, 2009; etc.); the socio-political unrest channel (Gründler, Scheuermeyer, 2014; Castells-Quintana, Royuela, 2014; Charles-Coll, 2012; etc.); the fiscal policy channel (Gründler, Scheuermeyer, 2014; Castells-Quintana, Royuela, 2014; Charles-Coll, 2012; etc.); the imperfect capital markets and investment channel (Panizza, 1999); the investment indivisibility channels (Castells-Quintana, Royuela, 2014). The mentioned authors investigated the impact of income inequality on economic growth through one or two transmission channels; they also used the variables reflecting different transmission channels. There is no common agreement concerning what variables should be used to investigate the impact of income inequality on economic growth. Moreover, there is lack of some more research studies on the impact of income inequality on economic growth through transmission channels.

J. A. Charles-Coll, E. L. Mayer-Granados (2017), J. A. Charles-Coll (2010), B. L. Chen (2003), R. J. Barro (2000) etc. argue that assessment of the impact of income inequality on economic growth should regard not only income inequality and its *change* but also the *level* of income inequality. The level of income inequality in countries may determine the range of slowing down or stimulation of economic

growth in relation to the change of income inequality (Charles-Coll, Mayer-Granados, 2017; Charles-Coll, 2010; Chen, 2003; Barro, 2000; etc.). The impact of income inequality on economic growth may depend not only on the level of income inequality but also on the level of income per capita (Gründler, Scheuermeyer, 2014; Jaumotte, Lall, Papageorgiou, 2013; Herzer, Vollmer, 2012; Malinen, 2009, 2008; Barro, 2000; Forbes, 2000).

Outcomes of conducted scientific research studies show that ambiguous results of the impact of income inequality on economic growth may be determined by a period under analysis, too. J. A. Charles-Coll (2010), R. A. Nahum (2005), B. L. Chen (2003) etc. investigated the relation between income inequality and economic growth in different periods of time. Research results obtained by the listed authors demonstrate that the impact of income inequality on economic growth is different in the short-term and long-term periods.

The empirical research employs different variables to measure income inequality. Usually, the variable approximating income inequality, Gini coefficient, is used. There are quite little of research studies dedicated to assessment of the impact of income differences in the top and bottom corners of income distribution on economic growth. Such research cases comprise assessment of the impact of income inequality on economic growth conducted by F. Guvenen, B. Kuruscu, S. Ozkan (2014), R. J. Barro (2000), K. J. Forbes (2000).

To sum up, scientific literature focuses on the following problems of the impact of income inequality on economic growth: how to measure income inequality; through what channels the income inequality makes impact on economic growth; what variables should reflect different impact channels; how the impact of income inequality on economic growth through channels depends on the level of income inequality, its change, level of development of a particular country.

In their research works, scientists usually assess the direct impact of income inequality on economic growth. However, research involving assessment of the impact of income inequality through different transmission channels is not being developed. Having assessed the research analysed in the dissertation, it can be stated that the impact of income inequality on economic growth has not been dealt with in terms of the groups of states singled out according to the level of income inequality and the level of income per capita.

The current dissertation research differs from research studies conducted by earlier mentioned authors in three aspects. First, the dissertation aims to assess how different impact of income inequality on economic growth can be related to the level of income inequality and the level of development of these states; therefore, EU-28 states have been grouped into four categories. The singling out of the four groups of states will allow to estimate the range of the impact of income inequality on economic growth in groups of the identical level of income inequality but different development of the states; what is the difference of the impact in groups of states of identical development but different level of income inequality. Second, there is no doubt about the impact of income inequality on economic growth; however, there is

lack of attention paid to find out what are the channels for this impact to manifest. The impact of income inequality on economic growth is investigated through the saving channel, the credit-market imperfections channel, the socio-political unrest channel, the fiscal policy channel. Third, when assessing the impact of income inequality on economic growth, four different variables reflecting income inequality are used. Aiming to carry out assessment of the impact of income inequality on economic growth, these four variables reflecting income inequality supplement each other.

The research problem: what is the impact of income inequality on economic growth and how to assess the impact of income inequality on economic growth.

The research object is the impact of income inequality on economic growth.

The research aim is to design a model of assessment of the impact of income inequality on economic growth and to empirically test it in different groups of states, having investigated theoretical interpretations of the impact of income inequality on economic growth. Striving to achieve the aim, particular objectives must be solved.

The research objectives:

1. To discuss the content and concept of the phenomenon of income inequality, the discussion questions on its measurement, to group and generalise the theories on the impact of income inequality on economic growth.
2. To theoretically substantiate the transmission channels of the impact of income inequality on economic growth.
3. To perform analysis of scientific research works on the impact of income inequality on economic growth.
4. To design a model for assessment of the impact of income inequality on economic growth and to prepare a set of research methods.
5. To empirically test the possibilities to apply the proposed model in the groups of EU states grouped according to the level of income inequality and the level of income per capita.

The scientific novelty and practical significance of the work is characterised by the following results:

1. Having revealed different approaches to the impact of income inequality on economic growth, the dissertation substantiates the demand for assessment of the impact of income inequality on economic growth not only directly but also through transmission channels. After carrying out analysis of scientific research, major transmission channels through which the income inequality makes impact on economic growth have been singled out. The variables reflecting the transmission channels have been identified. There are four indicators of income inequality employed for assessment of the impact of income inequality on economic growth through transmission channels. Different variables reflecting the transmission channels and income inequality demonstrate the causes for different impact of income inequality on economic growth.
2. Having carried out theoretical analysis of the impact of income inequality on economic growth and grounding on generalisation of empirical research

conducted by other scientists, the model of assessment of the impact of income inequality on economic growth has been designed. The model comprises four transmission channels of the impact of income inequality on economic growth reflected by the variables. The impact of income inequality on economic growth through transmission channels is demonstrated by the interaction of the variables reflecting the income inequality and transmission channels. The model can be applied to analyse the impact of income inequality on economic growth through transmission channels in different groups of states.

3. By carrying out assessment of the impact through transmission channels in particular and using the interactions of the variables reflecting both income inequality and channels, the direction of the impact of income inequality on economic growth and intensity of the impact of different transmission channels in groups of the states divided according to the level of income inequality and the level of income per capita have been estimated.
4. The research has found out that the impact of income inequality on economic growth through the four transmission channels differs in different groups of states. A negative impact of income inequality on economic growth has been assessed in the groups of the countries with a lower level of income inequality and a different level of income per capita. A positive impact on economic growth has been assessed in the groups of the countries with a higher level of income inequality and a different level of income per capita. A different impact of income inequality on economic growth depends on the transmission channels, the variables reflecting these transmission channels and the variables reflecting the income inequality.
5. The results of assessment of the impact of income inequality on economic growth may be important and practically used in institutions making decisions to reduce income inequality in a particular state and to promote economic growth.
6. The obtained research results can be used in creating or developing strategies of economic growth in a particular state or groups of states.

Hypotheses of the dissertation research. Aiming to assess the impact of income inequality on economic growth, the following hypotheses have been raised:

H_1: The change of income inequality makes a different impact on economic growth in the groups of the countries attributed with a different level of income inequality and a different level of income per capita.

H_2: The increase of income inequality promotes economic growth through the saving channel in the group of the countries attributed with a relatively higher level of income inequality and a relatively higher level of income per capita.

H_3: The increase of income inequality slows down economic growth through the credit-market imperfections channel in the group of the countries attributed with a relatively higher level of income inequality and a relatively lower level of income per capita.

H_4: The increase of income of the wealthiest layer of individuals through transmission channels slows down economic growth.

Limitations of the dissertation research. The Dissertation is disassociated form the impact of economic growth on income inequality, i.e. the current work investigates the impact of income inequality on economic growth. Grounding on theory, the impact of income inequality on economic growth is assessed through transmission channels: the saving channel, the credit-market imperfections channel, the socio-political unrest channel, the fiscal policy channel. Even though there are correlations among the channels of the impact of income inequality on economic growth, still, according to the designed model, interrelations of transmission channels have not been empirically investigated.

While investigating the impact of income inequality on economic growth through the fiscal policy channel in groups of various states, disassociation from tax rates is maintained because in different countries different fiscal policy may be applied.

Methods. While investigating the impact of income inequality on economic growth in the theoretical aspect, defining the concept of income inequality, importance of measurement, also pointing out the factors determining income inequality, analysis of scientific literature is carried out. When assessing the level of investigation of the scientific problem of the Dissertation as well as while designing the model and a set of research methods, generalisation, comparison, grouping of scientific literature are carried out, the method of modelling is applied.

While proceeding with empirical research, analysis of statistical data, grouping, comparative analysis, graphic depiction of data, correlation and regression analysis of panel data are carried out. Correlation and regression analysis is performed by using the Gretl program. When assessing the impact of income inequality on economic growth, the method of ordinary least squares is applied. Since errors of the models realised by the method of ordinary least squares are characteristic of heteroscedasticity, values of econometric models are calculated by using robust standard errors (HAC). While carrying out econometric analysis, the data is logarithmised, differentiated, interaction of variables is calculated. The White test, the Durbin-Watson test were used to assess reliability of the econometric model. Logical analysis is employed to prove or reject the hypotheses and to formulate the conclusions.

Structure and volume of the Doctoral Thesis. The Dissertation comprises the introduction, three chapters, conclusions and the list of references. 8 annexes are presented. The volume of the Doctoral Thesis is 138 pages. The Doctoral Thesis comprises 20 figures and 31 tables. 176 literary sources have been used. Fig. 1 presents the logical structure of the Dissertation and the objectives to be solved.

The first chapter solves first three objectives. When solving the first objective, the content and concept of the phenomenon of income inequality, discussion questions on its measurement, the factors determining income inequality, generalised theories on the impact of income inequality on economic growth are discussed. When solving the second objective, the channels of the impact of income inequality on economic growth are substantiated in the theoretical aspect. When solving the third objective, analysis of empirical research conducted by other authors on the impact of income inequality on economic growth is performed.

The second chapter deals with the fourth objective. The model of assessment of the impact of income inequality on economic growth is designed. Moreover, the methods for assessment of the impact of income inequality on economic growth are substantiated and the variables used in the empirical research are discussed.

The third chapter solves the fifth objective. EU-28 states are grouped according to the level of income inequality and the level of income per capita. Moreover, analysis and comparison of indicators reflecting income inequality, economic growth and transmission channels are carried out. Later, the possibilities of application of the proposed model are empirically tested for the groups of EU member states. The results of the conducted empirical research are generalised.

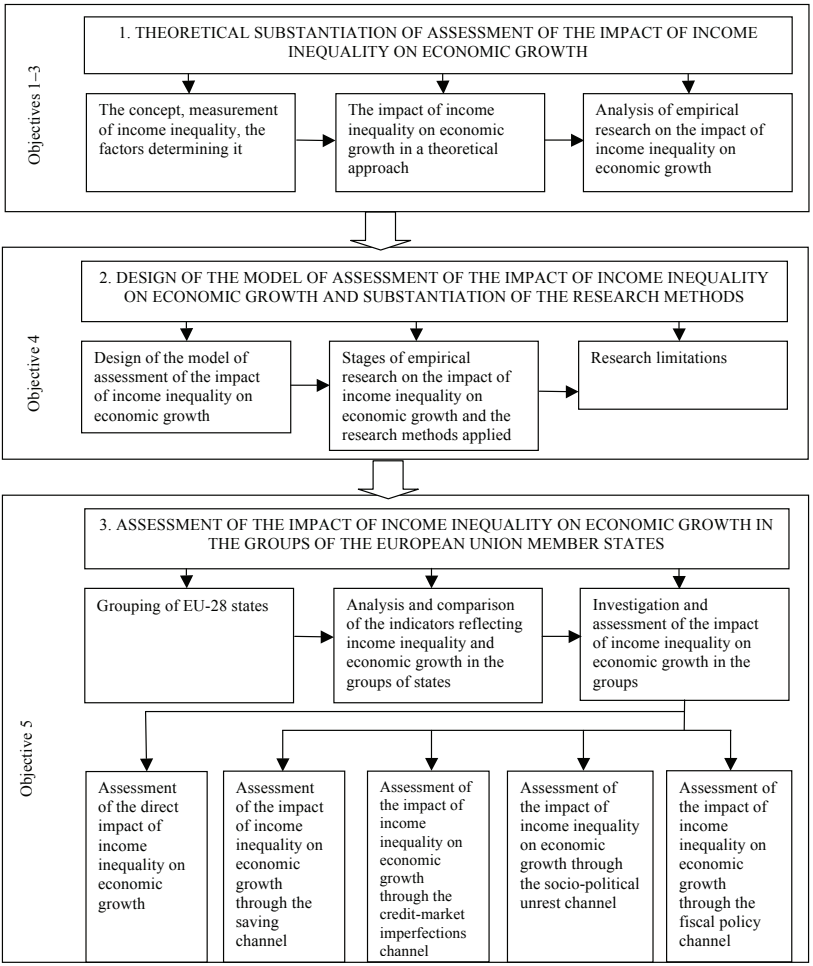

Fig. 1. The logical structure of the Dissertation

THEORETICAL SUBSTANTIATION OF THE IMPACT OF INCOME INEQUALITY ON ECONOMIC GROWTH

Income inequality can be defined as a phenomenon which shows distribution of income in an uneven manner among population (Inequality.org, 2016), among individuals in economics (Skučienė, 2008). Income inequality demonstrates the differences in income among individuals, households, states or any other identifiable combination of subjects. Caused by uneven distribution of income, when some economy subjects receive more income and others less, income inequality is related to negative consequences because these economy subjects which receive less income cannot purchase as many goods and services as they could afford before income inequality increased. Therefore, wishing to notice a negative impact of income inequality, it *necessarily* must be investigated along with other measureable elements, e.g. *assets*, *consumption, economic growth* (Charles-Coll, 2011).

Aiming to assess the impact of income inequality on economic growth, it is important to reveal the indicators measuring income inequality because each of them has some advantages and disadvantages (Gründler, Scheuermeyer, 2014; Bouvier, 2014; Castells-Quintana, Royuela, 2014; etc.).

The Gini coefficient of equivalised disposable income is presented in percentage. This means 0.0 per cent stands for complete income equality, and 100.0 per cent stand for total income inequality. In other words, the less is the value of the Gini coefficient, the less is the level of income inequality.

The research studies extensively apply other indicators of income inequality, too, for instance, decile ratio, two indicators constituting the decile ratio – the first decile of national equivalised disposable income and the tenth decile (Guvenen, Kuruscu, Ozkan, 2014; Milanovic, 2010; Arjona, Ladaique, Pearson, 2003).

The decile ratio is calculated as a ratio between the tenth and first deciles. The increase of the ratio shows that income of the layer of the wealthiest population increases in comparison to income of the layer of the poorest population. The first decile shows the part of the equivalised national disposable income of ten per cent of the poorest layer of population in all income of the population. The tenth decile shows the part of the equivalised national disposable income of ten per cent of the wealthiest layer of population in all income of the population (Eurostat, 2015).

Since the Gini coefficient shows differences of income in the middle of distribution of income, and the decile ratio provides information about differences of income in the top and bottom corners of distribution of income, it is necessary to use these two indicators together to assess income inequality in a particular state.

The authors (Guvenen, Kuruscu, Ozkan, 2014; Herzer, Vollmer, 2012; Banerjee, Duflo, 2013) who investigated the direct impact of income inequality on economic growth included different variables. However, income inequality makes not only direct but also indirect impact on economic growth. Aiming to assess the indirect impact of income inequality on economic growth, it is necessary to further discuss the transmission channels for the impact of income inequality on economic growth.

Income inequality may make an impact on economic growth through the saving channel, the credit-market imperfections channel, the socio-political unrest channel and the fiscal policy channel (Gründler, Scheuermeyer, 2014; Castells-Quintana, Royuela, 2014; Malinen, 2009; etc.). The mechanisms through which income inequality makes an impact on economic growth are called in different ways, i.e. *channels*, *transmission channels* or *mechanisms* (Brzeziński, 2013). The current Dissertation uses the concept of *transmission channels* in assessment of the impact of income inequality on economic growth.

Aiming to assess the impact of income inequality on economic growth in the theoretical aspect, the impact of income inequality on economic growth through ***the saving channel*** is discussed first. On the ground of the opinion shared by representatives of the classical theory of economics, N. Kaldor, S. Kuznets, A. Smith (1723–1790), the increasing level of income inequality stimulates economic growth because when income inequality increases the saving rate of the wealthiest layer of population increases. Wealthy individuals may allocate their accumulated income for accumulation of capital, and increasing capital may be used to increase the production level, i.e. to promote economic growth (Kaldor, 1939).

According to a representative of the Marxist theory, R. M. Goodwin (1913–1996), accumulation of capital and investment may increase because of decreasing salaries for the working population (Susanu, 2012; Goodwin, 1965). When spending less on salaries, the accumulated means may be allocated to investment. Therefore, the increasing level of income inequality stimulates the increase of the saving rate (Malinen, 2009), increase of investment and economic growth (Biswas, Chakraborty, Hai, 2017; Susanu, 2012; Malinen, 2009; Keynes, 1937).

According to a representative of the neo-Austrian school, F. Hayek (1960), when companies reduce salaries for employees, the saved means may be also allocated to promote investment and technological progress. Since the technological progress stimulates economic growth, it can be stated that in this case the increasing level of income inequality stimulates economic growth (Susanu, 2012).

S. Kuznets (1955) argues that the increasing level of income inequality increases accumulation of physical capital, and increasing physical capital increases human capital. In other words, increasing physical capital increases the demand for labour force; therefore, the increase of human capital is stimulated. Thus, the increase of both physical and human capital can be matched, which may promote economic growth. The author underlines that the impact manifests in a long-term period; he also indicates that the technological progress is one of the major factors stimulating economic growth (Markey-Towler, Foster, 2013; Barro, 2000; Kuznets, 1955).

The increase of the level of income inequality is related to the technological progress, i.e. it is related to the demand of the employees holding higher qualification (Guvenen, Kuruscu, Ozkan, 2014; Zabarauskaitė, Blažienė, 2012). In other words, increasing differences among salaries of the employees stimulate both technological progress and economic growth (Markey-Towler, Foster, 2013). D. W. Te Velde (2003) emphasises that a higher level of education forms the offer of qualified employees and the technological progress forms the demand for qualified employees.

Thus, increasing income inequality promotes the saving rate of the wealthy population (Peters, Volwahsen, 2017; Foellmi, Zweimüller, 2016; Gründler, Scheuermeyer, 2014; Malinen, 2009; Barro, 2000). The increasing saving rate provides an opportunity to invest more (Peters, Volwahsen, 2017; Gründler, Scheuermeyer, 2014; Castells-Quintana, Royuela, 2014; etc.). Companies may allocate their investment to scientific research and experimental development (Foellmi, Zweimüller, 2016; Castells-Quintana, Royuela, 2014; Markusen, 2013; Halter, Oechslin, Zweimüller, 2013; Susanu, 2012; Nissanke, Thorbecke, 2005; Banerjee, Duflo, 2003; Barro, 2000). When assessing the impact of income inequality on economic growth through the saving channel, income inequality makes an impact on the saving rate, volume of investment, company expenditure on technological development, this way making an impact on economic growth, too.

Income inequality also makes an impact on economic growth through the ***credit-market imperfections channel***. The impact of income inequality on economic growth manifesting due to *imperfection of the credit market* is negative because the increasing level of income inequality reduces the means of poor people as well as their opportunities to obtain higher education (Albig et al., 2017; Peters, Volwahsen, 2017; Hartmann et al., 2017; Stiglitz, 2016; Sbaouelgi, Boulila, 2016; Gründler, Scheuermeyer, 2014; Castells-Quintana, Royuela, 2014; Neves, Silva, 2014; Halter, Oechslin, Zweimüller, 2013; Marrero, Rodriguez, 2012; Susanu, 2012; Malinen, 2009; Nissanke, Thorbecke, 2005; Panizza, 1999; Barro, 2000; Figini, 1999).

As income inequality is increasing, poor people may be in pursuit of higher education because they have an opportunity to get a credit. However, when credit markets are imperfect, the opportunity to borrow some money decreases. Since poor people cannot borrow the means, they cannot be in pursuit of higher education. Thus, increasing income inequality reduces the level of education, i.e. decreases the accumulated human capital; and decreasing human capital slows down economic growth (Albig et al., 2017; Gründler, Scheuermeyer, 2014; Castells-Quintana, Royuela, 2014; Neves, Silva, 2014; Marrero, Rodriguez, 2012; Susanu, 2012; Nissanke, Thorbecke, 2005; Panizza, 1999).

As it was mentioned earlier, the increasing level of education may stimulate the technological progress and economic growth (Stiglitz, 2016; Agénor, Canuto, 2013; Galor, Moav, 2002; Gordon, 2012). However, according to D. de la Croix, M. Doepke (2001), the increase of income inequality increases the number of individuals who cannot obtain higher education, i.e. this reduces human capital; and decreasing human capital slows down economic growth. Therefore, one of the reasons that can determine the opposite correlation between income inequality and economic growth may be the decrease of human capital which slows down economic growth (Forbes, 2000).

On the ground of the performed analysis of scientific literature, it is obvious that the higher education is held by an individual, the higher salary one may get (Guvenen, Kuruscu, Ozkan, 2014; Azevedo, Inchaust, Sanfelice et al., 2013). However, as it was already mentioned, the level of education as one of indicators

of human capital may depend on the *credit market*. In other words, possibilities for households to reach for higher education may be diminished by credit-market imperfections (Barro, 2000).

J. E. Stiglitz (2016), R. J. Barro (2000), P. Figini (1999) called *the credit-market imperfections channel* the *capital market imperfections channel*, H. Albig (2017) called it the *human capital channel*. U. Panizza (1999) presented the *saving channel* and the *credit-market imperfections channel* as one transmission channel. The author called this transmission channel *the imperfect capital markets and investment channel*.

The socio-political unrest channel is another transmission channel through which income inequality makes an impact on economic growth. The socio-political unrest increases uncertainty which makes a negative impact on various economic decisions, e.g. accumulation of physical capital, saving rate. Income inequality makes a negative impact on political stability. Therefore, *political instability* may be one of the variables reflecting the impact of income inequality on economic growth through the socio-political unrest channel (Susanu, 2012; Nissanke, Thorbecke, 2005). Political instability increases political uncertainty which reduces investment in human or physical capital, reduces the saving rate. Therefore, while increasing political instability, income inequality slows down economic growth (Sbaouelgi, Boulila, 2016; Gründler, Scheuermeyer, 2014; Castells-Quintana, Royuela, 2014; etc.).

The impact of income inequality on economic growth that manifests through the socio-political unrest channel may also be assessed by regarding the transmission channel reflecting another variable – the rule of law index. In other words, income inequality determines lower protection of property rights (Susanu, 2012; Nissanke, Thorbecke, 2005; Figini, 1999).

Income inequality makes an impact on economic growth also through the ***fiscal policy channel*** because of the income distribution policy. It may occur that increasing taxes on physical capital can diminish not only the level of income inequality but economic growth, too (Biswas, Chakraborty, Hai, 2017; Alesina, Rodrik, 1994). As it was mentioned earlier, an increasing level of income inequality increases the saving rate (Peters, Volwahsen, 2017; Biswas, Chakraborty, Hai, 2017; Guvenen, Kuruscu, Ozkan, 2014; Barro, 2000). However, increasing taxes may diminish the saving rate (Arjona, Ladaique, Pearson, 2003), volume of investment (Markey-Towler, Foster, 2013; Susanu, 2012; Barro, 2000; Okun, 1975) and economic growth (Biswas, Chakraborty, Hai, 2017; Malinen, 2008; Arjona, Ladaique, Pearson, 2003). Therefore, after increasing the tax tariff for the population obtaining higher income, the level of income inequality may decline and economic growth may slow down (Biswas, Chakraborty, Hai, 2017; Charles-Coll, 2013, 2012, 2010; Alvaredo et al., 2013; Alesina, Rodrik, 1994). F. Alvaredo et al. (2013) maintains that reduction of tax tariffs for relatively wealthier population may stimulate the increase of salaries for the working population; therefore, a sum of tax return may increase.

J. A. Charles-Coll (2012) underlines that the tax system comprises both tax revenue and expenditure. According to the author, the tax distribution system being implemented may make an ambiguous impact on economic growth. J. A. Charles-Coll (2012) has it that in some countries it is more difficult to diminish the level of income inequality than in others, i.e. more endeavours should be put to achieve that income redistribution would reduce the level of income inequality. The author has it that in a country where the efficiency of redistribution declines and the tax system is underdeveloped there is relatively low tax revenue because tax payment is avoided and economics is officially less accounted.

Even though A. Alesina, D. Rodrik (1994) have it that government promotes economic growth by imposing taxes on capital income and distributing expenses, still A. Charles-Coll (2010) underlines that economic growth may be limited not only by an existing relatively *higher* level of income inequality and lower income distribution, but also a relatively *lower* level of income inequality and higher redistribution of income. In both cases accumulation of physical capital may be limited, investment and human capital may be reduced. Therefore, when performing the policy of redistribution of income, decrease of income inequality may make a different impact on economic growth. Also, there may be no correlation between decrease of the income taxes for the wealthiest population and growth of the real GDP per capita (Alvaredo et al., 2013).

A different impact of taxes on economic growth may also depend on *different levels* of income inequality and income redistribution. J. A. Charles-Coll (2012) analysed the correlation of the level of income inequality, income redistribution and economic growth. This correlation means that the level of income inequality should be minimised and economic growth should be maximised. Such level of income inequality is called the optimal rate of inequality *optimal rate of inequality (ORI*) (Charles-Coll, 2010). At an optimal level of income inequality present, any change of income inequality will slow down economic growth independently from whether it will increase or decrease (Charles-Coll, 2012, 2010; Hasanov, Izraeli, 2011; Banerjee, Duflo, 2003).

Thus, regarding the level of income inequality, the government carries out the policy of income distribution. Therefore, we can state that increasing income inequality may determine governmental decisions to increase taxes for the wealthy population and distribute income among the poor population (Castells-Quintana, Royuela, 2014; Neves, Silva, 2014; Susanu, 2012; Malinen, 2009; Nissanke, Thorbecke, 2005; Barro, 2000; Figini, 1999).

However, the impact of income inequality on economic growth through the fiscal politics channel may be different (Gründler, Scheuermeyer, 2014). First, increasing taxes may decrease income among the wealthy population. When income decreases, wealthy population may reduce their investment, and reduced investment slows down economic growth (Gründler, Scheuermeyer, 2014; Castells-Quintana, Royuela, 2014; Neves, Silva, 2014; Markey-Towler, Foster, 2013; Halter, Oechslin, Zweimüller, 2013; Charles-Coll, 2013; Susanu, 2012; Nissanke, Thorbecke, 2005; Panizza, 1999; Figini, 1999). Second, increasing expenditure of government

stimulate economic growth (Gründler, Scheuermeyer, 2014; Neves, Silva, 2014; Barro, 2000; Panizza, 1999, Figini, 1999).

T. Malinen (2009), R. J. Barro (2000), P. Figini (1999) called the *fiscal policy channel* as *the political economics channel.* Even though every channel of the impact of income inequality on economic growth may have several titles, the current Dissertation employs the following titles: *the saving channel, the credit-market imperfections channel, the socio-political unrest channel* and *the fiscal policy channel*.

The impact of income inequality on economic growth in the theoretical aspect only is ambiguous because without conducting empirical research it is not clear whether income inequality through different impact channels will stimulate or slow down economic growth. Further, the Dissertation presents the methods of empirical research.

DESIGN OF THE MODEL FOR ASSESSMENT OF THE IMPACT OF INCOME INEQUALITY ON ECONOMIC GROWTH AND SUBSTANTIATION OF RESEARCH METHODS

Further, the model designed to assess the impact of income inequality on economic growth is presented.

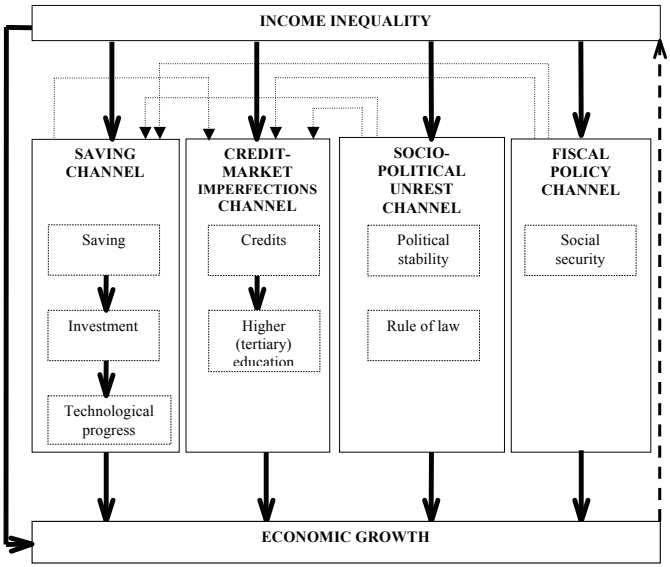

Fig. 2.1. The model for assessment of the impact of income inequality on economic growth

Fig. 2.1 depicts the model comprising four transmission channels of the impact of income inequality on economic growth: the saving channel, the credit-market imperfection channel, the socio-political unrest channel and the fiscal policy channel.

The channels of transmission of the impact of income inequality on economic growth are reflected by the variables. The saving channel is reflected by saving, investment, technological progress. The credit-market imperfections channel is reflected by credits and higher (tertiary) education. The socio-political unrest channel is reflected by political stability and the rule of law. The fiscal policy channel is reflected by social security. The variables reflecting the mentioned transmission channels are presented and described further in the equations of econometric analysis.

The model presented in Fig. 2.1 differs from the models proposed by the authors investigated in the theoretical part in fours aspects. First, the authors use different variables in their conducted empirical research. Second, aiming to assess whether the impact of income inequality on economic growth differs in groups of countries attributed with different levels of income inequality and different levels of income per capita, the research has been conducted after dividing the countries to four groups. Third, the impact of income inequality on economic growth is investigated by using correlations between indicators approximating income inequality and indicators reflecting transmission channels. Fourth, different models singling out the variables reflecting transmission channels are designed.

As demonstrated in the model in Fig. 2.1, continuous arrows depict the impact of income inequality on economic growth through the four transmission channels. Dash lines depict feedback, i.e. the impact of economic growth on income inequality. However, the current research dissociates from assessment of the impact of economic growth on income inequality.

Not only may the impact of income inequality on economic growth through the four transmission channels occur, but also the interaction among the transmission channels. For instance, the variables reflecting the socio-political unrest and the fiscal policy channel may make impact on the variables which reflect the saving channel and the credit-market imperfections channel. However, the Dissertation also dissociates from the mutual interaction of transmission channels. The impact of the variables reflecting the socio-political unrest and fiscal policy channels on variables of the saving and credit-market unrest channels is depicted by dotted lines.

Even though continuous lines show the impact of income inequality on economic growth, still the arrows do not show what impact of income inequality through each transmission channel, i.e. negative or positive, may be made on economic growth.

When grounding the period of research selected for the Dissertation, it should be noted that various authors (Gründler, Scheuermeyer, 2014; Castells-Quintana, Royuela, 2014; Brzeziński, 2013) usually employed the data of three–five decades in their investigations on the impact of income inequality on economic growth. In their research, T. Persson, G. Tabellini (1991) used the data of the period covering 1830–1995, and F. Guvenen, B. Kuruscu, S. Ozkan (2014) referred to the data of 1980–

2003. In their research, performing assessment of the impact of income inequality on economic growth, J. P. Azevedo, G. Inchaust, V. Sanfelice (2013) used the data of two years, i.e. 2000 and 2010, to calculate the change of income inequality. The research period covered from 10 to 165 years in the investigations conducted by the mentioned authors.

Selection of the research period in the Dissertation is based on the empirical research involving the period of 1995–2014 due to the lack of data. Nevertheless, such period will allow achieving the set aim of the research.

The current Dissertation involves a sample of twenty-eight member-states of the European Union. European states became members of the European Union in different periods, i.e. throughout 1958–2013. The EU internal market is the common market where free movement of goods, services, capital and people is ensured and where citizens can freely live, work, study and do business (EUR-Lex, 2016).

The groups of states can be made by the countries that are divided according to income, geographical location; however, some authors investigated groups of states comprising a community. For instance, A. Alesina, D. Rodrik (1994) in their research used the data of 35 OECD states. The current research work has selected a community (whose former title was the *European Community*), i.e. the European Union.

In 1993, the EU common market opened to competition, created new work places and diminished many obstacles limiting trade (EUR-Lex, 2016). Since the common market exists, different groups of the states may have a different impact of income inequality on economic growth set. Therefore, this will allow testing the theoretical model proposed in this research work. The research is being conducted on the ground of the data provided by the European Union statistical service "Eurostat" and the World Bank.

The purpose of grouping is to estimate the impact of income inequality on economic growth in the states where different levels of income inequality and income per capita are observed. Not only the level of income inequality differs, but also the tendencies of change do. The impact of income inequality on economic growth may also be different, too.

For instance, some authors (Brzeziński, 2013; Hasanov, Izraeli, 2011; Atkinson, Rainwater, Smeeding, 1994) analysing the impact of income inequality on economic growth conducted their research after grouping countries according to the level of income inequality; other authors (Gründler, Scheuermeyer, 2014; Jaumotte, Lall, Papageorgiou, 2013; Herzer, Vollmer, 2012; Malinen, 2009, 2008; Barro, 2000; Forbes, 2000) carried out their research after grouping countries according to the level of country's development. Research works by mentioned authors found out different varieties of the impact of income inequality on economic growth. The impact could differ depending on the level of income inequality in a particular country and the level of income per capita. Moreover, scientists employed data of different periods and different research methods.

Thus, the research can be carried out after dividing countries according to income inequality inside and among countries, i.e. according to income per capita,

too. In the current Dissertation, the countries are grouped on the ground of research conducted by a number of authors (Castells-Quintana, Royuela, 2014; Gründler, Scheuermeyer, 2014; Jaumotte, Lall, Papageorgiou, 2013; etc.).

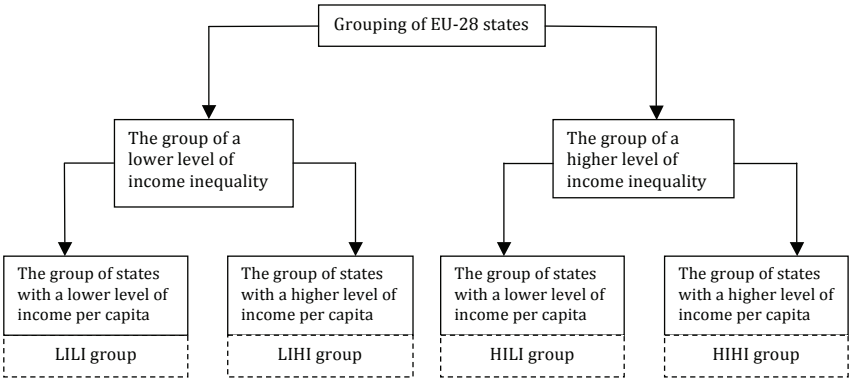

Fig. 2.2. Groups of the countries according to the level of income inequality and the level of income per capita

The first group of countries is LILI (see Fig. 2.2); it is characteristic of a lower level of income inequality and a lower level of income per capita. The second group of countries is LIHI; it is also characteristic of a lower level of income inequality but differs by a higher level of income per capita. Other groups of countries, i.e. HILI and HIHI, are characteristic of a higher level of income inequality. However, the group of countries HILI is characteristic of a higher level of income per capita, and the group HIHI is characteristic of a higher level of income per capita.

Aiming at reliability of obtained results in assessment of the impact of income inequality on economic growth, four indices of income inequality are used: Gini coefficient (Gini), decile ratio (Dec_ratio), the first decile (D1) and the tenth decile (D10). The indicators are calculated according to the purchase power standard (PPS). The Gini coefficient, the decile ratio, the first and tenth deciles were selected for this research work because, as mentioned earlier, each of them has advantages and disadvantages, also because they are the indicators of income inequality most frequently used by various authors in their research (Sbaouelgi, Boulila, 2016; Chen, 2003; Barro, 1991; etc.).

Grounding on the Gini coefficient that poorly reflects differences of income distribution in the top and bottom corners, the empirical research employs the decile ratio, too. The first and tenth deciles show the parts of income allocated to the poorest and wealthiest strata of the population. By assessing the impact of income inequality on economic growth, it is aimed at estimation whether results of the impact of income

inequality on economic growth differ when using different variables approximating income inequality. By using the Gini coefficient, the decile ratio, the tenth decile, results of the impact should not differ because when the Gini coefficient, the decile ratio and the tenth decile increase, income inequality increase. However, increase of the first decile shows decrease of income inequality. Used indicators approximating income inequality are taken from the data base of the European Union's statistical service "Eurostat".

Such indices approximating income inequality as the Theil index, the Atkinson index, Hoover coefficient have not been selected because it is difficult to interpret them and they are seldom used to perform analysis of income inequality (Zabarauskaitė, Blažienė, 2012).

Structural coefficients of measurement of the inequality, i.e. quartile variation coefficient, quartile skewness coefficient, are also commonly used. Advantages of structural coefficients mean that they are easily understood and calculated, also are not influenced by inflation. However, their disadvantage means that they do not assess the weight of observed values, requires detailed individual data, there is nothing to compare with, also it is not clear what is the acceptable level of an indicator (Čiulevičius, Čiulevičienė, 2008).

In general, economic growth is the increase of the gross domestic product; therefore, various authors (Brueckner, Lederman, 2015; Castells-Quintana, Royuela, 2014; Brzeziński, 2013; Charles-Coll, 2012, 2010; Hasanov, Izraeli, 2011; Malinen, 2009, 2008; Partridge, 2005; Nahum, 2005; De la Croix, Doepke, 2001; Barro, 2000; Forbes, 2000; Li, Zou, 1998; Alesina, Rodrik, 1994; Persson, Tabellini, 1991), assessing the impact of income inequality on economic growth, used real GDP per capita.

When assessing the impact of income inequality on economic growth in the groups of countries, the dependent variable of real GDP per capita in PPS is used (Brueckner, Lederman, 2015; Azevedo, Inchaust, Sanfelice, 2013; Milanovic, 2010; Almås, 2010).

To reflect economic growth, the empirical research employs the index of the real GDP per capita (in euros) in PPS (Charles-Coll, 2012; Hasanov, Izraeli, 2011; Malinen, 2009, 2008; Banerjee, Duflo, 2003; Barro, 2000; De la Croix, Doepke, 2001).

Table 2.1

The transmission channels of the impact of income inequality on economic growth and the variables reflecting the transmission channels

Transmission channels	Marking	Indicators	Measurement units	Data source
1	2	3	4	5
Saving channel	Svng	Gross saving rate	Percentage from the GDP	"Eurostat"
	Invs	Gross fixed capital formation per capita	Euros in the PPS. Absolute values	"Eurostat"
	R&D	Research and development expenditure per capita	Euros in the PGS, prices of 2005	"Eurostat"
Credit-market imperfections channel	Crdt	Level of the private sector credits	Percentage from the GDP	The World Bank
	Educ_tert	Higher (tertiary) education	Percentage of the population who gained tertiary education	"Eurostat"
Socio-political unrest channel	Polit_stabil	Index of political stability and absence of violence	Index from –2.5 to 2.5	The World Bank; Kaufmann, Kraay, 2016
	Rl	Index of the rule of law	Index from –2.5 to 2.5	The World Bank; Kaufmann, Kraay, 2016
Fiscal policy channel	Soc_prot	Social protection benefits per capita	Euros in PPS. Absolute values	"Eurostat"

Source: designed by the author of the Dissertation referring to: Gründler, Scheuermeyer (2014), Charles-Coll (2013, 2012), Herzer, Vollmer (2012) etc.

As demonstrated in Table 2.1, aiming to assess the impact of income inequality on economic growth through the saving channel, three indicators reflecting the impact of income inequality on economic growth through the saving channel are used. These are the gross saving rate, gross fixed capital formation and research and development (R&D) expenditure of the business enterprise sector.

The gross saving rate is expressed in the percentage of the gross domestic product (GDP) (Neves, Silva, 2014). Investment is reflected by the volume of investment. In other words, the data of gross fixed capital formation per capita is used (Sbaouelgi, Boulila, 2016; Gründler, Scheuermeyer, 2014; Herzer, Vollmer, 2012; Charles-Coll, 2012, 2010; Partridge, 2005; Li, Zou, 1998). In the current research work, technological progress is reflected by research and development expenditure of business enterprises per capita in PPS at constant 2005 prices (Neves, Silva, 2014; Nissanke, Thorbecke, 2005).

In the current Dissertation research, assessment of the impact of income inequality on economic growth through the credit-market imperfections channel employed two indicators to reflect the impact. The first indicator is the ratio of credit to the private sector shows the ratio of credits granted by financial institutions to the private sector. The ratio of credit to the private sector is presented in GDP percentage (Jaumotte, Lall, Papageorgiou, 2013). Since the data bases have no indicator to show the amount of credits granted to the poorest population, the current paper uses the ratio of credit to the private sector, which demonstrates the overall amount of credits granted to the private sector (Gründler, Scheuermeyer, 2014). The second indicator is the education attainment level. It is measured by percentage of population at the age 25–64 who gained higher (tertiary) education (Hartmann et al., 2017; Marrero, Rodriguez, 2012; Barro, 2000; Panizza, 1999; Persson, Tabellini, 1991). The indicator of educational attainment level shows the percentage of population who gained higher (tertiary) education, i.e. Bachelor's, Master's and Doctoral Degrees.

Analysing the impact of income inequality on economic growth, F. Hasanov, O. Izraeli (2011) used the index of education. The gained education was measured by a part of individuals at the age of 25 and above. These were individuals who graduated either from a university or a college. F. Hasanov, O. Izraeli (2011) applied the percentage expression, i.e. what part of population gained higher (tertiary) education. M. D. Partridge (2005) investigated two groups of population, i.e. those holding higher (tertiary) education and not holding higher (tertiary) education.

Aiming to assess the impact of income inequality on economic growth through the socio-political unrest channel, two indicators are used. These are the *political stability and absence of violence index* (Gründler, Scheuermeyer, 2014) as well as the *rule of law index* (Kaufmann, Kraay, 2016; Park, Mercado, 2015; Gründler, Scheuermeyer, 2014; Banerjee, Duflo, 2003; Barro, 2000).

D. Kaufmann, A. Kraay (2015) published the worldwide governance indicators, also the indicators of the two mentioned institutional variables. The mentioned authors presented indicators of 214 countries, calculated on the ground of the data from 31 sources. The political stability and absence of violence index demonstrates the measure of political instability and (or) probability of political violence. This index also shows the conditions for business activities.

The rule of law index shows the extent of trust in public attitudes of economy subjects and how society maintains the attitudes concerning protection of property rights, compliance with contracts. Values of both presented indicators range between –2.5 and 2.5. The higher is the value, the stronger is the governance performance.

Aiming to assess the impact of income inequality on economic growth through the fiscal policy channel, one indicator, i.e. social protection benefits per capita in PPS, is used (Arjona, Ladaique, Pearson, 2003). Investigating the impact of income inequality through the fiscal policy channel, K. Gründler, P. Scheuermeyer (2014), J. P. Azevedo, G. Inchaust, V. Sanfelice (2013), T. Malinen (2008) used gross expenditure benefits, government expenditure on social protection benefits.

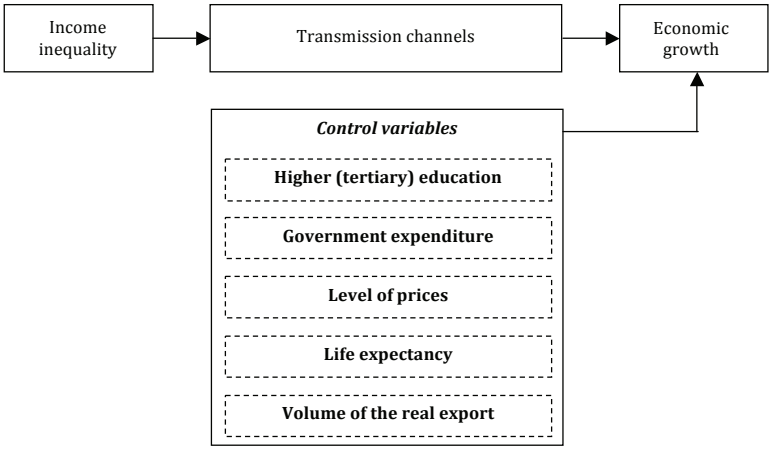

Fig. 2.3. Control variables used in assessment of the impact of income inequality on economic growth

Source: designed by the author of the Dissertation referring to: Gründler, Scheuermeyer (2014), Herzer, Vollmer (2012), Charles-Coll (2013, 2012) etc.

Aiming to avoid the impact of analysed variables on the investigated phenomenon, each designed econometric model in the current Dissertation employs control variables (see Fig 2.3). The first control variable is the already mentioned indicator of tertiary education (Educ_tert) (Charles-Coll, 2012, 2010; Nahum, 2005; Panizza, 1999). According to R. J. Barro (2000), the stimulating impact of the human capital on economic growth can be assessed according to the level of secondary and higher (tertiary) education.

The second control variable is the *government* final consumption *expenditure* (Gov) per capita in PPS. This indicator means that increasing government expenditure promotes economic growth; however, it can eliminate private investment and reduce economic growth (Gründler, Scheuermeyer, 2014; Malinen, 2008; Banerjee, Duflo, 2003; De la Croix, Doepke, 2001; Barro, 2000). This indicator is used as an absolute value.

The third control variable is the production price index (implicit deflator), i.e. GDP deflator (PI) (Sacerdote, 2017; Gründler, Scheuermeyer, 2014; Castells-Quintana, Royuela, 2014; Матыцин, 2011; Chen, 2003; Barro, 2000; Bernanke, Gertler, 2000; Tanzi, 1976). The price index is the indicator demonstrating the macroeconomic stability.

The fourth control variable is the indicator expressing health – *the life expectancy* (Life_exp) (Gründler, Scheuermeyer, 2014; Castells-Quintana, Royuela, 2014). Better health awards people with the opportunity for longer and harder work, i.e. increases efficiency of performance. The increasing performance efficiency stimulates economic growth. L. Mishel (2012) investigated the impact of salary

income inequality on economic growth by using the indicators of performance efficiency, capital income.

The fifth control variable is the indicator of openness of trade, i.e. *exports* of goods and services, chain linked volumes (2010), million euro (Expr) (Gründler, Scheuermeyer, 2014). The increase of export means the increasing GDP (Aisen, Veiga, 2010). This indicator is used as an absolute value.

Aiming to assess the impact of income inequality on economic growth through the transmission channels and the indicators reflecting them, the following hypotheses of the Dissertation have been formulated. Moreover, each formulated hypothesis has the procedures of testing it.

H_1: The change of income inequality makes a different impact on economic growth in groups of the countries attributed with a different level of income inequality and a different level of income per capita.

Results of the empirical research carried out by other scientists show that a direct impact of income inequality on economic growth in different countries or their groups differs depending on the rate of income inequality and the rate of income per capita. Therefore, the empirical part investigates the impact of income inequality on economic growth in groups of EU countries.

The procedure of testing the hypothesis. The first hypothesis is tested by assessing the impact of variables approximating income inequality on economic growth. The impact is assessed in different groups of countries. The direct correlation between the variables reflecting income inequality and real GDP per capita shows a positive impact of income inequality on economic growth. The reverse correlation between the mentioned variables and real GDP per capita shows a negative impact of income inequality on economic growth. The first hypothesis will be accepted if, having implemented all models, some groups of countries are attributed with a direct correlation, other groups of countries with a negative or insignificant correlation between the variables reflecting income inequality and real GDP per capita. If all groups of countries have no differences of the impact, the hypotheses will be rejected.

H_2: The increase of income inequality promotes economic growth through the saving channel in the group of the countries attributed with a relatively higher level of income inequality and a relatively higher level of income per capita.

On the ground of the results of theoretical research conducted by scientists, increase of income inequality stimulates economic growth through the saving channel; however, the results of empirical research carried out by scientists are ambiguous. In this case, the testing of the hypothesis has selected the group of countries where the level of income inequality is relatively higher and the level of income per capita is higher. This will allow estimating if, in terms of the impact of income inequality on economic growth through the saving channel, there is a significant and direct correlation between a higher level of income inequality and a higher level of income per capita.

The procedure of testing the hypothesis. The second hypothesis is tested by assessing the impact of interaction between two variables of the model, i.e. between the variable approximating the income inequality and the variable reflecting the

saving channel, on economic growth. The impact is assessed by investigating the group of the countries with a higher level of income inequality and a higher level of income per capita. The second hypothesis will be accepted if, having implemented all models of the saving channel, the surveyed group of the countries has a direct relation between the mentioned correlation and the real GDP per capita in at least one case. If in all cases there are no differences in the impact of the correlation between income inequality and the variables reflecting the saving channel on economic growth or the impact is insignificant, the hypothesis will be rejected.

H_3: The increase of income inequality slows down economic growth through the credit-market imperfections channel in the group of the countries attributed with a relatively higher level of income inequality and a relatively lower level of income per capita.

The theoretical part of the Dissertation paper deals with the results of research works conducted by scientists and finds that the increase of income inequality slows down economic growth through the credit-market imperfections channel. In this case, an assumption is drawn that an increasing income inequality slows down economic growth. Therefore, the testing of the hypothesis selected the group of the countries where the level of income inequality is higher and the level of income per capita is lower. This will enable estimation of whether assessment of the impact of income inequality on economic growth through the credit-market imperfections channel is significant and the correlation between a higher level of income inequality and a lower level of income per capita is reverse.

The procedure of testing the hypothesis. The third hypothesis is tested by assessing the impact of interaction of two variables of the model, i.e. the variable approximating income inequality and the variable reflecting the credit-market imperfections channel, on economic growth. The impact is assessed by investigation of the group of countries of a relatively higher level of income inequality and a relatively lower level of income per capita. The third hypothesis will be accepted if, having implemented all models of the credit-market imperfection channel, the surveyed group of countries has an estimated reverse correlation between the mentioned interaction and the real GDP per capita in one case at least.

H_4: The increase of income of the wealthiest layer of individuals through transmission channels slows down economic growth. With regard to different results obtained by various scientists, it can be stated that an increasing impact of income inequality on economic growth is ambiguous; therefore, the testing of the hypothesis will allow estimation of whether the increase of the part of income of the wealthiest population slows down economic growth.

The procedure of testing the hypothesis. The fourth hypothesis is tested by assessing the impact of interaction of two variables of the model, i.e. the variable approximating income inequality, the tenth decile, and the variable reflecting the channel, on economic growth. The impact is assessed by investigating different groups of the countries. The fourth hypothesis will be accepted if, having implemented all models, a reverse correlation between the mentioned interaction and the real GDP per capita is estimated in all cases. If at least in one case of the

impact of income of the wealthiest population on economic growth is found or the impact is insignificant, the hypothesis will be rejected.

The impact of income inequality on economic growth through different transmission channels is assessed in three stages.

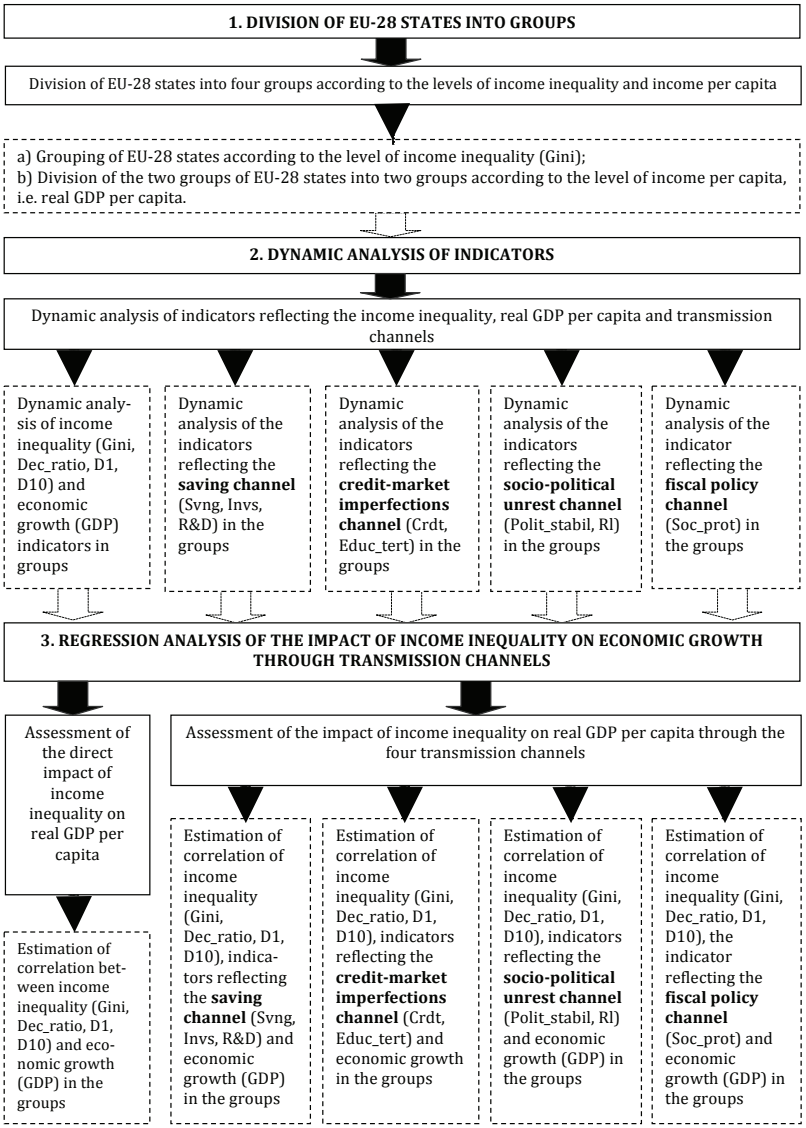

Fig. 2.4. Stages of the empirical research

Aiming to assess the impact of income inequality on economic growth in countries attributed with different levels of income inequality and development, EU-28 states are divided into four groups according to the level of income inequality level and the income per capita level. Having calculated average Gini coefficients of each country, the mean of all average values of the Gini coefficient of all the countries has been found.

After division of the countries into two groups, the first group includes the countries with Gini coefficient averages which are lower than the mean. The second group comprises the countries with Gini coefficient averages which are higher than the mean.

Both groups of the countries are additionally divided into the groups in terms of the average values of the real GDP per capita. Having calculated the average real GDP per capita for each country, the mean of average values of the real GDP per capita has been estimated. Then, the countries are grouped into four groups. As mentioned earlier, the countries have been grouped according to different levels of income inequality and income per capita (see Fig. 2.2).

After division of EU-28 states to the four groups, the second stage of the empirical research (see Fig. 2.4) carried out the dynamic analysis of the indicators approximating income inequality and economic growth. Aiming to test the formulated hypotheses in the groups of different levels of income inequality and income per capita, dynamic analysis of the Gini coefficient, decile correlation, the first decile, the tenth decile and real GDP per capita in PPS in all four groups has been conducted.

When performing dynamic analysis of the indicators reflecting the channels, the average values of the indicators reflecting transmission channels have been found:

1. Three indicators reflecting the saving channel, i.e. the savings rate, gross fixed capital formation and expenditure on R&D of business enterprises;
2. Indicators reflecting the credit-market imperfections channel, the rate of private sector credits and part of the population attaining higher (tertiary) education;
3. Indicators reflecting the socio-political unrest channel, i.e. political instability and absence of violence as well as the rule of law;
4. The indicator reflecting the fiscal policy channel, expenditure on social protection benefits.

When performing dynamic analysis, data characteristics have been compared, minimal and maximal values of the data under analysis, the change and standard deviation have been calculated. As F. Hasanovo, O. Izraeli (2011), A. V. Banerjee, E. Duflo (2003) have it, independently from whether income inequality is increasing or decreasing, it slows down economic growth. In other words, the more stable is the rate of income inequality, the higher is economic growth. The standard deviation demonstrates the dispersion of the obtained random size values around the mean. The empirical part compares characteristics of all used data.

In the third stage, the regression analysis of the impact of income inequality on economic growth through the four transmission channels was conducted. This

analysis was carried out by using the panel data (Gründler, Scheuermeyer, 2014; Castells-Quintana, Royuela, 2014; Guvenen, Kuruscu, Ozkan, 2014).

The time series data provides information on the change of indicators over time, the cross-section data provides information on the condition of indicators at a given moment and the panel data merges both panel and cross-section data, thus allowing assessment of the change of indicators for groups of EU-28 states at a given period of time (Stock, Watson, 2007). In other words, the panel data provides more information than cross-section and time series data. Also, by employing the panel data, variation both in time and among groups can be investigated.

One of the drawbacks of the panel data is that skewed and improper estimations of measurement errors occur, also that there is dependence on the cross-section data (Baltagi, 2005; Gujarati, 2004).

The use of panel data in performance of econometric analysis is required because the conducted regression analysis shows the impact of income inequality on economic growth in separate groups of countries. Investigation of the impact of income inequality on economic growth is implemented by employing *Office* package *Excel* program and open code software package *Gretl* designed for econometric analysis using the panel data.

Referring to the research works conducted by a number of authors (Gründler, Scheuermeyer, 2014; Castells-Quintana, Royuela, 2014; Azevedo, Inchaust, Sanfelice, 2014; etc.), aiming to assess the impact of income inequality on economic growth, various methods are employed: the ordinary least squares method, the two-stage least squares method, the three-stage least squares method, the fixed effect method, the random effect method etc. With regard to the fact that the mentioned authors usually used the least squares method in their research, this method is used in the current empirical research, too. The least squares method also is the most suitable because of a short time line.

Aiming to ensure validity of the research results, the testing whether the implemented model is not attributed with heteroscedasticity, autocorrelation and multicollinearity will be conducted. First, if errors of the models realised by the ordinary least squares method are characteristic of heteroscedasticity, i.e. the hypothesis concerning homoscedasticity of errors is rejected, the values of the model of investigated impact channels are calculated by using the regression of robust standard errors (HAC). The hypothesis on homoscedasticity of errors is rejected, if $p < 0.05$. The White's heteroscedasticity test checks whether the designed model has no heteroscedasticity. Second, it is tested whether the implemented model is not characteristic of autocorrelation. Autocorrelation is fixed due to inertia of the investigated phenomenon. The testing of heteroscedasticity, autocorrelation and multicollinearity is performed in all models implemented in the Dissertation.

Since the multiple regression equations are formed, the adjusted determination coefficient R^2 is used. The adjusted determination coefficient shows what percentage of the change of the dependent variable is impacted by the change of independent variables included in the model.

Additionally, other statistical characteristics of coefficients are assessed. The size of standard errors, i.e. standard deviations, shows reliability of assessed coefficients. The higher is the size, the lower is reliability. The *t*-value is presented to all parameters and shows significance of a variable. The *p*-value shows that at a selected significance level a coefficient for a variable can be equal to zero. This means that the values comply with the hypothesis stating that the coefficient is equal to zero, when *p*-value is higher than a selected significance level (Tamašauskienė et al., 2016).

Since the regression analysis was performed by employing software packages, t and F statistics will be calculated automatically. Acceptability of t and F statistics will be reflected in p-values, i.e. when $p < 0.05$, research results are considered as reliable.

Significance of investigated variables is estimated according to the significance levels at 99.0 per cent, 95.0 per cent and 90.0 per cent. The highest significance, i.e. the significance level at 99.0 per cent, is marked with three stars. Two stars mark the significance level at 95.0 per cent. One star marks the significance level at 90.0 per cent. This marking is applied to the results of all regression models realised in the Dissertation.

The data used in all models is logarithmised. The logarithmising of the data is required to transform analysed dependences to linear ones because in cases of investigation of economic phenomena the dependences are usually not linear. Moreover, the data is differentiated, i.e. annual changes of all variables are calculated; therefore, obtained results are interpreted as elasticity coefficients (Tamašauskienė et al., 2016).

First, the direct impact of income inequality on economic growth is assessed. Like in cases of other models, when designing the model of the direct impact of income inequality on economic growth, an equation formed by the ordinary least squares (OLS) method is used (Malinen, 2009). The principle of this method is the selection of such a line to obtain that the sum of squared deviations would be the least (Tamašauskienė et al., 2016):

$$\Delta\ln(gdp_{i,t})=\alpha+td_3 1997+...+td_{20}2014+\beta_1\Delta\ln(Ineq_{i,t})+\beta_2\Delta\ln(Ineq_{i,t})\cdot LIHI+$$
$$+\beta_3\Delta\ln(Ineq_{i,t})\cdot HILI+\beta_4\Delta\ln(Ineq_{i,t})\cdot HIHI+c_1\Delta\ln(Educ\_tert_{i,t})+c_2\Delta\ln(Gov_{i,t})+$$
$$+c_3\Delta\ln(PI_{i,t})+c_4\Delta\ln(Life\_exp_{i,t})+c_5\Delta\ln(Expr_{i,t})+u_{i,t}; \qquad (2.1)$$

here $gdp_{i,t}$ – real GDP (in PPS) per capita in *i* country at *t* time period; α – constant; td_t – time variables absorbing the impact of time on research results (time dummies); β – coefficients reflecting the impact of an independent factor on a dependent variable, they are interpreted as elasticity coefficients; Δ – change; *ln* – logarithm; $Ineq_{i,t}$ – indicator approximating income inequality in *i* country at *t* time period; $Educ\_tert_{i,t}$ – percentage of the population attaining higher (tertiary) education in *i* country at *t* time period; $Gov_{i,t}$ – government expenditure in *i* country at *t* time period; $PI_{i,t}$ – price index in *i* country at *t* time period; $Life\_exp_{i,t}$ – life expectancy in *i* country at *t* time period; $Expr_{i,t}$ – volume of export in *i* country at *t* time period; $u_{i,t}$ – model error.

The indicator approximating income inequality in *i* country at *t* time period will differ in interactions indicated by the coefficients β_1, β_2, β_3 and β_4 in different groups of countries. Further, the impact of income inequality on economic growth through the **saving** channel is assessed.

A variant of the model, when implementing the impact of income inequality on economic growth through the saving channel as reflected by the saving rate:

$$\Delta\ln(gdp_{i,t})=\alpha+td_3 1997+...+td_{20}2014+\beta_1\Delta\ln(Ineq_{i,t})+\beta_2\Delta\ln(Svng_{i,t})+$$
$$+\beta_3\Delta\ln(Invs_{i,t})+\beta_4\Delta\ln(R\&D_{i,t})+\beta_5\Delta\ln(Ineq_{i,t})\cdot LIHI+$$
$$+\beta_6\Delta\ln(Ineq_{i,t})\cdot HILI+\beta_7\Delta\ln(Ineq_{i,t})\cdot HIHI+\beta_8\Delta\ln(Ineq_{i,t})\cdot\Delta\ln(Svng_{i,t})+$$
$$+\beta_9\Delta\ln(Ineq_{i,t})\cdot\Delta\ln(Svng_{i,t})\cdot LIHI+\beta_{10}\Delta\ln(Ineq_{i,t})\cdot\Delta\ln(Svng_{i,t})\cdot HILI+$$
$$+\beta_{11}\Delta\ln(Ineq_{i,t})\cdot\Delta\ln(Svng_{i,t})\cdot HIHI+c_1\Delta\ln(Educ\_tert_{i,t})+c_2\Delta\ln(Gov_{i,t})+$$
$$+c_3\Delta\ln(PI_{i,t})+c_4\Delta\ln(Life\_exp_{i,t})+c_5\Delta\ln(Expr_{i,t})+u_{i,t}. \qquad (2.2)$$

A variant of the model, when implementing the impact of income inequality on economic growth through saving channel as reflected by the volume of investment:

$$\Delta\ln(gdp_{i,t})=\alpha+td_3 1997+...+td_{20}2014+\beta_1\Delta\ln(Ineq_{i,t})+\beta_2\Delta\ln(Svng_{i,t})+$$
$$+\beta_3\Delta\ln(Invs_{i,t}) +\beta_4\Delta\ln(R\&D_{i,t})+\beta_5\Delta\ln(Ineq_{i,t})\cdot LIHI+\beta_6\Delta\ln(Ineq_{i,t})\cdot HILI+$$
$$+\beta_7\Delta\ln(Ineq_{i,t})\cdot HIHI+\beta_8\Delta\ln(Ineq_{i,t})\cdot\Delta\ln(Invs_{i,t})+$$
$$+\beta_9\Delta\ln(Ineq_{i,t})\cdot\Delta\ln(Invs_{i,t})\cdot LIHI+\beta_{10}\Delta\ln(Ineq_{i,t})\cdot\Delta\ln(Invs_{i,t})\cdot HILI+$$
$$+\beta_{11}\Delta\ln(Ineq_{i,t})\cdot\Delta\ln(Invs_{i,t})\cdot HIHI+c_1\Delta\ln(Educ\_tert_{i,t})+c_2\Delta\ln(Gov_{i,t})+$$
$$+c_3\Delta\ln(PI_{i,t})+c_4\Delta\ln(Life\_exp_{i,t})+c_5\Delta\ln(Expr_{i,t})+u_{i,t}. \qquad (2.3)$$

A variant of the model, when implementing the impact of income inequality on economic growth through the saving channel as reflected by enterprise expenditure on R&D:

$$\Delta\ln(gdp_{i,t})=\alpha+td_3 1997+...+td_{20}2014+\beta_1\Delta\ln(Ineq_{i,t})+\beta_2\Delta\ln(Svng_{i,t})+$$
$$+\beta_3\Delta\ln(Invs_{i,t}) +\beta_4\Delta\ln(R\&D_{i,t})+\beta_5\Delta\ln(Ineq_{i,t})\cdot LIHI+\beta_6\Delta\ln(Ineq_{i,t})\cdot HILI+$$
$$+\beta_7\Delta\ln(Ineq_{i,t})\cdot HIHI+\beta_8\Delta\ln(Ineq_{i,t})\cdot\Delta\ln(R\&D_{i,t})+$$
$$+\beta_9\Delta\ln(Ineq_{i,t})\cdot\Delta\ln(R\&D_{i,t})\cdot LIHI+\beta_{10}\Delta\ln(Ineq_{i,t})\cdot\Delta\ln(R\&D_{i,t})\cdot HILI+$$
$$+\beta_{11}\Delta\ln(Ineq_{i,t})\cdot\Delta\ln(R\&D_{i,t})\cdot HIHI+c_1\Delta\ln(Educ\_tert_{i,t})+c_2\Delta\ln(Gov_{i,t})+$$
$$+c_3\Delta\ln(PI_{i,t})+c_4\Delta\ln(Life\_exp_{i,t})+c_5\Delta\ln(Expr_{i,t})+u_{i,t}; \qquad (2.4)$$

here, $Svng_{i,t}$ – the saving norm in *i* country at *t* time period; $Invs_{i,t}$ – formation of the gross fixed capital per capita in *i* country at *t* time period; $R\&D_{i,t}$ – enterprise expenditure on research and development per capita in *i* country at *t* time period.

With regard to the fact that the theoretical model points out three variables reflecting the saving channel, three variants of the model of the impact of income inequality on economic growth have been formed. Independent variables present in all three variants of the model will differ. They will differ in interactions shown by the coefficients β_8, β_9, β_{10} and β_{11}. The latter coefficients will be shown by the impact of interaction between income inequality and a variable reflecting the channel on economic growth in LILI, LIHI, HILI and HIHI groups of the countries accordingly. The coefficient β_8 will show the impact in the basic group of the countries which

in all models will be LILI. The coefficients β_9, β_{10} and β_{11} will show the difference in impact in the LIHI, HILI and HIHI groups of the countries accordingly, having compared with the basic group of the countries. Since there is no difference in the impact in the investigated group of the countries after comparison with the basic group of the countries, the econometric hypothesis will be accepted, if $p > 0.05$. Econometric hypotheses will be tested in all cases when the groups of the countries are compared with the basic group of the countries.

When implementing the impact of income inequality on economic growth through the saving channel, the first variant of the model will be reflected by the saving norm (*Svng*) in *i* country at *t* time period; in the second variant of the model – by formation of the gross fixed capital per capita (*Invs*) in *i* country at *t* time period; in the third variant of the model – by expenditure on R&D per capita in *i* country at *t* time period.

When forming an equation, time dummies have been included first; they absorb the impact of time on research results (Persson, Tabellini, 1991). The time variables are included in all equations of the Dissertation.

Aiming to investigate the impact of income inequality on economic growth through the fiscal policy channel, J. A. Charles-Coll (2012), K. Gründler, P. Scheuermeyer (2014) surveyed the impact of interaction between the Gini coefficient and income redistribution index on economic growth. Aiming to explore the impact of income inequality on economic growth through the four groups of the countries through different transmission channels, the Dissertation investigates the impact of interaction between indicators approximating income inequality and indicators reflecting the transmission channels on economic growth. In other words, the indirect impact of income inequality on economic growth is assessed. As mentioned earlier, when performing regression analysis, the notion *interaction* means the impact being made by two independent variables on a dependent variable at the same time (Lee, 2013).

Aiming to assess the impact of income inequality on economic growth through the **credit-market imperfections channel**, two different variants of the model have been designed. The first variant of the model investigates the impact of interaction between income inequality and private sector credit level on economic growth. The second variant of the model investigates the impact of interaction between income inequality and higher (tertiary) education on economic growth.

A variant of the model, when implementing the impact of income inequality on economic growth through the credit-market imperfections channel as reflected by the private sector credit level:

$$\Delta\ln(gdp_{i,t})=\alpha+td_3 1997+...+td_{20}2014+\beta_1\Delta\ln(Ineq_{i,t})+\beta_2\Delta\ln(Crdt_{i,t})+$$
$$+\beta_3\Delta\ln(Educ\_tert_{i,t})+\beta_4\Delta\ln(Ineq_{i,t})\cdot LIHI+\beta_5\Delta\ln(Ineq_{i,t})\cdot HILI+$$
$$+\beta_6\Delta\ln(Ineq_{i,t})\cdot HIHI+\beta_7\Delta\ln(Ineq_{i,t})\cdot\Delta\ln(Crdt_{i,t})+$$
$$+\beta_8\Delta\ln(Ineq_{i,t})\cdot\Delta\ln(Crdt_{i,t})\cdot LIHI+\beta_9\Delta\ln(Ineq_{i,t})\cdot\Delta\ln(Crdt_{i,t})\cdot HILI+$$
$$+\beta_{10}\Delta\ln(Ineq_{i,t})\cdot\Delta\ln(Crdt_{i,t})\cdot HIHI+c_1\Delta\ln(Gov_{i,t})+c_2\Delta\ln(PI_{i,t})+$$
$$+c_3\Delta\ln(Life\_exp_{i,t})+c_4\Delta\ln(Expr_{i,t})+u_{i,t}. \quad (2.5)$$

A variant of the model, when implementing the impact of income inequality on economic growth through the credit-market imperfections channel channel as reflected by percentage of population attaining higher (tertiary) education:

$$\Delta\ln(gdp_{i,t})=\alpha+td_3 1997+...+td_{20}2014+\beta_1\Delta\ln(Ineq_{i,t})+\beta_2\Delta\ln(Crdt_{i,t})+$$
$$+\beta_3\Delta\ln(Educ\_tert_{i,t})+\beta_4\Delta\ln(Ineq_{i,t})\cdot LIHI+\beta_5\Delta\ln(Ineq_{i,t})\cdot HILI+$$
$$+\beta_6\Delta\ln(Ineq_{i,t})\cdot HIHI+\beta_7\Delta\ln(Ineq_{i,t})\cdot\Delta\ln(Educ\_Tert_{i,t})+$$
$$+\beta_8\Delta\ln(Ineq_{i,t})\cdot\Delta\ln(Educ\_Tert_{i,t})\cdot LIHI+\beta_9\Delta\ln(Ineq_{i,t})\cdot\Delta\ln(Educ\_Tert_{i,t})\cdot HILI+$$
$$+\beta_{10}\Delta\ln(Ineq_{i,t})\cdot\Delta\ln(Educ\_Tert_{i,t})\cdot HIHI+c_1\Delta\ln(Gov_{i,t})+c_2\Delta\ln(PI_{i,t})+$$
$$+c_3\Delta\ln(Life\_exp_{i,t})+c_4\Delta\ln(Expr_{i,t})+u_{i,t}, \qquad (2.6)$$

here, $Crdt_{i,t}$ – the level of private sector credits in *i* country at *t* time period; $Educ\_tert_{i,t}$ – percentage of the population attaining higher (tertiary) education in *i* country at *t* time period.

Independent variables will differ in interactions which will be indicated by coefficients β_7, β_8, β_9 and β_{10}. Like in the case of the saving channel, in the current case the latter coefficients are shown by the impact of interaction between income inequality and a variable reflecting the channel on economic growth: correspondingly in LIHI, LIHI, HILI and HIHI groups of countries. In the first variant of the implemented model – the level of private sector credits (*Crdt*) in *i* country at *t* time period; in the second variant of the model – the percentage of the population attaining higher (tertiary) education (*Educ_Tert*) in *i* country at *t* time period.

Further, two variants of the model of the impact of income inequality on economic growth through the **socio-political unrest channel** have been designed. The first variant of the model investigates the impact of interaction between income inequality and political stability and absence of violence on economic growth. The second variant of the model investigates the impact of interaction between income inequality and the rule of law on economic growth.

A variant of the model, when implementing the impact of income inequality on economic growth through the socio-political unrest channel as reflected by the political stability and absence of violence index:

$$\Delta\ln(gdp_{i,t})=\alpha+td_3 1997+...+td_{20}2014+\beta_1\Delta\ln(Ineq_{i,t})+\beta_2\Delta\ln(Polit\_stabil_{i,t})+$$
$$+\beta_3\Delta\ln(Ineq_{i,t})\cdot LIHI+\beta_4\Delta\ln(Ineq_{i,t})\cdot HILI+\beta_5\Delta\ln(Ineq_{i,t})\cdot ANAP+$$
$$+\beta_6\Delta\ln(Ineq_{i,t})\cdot\Delta\ln(Polit\_stabil_{i,t})+\beta_7\Delta\ln(Ineq_{i,t})\cdot\Delta\ln(Polit\_stabil_{i,t})\cdot LIHI+$$
$$+\beta_8\Delta\ln(Ineq_{i,t})\cdot\Delta\ln(Polit\_stabil_{i,t})\cdot HILI+\beta_9\Delta\ln(Ineq_{i,t})\cdot\Delta\ln(Polit\_stabil_{i,t})\cdot HIHI+$$
$$+c_1\Delta\ln(Educ\_tert_{i,t})+c_2\Delta\ln(Gov_{i,t})+c_3\Delta\ln(PI_{i,t})+c_4\Delta\ln(Life\_exp_{i,t})+$$
$$+c_5\Delta\ln(Expr_{i,t})+u_{i,t}. \qquad (2.7)$$

A variant of the model, when implementing the impact of income inequality on economic growth through the socio-political unrest channel as reflected by the rule of law index:

$$\Delta\ln(gdp_{i,t})=\alpha+td_3 1997+...+td_{20}2014+\beta_1\Delta\ln(Ineq_{i,t})+\beta_2\Delta\ln(Rl_{i,t})+$$
$$+\beta_3\Delta\ln(Ineq_{i,t})\cdot LIHI+\beta_4\Delta\ln(Ineq_{i,t})\cdot HILI+\beta_5\Delta\ln(Ineq_{i,t})\cdot HIHI+$$

$$+\beta_6\Delta\ln(Ineq_{i,t})\cdot\Delta\ln(Rl_{i,t})+\beta_7\Delta\ln(Ineq_{i,t})\cdot\Delta\ln(Rl_{i,t})\cdot LIHI+$$
$$+\beta_8\Delta\ln(Ineq_{i,t})\cdot\Delta\ln(Rl_{i,t})\cdot HILI+\beta_9\Delta\ln(Ineq_{i,t})\cdot\Delta\ln(Rl_{i,t})\cdot HIHI+$$
$$+c_1\Delta\ln(Educ\_tert_{i,t})+c_2\Delta\ln(Gov_{i,t})+c_3\Delta\ln(PI_{i,t})+c_4\Delta\ln(Life\_exp_{i,t})+$$
$$+c_5\Delta\ln(Expr_{i,t})+u_{i,t}. \qquad (2.8)$$

The socio-political unrest channel will be reflected by the indicator of political stability and absence of violence (*Polit_stabil*) in *i* country at *t* time period and the rule of law index (*Rl*) in *i* country at *t* time period. Independent variables are demonstrated by the coefficient β_2. The impact of the interaction between income inequality and a variable reflecting the channel on economic growth in corresponding groups of countries (LILI, LIHI, HILI and HIHI) is shown by coefficients β_6, β_7, β_8 and β_9.

The designed model of the impact of income inequality on economic growth through the **fiscal policy channel** is identical to the equation (2.7). In the latter equation, the indicator reflecting the fiscal policy channel of the impact of income inequality on economic growth, i.e. independent variable, is the expenditure on social protection (*Soc_prot*) in *i* country at *t* time period.

A variant of the model, when implementing the impact of income inequality on economic growth through the fiscal policy channel as reflected by expenditure on social protection:

$$\Delta\ln(gdp_{i,t})=\alpha+td_3 1997+...+td_{20}2014+\beta_1\Delta\ln(Ineq_{i,t})+\beta_2\Delta\ln(Soc\_prot_{i,t})+$$
$$+\beta_3\Delta\ln(Ineq_{i,t})\cdot LIHI+\beta_4\Delta\ln(Ineq_{i,t})\cdot HILI+\beta_5\Delta\ln(Ineq_{i,t})\cdot HIHI+$$
$$+\beta_6\Delta\ln(Ineq_{i,t})\cdot\Delta\ln(Soc\_prot_{i,t})+\beta_7\Delta\ln(Ineq_{i,t})\cdot\Delta\ln(Soc\_prot_{i,t})\cdot LIHI+$$
$$+\beta_8\Delta\ln(Ineq_{i,t})\cdot\Delta\ln(Soc\_prot_{i,t})\cdot HILI+\beta_9\Delta\ln(Ineq_{i,t})\cdot\Delta\ln(Soc\_prot_{i,t})\cdot HIHI+$$
$$+c_1\Delta\ln(Educ\_tert_{i,t})+c_2\Delta\ln(Gov_{i,t})+c_3\Delta\ln(PI_{i,t})+c_4\Delta\ln(Life\_exp_{i,t})+$$
$$+c_5\Delta\ln(Expr_{i,t})+u_{i,t}. \qquad (2.9)$$

When assessing the impact of income inequality on economic growth by applying all models, the LILI group of countries has been chosen as the basic group. Any group may be the basic group, i.e. it is not important which group is treated as basic. The obtained results of other groups of the countries will be compared with the obtained results of the basic group of the countries.

Further, limitations of the impact of income inequality on economic growth are presented. Since correlation between income inequality and economic growth may be reciprocal, i.e. not only income inequality may make impact on economic growth but also economic growth may impact income inequality, first, the impact of economic growth on income inequality is dissociated from. In other words, the current research work investigates the impact of income inequality on economic growth.

On the ground of the theory, the impact of income inequality on economic growth is assessed through transmission channels reflected by indicators. Interrelations among the channels of the impact of income inequality on economic growth exist; however, the correlations among the transmission channels are not empirically investigated according to the designed model.

Another limitation in investigation of the impact of income inequality on economic growth is related to the fiscal policy channel. In their research, a number of authors (Guvenen, Kuruscu, Ozkan, 2014; Gründler, Scheuermeyer, 2014; Cingano, 2014; Chetty et al., 2013; Charles-Coll, 2012, 2011; Muinelo-Gallo, Roca-Sagalés, 2011; Figini, 1999) investigating the impact of income inequality on economic growth through the fiscal policy channel in groups of various countries dissociated themselves from tax tariffs because in different countries different fiscal policy may apply. Therefore, the listed authors used government expenditure. Since the current research work investigates the groups of EU-28 states, it dissociates from taxes.

To sum up the second part of the Dissertation, the theoretical model employed to conduct investigation of the impact of income inequality on economic growth through the transmission channels has been designed. By applying the theoretical model, the impact of income inequality on economic growth is assessed by dividing countries into four groups according to the levels of income inequality and income per capita. Aiming to assess the impact of income inequality on economic growth through the transmission channels, the four different indicators of income inequality have been substantiated because each of them has both advantages and disadvantages. Moreover, the eight indicators reflecting the channels have been pointed out because the impact of income inequality on economic growth through each transmission channel may differ. Aiming to avoid over-estimation of the impact of analysed variables on economic growth, the five test variables have been presented. Further, grounding on the introduced methods, the empirical research of the impact of income inequality on economic growth through the transmission channels has been conducted.

EMPIRICAL ASSESSMENT OF THE IMPACT OF INCOME INEQUALITY ON ECONOMIC GROWTH IN THE GROUPS OF THE EUROPEAN UNION COUNTRIES

First, the countries are grouped according to the level of income inequality, i.e. average Gini coefficient over the period 1995–2014. The average value of the Gini coefficient comprised 30.0 per cent (see Table 3.1). Even though this Dissertation investigates the impact of income inequality on economic growth, another indicator approximating income inequality, i.e. decile ratio, is used, too; however, with regard to the Gini coefficient which shows the gross level of income inequality and the decile ratio shows income differences at the top and bottom corners of income distribution, EU-28 states are grouped according to the Gini coefficient. Then, both groups of the countries are also divided in two other groups according to the level of country's development, i.e. according to the average real GDP per capita in purchase power standards (PPS) over the period 1995–2014, which comprised 21,000 euros (see Table 3.1 below).

Table 3.1

Division of EU-28 states according to average data of the Gini coefficient and GDP per capita in 1995–2014

No.	Country	Gini coefficient (per cent)	Real GDP per capita (euros, PPS)
Group 1. A lower level of income inequality and a lower level of country's development (LILI)			
1.	Czech Republic	25.1	17,590
2.	Croatia	29.7	12,475
3.	Hungary	26.6	13,415
4.	Malta	27.7	18,305
5.	Slovenia	23.3	18,280
6.	Slovakia	25.5	13,860
Group 2. A lower level of income inequality and a higher level of country's development (LIHI)			
7.	Belgium	27.3	26,655
8.	Denmark	27.7	27,915
9.	France	28.6	24,430
10.	Cyprus	29.9	21,085
11.	Luxembourg	27.5	54,390
12.	The Netherlands	26.8	29,745
13.	Austria	26.3	28,275
14.	Finland	25.1	25,430
15.	Sweden	23.7	27,960
Group 3. A higher level of income inequality and a lower level of country's development (HILI)			
16.	Bulgaria	30.7	8,285
17.	Estonia	31.1	12,780
18.	Greece	33.9	19,045
19.	Latvia	36.1	11,030
20.	Lithuania	34.1	11,935
21.	Poland	31.6	11,990
22.	Portugal	36.0	17,385
23.	Romania	32.7	8,805
Group 4. A higher level of income inequality and a higher level of country's development (HIHI)			
24.	Germany	33.5	26,435
25.	Ireland	31.1	29,155
26.	Spain	32.9	21,625
27.	Italy	31.6	24,150
28.	The United Kingdom	32.6	25,780
Average		30.0	21,000

Source: designed by the author of the Dissertation referring to the data of the European Union's statistics service "Eurostat" (2015).

The group LILI includes the countries where the Gini coefficient comprised less than 30.0 per cent and the real GDP per capita was less than 21,000 euros. The group LIHI includes the countries where the Gini coefficient comprised less than 30.0 per cent and the real GDP per capita was more than 21,000 euros. The group

HILI includes the countries where the Gini coefficient comprised more than 30.0 per cent and the real GDP per capita was less than 21,000 euros. The group HIHI includes the countries where the Gini coefficient comprised more than 30.0 per cent and the real GDP per capita was more than 21,000 euros.

Further, aiming to assess the impact of income inequality on economic growth through the saving channel, regression analysis of the impact of income inequality on economic growth through the **saving channel** is conducted.

Table 3.2

The impact of income inequality on economic growth through the saving channel reflected by the saving rate

Variables	Coefficient indices calculated by using robust standard errors (HAC)			
	Indicators of income inequality			
	1	*2*	*3*	*4*
	Gini	*Dec*	*D1*	*D10*
Ineq*Svng	**−1.591*****	**−0.794*****	**1.376*****	**−1.606*****
Ineq*Svng*LIHI	**1.522*****	**0.722*****	**−1.340*****	**1.264*****
Ineq*Svng*HILI	**0.857*****	**0.702*****	**−1.301*****	**0.787*****
Ineq*Svng*HIHI	0.575	**0.500****	**−1.471****	0.648
Svng	**0.024***	0.021	0.022	**0.023***
Invs	**0.176*****	**0.171*****	**0.172*****	**0.183*****
R&D	**0.024****	**0.025***	**0.024***	**0.027****
Educ_tert	0.067	0.058	0.058	0.059
Gov	0.268***	0.256***	0.256***	0.272***
Expr	0.188***	0.207***	0.213***	0.185***
PI	0.070	0.090	0.098	0.070
Life_exp	−0.550	−0.584	−0.609	−0.451
N	172	170	170	170
Adjusted R^2	0.889	0.886	0.884	0.889
p-value of testing H0: no autocorrelation	−0.058	−0.052	−0.051	−0.048
p-value of testing H0: heteroscedasticity not present	0.002	0.000	0.000	0.001

* - sig. level 90%, ** - sig. level 95%, *** - sig. level 99%

Source: designed by the author of the Dissertation referring to the data of the European Union's statistics service "Eurostat" (2015).

As mentioned earlier, assessment of the impact of income inequality on economic growth through the saving channel and other channels, the group of countries LILI has been chosen as the basic group. The model of the impact of income inequality on economic growth demonstrated in Table 3.2 points out the indicator reflecting the savings channel, i.e. saving rate. In other words, the impact of the interaction between income inequality and saving rate is investigated while assessing the impact of income inequality on economic growth through the saving channel.

A negative impact of income inequality approximated by the Gini coefficient, the decile ratio and the tenth decile as well as the saving rate on economic growth was estimated in all four groups of the countries (see Table 3.2.). The results of the conducted research show a negative impact of the interaction between income inequality and saving rate on economic growth in the basic group of the countries expressed by coefficient values: –1.591, –0.794 and –1.606 at 99.0 per cent of significance levels (see Table 3.2 columns 1, 2 and 4).

A negative impact of the interaction between income inequality and saving rate on economic growth through the saving channel was also estimated in the groups of the countries LIHI, HILI and HIHI. Even though in the group of the countries LIHI the coefficients of differences between the impact of income inequality and saving rate on economic growth comprised 0.857, 0.702 and 0.787 and in the group of the countries HILI they differed as 1.522, 0.722 and 1.264 (see Table 3.2 columns 1, 2 and 4), still, differences of the impact were less than in the basic group of the countries. Therefore, the impact of income inequality on economic growth through the saving channel in the groups of the countries LIHI and HILI is negative. In the group of the countries HIHI, coefficients of the differences in the impact (see columns 1 and 4, Table 3.2) were estimated as statistically insignificant, i.e. comprised 0.575 and 0.648, and the coefficient of the impact difference in column 2 comprised 0.500 and it was less than in the basic group of the countries. Therefore, it can be stated that in all groups of the countries a negative impact of income inequality on economic growth was estimated.

Interpreting the data displayed in Table 3.2, it can be stated that in EU-28 states a positive impact of the saving rate on economic growth could be observed under an assumption that there was no income inequality. As the saving rate increased by 1.0 per cent, economic growth increased by some 0.023–0.024 per cent at significance of 90.0 per cent (see columns 1 and 4, Table 3.2). Since increase of the saving rate stimulated economic growth under an assumption that there was no income inequality, it can be stated that income inequality slowed down economic growth.

On the ground of the results obtained in Table 3.2 column 4, it can be stated that when the percentage of income and saving of the wealthier population increased, economic growth slowed down in all four groups of the countries. The research results prove a positive impact of percentage of income and saving of the poorest population on economic growth. Therefore, this shows that when aiming at economic growth it is necessary to reduce the level of income inequality.

Table 3.3 presents the results of assessment of the impact of income inequality on economic growth through the saving channel reflected by the variable of investment volume.

As seen in Table 3.3, the implemented model of the impact of income inequality on economic growth singles out the indicator reflecting the saving channel, i.e. the volume of investment. In this case, when investigating the impact of income inequality on economic growth through the saving channel, the impact of interaction between income inequality and volume of investment on economic growth is investigated.

Table 3.3

The impact of income inequality on economic growth through the saving channel reflected by the volume of investment

Variables	Coefficient values calculated by using robust standard errors (HAC)			
	Indicators of inequality indicators			
	1	*2*	*3*	*4*
	Gini	*Dec*	*D1*	*D10*
Ineq*Invs	−0.393	−0.067	−0.226	−0.620
Ineq*Invs*LIHI	−0.368	−0.084	0.323	−0.535
Ineq*Invs*HILI	1.212	0.110	0.258	1.275*
Ineq*Invs*HIHI	−0.655	−0.019	0.755	0.919
Svng	**0.023***	0.021	0.019	0.021
Invs	**0.173*****	**0.176*****	**0.178*****	**0.173*****
R&D	**0.023****	**0.025*****	**0.024****	**0.024****
Educ_tert	0.048	0.050	0.048	0.051
Gov	0.273***	0.264***	0.263***	0.273***
Expr	0.191***	0.200***	0.202***	0.192***
PI	0.119	0.113	0.113	0.118
Life_exp	−0.361	−0.536	−0.531	−0.358
N	172	170	170	170
Adjusted R^2	0.901	0.878	0.877	0.880
p-value of testing H0: no autocorrelation	0.045	−0.003	−0.009	−0.055
p-value of testing H0: heteroscedasticity not present	0.044	0.000	0.001	0.048

* - sig. level 90%, ** - sig. level 95%, *** - sig. level 99%

Source: designed by the author of the Dissertation referring to the data of the European Union's statistics service "Eurostat" (2015).

However, as all four columns of Table 3.3 demonstrate, in the realised model, coefficient values of the impact of income inequality approximated by the Gini coefficient, the decile ratio, the first and tenth deciles on economic growth through the saving channel reflected by the variable of the volume of investment were estimated as statistically insignificant. A statistically insignificant impact of increase of income inequality on economic growth through the saving channel was estimated in all four groups of the countries in the aspect of the volume of investment.

When interpreting the data presented in Table 3.3 it can be stated that in EU-28 countries a positive impact of the volume of investment on economic growth could exist under the assumption that there was no income inequality. It can be stated that the strongest impact on economic growth could be made by an increasing volume of investment, as the designed model suggests. After the volume of investment increased by 1.0 per cent, economic growth increased by some 0.17–0.18 per cent at significance of 99.0 per cent (see Table 3.3). Since increase of the volume of

investment stimulated economic growth under the assumption that there was no income inequality, it can be stated that income inequality slowed down economic growth.

Grounding on the results presented in Tables 3.2 and 3.3, it can be stated that when the level of income inequality increases, interaction between percentage of income of the wealthiest population and saving slowed down economic growth. The wealthiest population could invest the savings insufficiently to stimulate economic growth. Increase of percentage of income and saving of the poorest population when the level of income inequality increased promoted economic growth.

Further, the impact of income inequality on economic growth through the saving channel reflected by business enterprise expenditure on R&D is investigated.

As seen in Table 3.4, in the implemented model of the impact of income inequality on economic growth, an indicator reflecting the saving channel, business enterprise expenditure on R&D, is pointed out. In other words, the impact of interaction between income inequality and business enterprise expenditure on R&D on economic growth is investigated.

It was found out that in the basic group of the countries, increase of income inequality approximated by the Gini coefficient, the decile ratio and the tenth decile, also business enterprise expenditure on R&D slowed down economic growth through the saving channel. A negative impact of income inequality on economic growth is shown by negative values of coefficients: –0.690, –0.364 and –0.446 (see Table 3.4 columns 1, 2 and 4).

Table 3.4

The impact of income inequality on economic growth through the saving channel reflected by business enterprise expenditure on R&D

Variables	Coefficient values calculated by using robust standard errors (HAC)			
	Indicators of income inequality			
	1	*2*	*3*	*4*
	Gini	*Dec*	*D1*	*D10*
Ineq*R&D	**−0.690***	**−0.364****	**0.650*****	**−0.446***
Ineq*R&D*LIHI	0.429	0.489	**−0.756***	0.644
Ineq*R&D*HILI	**1.096****	**0.457*****	**−0.754*****	**0.768****
Ineq*R&D*HIHI	**2.443****	**1.435****	**−4.384*****	0.645
Svng	**0.021***	0.020	0.021	0.019
Invs	**0.175*****	**0.175*****	**0.175*****	**0.177*****
R&D	**0.027***	**0.025***	**0.024***	**0.027****
Educ_tert	0.049	0.051	0.052	0.052
Gov	0.263***	0.256***	0.257***	0.261***
Expr	0.196***	0.205***	0.211***	0.191***
PI	0.089	0.099	0.105	0.089
Life_exp	−0.464	−0.548*	−0.628*	−0.413
N	172	170	170	170

Continued Table 3.4

Adjusted R^2	0.881	0.881	0.882	0.877
p-value of testing H0: no autocorrelation	0.015	0.008	-0.075	0.005
p-value of testing H0: heteroscedasticity not present	0.001	0.000	0.006	0.000

* - sig. level 90%, ** - sig. level 95%, *** - sig. level 99%

Source: designed by the author of the Dissertation referring to the data of the European Union's statistical service "Eurostat" (2015).

A negative impact of the increase of income inequality and business enterprise expenditure for R&D on economic growth through the saving channel also was found in the group of the countries LIHI. In this group of the countries, difference coefficients of the impact of income inequality on economic growth through the savings channel reflected by business enterprise expenditure on R&D comprised 0.429, 0.489 and 0.644 (see Table 3.4 columns 1, 2 and 4). However, having compared with the basic group of the countries, coefficients of impact differences were estimated as insignificant; therefore, there are no impact differences.

Thus, in the groups of the countries LILI and LIHI, income inequality slowed down economic growth through the saving channel reflected by business enterprise expenditure on R&D. In other words, income inequality slowed down economic growth in the groups of the countries which were characteristic of a lower level of income inequality. It can be stated that in the mentioned groups of the countries business enterprise expenditure on R&D were insufficient to stimulate economic growth after the level of income inequality increased. Therefore, aiming at economic growth, it is necessary to decrease the level of income inequality in the mentioned groups of the countries.

However, in the groups of countries HILI and HIHI, income inequality stimulated economic growth through the saving channel reflected by business enterprise expenditure on R&D in two cases. In the group of the countries HILI, difference of of the impact of interaction between income inequality approximated by the Gini coefficient and enterprise expenditure on R&D on economic growth comprised 1.096 at 95.0 per cent of significance. In the group of the countries HIHI, the difference of the impact of interaction between income inequality approximated by the decile ratio and business enterprise expenditure on R&D comprised 1.435 at 95.0 per cent of significance. As the groups of the countries HILI and HIHI had no impact difference having compared with the basic group, the hypothesis was rejected because $p < 0.05$. In other words, income inequality stimulated economic growth through the saving channel reflected by business enterprise expenditure on R&D in the groups of the countries attributed with a higher level of income inequality (see Table 3.4 columns 1 and 2). Increase of business enterprise expenditure on R&D in the group of the countries with a relatively higher level of income inequality could be determined by the wealthier population.

Interpreting the data of the tables presented in Table 3.4, it can be stated that in EU-28 states the increase of business enterprise expenditure on R&D could promote

economic growth under the assumption that there was no income inequality. As business enterprise expenditure on R&D increased by 1.0 per cent, economic growth increased by some 0.024–0.027 per cent at 90.0 and 95.0 per cent of the significance level (see Table 3.4).

Economic growth through the saving channel reflected by the saving rate and business enterprise expenditure on R&D in all four groups of the countries could be promoted by 10.0 per cent of income of the poorest population. However, in one case, the impact of 10.0 per cent of income of the poorest population on economic growth was negative through the saving channel reflected by business enterprise expenditure on R&D, i.e. in the group of the countries HIHI. This is demonstrated by the impact difference –4.384 at 99.0 per cent of significance (see Table 3.4). Since the impact difference is insignificant comparing to the basic group of the countries, the hypothesis was rejected because $p < 0.05$.

When comparing the results presented in Tables 3.2, 3.3 and 3.4, it can be stated that the impact of income inequality and saving rate on economic growth in all groups of the countries was estimated as negative. A negative impact on economic growth could be made by increasing saving of the wealthiest population. Increase of saving of the poorest population stimulated economic growth. However, after the level of income inequality increased, the wealthiest population could allocate insufficient income for investment to stimulate economic growth. Therefore, it can be stated that, aiming at economic growth, it is necessary to diminish the level of income inequality.

However, it was also found out that after the level of income inequality increased, economic growth was stimulated by increasing business enterprise expenditure on R&D in the groups of the countries with a higher level of income inequality. This shows that at a higher level of income inequality the wealthiest population could save more capital and allocate it to expenditure on R&D, this way promoting economic growth. Therefore, it can be stated that aiming at economic growth, the groups of the countries with a relatively lower level of income should reduce the level of income inequality, and the groups of the countries with a higher level of income inequality should decrease the level of income inequality or the wealthiest population should increase expenditure on R&D.

The obtained results show that the second hypothesis has been accepted because *the increase of income inequality promoted economic growth through the saving channel in the group of the countries attributed with a relatively higher level of income inequality and a relatively higher level of income per capita.* The second hypothesis was proven because income inequality in the group of a relatively higher level of income inequality and a relatively higher level of income per capita approximated by the decile ratio stimulated economic growth through the saving channel reflected by business enterprise expenditure on R&D.

To sum up, when assessing the impact of income inequality on economic growth through the saving channel, ambiguous results have been obtained. Income inequality and saving slowed down economic growth in all four groups of the countries. A negative impact of income inequality on economic growth could be made by the

increase of the percentage of income of the wealthiest population, and a positive impact could be made by the increase of the percentage of income of the poorest population. Therefore, it is necessary to reduce the level of income inequality.

After the level of income inequality increased, the wealthiest population could allocate insufficient income for investment in all four groups of the countries to stimulate economic growth. However, as the level of income inequality is increasing, increasing business enterprise expenditure on R&D promotes economic growth in the groups of the countries HILI and HIHI. This means that income inequality stimulated economic growth in the groups of the countries which were attributed with a higher level of income inequality. It can be stated that in the mentioned groups of the countries attributed with a higher level of income inequality, expenditure on R&D allocated by the wealthiest population stimulated economic growth.

Having carried out econometric analysis, it was found that the growth of the saving rate, volume of investment and expenditure on R&D in EU-28 states could promote economic growth under the assumption that there was no income inequality. According to the implemented model, the strongest impact on economic growth could be made by the increasing volume of investment.

Further, to assess the impact of income inequality on economic growth through the **credit-market imperfections channel**, the regression analysis has been conducted.

Table 3.5

The impact of income inequality on economic growth through the credit-market imperfections channel reflected by the private sector credit level

Variables	Coefficient values calculated by using robust standard errors (HAC)			
	Indicators of income inequality			
	1	*2*	*3*	*4*
	Gini	*Dec*	*D1*	*D10*
Ineq*Crdt	**0.694****	0.056	0.027	0.170
Ineq*Crdt*LIHI	0.772	0.886**	−0.821***	1.360**
Ineq*Crdt*HILI	0.371	0.273	0.464***	0.959*
Ineq*Crdt*HIHI	**2.472***	1.946***	−5.239***	1.803*
Crdt	**0.039****	−0.004	−0.002	−0.013
Educ_tert	0.000	0.012	0.010	0.006
Gov	0.308***	0.295***	0.302***	0.322***
Expr	0.280***	0.287***	0.276***	0.286***
PI	0.200**	0.178**	0.173*	0.190**
Life_exp	−0.828	−0.873	−0.794	−0.861
N	180	178	178	178
Adjusted R^2	0.763	0.761	0.761	0.755
p-value of testing H0: no autocorrelation	0.097	0.065	0.069	0.112
p-value of testing H0: heteroscedasticity not present	0.001	0.000	0.000	0.002

* - sig. level 90%, ** - sig. level 95%, *** - sig. level 99%

Source: designed by the author of the Dissertation referring to the data of the European Union's statistics service "Eurostat" (2015) and the World Bank presented by D. Kaufmann, A. Kraay (2016).

Assessing the impact of income inequality on economic growth through the credit-market imperfections channel, the group of the countries LILI has been selected as the basic group. The model of the impact of income inequality on economic growth presented in Table 3.5 points out the indicator of the private sector credit level reflecting the credit-market imperfections channel. In other words, assessment of the impact of income inequality on economic growth through the credit-market imperfections channel involves investigation of the impact of interaction between income inequality and private sector credit level on economic growth.

In the group of the countries LILI, income inequality measured by the Gini coefficient stimulated economic growth through the credit-market imperfections channel reflected by the variable of the private sector credit level. The fact that income inequality stimulated economic growth is shown by a positive coefficient value which was 0.694 at 95.0 per cent significance (see Table 3.5 column 1).

Income inequality measured by the Gini coefficient stimulated economic growth through the credit-market imperfections channel also in the group of the countries LIHI, HILI and HIHI. In the group of the countries HIHI, the coefficient of difference of the impact of income inequality on economic growth comprised 2.472 at 90.0 per cent of significance. In the groups of the countries LIHI and HILI, coefficients of differences of the impact of income inequality on economic growth comprised 0.772 and 0.371 accordingly, though were statistically insignificant. Therefore, there are no differences of the impact in comparison to the basic group of the countries (see Table 3.5 column 1). Thus, grounding on the results presented in Table 3.5, it can be stated that income inequality and the increasing level of private sector credits stimulated economic growth in all four groups of the countries.

Referring to the data presented in Table 3.5 column 1, it can be stated that the increase of the private sector credit level in the EU-28 states promoted economic growth under the assumption that there was no income inequality, too. In other words, the increase of the private sector credit level by 1.0 per cent could increase economic growth by 0.04 per cent accordingly at 95.0 per cent of significance. The impact of income inequality approximated by the decile ratio, the first and tenth deciles on economic growth has been estimated as insignificant.

Thus, having carried out the regression analysis, it can be stated that income inequality stimulated economic growth through the credit-market imperfections channel, with the exception of the private sector credit level. Further, the impact of income inequality on economic growth through the credit-market imperfections channel reflected by the variable of the attained higher (tertiary) education level is investigated.

Table 3.6

The impact of income inequality on economic growth through the credit-market imperfections channel reflected by the level of higher (tertiary) education

Variables	Coefficient values calculated by using robust standard errors (HAC)			
	Indicators of income inequality			
	1	*2*	*3*	*4*
	Gini	*Dec*	*D1*	*D10*
Ineq*Educ_tert	3.014	0.712	1.296	3.284
Ineq*Educ_tert*LIHI	−3.871	−1.027	−1.169	−3.990
Ineq*Educ_tert*HILI	−8.089**	−2.791*	1.225	−6.518
Ineq*Educ_tert*HIHI	2.046	1.547	−6.277	−0.294
Crdt	0.002	−0.002	−0.001	−0.000
Educ_tert	−0.027	0.712	−0.011	−0.016
Gov	0.322***	0.317***	0.325***	0.328***
Expr	0.254***	0.266***	0.274***	0.260***
PI	0.177*	0.180**	0.185**	0.170
Life_exp	−0.354	−0.497	−0.606	−0.463
N	180	178	178	178
Adjusted R^2	0.750	0.751	0.752	0.744
p-value of testing H0: no autocorrelation	0.149	0.099	0.076	0.146
p-value of testing H0: heteroscedasticity not present	0.000	0.001	0.002	0.000

* - sig. level 90%, ** - sig. level 95%, *** - sig. level 99%

Source: designed by the author of the Dissertation referring to the data of the European Union's statistics service "Eurostat" (2015) and the World Bank presented by D. Kaufmann, A. Kraay (2016).

In the implemented model of the impact of income inequality on economic growth, the indicator representing the credit-market imperfections channel, i.e. higher (tertiary) education, has been pointed out (see Table 3.6). In this version of the model, assessment of the impact of income inequality on economic growth through the credit-market imperfections channel involves investigation of the impact of interaction between income inequality and attained higher (tertiary) education on economic growth.

However, as seen in all four columns in Table 3.6, in the realised model, the coefficient values of the impact of income inequality approximated by the Gini coefficient, the decile rate, the first and tenth deciles on economic growth through the credit-market imperfections channel were estimated as statistically insignificant. This means that a statistically insignificant impact of income inequality on economic growth through the credit-market imperfections channel reflected by the level of attained education was found in all four groups of the countries.

Referring to the results displayed in Tables 3.5 and 3.6, it can be stated that after the level of income inequality measured by the Gini coefficient increased, the

increasing level of private sector credits stimulated economic growth in all four groups of the countries. However, the increasing level of education did not promote economic growth. Therefore, it can be stated that after income inequality increased, i.e. income of the wealthier population increased, more credits were granted. However, while the level of the private sector credits was increasing, the increasing level of attained education of the poor population did not promote economic growth.

The third hypothesis has been rejected because the results of the conducted research show that in the group of the countries attributed with a relatively higher level of income inequality and a relatively lower level of income per capita income inequality did not slow down but rather stimulated economic growth through the credit-market imperfections channel reflected by the private sector credit level. Therefore, it can be stated that after the level of income inequality approximated by the Gini coefficient the relatively poorer population could get credits; therefore, this could stimulate economic growth. However, the means allocated by the poor population allocated to attain higher (tertiary) education did not stimulate economic growth.

To sum up, after the level of income inequality increased, the increasing private sector credit level stimulated economic growth in all analysed groups of the countries. However, the increasing level of education after the level of income inequality increased did not promote economic growth.

In assessment of the impact of income inequality on economic growth through the **socio-political unrest channel**, the group of the countries LILI has been chosen as the basic group. In the implemented model of the impact of income instability on economic growth, the indicator reflecting the socio-political unrest channel, i.e. the index of political stability and absence of violence, is pointed out. In other words, assessment of the impact of income inequality on economic growth through the socio-political channel involves investigation of the impact of interaction between income inequality and political instability and absence of violence on economic growth (see Table 3.7).

Table 3.7

The impact of income inequality on economic growth through the socio-political unrest channel reflected by the political stability and absence of violence index

Variables	Coefficient values calculated by using robust standard errors (HAC)			
	Indicators of income inequality			
	1	*2*	*3*	*4*
	Gini	*Dec*	*D1*	*D10*
Ineq*Polit_stabil	**−2.490*****	**−1.366*****	**2.623*****	**−2.609*****
Ineq*Polit_stabil*LIHI	**10.576*****	1.894	**−2.579****	**8.532****
Ineq*Polit_stabil*HILI	**6.025*****	**1.879*****	**−2.687*****	**6.142*****
Ineq*Polit_stabil*HIHI	**4.788*****	**2.390*****	**−3.980*****	**4.490*****
Polit_stabil	0.041	0.016	0.004	0.025
Educ_tert	0.021	0.019	0.018	0.023
Gov	0.375***	0.353***	0.338***	0.375***
Expr	0.291***	0.2947***	0.308***	0.279***
PI	0.163*	0.181*	0.186*	0.154*
Life_exp	−1.092	−1.198*	−1.236	−1.126
N	184	182	182	182
Adjusted R^2	0.793	0.788	0.782	0.790
p-value of testing H0: no autocorrelation	0.019	-0.013	−0.022	−0.006
p-value of testing H0: heteroscedasticity not present	0.000	0.002	0.000	0.000

* - sig. level 90%, ** - sig. level 95%, *** - sig. level 99%

Source: designed by the author of the Dissertation referring to the data of the European Union's statistics service "Eurostat" (2015) and the World Bank presented by D. Kaufmann, A. Kraay (2016).

Income inequality approximated by the Gini coefficient, the decile ratio and the tenth decile through the socio-political unrest channel and reflected by the political stability and absence of violence index slowed down economic growth in the basic group of the countries (see Table 3.7). After political stability decreased in the latter group of the countries, a negative impact of income inequality on economic growth is shown by negative coefficient values –2.490, –1.366 and –2.609 at 99.0 per cent significance levels (see Table 3.7 columns 1, 2 and 4).

A negative impact of income inequality on economic growth through the socio-political unrest channel was also found in the group of the countries LIHI. Even though the coefficients of differences of income inequality, approximated by the Gini coefficient and the tenth decile, on economic growth through the socio-political unrest channel in the group of these countries comprised 10.576 and 8.532 at 99.0 per cent and 95.0 per cent of significance levels appropriately, still, having compared with the basic group of the countries, there are no differences in the impact (see Table 3.7 columns 1 and 4). Since the differences of the impact are insignificant in comparison to the basic group of the countries, the hypotheses in the group of

the countries LIHI were accepted because $p > 0.05$ (see Table 3.7 column 2). In the group of the countries LIHI, the difference of the impact on income inequality approximated by the decile ratio on economic growth through the socio-political unrest channel comprised 1.894, though it was insignificant. Therefore, after political stability increased, it can be stated that in the groups of the countries attributed with a lower level of income inequality the impact of income inequality on economic growth was negative.

However, in the group of the countries HILI, difference coefficients of the impact of income inequality on economic growth through the socio-political unrest channel comprised 6.025 and 6.142, and in the group of the countries HIHI they comprised 4,788, 2.390 and 4.490 (see Table 3.7 columns 1, 2 and 4) at 99.0 per cent of significance. Therefore, it can be stated that in the groups of the countries HILI and HIHI, through the socio-political unrest channel reflected by the variable of political stability and absence of violence, income inequality promoted economic growth.

Thus, income inequality slowed down economic growth in the groups of the countries LILI and LIHI, i.e. in the groups of the countries attributed with a lower level of income inequality, and stimulated in the group of the countries HILI and HIHI, i.e. in the groups of the countries attributed with a higher level of income inequality. In the groups of the countries attributed with a lower level of income inequality, economic growth would be stimulated by the decreasing level of income inequality, i .e. the increasing percentage of income of 10.0 per cent of the poorest population. Therefore, it can be stated that in the mentioned groups of the countries, aiming at economic growth, it is necessary to reduce income inequality.

However, in the groups of the countries attributed with a higher level of income inequality, the estimated impact of increasing income of both 10.0 per cent of the poorest population and 10.0 per cent of the wealthiest population on economic growth was positive. Nevertheless, as mentioned earlier, in the groups of the countries attributed with a higher level of income inequality, a positive impact of business enterprise expenditure on R&D on economic growth has been found. Therefore, it can be stated that the increased level of income inequality and political stability could determine the decisions of business enterprises to increase expenditure on R&D.

Even though the positive impact of income of 10.0 per cent of the poorest population on economic growth through the socio-political unrest channel has been estimated in all four groups of the countries, still, in EU-28 states the direct impact of political stability and absence of violence on economic growth was found as insignificant. Therefore, this case also suggests that it is necessary to reduce the level of income inequality in both LILI and LIHI groups of the countries.

The fourth hypothesis has been rejected. In the groups of the countries attributed with a relatively lower level of income inequality and a different level of income per capita, it was found that the impact of the change of income of 10.0 per cent of the wealthiest population on economic growth was negative; and in the groups of the

countries attributed with a relatively higher level of income inequality and a different level of income per capita, it was found that the impact of the change of income of 10.0 per cent of the wealthiest population on economic growth was positive.

It can be stated that income inequality slowed down economic growth in the groups of the countries attributed with a lower level of income inequality under the assumption that political stability increases. Therefore, aiming at economic growth it is necessary to diminish the level of income inequality in these groups of the countries. As political stability was increasing, income inequality stimulated economic growth in the groups of the countries attributed with a higher level of income inequality.

Table 3.8 demonstrates the model of the impact of income inequality on economic growth through the socio-political unrest channel; it points out the indicator, i.e. the rule of law index, reflecting the socio-political unrest channel. In this variant of the model, when assessing the impact of income inequality on economic growth through the socio-political unrest channel, the impact of interaction between income inequality and the law of rule on economic growth is investigated.

Table 3.8

The impact of income inequality on economic growth through the socio-political unrest channel reflected by the rule of law index

Variables	Coefficient values calculated by using robust standard errors (HAC)			
	Indicators of income inequality			
	1	*2*	*3*	*4*
	Gini	*Dec*	*D1*	*D10*
Ineq*Rl	−3.193	**−1.838***	**3.499*****	−3.530
Ineq*Rl*LIHI	−4.872	−1.193	1.646	−4.601
Ineq*Rl*HILI	8.276	**2.594****	**−4.001*****	3.198
Ineq*Rl*HIHI	18.737***	**9.146*****	**−19.124*****	15.937***
Rl	0.220	0.186	0.183	0.202
Educ_tert	0.002	0.014	0.011	0.019
Gov	0.338***	0.334***	0.335***	0.352***
Expr	0.283***	0.301***	0.312***	0.278***
PI	0.178*	0.180*	0.185*	0.166*
Life_exp	−1.398	−1.397*	−1.367	−1.337
N	184	182	182	182
Adjusted R^2	0.786	0.787	0.785	0.784
p-value of testing H0: no autocorrelation	0.050	−0.018	−0.026	0.032
p-value of testing H0: heteroscedasticity not present	0.000	0.000	0.000	0.000

* - sig. level 90%, ** - sig. level 95%, *** - sig. level 99%

Source: designed by the author of the Dissertation referring to the data of the European Union statistical service "Eurostat" (2015) and the data of the World Bank provided in D. Kaufmann, A. Kraay (2016).

In the group of the countries LILI, income inequality approximated by the decile ratio slowed down economic growth through the socio-political unrest channel. The fact that income inequality slowed down economic growth is shown by the negative coefficient value –1.838 at 90.0 per cent of significance (see Table 3.8 column 2).

A negative impact of income inequality approximated by the decile ratio on economic growth through the socio-political unrest channel also has been found in the groups of the countries LIHI and HILI. In the group of the countries LIHI, the coefficient of difference of the impact of income inequality on economic growth comprised –1.193; however, it was statistically insignificant. In the group of the countries HILI, compared to the basic group of countries, the difference of the impact of income inequality on economic growth comprised 2.594 at 95.0 per cent of significance. However, the hypothesis that there is no difference in the impact has been accepted because $p > 0.05$ (see Table 3.8 column 2). Therefore, in the groups of the countries LIHI and HILI, compared to the basic group of countries, there are no differences of the impact (see Table 3.8 column 1). It can be stated that the impact of income inequality on economic growth has been found in the groups of the countries LILI, LIHI and HILI.

However, in the group of the countries HIHI, income inequality through the channel of socio-political unrest channel reflected by the rule of law stimulated economic growth. The fact that income inequality promotes economic growth in the group of the countries HIHI is demonstrated by the difference coefficient 9.146 at 99.0 per cent of significance. The hypothesis that there is no impact if compared to the basic group of the countries has been rejected because $p < 0.05$ (see Table 3.8 column 2). Therefore, it can be stated that, when protection of property rights increased, income inequality stimulated economic growth in the group of the countries attributed with a higher level of income inequality and a lower level of income per capita.

In the group of the countries LILI, LIHI and HILI, the positive impact of income inequality on economic growth through the socio-political unrest channel reflected by the rule of law could be determined by the percentage of income of 10.0 per cent of the poorest population. This means that in the basic group of the countries the coefficient value was positive and comprised 3.499 at 99.0 per cent of significance. In the group of the countries LIHI, the difference coefficient of percentage of income of 10.0 per cent of the poorest population on economic growth through the socio-political unrest channel reflected by the rule of law index comprised 1.646 and was insignificant (see Table 3.8 column 2). Since there is no impact difference in the group of the countries LIHI if compared with the basic group, it can be stated that the impact of increased percentage of income of 10.0 per cent of the wealthiest population on economic growth was positive in the group of these countries, too. In the group of the countries HILI, the difference coefficient of the percentage of income of 10.0 per cent of the poorest population on economic growth comprised –4.001 at 99.0 per cent of significance. However, the hypothesis stating that there is no impact difference in the group of the countries HILI if compared with the basic group of countries has been accepted because $p > 0.05$. Therefore, it can be stated

that, in the groups of the countries LILI, LIHI and HILI, the positive impact of the change of the percentage of income of the poorest population on economic growth has been found.

However, in the group of the countries HIHI, the impact of the change of the percentage of income of 10.0 per cent of the poorest population on economic growth through the socio-political unrest channel reflected by the rule of law index was negative. This means that the difference coefficient of the impact comprised –19.124 at 99.0 per cent of significance. Since there is no difference of the impact of income inequality on economic growth in the group of the countries HIHI if compared to the basic group of the countries, the hypothesis has been rejected because $p < 0.05$. Therefore, it can be stated that, in the group of the countries attributed with a higher level of income inequality and a higher level of income per capita, the change of the percentage of income of the poorest population under a higher property rights protection slowed down economic growth. This may be related with the case that, in the group of the countries HIHI, the poorest population did not use their income at an extent to promote economic growth.

Thus, income inequality under the increasing rule of law slowed down economic growth through the socio-political unrest channel in the groups of the countries LILI, LIHI and HILI. Therefore, it can be stated that, with regard to the rule of law, it is necessary to reduce income inequality in the mentioned groups of the countries. After the level of income inequality increased, the increasing rule of law stimulated economic growth through the socio-political unrest channel in the group of the countries HIHI. In other words, the positive impact of income inequality on economic growth has been estimated in the group attributed with a higher level of income inequality and a higher level of income per capita.

To sum up, it can be stated that after carrying out regression analysis, it has been found out that the negative impact of income inequality in the groups of the countries LILI and LIHI on economic growth through the socio-political unrest channel has been estimated. This means that income inequality slowed down economic growth in the groups of the countries of a lower level of income inequality. In other words, the increasing political stability and protection of property rights were insufficient to stimulate economic growth. Therefore, aiming at economic growth in the mentioned countries, it is necessary to reduce the level of income inequality.

In the groups of the countries HILI and HIHI, the positive impact of income inequality on economic growth through the socio-political unrest channel has been found. This means that after the level of income inequality increased, the increasing political stability stimulated economic growth in the groups of the countries attributed with a higher level of income inequality. As mentioned earlier, the positive impact of business enterprise expenditure on R&D on economic growth in the groups of the countries attributed with a higher level of income inequality has been found. Therefore, it can be stated that political stability could determine the decisions of business enterprises to increase their expenditure on R&D. In the group of a higher level of income inequality and a higher level of income per capita, income inequality and protection of property rights promoted economic growth.

Table 3.9

The impact of income inequality on economic growth through *the fiscal policy channel* reflected by expenditure on social protection

Variables	Coefficient values calculated using robust standard errors (HAC)			
	Indicators of income inequality			
	1	*2*	*3*	*4*
	Gini	*Dec*	*D1*	*D10*
Ineq*Soc_Prot	**−4.672*****	**−2.271*****	**3.557*****	**−4.918*****
Ineq*Soc_Prot*LIHI	2.151	1.323	−1.805	3.708
Ineq*Soc_Prot*HILI	**6.062*****	**2.194*****	**−3.376*****	**5.823****
Ineq*Soc_Prot*HIHI	**17.184****	**8.066*****	**−16.601*****	**14.302*****
Soc_Prot	**0.123*****	**0.122****	**0.119****	**0.128*****
Educ_tert	0.004	0.010	0.009	0.016
Gov	0.314***	0.322***	0.323***	0.327***
Expr	0.290**	0.303***	0.302***	0.290***
PI	0.170*	0.182*	0.189**	0.165*
Life_exp	−1.404	−1.351	−1.302	−1.395
N	181	179	179	179
Adjusted R^2	0.794	0.794	0.793	0.792
p-value of testing H0: no autocorrelation	0.053	0.031	0.029	0.029
p-value of testing H0: heteroscedasticity not present	0.000	0.000	0.000	0.000

* - sig. level 90%, ** - sig. level 95%, *** - sig. level 99%

Source: designed by the author of the Dissertation referring to the data of the European Union statistical service "Eurostat" (2015).

Next, regression analysis of the impact of income inequality on economic growth through the **fiscal policy channel** is carried out. Grounding on the data available in all four columns in Table 3.9, it can be stated that the increase of government expenditure on social protection in EU-28 states could stimulate economic growth in all four groups of the countries.

When assessing the impact of income inequality on economic growth through the fiscal policy channel, the group of the countries LILI has been chosen as the basic group. The model of the impact of income inequality on economic growth presented in Table 3.9 points out the indicator of expenditure on social protection to reflect the fiscal policy channel, i.e. the impact of interaction between income inequality and expenditure on social protection on economic growth is investigated.

Income inequality approximated by the Gini coefficient, the decile ratio and the tenth decile slowed down economic growth in the basic group of the countries. The negative impact of income inequality on economic growth is shown by negative coefficient values –4.672, –2.271 and –4.918 at 99.0 per cent of significance (see Table 3.9 columns 1, 2 and 4).

The negative impact of income inequality on economic growth through the fiscal policy channel has been also found in the groups of the countries LIHI and HILI. In the group of the countries LIHI, the difference coefficients of the impact of income inequality on economic growth through the fiscal policy channel comprised 2.151, 1.323 and 3.708; however, they were statistically insignificant. Therefore, having compared with the basic group of the countries, there are no impact differences in the mentioned group of the countries (see Table 3.9 columns 1, 2 and 4). In the group of the countries HILI, there are no differences of the impact of income inequality approximated by the Gini coefficient and the tenth decile on economic growth, if compared with the basic group of the countries, too. As there are no impact differences, the hypothesis has been accepted because $p > 0.05$ (see Table 3.9 columns 1 and 4). It can be stated that the negative impact of income inequality on economic growth through the fiscal policy channel has been estimated in the groups of the countries LILI, LIHI and HILI. The negative impact of income inequality has been found as expenditure on social protection benefits was increasing.

However, the positive impact of income inequality on economic growth in the group of the countries HIHI has been found. Since the impact in the group of the countries HIHI, if compared to the basic group of the countries, is insignificant, the hypothesis has been rejected because $p < 0.05$. Therefore, it can be stated that the positive impact of income inequality approximated by the Gini coefficient, the decile ratio and the tenth decile on economic growth through the fiscal policy channel has been found in the group of the countries. This means that difference coefficients of the impact comprised 17.184, 8.066 and 14.302 accordingly (see Table 3.9 columns 1, 2 and 4).

It can be stated that, after the level of income inequality increased, increasing government expenditure on social benefits promoted economic growth in the group of the countries HIHI, i. e. in the group of the countries attributed with a higher level of income inequality and a higher level of income per capita. In the latter group of the countries, the positive impact on economic growth could be made by the percentage of income of the wealthiest population and increasing government expenditure on social protection. In other words, after the level of income inequality increased, i.e. the percentage of income of the wealthiest population, more revenue could be collected from the latter population. After revenue increased, government could allocate more money for social protection, thus, stimulating economic growth.

It can be stated that, in the groups of the countries LILI, LIHI and HILI, the change of the percentage of income of the wealthiest population, while government expenditure on social benefits was increasing, slowed down economic growth. This can be estimated using the data taken from all four columns of Table 3.9 demonstrating that in EU-28 states expenditure on social benefits promoted economic growth under the assumption that there was no income inequality. Coefficient values of the impact of expenditure allocated for social protection on economic growth comprised 0.123, 0.122, 0.119 and 0.128. In other words, the obtained results show that the increase of expenditure on social protection by 1.0 per cent increased economic growth by some 0.12–0.13 per cent.

In the groups of the countries LILI, LIHI and HILI, the positive impact of the change of the percentage of income of 10.0 per cent of the poorest population on economic growth has been found. This means that in the basic group of the countries the coefficient value comprised 3.557 at 99.0 per cent of significance. In the group of the countries LIHI, the difference coefficient of the impact of the percentage of income of 10.0 per cent of the poorest population on economic growth comprised –1.805; however, the estimated coefficient was insignificant. Therefore, it can be stated that, after comparison to the basic group of the countries, there is no difference of the impact. In the group of the countries HILI, the coefficient of the impact difference comprised –3.376 at 99.0 per cent of significance; however, in comparison to the basic group of the countries, there is no impact different either (see Table 3.9 column 3). As expenditure on social benefits was increasing the percentage of income of the poorest population stimulated economic growth, it can be stated that the level of income inequality should be reduced in the groups of the countries LILI, LIHI and HILI by increasing expenditure for the socially disadvantaged population. In the mentioned groups of the countries, after the level of income inequality increased, government expenditure on social benefits could be insufficient to promote economic growth. In other words, implementation of the policy of redistribution of income did not reach the expected results because it could be simply inefficient.

However, in the group of the countries HIHI, the negative impact of the change of income of 10.0 per cent of the poorest population on economic growth has been found. The impact difference coefficient comprised –16.601 at 99.0 per cent of significance. Since the impact of the change of the percentage of income of 10.0 per cent of the poorest population on economic growth is insignificant, the hypothesis has been rejected because $p < 0.05$ (see Table 3.9 column 3). Therefore, it can be stated that the mentioned group of the countries should not reduce the income inequality level.

To sum up, it can be stated that, having carried out econometric analysis of the impact of income inequality on economic growth through the fiscal policy channel, it has been found that increasing expenditure on social protection makes a direct impact on economic growth, i.e. stimulates economic growth. However, after the level of income inequality increased, increasing expenditure on social protection slowed down economic growth in all groups of the countries, except for the group of the countries attributed with a higher level of income inequality and a higher level of income per capita. In the earlier group of the countries, not only increasing expenditure on social protection but also income inequality could promote economic growth. This is shown by the positive impact of the increasing income of the wealthiest population and expenditure allocated for social protection on economic growth. Moreover, it has been found that increasing expenditure on social protection and the change of the percentage of income of the poorest population in the group of the countries attributed with a higher level of income inequality and a higher level of income per capita slowed down economic growth.

In all groups of the countries, except for the group of the countries attributed with a higher level of income inequality and a higher level of income per capita, when increasing expenditure on economic protection, a negative impact on economic growth could be made by they change of the percentage of income of the wealthiest population. In other words, expenditure on social protection could be insufficient to achieve the positive impact on economic growth. Moreover, in all groups of the countries, except for the group of the countries attributed with a higher level of income inequality and a higher level of income per capita, increasing expenditure on social protection and the percentage of the poorest population stimulated economic growth. Therefore, it is necessary to reduce the level of income inequality in the mentioned groups of the countries.

CONCLUSIONS

When solving the scientific problem formulated in the Dissertation and aiming to achieve the set aim and objectives, the obtained research results can be generalised in the following conclusions:

1. In scientific literature, income inequality is defined by income differences in economics among individuals, households, countries or any other combination of an identified subject in economics. However, aiming to assess income inequality, scientific literature does not provide any common agreement concerning the most suitable indicator for income inequality, also, opinions of scientists differ concerning the impact of income inequality on economic growth. According to the *welfare economics* and representatives of *institutionalism*, increasing income inequality slows down economic growth, and, as representatives of the *neo-Austrian school* and *supply-side economics* state, it stimulates economic growth.
2. Performed analysis of theoretical literature and empirical research reveals that the impact of income inequality on economic growth can be assessed through the saving channel, the credit-market imperfections channel, the socio-political unrest channel, the fiscal policy channel. Income inequality through the saving channel should stimulate economic growth because increasing income inequality increases the saving rate, volume of investment, expenditure on technological development of the wealthy population. Income inequality through the credit-market imperfections channel should slow down economic growth because increasing income inequality reduces income of the poor population. At credit-market imperfections present, the possibilities for these people to borrow money to attain higher (tertiary) education may be limited. Income inequality through the socio-political unrest channel should also slow down economic growth because the increasing level of economic growth increases political instability, diminishes the rule of law. The impact of income inequality on economic growth through the fiscal policy channel is ambiguous.

Regarding the level of income inequality, the government can implement the policy of income redistribution. Increasing taxes for the wealthiest population make a negative impact on economic growth, and increasing expenditure on social protection stimulates economic growth.

3. The impact of income inequality on economic growth can be investigated through various transmission channels which show diverse impact of income inequality on economic growth. The results of research studies conducted by scientists show that the impact may differ in assessment of both direct impact of income inequality on economic growth and through different transmission channels because different research methods are employed, the sample of countries differs, various research periods are covered, various indicators reflecting the channels and various independent variables are used.
4. Having summed up the results of the theoretical and empirical research, the assessment model and methods have been designed. Grounding on the designed model and methods of assessment, first of all, EU-28 countries are divided according to the level of income inequality and the level of income per capita, dynamic analysis of the variables is discussed. The impact of income inequality on economic growth is assessed through the saving channel, the credit-market imperfections channel, the socio-political unrest channel and the fiscal policy channel; also, through different variants of the models of impact channels, i.e. different variables reflecting the channels. Different variables show whether the impact of income inequality on economic growth through a particular transmission channel under investigation differs.
5. Having grouped the countries to the four groups according to the level of income inequality and the level of income per capita, it had been found that the highest average values of the decile ratio and the tenth decile were estimated in the groups of the countries attributed with the highest values of the Gini coefficient and different real GDP per capita. In the groups of the countries attributed with a higher level of income inequality, the least percentage of income of the poorest population was found.
6. Assessing the impact of income inequality on economic growth through the saving channel it was found that in all four groups of the countries income inequality slowed down economic growth. This is shown by a negative impact of the increase of the percentage of income of the wealthiest population and the saving rate on economic growth. Since the increase of the percentage of income of the poorest population and the saving rate promoted economic growth, we can state that it is necessary to reduce the level of income inequality.
7. The impact of income inequality on economic growth through the saving channel reflected by the variable of the volume of investment was estimated as insignificant in all four groups of the countries. However, in the groups of the countries attributed with a higher level of income inequality and a different level of income per capita, income inequality through the saving channel stimulated economic growth under the condition that business enterprise expenditure on technological development is being increased. It can be stated that, aiming at

economic growth, all groups of the countries should either diminish the level of income inequality or the wealthiest population should increase expenditure on technological development in the groups of a higher level of income inequality.

8. The ambiguous impact of income inequality on economic growth manifested not only through the saving channel but also through the credit-market imperfections channel reflected by different variables. Through the credit-market imperfections channel, income inequality and the increasing level of private sector credits stimulated economic growth in all groups of the countries; however, the increasing level of attained education did not promote economic growth. The increasing level of attained education did not promote economic growth under an assumption that there was no income inequality, too. It can be stated that, through the credit-market imperfections channel, income inequality stimulated economic growth only because of granted private sector credits.
9. Grounding on the obtained results it can be stated that, also through the socio-political unrest channel, following the increased level of income inequality, in the groups of the countries with a higher level of income inequality, a decision made by business enterprises to increase expenditure on R&D could be determined by a higher political stability. This is shown by the positive impact of the increasing percentage of income of the wealthiest population and the increasing political stability on economic growth. In the groups of the countries attributed with a higher level of income inequality and a different level of income per capita, a decision of business enterprises to increase expenditure on R&D could be determined by the increasing protection of property rights, too.
10. As mentioned earlier, economic growth can be promoted not only by business enterprise expenditure on R&D but also by implementation of the policy of income redistribution through the fiscal policy channel aiming at the decrease of income inequality. However, the increase of the level of income inequality and expenditure on social protection slowed down economic growth in all groups of the countries, except for the group of the countries with a higher level of income inequality and the level of income per capita. In the latter group of the countries, a positive impact of the increasing level of income inequality on economic growth could be determined by the percentage of income of the wealthiest population. In other words, as the percentage of income of the wealthiest population increased and the policy of income redistribution was being implemented, more revenue could be collected and more expenditure could be allocated to social protection. However, after expenditure on social protection and the percentage of income of the poorest population increased, a negative impact on economic growth was found in the mentioned group of the countries. In all groups of the countries accordingly, except for the group of the countries with a higher level of income inequality and a higher level of income per capita, a negative impact on economic growth could be made by the increasing percentage of income of the wealthiest population.
11. It can be stated that, in the group of the countries with a higher level of income inequality and a different level of income per capita, income inequality stimulated

economic growth. A positive impact of income inequality could be determined by the increase of the percentage of income of the wealthiest population. While saving more, the wealthy population allocated part of the funds to technological development, credit market. Such decisions of the people could be determined by political stability, and, additionally, by higher protection of property rights in the group of the countries attributed with a higher level of income inequality and a higher level of income per capita. In the group of the countries attributed with a higher level of income inequality and a higher level of income per capita, increasing income of the wealthiest population could determine higher revenue and higher government expenditure on social protection.

12. In the groups of the countries attributed with a lower level of income inequality and a different level of income per capita, income inequality slowed down economic growth. Saving more, the wealthiest population allocated insufficient capital to investment, and the increasing income of the poorest population stimulated economic growth. Such decisions of the wealthiest population could be determined by insufficient political stability and poorer protection of property rights. After the level of income inequality increased, government expenditure on social protection could be insufficient to promote economic growth; therefore, in the groups of the countries attributed with a lower level of income inequality and a different level of income per capita, it is necessary to reduce the level of income inequality.
13. It can be stated that in the groups of the countries attributed with a lower level of income inequality and a different level of income per capita, aiming at economic growth, it is necessary to reduce the level of income inequality because a negative impact of income inequality on economic growth has been found in the countries of the latter group. In the groups of the countries attributed with a higher level of income inequality and a different level of income per capita, aiming at economic growth, it is necessary either to diminish the level of income inequality or to increase business enterprise expenditure on technological development.
14. When solving the fifth objective of the Dissertation, the empirical part of the Dissertation tested four research hypotheses. The first hypothesis had been proven because the negative impact of income inequality on economic growth was estimated in the group of the countries attributed with a lower level of income inequality and a higher level of income per capita However, a positive impact of income inequality on economic growth has been found in other groups of the countries.

With regard to a positive impact of income inequality on economic growth through the saving channel reflected by business enterprise expenditure on R&D, the second hypothesis has been proven, too. The second hypothesis has been proven because, in the group of the countries attributed with a higher level of income inequality and a higher level of income per capita, pointing out business enterprise expenditure on R&D, income inequality approximated by the decile ratio stimulated economic growth through the saving channel. In other words, income inequality promoted economic growth while business enterprise expenditure on R&D

increased. Therefore, it can be stated that business enterprises allocate increasingly more funds for technological development, and increasing expenditure on R&D stimulated economic growth.

The third hypothesis has been rejected because, in the group of the countries attributed with a higher level of income inequality and a lower level of income per capita, increase of income inequality promoted economic growth through the credit-market imperfections channel reflected by the level of the private sector credits. In other words, as the level of the private sector credits increased, income inequality stimulated economic growth. Thus, we can state that after the level of income inequality increased, the poorest population could be granted credits; therefore, this could stimulate economic growth. However, an insignificant impact of income inequality on economic has been found out pointing out the level of attained higher (tertiary) education.

The fourth hypothesis has been rejected. In the groups of the countries attributed with a lower level of income inequality and a different level of income per capita, it has been found that the impact of increase of 10.0 per cent of the part of income of the wealthiest population on economic growth is negative. However, in the groups of the countries attributed with a higher level of income inequality and a different level of income per capita, in the cases when a positive impact of income inequality on economic growth has been found, a positive impact of the increase of 10.0 per cent of the part of income of the wealthiest population has been also found. This shows that, in the groups of the countries attributed with a higher level of income inequality and a different level of income per capita, increasing income of the wealthiest population stimulated economic growth.

In the groups of the countries attributed with a lower level of income inequality and a different level of income per capita, it has been found that the impact of income of 10.0 per cent of the part of the wealthiest population on economic growth was positive. Therefore, economic growth was promoted by the decreasing level of income inequality. However, in the groups of the countries attributed with a higher level of income inequality and a different level of income, having estimated a positive impact of income inequality on economic growth, a negative impact of 10.0 per cent of the part of income of the poorest population on economic growth has been found. This shows that income inequality stimulated economic growth.

Substantiating on the results and limitations of the Dissertation research, the following directions for further research are available:

1. To perform research on assessment of the impact of income inequality on economic growth not in the European Union states but for the cases of the countries of South and North Americas, Asia.
2. Research on the impact of income inequality on economic growth can be expanded by using other variables reflecting the transmission channels.
3. The research can be conducted aiming to investigate the interactions among the transmission channels of the impact of income inequality on economic growth.
4. Assessment of the impact of income inequality on sustainable economic growth through different transmission channels can be carried out.

5. Other directions for research are the optimal level of income inequality stimulating economic growth; the impact of economic growth on income inequality.

Approval and dissemination of the results of the Dissertation. The results of the research were presented in the publications from the list referred to in the international data bases approved by the Research Council of Lithuania:

1. Čiegis, R., **Dilius, A.**, Andriuškevičius, K. An Assessment of Impact of Income Inequality on Sustainable Economic Growth in the Context of Saving. *Inžinerinė ekonomika-Engineering Economics*, ISSN 1392-2785, 2017 3(28), p. 232–239.
2. Čiegis, R., **Dilius, A.**, Martinaitytė, L. Pajamų nelygybės poveikio darniam ekonomikos augimui vertinimas taikant IDVI [Assessment of the Impact of Income Inequality on Sustainable Economic Growth by Applying the IDVI]. *Taikomoji ekonomika: sisteminiai tyrimai [Applied Mathematics: Systemic Research]*, ISSN 2335-8742, 2016 1(10), p. 13–26.
3. Čiegis, R., **Dilius, A.** Pajamų nelygybės poveikio darniam ekonomikos augimui vertinimas [Assessment of the Impact of Income Inequality on Sustainable Economic Growth]. *Darnaus vystymosi problemos ir jų sprendimai Lietuvoje [Issues of Sustainable Development and Their Solutions in Lithuania]*, ISBN 978-609-449-091-0, 2015, Vilniaus universitetas, Aleksandro Stulginskio universitetas, p. 9–50.
4. Tamašauskienė, Z., **Dilius, A.** Diskusiniai pajamų nelygybės poveikio ekonomikos augimui vertinimo klausimai [Discussion Issues on Assessment of the Impact of Income Inequality on Economic Growth]. *ŠU mokslo studija* „Socialinių-ekonominių procesų Lietuvoje raidos prieštaros: teorija ir praktika“ [*ŠU research study* “Contradictions of Evolution of Social-Economic Processes in Lithuania: Theory and Practice”], ISBN 9786098080360, 2015, p. 30–45.
5. Čiegis, R., **Dilius, A.** Ekonominio augimo poveikio pajamų nelygybei teorinis pagrindimas [Theoretical Substantiation of the Impact of the Economic Growth on Income Inequality]. *Management Theory and Studies for Rural Business and Infrastructure*, ISSN 1822-6760, 2013 3(35), p. 368–375.

The results of the Dissertation were presented at international scientific conferences:

1. 2016, “Assessment of the Impact of Income Inequality on Economic Growth”, 16th international scientific conference named after Ernestas Galvanauskas held at Šiauliai University, Šiauliai.
2. 2015, “Assessment of the Impact of Income Inequality on Sustainable Economic Growth”, scientific conference “Sustainable Development: Theory and Practical Implementation”, held at Vilnius University Kaunas Faculty of Humanities, Kaunas.
3. 2014, “Assessment of the Impact of Income Inequality on Economic Growth in the Theoretical Aspect”, 14th international scientific conference named after Ernestas Galvanauskas held at Šiauliai University, Šiauliai.

ĮVADAS

Temos aktualumas. Pasaulyje pajamų nelygybė tampa ypač aktuali dėl jos nuolatinio augimo. Pajamų nelygybė didėja daugelyje pasaulio šalių, o šalyse, kuriose pajamų nelygybė mažėja, pastebimas santykinai aukštas pajamų nelygybės lygis. Pajamų nelygybės didėjimas yra aktualus ir dėl sąsajų su socialiniais ekonominiais reiškiniais. Pajamų nelygybė lemia skurdą, migraciją, mažesnį išsilavinimo lygį, neigiamai veikia gyventojų sveikatą bei sąlygoja kitas mikro- ir makrolygmens socialines ekonomines pasekmes.

Ypatingas dėmesys pajamų nelygybei buvo skirtas po 2008 m. pasaulyje įvykusios ekonomikos Didžiosios recesijos. Teigiama, kad būtent pajamų nelygybė buvo pagrindinė jos priežastis. Pajamų nelygybės daromą poveikį ekonomikos augimui rodo įvairūs pasaulyje atlikti tyrimai. Pajamų nelygybės poveikis ekonomikos augimui pasireiškia ir Lietuvoje bei kitose Europos Sąjungos šalyse.

Kadangi pajamų nelygybė kaip dinamiškas reiškinys nuolat kinta, jo pokytis gali turėti nevienareikšmį poveikį ekonomikos augimui. Todėl pajamų nelygybės kitimo stabilizavimas ir orientavimas į ekonomikos augimo skatinimą lemia tam tikrus teorinius pagrindimus ir praktinius sprendimus.

Mokslinėje literatūroje atkreipiamas tyrėjų dėmesys į tokias svarbias pajamų nelygybės ekonomikoje problemas: kaip matuojama pajamų nelygybė; kokie veiksniai lemia pajamų nelygybės didėjimą; kokie pajamų nelygybės padariniai vartojimui, investicijoms, išsilavinimui, gyventojų sveikatai, skurdui, migracijai, aplinkosaugai ir kt. Reikia pabrėžti tai, kad tyrimuose ir toliau yra diskutuojama dėl pajamų nelygybės poveikio ekonomikos augimui. Taigi moksliniu požiūriu yra prasminga plėtoti tyrimus apie pajamų nelygybės poveikį ekonomikos augimui.

Pajamų nelygybės poveikio ekonomikos augimui aktualumas grindžiamas ir tuo, kad vyriausybės, atsižvelgdamos į pajamų nelygybės poveikį ekonomikos augimui, vykdo pajamų perskirstymo politiką, siekdamos sumažinti pajamų nelygybę ir paskatinti ekonomikos augimą.

Pajamų nelygybės tyrimai atliekami įvairiuose pasaulio mokslinių tyrimų institutuose: Luxembourg Income Study (2017), Luxembourg Institute of Socio_Economic Research (2017), Stone Center on Socio-Economic Inequality (2017), International Inequalities Institute (2017), Inequality.org (2016). Taigi, pajamų nelygybės poveikio ekonomikos augimui problema yra aktuali tiek teoriniu, tiek praktiniu požiūriu.

Mokslinė problematika ir jos ištyrimo lygis. Didėjanti pajamų nelygybė skatina diskusijas apie pajamų nelygybės daromą poveikį ekonomikos augimui. Nors S. Kuznetsas (1955) nagrinėjo ekonomikos augimo poveikį pajamų nelygybės lygiui, tačiau kiti mokslininkai teigė, kad derėtų tirti ne ekonomikos augimo poveikį pajamų nelygybei, bet pajamų nelygybės poveikį ekonomikos augimui (Charles-Coll, Mayer-Granados, 2017; Charles-Coll, 2013, 2010; Marrero, Rodriguez, 2012; Chen, 2003; Persson, Tabellini, 1991). Remiantis atliktų mokslinių tyrimų rezultatais, socialinė ekonominė nelygybė stabdo ekonomikos augimą ir gyventojų gyvenimo kokybės kilimą (Rakauskienė ir kt., 2017).

Galima išskirti dvi mokslininkų, vertinusių pajamų nelygybės poveikį ekonomikos augimui, grupes. Vieni mokslininkai (Agénor, Canuto, 2013; Azevedo, Inchaust, Sanfelice, 2013; Brzeziński, 2013; ir kt.) tyrė tiesioginį pajamų nelygybės poveikį ekonomikos

augimui. Jų atliktų tyrimų rezultatai rodo, kad pajamų nelygybė gali daryti teigiamą, neigiamą ar nereikšmingą poveikį ekonomikos augimui. Tačiau minėti mokslininkai netyrė, kokiu būdu, kokiais kanalais šis poveikis pasireiškia. Kiti mokslininkai (Castells-Quintana, Royuela, 2014; Gründler, Scheuermeyer, 2014; Halter, Oechslin, Zweimüller, 2013; ir kt.) tyrė pajamų nelygybės poveikį ekonomikos augimui transmisijos kanalais.

Mokslininkų (Guvenen, Kuruscu, Ozkan, 2014; Brzeziński, 2013; Markey-Towler, Foster, 2013; Heckman, Yi, 2012; Herzer, Vollmer, 2012; Hasanov, Izraeli, 2011; Rooth, Stenberg, 2011; Claessens, Perotti, 2007), tyrusių pajamų nelygybės tiesioginį poveikį ekonomikos augimui, atliktų tyrimų rezultatai skiriasi. Minėti autoriai savo tyrimuose naudojo skirtingus pajamų nelygybės rodiklius ir skirtingus ekonomikos augimą lemiančius veiksnius.

Pasaulyje atlikta palyginti nedaug tyrimų, kuriuose vertinamas pajamų nelygybės poveikis ekonomikos augimui transmisijos kanalais. Mokslininkai tyrė pajamų nelygybės poveikį ekonomikos augimui šiais aspektais: taupymo kanalu (Gründler, Scheuermeyer, 2014; Castells-Quintana, Royuela, 2014; Halter, Oechslin, Zweimüller, 2013; ir kt.); kreditų rinkos netobulumo kanalu (Gründler, Scheuermeyer, 2014; Castells-Quintana, Royuela, 2014; Halter, Oechslin, Zweimüller, 2013; Charles-Coll, 2012; Muinelo-Gallo, Roca-Sagalés, 2011; Malinen, 2009; ir kt.); socialinių politinių neramumų kanalu (Gründler, Scheuermeyer, 2014; Castells-Quintana, Royuela, 2014; Charles-Coll, 2012; ir kt.); fiskalinės politikos kanalu (Gründler, Scheuermeyer, 2014; Castells-Quintana, Royuela, 2014; Charles-Coll, 2012; ir kt.); kapitalo rinkos netobulumo ir investicijų kanalu (Panizza, 1999), investicijų nedalumo kanalu (Castells-Quintana, Royuela, 2014). Minėti autoriai tyrė pajamų nelygybės poveikį ekonomikos augimui vienu ar dviem transmisijos kanalais, taip pat naudojo skirtingus transmisijos kanalus atspindinčius kintamuosius. Nėra bendro sutarimo, kokie kintamieji turėtų būti naudojami, tiriant pajamų nelygybės poveikį ekonomikos augimui. Taip pat trūksta pajamų nelygybės poveikio ekonomikos augimui transmisijos kanalais tyrimų.

J. A. Charles-Coll, E. L. Mayer-Granados (2017), J. A. Charles-Coll (2010), B. L. Chen (2003), R. J. Barro (2000) ir kt. argumentuoja, kad, vertinant pajamų nelygybės poveikį ekonomikos augimui, derėtų atsižvelgti ne tik į pajamų nelygybę ir jos *kitimą*, bet ir į pajamų nelygybės *lygį*. Nuo pajamų nelygybės lygio šalyse gali priklausyti, kokiu mastu pajamų nelygybės kitimas lėtins ar skatins ekonomikos augimą. Pajamų nelygybės poveikis ekonomikos augimui gali priklausyti ne tik nuo pajamų nelygybės lygio, bet ir nuo pajamų vienam gyventojui lygio (Gründler, Scheuermeyer, 2014; Jaumotte, Lall, Papageorgiou, 2013; Herzer, Vollmer, 2012; Malinen, 2009, 2008; Barro, 2000; Forbes, 2000).

Atliktų mokslinių tyrimų rezultatai rodo, kad pajamų nelygybės poveikio ekonomikos augimui nevienareikšmius rezultatus gali lemti ir analizuojamas laikotarpis. J. A. Charles-Coll (2010), R. A. Nahum (2005), B. L. Chen (2003) ir kt. tyrė pajamų nelygybės ir ekonomikos augimo ryšį skirtingais laikotarpiais. Minėtų autorių tyrimų rezultatai rodo, kad pajamų nelygybės poveikis ekonomikos augimui trumpuoju ir ilguoju laikotarpiais yra skirtingas.

Empiriniuose tyrimuose yra naudojami skirtingi kintamieji, kuriais matuojama pajamų nelygybė. Dažniausiai yra naudojamas pajamų nelygybę aproksimuojantis kintamasis – Gini koeficientas. Tyrimų, kuriuose vertinamas pajamų skirtumų viršutiniame ir apatiniame pajamų pasiskirstymo kraštuose poveikis ekonomikos augimui, yra santyki-

nai mažai. Prie tokių tyrimų galima priskirti F. Guvenen, B. Kuruscu, S. Ozkan (2014), R. J. Barro (2000), K. J. Forbes (2000) atliktus pajamų nelygybės poveikio ekonomikos augimui vertinimus.

Apibendrinant galima teigti, kad mokslinėje literatūroje atkreipiamas dėmesys į tokias pajamų nelygybės poveikio ekonomikos augimui problemas: kaip matuoti pajamų nelygybę; kokiais kanalais pajamų nelygybė daro poveikį ekonomikos augimui; kokiais kintamaisiais atspindėti skirtingus poveikio kanalus; kaip pajamų nelygybės poveikis ekonomikos augimui įvairiais kanalais priklauso nuo pajamų nelygybės lygio, jos kitimo, šalies išsivystymo lygio.

Mokslininkai tyrimuose dažniausiai vertina tiesioginį pajamų nelygybės poveikį ekonomikos augimui. Tačiau neplėtojami tyrimai, kuriuose yra vertinamas pajamų nelygybės poveikis ekonomikos augimui skirtingais transmisijos kanalais. Įvertinus disertacijoje išanalizuotus tyrimus, galima teigti, jog pajamų nelygybės poveikis ekonomikos augimui šalių grupėse, išskirtose pagal pajamų nelygybės lygį ir pajamų vienam gyventojui lygį, nėra nagrinėtas.

Tyrimas, atliktas šioje disertacijoje, skiriasi nuo anksčiau minėtų autorių atliktų tyrimų trimis aspektais. Pirma, disertacijoje siekiama įvertinti, kaip skirtingą pajamų nelygybės poveikį ekonomikos augimui galima susieti su šalių pajamų nelygybės lygiu ir išsivystymo lygiu, todėl ES-28 šalys sugrupuotos į keturias grupes. Keturių šalių grupių išskyrimas leis nustatyti, kokiu mastu skiriasi pajamų nelygybės poveikis ekonomikos augimui vienodo pajamų nelygybės lygio, bet skirtingo šalių išsivystymo grupėse; kiek skiriasi poveikis vienodo šalių išsivystymo, bet skirtingo pajamų nelygybės lygio šalių grupėse. Antra, pajamų nelygybės poveikiu ekonomikos augimui neabejojama, tačiau nepakankamai dėmesio skiriama aiškinantis, kokiais kanalais šis poveikis pasireiškia. Pajamų nelygybės poveikis ekonomikos augimui tiriamas taupymo kanalu, kreditų rinkos netobulumo kanalu, socialinių politinių neramumų kanalu, fiskalinės politikos kanalu. Trečia, vertinant pajamų nelygybės poveikį ekonomikos augimui, naudojami keturi skirtingi pajamų nelygybę atspindintys kintamieji. Siekiant atlikti pajamų nelygybės poveikio ekonomikos augimui vertinimą, šie keturi pajamų nelygybę atspindintys kintamieji vienas kitą papildo.

Mokslinė problema – koks yra pajamų nelygybės poveikis ekonomikos augimui ir kaip įvertinti pajamų nelygybės poveikį ekonomikos augimui.

Tyrimo objektas – pajamų nelygybės poveikis ekonomikos augimui.

Tyrimo tikslas – išnagrinėjus pajamų nelygybės poveikio ekonomikos augimui teorines interpretacijas, sudaryti pajamų nelygybės poveikio ekonomikos augimui vertinimo modelį ir jį empiriškai patikrinti skirtingose šalių grupėse. Siekiant išsikelto tikslo, sprendžiami konkretūs uždaviniai.

Tyrimo uždaviniai:

1. Aptarti pajamų nelygybės reiškinio turinį ir sampratą, jos matavimo diskusinius klausimus, sugrupuoti ir apibendrinti pajamų nelygybės poveikio ekonomikos augimui teorijas.
2. Teoriškai pagrįsti pajamų nelygybės poveikio ekonomikos augimui transmisijos kanalus.
3. Atlikti pajamų nelygybės poveikio ekonomikos augimui mokslinių tyrimų analizę.
4. Sudaryti pajamų nelygybės poveikio ekonomikos augimui vertinimo modelį ir parengti tyrimo metodiką.

5. Empiriškai patikrinti siūlomo modelio pritaikymo galimybes ES šalių, išskirtų pagal pajamų nelygybės lygį ir pajamų vienam gyventojui lygį, grupėse.

Darbo mokslinį naujumą ir praktinį reikšmingumą nusako šie rezultatai:

1. Atskleidus skirtingus požiūrius į pajamų nelygybės poveikį ekonomikos augimui, disertacijoje pagrįstas poreikis vertinti pajamų nelygybės poveikį ekonomikos augimui ne tik tiesiogiai, bet ir transmisijos kanalais. Atliekant mokslinių tyrimų analizę, išskirti pagrindiniai transmisijos kanalai, kuriais pajamų nelygybė daro poveikį ekonomikos augimui. Identifikuoti transmisijos kanalus atspindintys kintamieji. Vertinant pajamų nelygybės poveikį ekonomikos augimui transmisijos kanalais, yra naudojami keturi pajamų nelygybės rodikliai. Skirtingi transmisijos kanalus ir pajamų nelygybę atspindintys kintamieji parodo, dėl kokių priežasčių skiriasi pajamų nelygybės poveikis ekonomikos augimui.
2. Atlikus pajamų nelygybės poveikio ekonomikos augimui teorinę analizę ir remiantis kitų mokslininkų empirinių tyrimų rezultatų apibendrinimu, sudarytas pajamų nelygybės poveikio ekonomikos augimui vertinimo modelis. Į modelį įtraukti keturi pajamų nelygybės poveikio ekonomikos augimui transmisijos kanalai, kuriuos atspindi kintamieji. Pajamų nelygybės poveikį ekonomikos augimui transmisijos kanalais parodo pajamų nelygybę ir transmisijos kanalus atspindinčių kintamųjų sąveikos. Modelis gali būti taikomas, analizuojant pajamų nelygybės poveikį ekonomikos augimui transmisijos kanalais, skirtingose šalių grupėse.
3. Konkrečiai atliekant poveikio vertinimą transmisijos kanalais ir naudojant pajamų nelygybę ir kanalus atspindinčių kintamųjų sąveikas, įvertinta pajamų nelygybės poveikio ekonomikos augimui kryptis bei skirtingų transmisijos kanalų poveikio stiprumas šalių grupėse, išskirtose pagal pajamų nelygybės lygį ir pajamų vienam gyventojui lygį.
4. Tyrimu nustatyta, kad pajamų nelygybės poveikis ekonomikos augimui keturiais transmisijos kanalais skiriasi skirtingose šalių grupėse. Žemesnio pajamų nelygybės lygio ir skirtingo pajamų vienam gyventojui lygio šalių grupėse nustatytas pajamų nelygybės neigiamas poveikis ekonomikos augimui. Aukštesnio pajamų nelygybės lygio ir skirtingo pajamų vienam gyventojui lygio šalių grupėse nustatytas teigiamas poveikis ekonomikos augimui. Pajamų nelygybės skirtingas poveikis ekonomikos augimui priklauso nuo transmisijos kanalų, nuo juos atspindinčių kintamųjų ir nuo pajamų nelygybę atspindinčių kintamųjų.
5. Pajamų nelygybės poveikio ekonomikos augimui vertinimo rezultatai gali būti svarbūs ir praktiškai naudojami institucijose, kuriose yra priimami sprendimai siekiant šalyje mažinti pajamų nelygybę ir skatinti ekonomikos augimą.
6. Gauti tyrimo rezultatai gali būti naudojami kuriant ar plėtojant šalies ar šalių grupių ekonominio augimo strategijas.

Disertacinio tyrimo hipotezės. Siekiant įvertinti pajamų nelygybės poveikį ekonomikos augimui, keliamos šios hipotezės:

H_1: Pajamų nelygybės kitimas daro skirtingą poveikį ekonomikos augimui skirtingo pajamų nelygybės lygio ir skirtingo pajamų vienam gyventojui lygio šalių grupėse.

H_2: Pajamų nelygybės didėjimas skatina ekonomikos augimą taupymo kanalu santykinai aukštesnio pajamų nelygybės lygio ir santykinai aukštesnio pajamų vienam gyventojui lygio šalių grupėje.

H_3: Pajamų nelygybės didėjimas lėtina ekonomikos augimą kreditų rinkos netobulumo kanalu santykinai aukštesnio pajamų nelygybės lygio ir santykinai žemesnio pajamų vienam gyventojui lygio šalių grupėje.

H_4: Turtingiausio asmenų sluoksnio pajamų dalies didėjimas transmisijos kanalais lėtina ekonomikos augimą.

Disertacinio tyrimo apribojimai. Disertacijoje atsiribota nuo ekonomikos augimo poveikio pajamų nelygybei, t. y. šiame darbe tiriamas pajamų nelygybės poveikis ekonomikos augimui. Remiantis teorija, pajamų nelygybės poveikis ekonomikos augimui yra vertinamas transmisijos kanalais: taupymo kanalu, kreditų rinkos netobulumo kanalu, socialinių politinių neramumų kanalu, fiskalinės politikos kanalu. Nors tarp pajamų nelygybės poveikio ekonomikos augimui kanalų egzistuoja tarpusavio ryšiai, tačiau pagal sudarytą modelį transmisijos kanalų tarpusavio ryšiai empiriškai nėra tiriami.

Tiriant pajamų nelygybės poveikį ekonomikos augimui fiskalinės politikos kanalu įvairių šalių grupėse, atsiribojama nuo mokesčių tarifų, nes skirtingose šalyse gali būti taikoma skirtinga fiskalinė politika.

Metodai. Tiriant pajamų nelygybės poveikį ekonomikos augimui teoriniu aspektu, apibrėžiant pajamų nelygybės sampratą, matavimo svarbą, taip pat išskiriant pajamų nelygybę lemiančius veiksnius, atliekama mokslinės literatūros analizė. Vertinant disertacijos mokslinės problematikos ištirtumo lygį ir sudarant modelį bei rengiant tyrimo metodiką, atliekamas mokslinės literatūros apibendrinimas, lyginimas, grupavimas, taikomas modeliavimo metodas.

Empiriniame tyrime atliekama statistinių duomenų analizė, grupavimas, lyginamoji analizė, grafinis duomenų vaizdavimas, panelinių duomenų koreliacinė ir regresinė analizė. Koreliacinė ir regresinė analizė atliekama naudojant Gretl programą. Vertinant pajamų nelygybės poveikį ekonomikos augimui naudojamas mažiausių kvadratų metodas. Kadangi įprastu mažiausių kvadratų metodu realizuotų modelių paklaidos pasižymi heteroskedastiškumu, ekonometrinių modelių įverčiai apskaičiuoti naudojant stabilizuotų liekamųjų paklaidų regresiją. Atliekant ekonometrinę analizę duomenys logaritmuojami, diferencijuojami, apskaičiuojama kintamųjų sąveika. Ekonometrinio modelio patikimumui vertinti naudojamas White'o testas, Durbino-Watsono testas. Hipotezėms patvirtinti arba paneigti ir išvadoms suformuluoti naudojama loginė analizė.

Darbo struktūra ir apimtis. Disertaciją sudaro įvadas, trys dalys, išvados ir literatūros šaltinių sąrašas. Pateikti 8 priedai. Darbo apimtis 138 puslapiai. Darbe yra 20 paveikslų ir 31 lentelė. Panaudoti 176 literatūros šaltiniai. 1 paveiksle pateikta disertacijos loginė struktūra ir sprendžiami uždaviniai.

Pirmoje dalyje sprendžiami pirmieji trys uždaviniai. Sprendžiant pirmąjį uždavinį, aptarti pajamų nelygybės reiškinio turinys ir samprata, jos matavimo diskusiniai klausimai, pajamų nelygybę lemiantys veiksniai, apibendrintos pajamų nelygybės poveikio ekonomikos augimui teorijos. Sprendžiant antrąjį uždavinį, pagrįsti pajamų nelygybės poveikio ekonomikos augimui kanalai teoriniu aspektu. Sprendžiant trečiąjį uždavinį, atlikta kitų autorių, nagrinėjusių pajamų nelygybės poveikį ekonomikos augimui, empirinių tyrimų analizė.

Antroje dalyje sprendžiamas ketvirtasis uždavinys. Sukonstruotas pajamų nelygybės poveikio ekonomikos augimui vertinimo modelis. Taip pat parengta pajamų nelygybės poveikio ekonomikos augimui vertinimo metodika ir aptarti empiriniame tyrime naudojami kintamieji.

Trečioje dalyje sprendžiamas penktasis uždavinys. ES-28 šalys sugrupuotos pagal pajamų nelygybės lygį ir pajamų vienam gyventojui lygį. Atlikta rodiklių, atspindinčių pajamų nelygybę, ekonomikos augimą ir transmisijos kanalus, analizė, lyginimas. Po to empiriškai patikrintos siūlomo modelio pritaikymo galimybės ES šalių grupėms. Apibendrinti atlikto empirinio tyrimo rezultatai.

IŠVADOS

Sprendžiant disertacijoje suformuluotą mokslinę problemą ir siekiant išsikelto tikslo bei užsibrėžtų uždavinių įgyvendinimo gautus tyrimų rezultatus galima apibendrinti šiose išvadose:

1. Mokslinėje literatūroje pajamų nelygybė yra apibrėžiama pajamų skirtumais ekonomikoje tarp individų, asmenų, namų ūkių, šalių ar bet kurio kito identifikuojamo subjektų derinio. Tačiau, siekiant įvertinti pajamų nelygybę, mokslinėje literatūroje nėra bendro sutarimo, koks pajamų nelygybės rodiklis yra tinkamiausias, taip pat skiriasi mokslininkų nuomonės dėl pajamų nelygybės poveikio ekonomikos augimui. Remiantis *gerovės ekonomikos* teorija ir *institucionalizmo* atstovais, didėjanti pajamų nelygybė lėtina ekonomikos augimą, o *neoaustriškosios mokyklos* ir *pasiūlos ekonomikos* šalininkų teigimu – skatina ekonomikos augimą.
2. Atlikta teorinės literatūros ir empirinių tyrimų analizė atskleidė, kad pajamų nelygybės poveikis ekonomikos augimui gali būti vertinamas taupymo kanalu, kreditų rinkos netobulumo kanalu, socialinių politinių neramumų kanalu, fiskalinės politikos kanalu. Pajamų nelygybė taupymo kanalu turėtų skatinti ekonomikos augimą, nes didėjanti pajamų nelygybė didina turtingųjų asmenų taupymo normą, investicijų apimtį, išlaidas technologinei plėtrai. Pajamų nelygybė kreditų rinkos netobulumo kanalu turėtų lėtinti ekonomikos augimą, nes didėjanti pajamų nelygybė mažina skurdžiai gyvenančių asmenų pajamas. Esant kreditų rinkos netobulumui, šių asmenų galimybės skolintis lėšų, siekiant aukštesnio išsilavinimo, gali būti ribotos. Pajamų nelygybė socialinių politinių neramumų kanalu turėtų taip pat lėtinti ekonomikos augimą, nes didėjantis pajamų nelygybės lygis didina politinį nestabilumą, mažina įstatymo viršenybę. Pajamų nelygybės poveikis ekonomikos augimui fiskalinės politikos kanalu yra nevienareikšmis. Vyriausybė, atsižvelgdama į pajamų nelygybės lygį, gali vykdyti pajamų perskirstymo politiką. Didėjantys mokesčiai turtingiausiam asmenų sluoksniui daro neigiamą poveikį ekonomikos augimui, o didėjančios išlaidos socialinei apsaugai skatina ekonomikos augimą.
3. Pajamų nelygybės poveikis ekonomikos augimui gali būti nagrinėjamas skirtingais transmisijos kanalais, kurie parodo nevienodą pajamų nelygybės poveikį ekonomikos augimui. Mokslininkų atliktų empirinių tyrimų rezultatai parodė, kad poveikis gali skirtis vertinant tiek pajamų nelygybės tiesioginį poveikį ekonomikos augimui, tiek vertinant skirtingais transmisijos kanalais, nes naudojami skirtingi tyrimo metodai, skiriasi šalių imtis, skirtingi tyrimo laikotarpiai, naudojami įvairūs kanalus atspindintys rodikliai ir skirtingi nepriklausomi kintamieji.
4. Apibendrinus teorinių ir empirinių tyrimų rezultatus, sudarytas vertinimo modelis ir metodika. Remiantis sudarytu vertinimo modeliu ir metodika, pirmiausia ES-28

šalys grupuojamos pagal pajamų nelygybės lygį ir pajamų vienam gyventojui lygį, aptariama kintamųjų dinaminė analizė. Pajamų nelygybės poveikis ekonomikos augimui vertinamas taupymo kanalu, kreditų rinkos netobulumo kanalu, socialinių politinių neramumų kanalu ir fiskalinės politikos kanalu, taip pat skirtingais poveikio kanalų modelių variantais, t. y. kanalus atspindint skirtingais kintamaisiais. Skirtingi kintamieji parodo, ar nagrinėjamu transmisijos kanalu pajamų nelygybės poveikis ekonomikos augimui skiriasi.

5. Sugrupavus šalis į keturias grupes pagal pajamų nelygybės lygį ir pagal pajamų vienam gyventojui lygį, nustatyta, kad decilinio santykio bei dešimtojo decilio didžiausios vidutinės reikšmės nustatytos šalių grupėse, kurios pasižymėjo didžiausiomis Gini koeficiento reikšmėmis ir skirtingomis realiojo BVP vienam gyventojui reikšmėmis. Šalių grupėse, kurios pasižymėjo aukštesniu pajamų nelygybės lygiu, nustatyta mažiausia skurdžiausio asmenų sluoksnio pajamų dalis.
6. Vertinant pajamų nelygybės poveikį ekonomikos augimui taupymo kanalu nustatyta, kad visose keturiose šalių grupėse pajamų nelygybė lėtino ekonomikos augimą. Tai rodo turtingiausio asmenų sluoksnio pajamų dalies ir taupymo normos didėjimo neigiamas poveikis ekonomikos augimui. Kadangi skurdžiausio asmenų sluoksnio pajamų dalies ir taupymo normos didėjimas skatino ekonomikos augimą, galima teigti, kad būtina mažinti pajamų nelygybės lygį.
7. Pajamų nelygybės poveikis ekonomikos augimui taupymo kanalu, jį atspindint investicijų apimties kintamuoju, visose keturiose šalių grupėse buvo nustatytas nereikšmingas. Tačiau aukštesnio pajamų nelygybės lygio ir skirtingo pajamų vienam gyventojui lygio šalių grupėse pajamų nelygybė taupymo kanalu skatino ekonomikos augimą esant sąlygai, kad yra didinamos verslo įmonių išlaidos technologinei plėtrai. Galima teigti, kad visose šalių grupėse, siekiant ekonomikos augimo, arba derėtų mažinti pajamų nelygybės lygį, arba turtingiausiam asmenų sluoksniui derėtų didinti išlaidas technologinei plėtrai aukštesnio pajamų nelygybės lygio šalių grupėse.
8. Pajamų nelygybės nevienareikšmis poveikis ekonomikos augimui pasireiškė ne tik taupymo kanalu, bet ir kreditų rinkos netobulumo kanalu, jį atspindint skirtingais kintamaisiais. Kreditų rinkos netobulumo kanalu pajamų nelygybė ir didėjantis privataus sektoriaus kreditų lygis skatino ekonomikos augimą visose šalių grupėse, tačiau didėjantis išsilavinimo lygis neskatino ekonomikos augimo. Didėjantis išsilavinimo lygis neskatino ekonomikos augimo ir esant prielaidai, kad nėra pajamų nelygybės. Galima teigti, kad kreditų rinkos netobulumo kanalu pajamų nelygybė skatino ekonomikos augimą tik dėl suteikiamų privataus sektoriaus kreditų.
9. Remiantis gautais rezultatais galima teigti, kad ir socialinių politinių neramumų kanalu, padidėjus pajamų nelygybės lygiui, aukštesnio pajamų nelygybės lygio šalių grupėse verslo įmonių sprendimą didinti išlaidas MTEP galėjo lemti didesnis politinis stabilumas. Tai rodo turtingiausio asmenų sluoksnio didėjančios pajamų dalies ir didėjančio politinio stabilumo teigiamas poveikis ekonomikos augimui. Aukštesnio pajamų nelygybės lygio ir skirtingo pajamų vienam gyventojui lygio šalių grupėse verslo įmonių sprendimą didinti išlaidas MTEP galėjo lemti ir didėjanti nuosavybės teisių apsauga.
10. Kaip jau buvo minėta, ekonomikos augimą gali skatinti ne tik verslo įmonių išlaidos MTEP, bet ir pajamų perskirstymo politikos vykdymas fiskalinės politikos kanalu,

siekiant pajamų nelygybės mažėjimo. Tačiau pajamų nelygybės lygio ir išlaidų socialinei apsaugai didėjimas lėtino ekonomikos augimą visose šalių grupėse, išskyrus aukštesnio pajamų nelygybės lygio ir aukštesnio pajamų vienam gyventojui lygio šalių grupę. Pastarojoje šalių grupėje didėjančio pajamų nelygybės lygio teigiamą poveikį ekonomikos augimui galėjo lemti turtingiausio asmenų sluoksnio pajamų dalis. Kitaip tariant, didėjant turtingiausio asmenų sluoksnio pajamų daliai ir vykdant pajamų perskirstymo politiką, galėjo būti surinkta daugiau mokestinių pajamų ir daugiau skirta išlaidų socialinei apsaugai. Tačiau, padidėjus išlaidoms socialinei apsaugai ir skurdžiausio asmenų sluoksnio pajamų daliai, minėtoje šalių grupėje poveikis ekonomikos augimui nustatytas neigiamas. Atitinkamai visose šalių grupėse, išskyrus aukštesnio pajamų nelygybės lygio ir aukštesnio pajamų vienam gyventojui lygio šalių grupę, neigiamą poveikį ekonomikos augimui galėjo daryti didėjanti turtingiausio asmenų sluoksnio pajamų dalis.

11. Galima teigti, kad aukštesnio pajamų nelygybės lygio ir skirtingo pajamų vienam gyventojui lygio šalių grupėse pajamų nelygybė skatino ekonomikos augimą. Pajamų nelygybės teigiamą poveikį ekonomikos augimui galėjo lemti turtingiausio asmenų sluoksnio pajamų dalies didėjimas. Turtingiausi asmenys, daugiau sutaupydami, dalį lėšų skyrė technologinei plėtrai, kreditų rinkai. Tokius šių asmenų sprendimus galėjo lemti politinis stabilumas, o aukštesnio pajamų nelygybės lygio ir aukštesnio pajamų vienam gyventojui lygio šalių grupėje dar ir didesnė nuosavybės teisių apsauga. Aukštesnio pajamų nelygybės lygio ir aukštesnio pajamų vienam gyventojui lygio šalių grupėje turtingiausio asmenų sluoksnio didėjančios pajamos galėjo lemti didesnes mokestines pajamas ir didesnes vyriausybės išlaidas socialinei apsaugai.
12. Žemesnio pajamų nelygybės lygio ir skirtingo pajamų vienam gyventojui lygio šalių grupėse pajamų nelygybė lėtino ekonomikos augimą. Turtingiausi asmenys, daugiau sutaupydami, skyrė nepakankamai lėšų investicijoms, o skurdžiausio asmenų sluoksnio didėjančios pajamos skatino ekonomikos augimą. Tokius turtingiausio asmenų sluoksnio sprendimus galėjo lemti nepakankamas politinis stabilumas ir prastesnė nuosavybės teisių apsauga. Padidėjus pajamų nelygybės lygiui, vyriausybės išlaidos socialinei apsaugai galėjo būti nepakankamos, kad būtų skatinamas ekonomikos augimas, todėl žemesnio pajamų nelygybės lygio ir skirtingo pajamų vienam gyventojui lygio šalių grupėse būtina mažinti pajamų nelygybės lygį.
13. Galima teigti, kad žemesnio pajamų nelygybės lygio ir skirtingo pajamų vienam gyventojui lygio šalių grupėse, siekiant ekonomikos augimo, būtina mažinti pajamų nelygybės lygį, nes pastarosiose šalių grupėse buvo nustatytas pajamų nelygybės neigiamas poveikis ekonomikos augimui. Aukštesnio pajamų nelygybės lygio ir skirtingo pajamų vienam gyventojui lygio šalių grupėse, siekiant ekonomikos augimo, būtina arba mažinti pajamų nelygybės lygį, arba didinti verslo įmonių išlaidas technologinei plėtrai.
14. Sprendžiant penktą disertacijos uždavinį, empirinėje disertacijos dalyje buvo tikrinamos keturios tyrimo hipotezės. Pirmoji hipotezė pasitvirtino, nes šalių grupėje, kuri pasižymėjo žemesniu pajamų nelygybės lygiu ir aukštesniu pajamų vienam gyventojui lygiu, buvo nustatytas pajamų nelygybės neigiamas poveikis ekonomikos augimui. Tačiau kitose šalių grupėse nustatytas teigiamas pajamų nelygybės poveikis ekonomikos augimui.

Atsižvelgiant į pajamų nelygybės teigiamą poveikį ekonomikos augimui taupymo kanalu, jį atspindint verslo įmonių išlaidomis MTEP, taip pat pasitvirtino ir antroji hipotezė. Antroji hipotezė buvo patvirtinta, nes aukštesnio pajamų nelygybės lygio ir aukštesnio pajamų vienam gyventojui lygio šalių grupėje, išskiriant verslo įmonių išlaidas MTEP, pajamų nelygybė, aproksimuota deciliniu santykiu, skatino ekonomikos augimą taupymo kanalu. Kitaip tariant, pajamų nelygybė skatino ekonomikos augimą didėjant verslo įmonių išlaidoms MTEP. Todėl galima teigti, kad verslo įmonėse vis daugiau lėšų buvo skiriama technologinei plėtrai, o didėjančios išlaidos MTEP skatino ekonomikos augimą.

Trečioji hipotezė buvo atmesta, nes aukštesnio pajamų nelygybės lygio ir žemesnio pajamų vienam gyventojui lygio šalių grupėje pajamų nelygybės didėjimas skatino ekonomikos augimą kreditų rinkos netobulumo kanalu, jį atspindint privataus sektoriaus kreditų lygiu. Kitaip tariant, didėjant privataus sektoriaus kredito lygiui, pajamų nelygybė skatino ekonomikos augimą. Taigi galima teigti, kad, padidėjus pajamų nelygybės lygiui, skurdžiausias asmenų sluoksnis galėjo gauti kreditų, todėl tai galėjo skatinti ekonomikos augimą. Tačiau nustatytas nereikšmingas pajamų nelygybės poveikis ekonomikos augimui, išskiriant aukštojo išsilavinimo lygį.

Ketvirtoji hipotezė buvo atmesta. Žemesnio pajamų nelygybės lygio ir skirtingo pajamų vienam gyventojui lygio šalių grupėse nustatyta, kad 10,0 proc. turtingiausio asmenų sluoksnio pajamų dalies didėjimo poveikis ekonomikos augimui yra neigiamas. Tačiau aukštesnio pajamų nelygybės lygio ir skirtingo pajamų vienam gyventojui lygio šalių grupėse tais atvejais, kai buvo nustatytas pajamų nelygybės teigiamas poveikis ekonomikos augimui, 10,0 proc. turtingiausio asmenų sluoksnio pajamų dalies didėjimo poveikis ekonomikos augimui taip pat buvo nustatytas teigiamas. Tai rodo, kad aukštesnio pajamų nelygybės lygio ir skirtingo pajamų vienam gyventojui lygio šalių grupėse didėjančios turtingiausių asmenų pajamos skatino ekonomikos augimą.

Žemesnio pajamų nelygybės lygio ir skirtingo pajamų vienam gyventojui lygio šalių grupėse nustatyta, kad 10,0 proc. skurdžiausio asmenų sluoksnio pajamų dalies poveikis ekonomikos augimui buvo teigiamas. Todėl ekonomikos augimą skatino mažėjantis pajamų nelygybės lygis. Tačiau aukštesnio pajamų nelygybės lygio ir skirtingų pajamų lygių šalių grupėse tais atvejais, kai buvo nustatytas pajamų nelygybės teigiamas poveikis ekonomikos augimui, 10,0 proc. skurdžiausio asmenų sluoksnio pajamų dalies poveikis ekonomikos augimui buvo nustatytas neigiamas. Tai rodo, kad pajamų nelygybė skatino ekonomikos augimą.

Atsižvelgiant į disertacinio darbo rezultatus ir apribojimus, galimos tokios tolesnių tyrimų kryptys:

1. Atlikti pajamų nelygybės poveikio ekonomikos augimui vertinimo tyrimą ne Europos Sąjungos šalims, o Pietų ir Šiaurės Amerikos, Azijos šalims.
2. Pajamų nelygybės poveikio ekonomikos augimui tyrimą galima praplėsti naudojant kitus transmisijos kanalus atspindinčius kintamuosius.
3. Tyrimas gali būti atliktas siekiant ištirti sąveikas tarp pajamų nelygybės poveikio ekonomikos augimui transmisijos kanalų.
4. Gali būti vertinamas pajamų nelygybės poveikis darniam ekonomikos augimui skirtingais transmisijos kanalais.
5. Kitos tyrimų kryptys − optimalus pajamų nelygybės lygis, skatinantis ekonomikos augimą; ekonomikos augimo poveikis pajamų nelygybei.

Disertacijos rezultatų aprobavimas ir sklaida. Darbo rezultatai pateikti Lietuvos mokslo tarybos patvirtinto sąrašo tarptautinėse duomenų bazėse referuojamuose leidiniuose:

1. Čiegis, R., **Dilius, A.**, Andriuškevičius, K. An Assessment of Impact of Income Inequality on Sustainable Economic Growth in the Context of Saving. *Inzinerine Ekonomika-Engineering Economics*, ISSN 1392-2785, 2017 3(28), p. 232–239.
2. Čiegis, R., **Dilius, A.**, Martinaitytė, L. Pajamų nelygybės poveikio darniam ekonomikos augimui vertinimas taikant IDVI. *Taikomoji ekonomika: sisteminiai tyrimai*, ISSN 2335-8742, 2016 1(10), p. 13–26.
3. Čiegis, R., **Dilius, A.** Pajamų nelygybės poveikio darniam ekonomikos augimui vertinimas. *Darnaus vystymosi problemos ir jų sprendimai Lietuvoje*, ISBN 978-609-449-091-0, 2015, Vilniaus universitetas, Aleksandro Stulginskio universitetas, p. 9–50.
4. Tamašauskienė, Z., **Dilius, A.** Diskusiniai pajamų nelygybės poveikio ekonomikos augimui vertinimo klausimai. *ŠU mokslo studija* „Socialinių-ekonominių procesų Lietuvoje raidos prieštaros: teorija ir praktika“, ISBN 9786098080360, 2015, p. 30–45.
5. Čiegis, R., **Dilius, A.** Ekonominio augimo poveikio pajamų nelygybei teorinis pagrindimas. *Management Theory and Studies for Rural Business and Infrastructure*, ISSN 1822-6760, 2013 3(35), p. 368–375.

Disertacinio tyrimo rezultatai buvo pristatyti tarptautinėse mokslinėse konferencijose:

1. 2016 m. „Pajamų nelygybės poveikio ekonomikos augimui vertinimas“ 16-ojoje Ernesto Galvanausko tarptautinėje mokslinėje konferencijoje Šiaulių universitete, Šiauliuose.
2. 2015 m. „Pajamų nelygybės poveikio darniam ekonomikos augimui vertinimas“ mokslinėje konferencijoje „Darnus vystymasis: teorija ir praktinis įgyvendinimas“ Vilniaus universiteto Kauno humanitariniame fakultete, Kaune.
3. 2014 m. „Pajamų nelygybės poveikio ekonomikos augimui vertinimas teoriniu aspektu“ 14-ojoje Ernesto Galvanausko tarptautinėje mokslinėje konferencijoje Šiaulių universitete, Šiauliuose.

ABOUT THE AUTHOR

Name surname	Aidas Dilius
E-mail address	aidasdilius@gmail.com
Education:	
2013–2017	Doctoral studies in the area of Social Sciences, the field of Economics (Vytautas Magnus University jointly with Aleksandras Stulginskis University, ISM University of Management and Economics, Mykolas Romeris University and Šiauliai University)
2011–2013	Economics study programme, specialisation Economic Analysis and Planning, Master's Qualification Degree in Economics awarded. Šiauliai University Faculty of Social Sciences, Department of Economics
2006–2011	Economics study programme, specialisation Economic Analysis and Planning, Bachelor's Qualification Degree in Economics awarded. Šiauliai University Faculty of Social Sciences, Department of Economics
Internships:	
2015	Doctoral internship in the Baltic University (Rogow, Poland)
Fields of scientific interests	Income Inequality, Economic Growth, Sustainable Development

APIE AUTORIŲ

Vardas, pavardė	Aidas Dilius
E. pašto adresas	aidasdilius@gmail.com
Išsilavinimas:	
2013–2017	Socialinių mokslų srities ekonomikos krypties doktorantūros (Vytauto Didžiojo universiteto su Aleksandro Stulginskio universitetu, ISM Vadybos ir ekonomikos universitetu, Mykolo Romerio universitetu ir Šiaulių universitetu) studijos
2011–2013	Ekonomikos studijų programa, specializacija ekonominė analizė ir planavimas, suteiktas ekonomikos magistro kvalifikacinis laipsnis. Šiaulių universitetas, Socialinių mokslų fakultetas, Ekonomikos katedra
2006–2011	Ekonomikos studijų programa, specializacija ekonominė analizė ir planavimas, suteiktas ekonomikos bakalauro kvalifikacinis laipsnis. Šiaulių universitetas, Socialinių mokslų fakultetas, Ekonomikos katedra
Stažuotės:	
2015 m.	Doktorantūros stažuotė Baltijos universitete (Rogow, Lenkija)
Mokslinių interesų kryptys	Pajamų nelygybė, ekonomikos augimas, darnus vystymasis

Aidas Dilius

AN ASSESSMENT OF THE IMPACT OF INCOME INEQUALITY ON ECONOMIC GROWTH IN THE GROUPS OF EUROPEAN UNION COUNTRIES

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