Social aspects of economy performance in European countries

Diploma thesis

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Abstract

Pitoňáková, Z. Social aspects of economy performance in European countries. Diploma thesis. Brno: Mendel university, 2016.

The diploma thesis deals with monetary and social view on economy performance reflected by GDP per capita and alternative measures to GDP. The main objective of the thesis is to determine relationship between GDP per capita and alternative measures available for 28 member states of EU and propose a new alternative index related to EU current social issues. Within observed periods of time there are no significant changes in correlations however the increasing complexity of alternatives or sustainability issue weaken the correlation or prove no relationship. The hypothesis about Easterlin paradox is not confirmed. Clustering brings ambiguous results but fully developed countries seem to be more homogeneous than rest of the EU countries. In new proposed index also those developed countries are placed in the top of the ranking approached by Slovenia and Czech Republic and the most significant change in the ranking compared to GDP or HDI rank is observed by Greece, Cyprus and Ireland.

Keywords: GDP, alternative measures, social aspects, EU, new index proposal

Abstrakt

Pitoňáková, Z. *Sociálne aspekty výkonnosti ekonomiky v krajinách Európy*. Diplomová práca. Brno: Mendelova univerzita, 2016.

Diplomová práca sa zaoberá monetárnym a sociálnym pohľadom na výkonnosť ekonomiky reprezentovaným HDP na obyvateľa a alternatívnymi ukazovateľmi. Hlavným cieľom práce je overiť a kvantifikovať vzťah medzi HDP na obyvateľa a alternatívnymi ukazovateľmi podľa ich dostupnosti pre 28 členských štátov EU a navrhnúť nový alternatívny index s prihliadnutím aktuálnych sociálnym problémom EU. V pozorovaných obdobiach nie sú významné zmeny v koreláciách avšak zvýšená komplexita ukazovateľov či aspekt udržateľnosti oslabujú či vykazujú žiadne korelácie. Hypotéza o Easterlin paradoxe nie je potvrdená. Zhlukovanie prináša nejednoznačné výsledky avšak v pozorovaných obdobiach plne rozvinuté krajiny sú viac homogénne ako zvyšok krajín EU. Tieto rozvinuté krajiny sa rovnako nachádzajú na prvých miestach v rebríčku nového indexu a výrazne sa k nim približujú krajiny ako Slovinsko a Česká republika. Najväčšie zmeny v umiestnení krajín v porovnaní s HDP a HDI rebríčkom sú u krajín Cyprus, Írsko a Grécko.

Kľúčové slová: HDP, alternatívne ukazovatele, sociálne aspekty, EU, návrh nového indexu

„No one would just look at a firm´s revenues to assess how well it was doing. Far more relevant is balance sheet, which shows assets and liabilities. That is also true for the country.“

Joseph Stiglitz

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List of abbreviations

ANS	Adjusted Net Savings
BLI	Better Life Index
BLI_{WBL}	Work-life balance part of BLI
BLI_{EA}	Educational attainment part of BLI
BLI_{SS}	Students score part of BLI
BLI_C	Community network part of BLI
BOD	Benefits of doubt
CEE	Central Eastern Europe
CEI	Combined Education Index
CPI	Corruption Perception Index
DEA	Data envelopment analysis
EF	Ecological Footprint
EPI	Environmental Performance Index
EU	European Union
EWI	Economic Welfare Index
FDI	Foreign Direct Investment
GDP	Gross domestic product
GDP/PC	Gross domestic product per capita
HDI	Human Development Index
HPI	Human Planet Index
HPI_{LE}	Life expectancy part of HPI
HPI_{WB}	Well-being part of HPI
IHDI	Inequality adjusted HDI

LS	Life Satisfaction
MIPEX	Migrant integration policy index
NDP	Net domestic product
NEET	Not employed, educated or trained
OECD	Organization for Economic Cooperation and Development
PIIGS	Portugal Ireland Italy Greece Spain
SDI	Social Development Index
SSI	Social Sustainability Index
SSI_{HW}	Human well-being part of SSI
SSI_{EnW}	Environmental well-being part of SSI
SSI_{EcW}	Economic well-being part of SSI
SWF	Social Welfare Function
UK	United Kingdom
UNDP	United Nations Development Programme
USA	United States of America
V4	Vysegrad countries

1 Introduction and objectives

The introduction covers the insight of the topic analysed in the thesis, reasons why such an analysis is valuable in contemporary times and objectives that are expected to be achieved.

1.1 Introduction

Traditionally decision-making about government and public policies within the countries or possibilities of financial means lending and funding for the countries from banks and major global institutions are based on the economy performance or how well the economy meets the expectations of GDP growth. The well-being of the citizens is generally measured by the GDP per capita. Over the past years critique was raised opposing that such a measurement does not reflect the well-being of the typical citizen. In consequence of that new alternative measures have been developed. Some of them compete with GDP, some adjust it or some of them supplement this economy performance indicator with broader view of social and environmental aspects. Nevertheless, the alternative indicators still do not play significant role in determination of decision-making policies within the countries or at least have impact on it. Usually the relevant reason for that is that alternative indicators are hard to be measured because of the non-monetary character. Therefore they are also difficult to be compared within different countries. On the other hand alternative measures prove diversity and for particular policies may be a valuable source to consider. The relevance of alternative measures may be found also within the private sector of the countries as the qualitative assessment of the areas that are not covered by GDP can reveal particular need in the economy and call for the improvement in areas of well-being as healthcare, education, social interactions or inequality issues. The need of solving given areas may attract the businesses to deal with those problems of society and increase economy performance simultaneously.

1.2 Objectives

The main objective of the thesis is to determine the relationship between GDP and alternative indicators focused on social aspects of economy performance of EU28 and propose new alternative index that would be supplement to GDP

based on the literature review, studies overview and current social challenges of EU.

The thesis covers also several partial objectives. The first partial objective is to define GDP benefits and disadvantages, classify alternative measures to GDP and describe specifics about selected alternative indicators used in empirical part.

One of the partial objectives in empirical part of thesis is to determine correlation between GDP and alternatives as well as among alternatives themselves. The correlation analysis is followed by cluster analysis to determine the clusters of countries that gather together based on homogenous characteristics related to observed variables. The more precise quantification of relationship between GDP and alternatives measures may be applied based on the results of cluster analysis. Both analyses include dynamic aspect in terms of observations within different periods of time.

Another partial objective of the thesis is to define dimensions for new proposed index and select relevant and suitable data set related to those dimensions. The last partial objective of the thesis is to make suggestions and recommendations for further research and analysis.

2   Literature review

In following subchapters the literature review is provided with focus on GDP imperfections and the most recent research of alternative measures to GDP.

2.1   GDP

Stiglitz, Sen and Fitoussi (2009) define GDP as widely known measure of economy performance. It reflects market production including households, firms and government in monetary equivalents.

Jacobs and Šlus (2010) explain GDP as total production of finished goods and services in economy without any consideration for improvement of human well-being.

According to Schepelmann, Goossens and Makipaa (2010) GDP is the value of the production in the market limited by geographical area and time, without deduction of capital depreciation, regardless of nationality and no consideration of activities between input and final product.

2.2   Benefits of GDP

Reason why GDP is broadly used in every economy Schepelmann, Goossens and Makipaa (2010) say is especially very simple calculation of the GDP in linear measures.

Bergh (2008) also offers few reasons for GDP defence as GDP provides information to macroeconomic models, is one of the macroeconomic goals along with stable prices, low unemployment and enable the uniform comparison within the countries all around the world. On the other hand the alternative measures to GDP have arisen in past years mainly because of the disadvantages that GDP brings to reflect economy performance of the country.

2.3   Concerns with GDP

Authors emphasize some of the issues that make GDP as measure of economy performance questionable.

2.3.1   Quantity vs. quality

GDP covers all the production of the economy including the elements that have a negative impact on social being as costs of natural disasters, renovating

infrastructures or diseases expenses. Also Jacobs and Šlus (2010) add that the quality of production has changed dramatically over past years. For instance in GDP is not included improvement of telecommunication services as free calls via Skype or quality of employment as there is decline of manual work and crafts. The suggestion is to incorporate qualitative changes of goods and services in measurement and move emphasis from quantifying the economy production to well-being of people.

2.3.2   Imperfection of prices

According to Stiglitz, Sen and Fitoussi (2009) GDP considered as measure of economic well-being can lead to the misinterpretations about how people are better-off or worse-off and based on that fact wrong policy decisions can be made. The reasons why Stiglitz, Sen and Fitoussi (2009) emphasise disadvantages of using GDP as measure of economy performance are imperfections of prices that are used to be quantification of GDP as some of the good and services are not priced, transparency of prices is open to be doubt or society values the good and services differently.

2.3.3   Lexicographic preferences

Bergh (2008) states the fact that the basic needs as water, freedom, shelter at the bottom of Maslowian pyramid are not correlated with GDP growth as it is supposed to be with the consumption of "higher" needs and it may lead to situation that basic welfare of people and quality of life is not captured in GDP growth.

2.3.4   Complexity of measurement

Stiglitz, Sen and Fitoussi (2009) point out the need of changing the view of measurement of economy progress and place recommendations how to contribute to better measures of economic performance taking into consideration its complexity. The authors recommend focusing on national accounts aggregates more than GDP as for instance structure of production is changing over time hence difference between GDP and Net Domestic Product (NDP) can be more visible taking into account depreciation measures. This statement is supported by Schepelmann, Goossens and Makipaa (2010) that agree that in the past years the difference between GDP and NDP is rising in the most European countries and especially in those of high level of technological progress and therefore results of GDP may be overestimated for some countries.

2.3.5   Services measuring

Other suggestion from Stiglitz, Sen and Fitoussi (2009) is improvement of services measuring, government-provided especially. For instance when measuring those kind of services some of them are based on inputs rather than on outputs so even the productivity is changing within the service the over-estimation or under-estimation of growth may occur. To secure proper measure of the services provided also good measure of quality change has to be set up. For instance the health service is measured by input of doctors not by output of how many patients were served.

2.3.6   Households´ perspective

GDP focuses more on overall production rather than consumption of citizens in households. When considering households´ perspective Stiglitz, Sen and Fitoussi (2009) suggest that the government services in kind should be taken into account like health and education services, sport and recreational facilities or subsidized housing when measuring human well-being. The measure that focuses on this consideration is *adjusted disposable income* if invariance principle[1] is not disrupted. The other aspect of households´ perspective is consideration of average measures vs. median measures in case of income, consumption and wealth distribution. It is necessary to distinguish between those two measures that can bring different explanatory power of social well-being. To illustrate the problem imagine that the income rises only in the top 5 % of the society with highest income, in statistics average income rises as well but medium income may stay the same. Housework production is also worth to consider when evaluating well-being in the economy from household perspective. As it is different when the individuals do the housework alone or let it to be done by service providers. This distinction is rarely recognized by traditional measures and leads to conclusion that both views have same standards of living. The following figure provides insight how involving housework and leisure of household into income influence real purchasing power of households.

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[1] The principle that explains that measurement of performance is same for activities within private and public sector unless there is difference in quality of access.
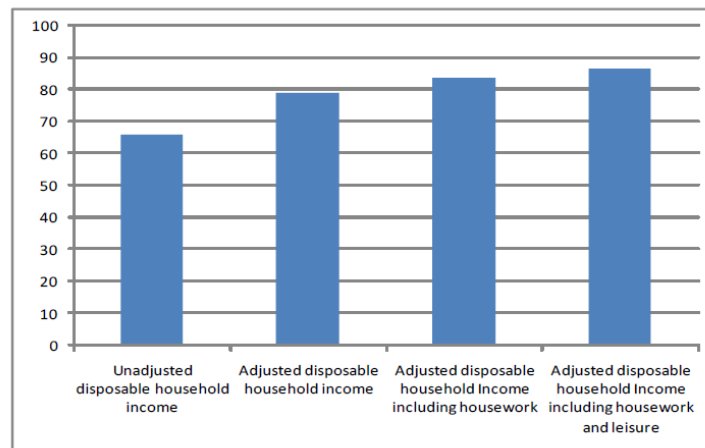
Fig. 1   Comparison of real income per capita between France and USA (USA=100)
Source: Stiglitz, Sen and Fitoussi, 2009

In the figure above is depicted the comparison of France and USA comparing their real incomes per capita in year 2005. It is visible that when taking into account housework and leisure influence the real income of France rises from 66 % to 87 % of USA real income.

2.3.7   Lack of objective and subjective well-being

Stiglitz, Sen and Fitoussi (2009) place other dimensions of quality of life as health, education, personal activities, political voice, social connections and relationships, environment and insecurity that omits GDP measurement. Objective and subjective[2] well-being is equally important as it provides valuable information about quality of people´s life. For instance considering costs of unemployment from subjective point of view some individuals may suffer from being judged by society more than from loss of income. Stiglitz, Sen and Fitoussi (2009) also challenge investing to personal activities measurement by finding not only their quantities but also how people feel about them. They concluded that right assessment of links between those dimensions plays a significant role in meaning how developments of those dimensions are related to income.

2.3.8   Easterlin paradox

Richard Easterlin (1974) dealt with the relationship of GDP progress and happiness advancement and challenged another concern of GDP growth. Based

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[2] Happiness, positive and negative emotions, satisfaction measured by surveys

on the evidence of USA economy data he found that in general rich people tend
to be happier than poorer ones, but more developed countries did not
necessarily tend to be happier. He also adds that life satisfaction rises with
average income but only to certain level of income.

The following figure depicts main areas mentioned above that challenge the
GDP as pure monetary equivalent in terms of society and environmental view.
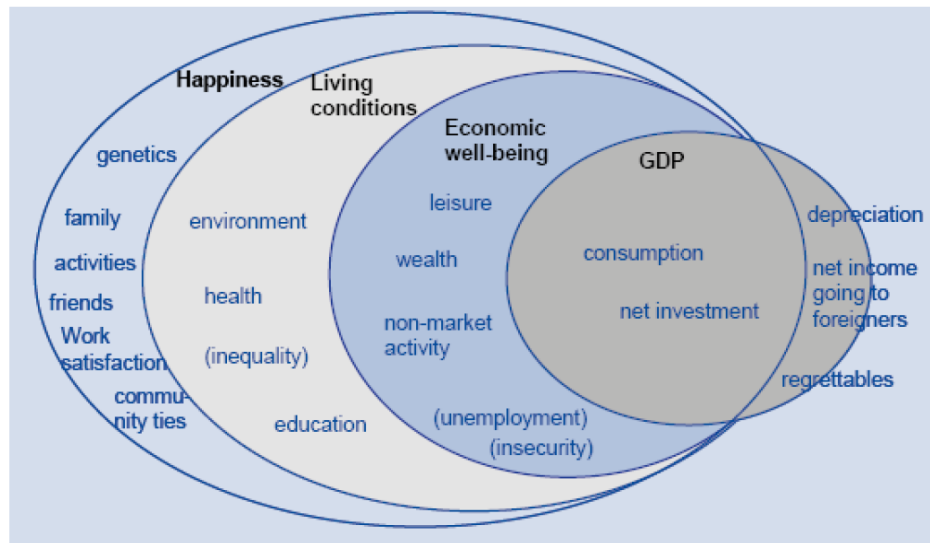
Fig. 2   The elements of well-being
Source: Deutsche Bank, 2006

2.4   Classification of alternative indicators to GDP

In following subchapters are classified alternative measures to GDP according
to different points of view.

2.4.1   Relation to GDP

Schepelmann, Goossens and Makipaa (2010) classifies the alternative indicators
according to relation to GDP as those that:

- adjust GDP: traditional GDP or national accounts are adjusted by social
  and environmental aspects (e.g. The index of Sustainable Economic
  Welfare, Genuine Progress Indicator, Adjusted Net Savings)
- replace GDP: indicators that measure the welfare or social well-being
  directly without consideration of traditional measures (e.g. Human

Development Index, Happy Planet Index, Ecological Footprint, Quality of life Index)

- supplement GDP: additional information to GDP is added but GDP is not adjusted or replaced (e.g. Systems for greening GDP, Sustainable Development Indicators, Decoupling indicators, Millennium Development Goals)

2.4.2   Substance- based approach

Bleys (2012) categories alternative indicators according to the importance of area that individual index covers. He found three main points of view on the economy performance as social well-being, economic welfare and sustainability.

Social well-being is considered to be broad concept that covers many dimensions that are interrelated in persons´ life and are not identical for everyone. It is very hard to convert the value of well-being into single number but separately those dimensions can be used for particular decision-making processes. In following Table 1 are depicted social well-being measures reflecting utility, human needs, functioning and capabilities based on objective, subjective or combined approach.

Tab. 1   Social well-being measures

	Utilitarianism	Human needs	Functionings and Capabilities
objective	Gross Domestic Product Consumption expenditures	Fulfilment of Hierarchical Needs Index Index of Social Progress Calvert-Henderson Quality of Life Indicators Sustainable Society Index	Human Development Index Physical Quality of Life Index
subjective	Happiness/Life Satisfaction	Human needs Assessment	
combined	Happy Life Expectancy Happy Planet Index	Happy Life Expectancy Happy Planet Index	Happy Life Expectancy Happy Planet Index

Source: Bleys, 2012 edited

Economic welfare is viewed as the economic dimension of social well-being that is pursued at national level and is expressed mostly in form of income. According to Bleys (2012) economic welfare measures may be environmentally adjusted eg. *Environmentally Adjusted Net Domestic Product* or non-environmentally adjusted eg. *GDP*.

Bleys (2012) considers sustainability for the ability to keep the processes perserved into the future. In context of well-being how much sustainable is well-being for next years and generations. Stiglitz, Sen and Fitoussi (2009) explain that sustainability complements well-being indicators but is needed to be examined independently. The change of the available "stocks" as natural resources, physical and human capital can be measured either in the physical units or monetary equivalents.

2.5   Alternative indicators to GDP

In following subchapters are described the alternative indexes that are used in the empirical part of the thesis. The selection of particular indexes was based on the availability of data for EU28 among different time periods regarding economic development. The thesis primarily focuses on social aspects of economy performance therefore because of thesis scope environmental aspects are omitted unless there are parts of composite indexes. The data availability is limited by amount of countries and institutions that run statistics to release the outcomes only for given period of time mainly because those indexes are part of unique project with no further financial support.
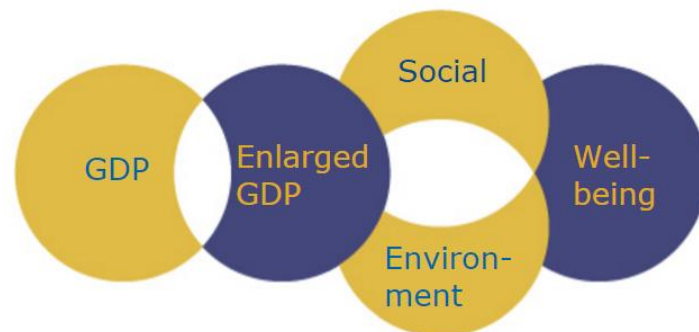
Fig. 3   Themes of indicators
Source: EC Europa, 2016

2.5.1   Human development index

Based on Human development reports (2016) Human development index was first of the approaches to measure enhancement of human development in the economy. It focuses on 3 main capabilities as depicted below: healthcare, education and standard of living.
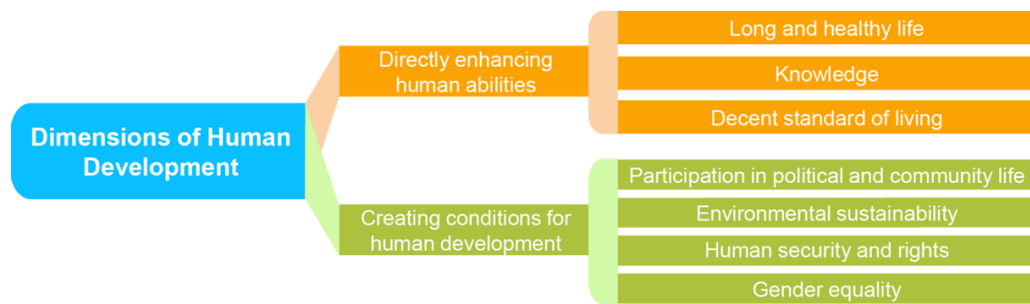
Fig. 4   Dimensions of Human Development
Source: United nations development programme, 2016 online

HDI belongs to objective approaches of social well-being measures that may replace GDP measures in some areas of decision-making policies. In recent years the indicator was altered based on the criticism mainly because of its simplicity and unclear measurement of indicators that gathers. Klugman, Rodríguez and Choi (2011) noticed the patterns of comparison between GDP and HDI rankings are very similar for all the time periods covered by measurement of the human development while more than one third of countries differs about 20 places in ranking. Klugman, Rodríguez and Choi (2011) state that interesting observation is the correlation between HDI and GDP that proves to be very strong while correlation among the 3 components of HDI is becoming insignificant. As mentioned above, the criticism was gathered about stock and flow measures of variables included in HDI that were perceived as misleading, e.g. the life expectancy does not reflect healthy life. Hou, Walsh and Zhang (2015) advocate usage of flow measures in 3 dimensions of HDI to better catch human development especially in developing countries compared to traditional HDI.

In 2010 the HDI was adjusted regarding the standard of living, where GDP was replaced by Gross National Income and educational variable represents mean years of schooling and expected years of schooling. HDI was also broaden of income and gender inequality measures and poverty aspect that reflect the situation of countries as to be more authentic.

Bilbao-Ubillos (2011) proposed the new version of HDI called composite dynamic HDI. This indicator includes all the previous mentioned adjustments and above those the sustainability and personal safety issue to be included into the composite index. He adds that this new version of HDI is not aimed to replace the HDI but only points out the limitations that this index has.

The values of HDI are classified in 3 categories by two cut-offs to differentiate the level of human development. This categorizing was doubted

by Wolff, Chong and Auffhammer (2011) were data error was proved mostly for least developed countries that led to the misplacement of countries in ranking about 45 %. This finding can be useful for governments or organisations to provide development aids but also for business area of investors.

In first release of human development reports the sufficiency over satiety is encouraged in 3 dimensions that HDI covers therefore Luque, Pérez-Moreno and Rodríguez (2015) proposed to change the methodology of HDI calculation to make dimensions weighted and observe evolution of the weakest dimension to fulfil the human development paradigm of all dimension to be in balance.

2.5.2   Adjusted net savings

The World Bank (2012) describes this indicator as the one that reflects genuine savings in economy to observe the state of economy related to its sustainability so future generations can rely on the same opportunities as today´s generation has. Gross national savings are adjusted about few components to get ANS.

Gross national savings are reduced by consumption of fixed assets to get net national savings. To net national savings are added investments to human capital in form of expenses for education and on the other hand environmental damage is deducted. If the indicator is positive it signs the sustainable path of the country for the future.

Like HDI also ANS meets some challenges as alternative measure to GDP mostly regarding methodology errors and missing data of some resources that are part of environmental aspects. Sustainability of positive ANS is also questioned when the population of the country grows fast. To take into consideration the issue of population growth costs and costs of current CO_2 emissions Pezzy (2014) proposed new version of ANS that would better reflect sustainability at global level.

2.5.3   Happy planet index

The title of the index indicates that purpose of this measure is to provide information about happy lives of humans on our planet, more precisely Stoll (2012) explains the index as the one that evaluate to which extent countries provide their citizens opportunities to live long, happy and sustainable life. The centre of the index is the sustainable well-being, not wealth of nations. Apart from the experienced well-being[3] the index consists of ecological footprint and

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[3]Experienced well-being is reported directly from surveys of Gallup World Poll

life expectancy[4]. The HPI attacks the western style of development because of its unsustainability for future generations.

To become HPI more accepted internationally Ng (2007) suggests replacing ecological footprint part of HPI with per capita external costs[5] to create environmentally responsible index and see how much costs nation imposes on global community.

2.5.4   Better life index

In 2011 OECD launched new alternative index called Better Life Index. This index applies to 34 OECD countries providing information about 11 following criteria: income, housing, jobs, community, education, environment, civic engagement, health, life satisfaction, safety and work-life balance. The innovation coming with this index is the possibility to add the weights to criteria by user based on his preferences of well-being. Kasparian and Rolland (2012) incline to this idea of weighting the criteria but emphasizes the imperfections like completeness of indicators, scoring system or constraints of ranking for BLI global score. OECD states that ranking of countries in not predetermined, but this statement was doubted when adding different weight to criteria what proved to have small or none influence over the hierarchy of countries.

Individual indicators in BLI inspired Mizobuchi (2014) to propose composite indicator of single number to allow the cross country evaluation and avoid fixed weighting. The Benefits of Doubt (BOD) and Data Envelopment Analysis (DEA approaches were used while BOD focuses on elimination of subjective determination of weights and DEA searches for efficiency indexes. The weights are calculated to maximize composite index of the country so weight is higher for indicator at which country performs better and DEA uses efficiency aspect in form of evaluation productive base of the country. As every country has different productive base, it should be considered when evaluating well-being especially in countries with low level of well-being and limited productive base.

The change in the methodology using I-distance iterations was proposed by Marković et al. (2015) to target only indicators that prove to be significant and the reduction from original 24 indicators from 11 to 6 categories[6] was

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[4] Life expectancy data are used from Human Development Reports

[5] e.g. CO_2 emissions

[6] Personal earnings, life satisfaction, household net adjusted disposable income, employment rate, rooms per person, water quality

suggested. Investment to those indicators is supposed to influence more the current ranking of the country than those with low level of significance.

2.5.5 Corruption perception index

In general corruption is related to misuse of power for personal or other gain. It can influence the productivity of economy, economic growth or flow of FDI. Transparency International (2016) launches annually CPI to assess the perception level of corruption in approximately 180 countries and deliver the information to policy makers to enhance reforms and anti-corruption movement.

The impact of corruption level within the country on the economic growth is significantly negative as Deyshappriya (2016) states. The good governance of corruption situation in the country is highly recommended to secure steady growth of GDP.

Ortega, Casquero and Sanjuán (2015) examined the relationship of CPI and HDI for the period of 22 years to find out the impact of corruption level on human development. By using of clustering the effect of corruption on converging process between economic growth and human development was determined. Highly corrupted countries have different economic growth path as those with lower perception of corruption.

Similar conclusion about correlation of corruption level correlation with economic activities within the country was brought by Wilhelm (2002). He focused on international level and corruption in relation to business ethics and entrepreneurship. One of his main finding is importance of education of managers that should be aware of ethics when going to do business abroad to help eliminate corruption level globally.

2.5.6 Social sustainability index

SSI belongs to the latest indexes released by Sustainable Society Foundation (2012) as alternative to GDP although income is part of economic well-being dimension that SSI covers. Other two are human and environmental well-being. Purpose of the index is to measure ability of the country to fulfil the needs of present generation and ensure at least the same needs for future generations. In this sense the index is similar to ANS but with extension of human and environmental aspect. In economic well-being SSI includes apart from the GDP also Genuine Savings and Public Debt.

Fig. 5   3 dimensions of SSI
Source: Sustainable Society Foundation, online, 2012

The latest Sustainable Society Foundation (2012) pointed out the progress in human and economic well-being but also significant environmental well-being decrease that leads to unsustainability.

Gallego-Álvarez, Galindo-Villardón and Rodríguez-Rosa (2015) examined the scores of all the dimensions of SSI related to geographical areas of countries to find out differences in relevance of the dimensions for particular countries while the human well-being seemed to be more relevant for Europe, America and environmental well-being was closer to Africa and Asia. Variables within the dimensions proved to be highly correlated. This observation is about to raise awareness that not all of the countries perceive the same standpoint on areas of economic, human and environmental well-being.

2.5.7   Life satisfaction

Life satisfaction is subjective measure that is part of World Database of Happiness. It is perceived mostly as happiness or subjective well-being within the literature.

Tab. 2   Four types of satisfaction

	Passing	Enduring
Part of life	Pleasure	Domain satisfaction
Life as a whole	Top experience	Happiness

Source: Veenhoven (2012) edited

As depicted above by life satisfaction is understood enduring and whole life state. Veenhoven (2012) states that conditions to determine the happiness are similar across the world so the comparison is possible. He lists some of the issues that arise with comparison across the countries as language differences to understand words happiness or satisfaction, desirability bias or responses styles but none of them appeared to be the case. There are only cultural variations present when conditions to be happy are different.

With life satisfaction is connected preference drift[7] that occurs according to Groot (1999) at higher levels of satisfaction once the basic needs are satisfied. Income effect on life satisfaction depends on given level of life satisfaction already accomplished. The higher level of life satisfaction the higher change of income needed to observe preference drift.

Okulicz-Kozaryn (2011) deals with life satisfaction in different regions of European countries. He finds out that happiness in European regions is mainly positively correlated and it is not limited to national boundaries. Interesting observation is also life satisfaction equality within the regions e.g. Denmark is most equal to opposite in France.

2.6 Social challenges in EU

As the scope of the thesis is limited to social aspects of economy performance within European countries it is important to emphasize current social issues that shape EU social policy direction. The latest volume of Social Europe Guide released by Directorate-General for Employment, Social Affairs and Inclusion (2013) focused on social policies in EU provides summary of current social challenges within EU as following:

- risk of poverty or social exclusion
- homelessness,
- youth unemployment,
- stability of social systems,
- active ageing,
- healthcare,
- intergenerational transmission of disadvantage[8],
- gender equality,
- integration of immigrants and ethnic minorities,
- divergence in effectiveness and efficiency of social policies within EU member states and others.

To solve the issues named above EU decided to use a toolkit of instruments as Europe 2020 Strategy with clear goals in dimensions of poverty, education, employment, climate and innovation. Among other tools belongs the social Open Method of Coordination or EU Funds.

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[7] Situation when preferences of individual are changed by change of income

[8] Related to children that grow in poor standards of living, usually get lower education and face higher risk of unemployment compared to higher-income children.

3 Studies overview

In following overview are selected studies that point out the concerns related to GDP in different views including latest research results and some of them suggest the possible modification of economy performance measurement to reflect social well-being in better way.

Inequality within society is considered to be widespread concern. It may bring disadvantages for some segments of the society in terms of income and opportunities beyond individual´s control (gender, family background etc.). On the other hand inequality may lead to increasing human capital, innovation and entrepreneurship and support economic growth as stated by Dabla-Norris et al. (2015)

Jacobs and Šlus (2010) focused on income inequality. The Gini coefficient is most well-known coefficient for determination of income distribution inequality but faces different challenges in incorporation to alternative indexes. The coefficient measures only income not wealth distribution, omits the insight how possible is for people in country to break social barriers to move to the upper social group and abstracts from non-monetized products and services. To observe the actual impact of the Gini coefficient on income is better to use *Social Welfare Function* that multiply it with mean per capita GDP however SWF focuses rather on economic growth than on welfare of consumers. To modify SWF Jacobs and Šlus (2010) proposed new index - Economic Welfare Index (EWI) that is based on adjusted Gini coefficient with efficiency aspect. EWI consists of disposable income and government expenditures related to welfare. The expenditures are considered to be equitable therefore are not adjusted by Gini coefficient. The results of EWI application to 16 highest GDP ranked countries in 2005 proved that the rank has changed about 1 -2 positions so incorporation of the income inequality can bring different explanatory power compared to GDP.

Inequality issue is from 2010 incorporated in new version of HDI to eliminate inequality in all 3 dimensions HDI covers. Based on Human Development Reports (2016) the average decline of human development taking into account inequality in countries is by 22,8 % ranging from 5,4 % to 46,7 % and shows the significance of this GDP disadvantage.

Ray (2007) provides correlation analysis of international comparison between HDI with GDP within 102 countries, including 21 OECD countries. The results proved higher Spearman coefficient compared to Pearson coefficient so more than magnitude of the values the ranking of countries related to the

values is important. Regarding non-OECD countries the coefficients are smaller than in all countries compared to GDP per capita.

Jacobs and Šlus (2010) present the *Combined Education Index* that evaluates the change of primary, secondary and tertiary enrolments for education and its impact on future economic development. It is cumulative index of changes in 25 years while tertiary education is double-weighted. The countries with highest CEI above 1,10 are Sweden, Korea, Germany and UK. On the other hand CEI does not include the quality of education so modification of CEI based on *Programme for International Student Assessment* results about quality in education is suggested.

Anchorena (2015) examined the relationship between social capital[9] and eco-nomy development in 2000 for countries of USA. The key hypothesis for the research was that by socializing the trade efficiency increases and therefore increases the incentive to production and in the end the positive economic development occurs. The assumption is that those social ties remain constant over time in different countries and in research results are not included costs of communication and transportation to build the social ties that could influence the final outcome. The model also captured that countries with high number of social ties have lower strength of those ties. The hypothesis proved to be confirmed but author opens the discussion of possible negative impact of the social ties to economic development as criminal activity or exclusion of competitors.

Bartolini and Sarracino (2014) validated the Easterlin paradox[10] with 27 countries selected based on the availability of time series data. To point out this paradox the time series data are necessary not cross-sectional as it was shown in the study. Bertolini and Sarracino (2014) examined both relationship of GDP and social capital to happiness of people. Validation proved that social capital is significantly correlated to subjective well-being in long run and GDP in the short run what confirmed the hypothesis about Easterlin paradox.

Related to Easterlin paradox is research of De Neve and Norton (2014) that looked at the economic growth from different view as how economic growth fluctuations affect individual well-being. The evidence proved that sensitivity of negative economic growth is from two to six times higher than the positive economic growth. The research also confirmed the Easterlin paradox that was illustrated on data of Greece as GDP grew from 1981 until 2008 by 50 % while life satisfaction increased only about 5 to 10 %.

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[9] number of social ties (relationships) times time devoted to those ties

[10] Theory that states no relation of economic growth to subjective well-being in the long run

Stevenson, Betsey and Wolfers (2008) on other hand reassessed Easterlin paradox and concluded positive correlation between income and subjective well-being and did not find any satiation point of income beyond which subjective well-being does not increase.

The impact of social capital on happiness of individuals within European countries was examined by Andrés Rodríguez-Pose (2012) and the results proved positive correlation between these variables. However the aspects of social capital that matter the most vary within the macro-regions of EU members and are influenced by culture, institutions, traditions in that regions. According to results the main contributors to happiness seems to be informal social interactions and trust.

Other research related to social networks from Lim and Putnam (2010) describe the religiosity aspect that has impact on subjective well-being. The research proved that religious service attendance has positive impact on life satisfaction. Moreover, the social networks created in congregations are key mediator to contribution of subjective well-being as the people gather more frequently and build intimate relationships. Data used for the research were in USA in years 2006 and 2007. Main findings were that effects of social ties on life satisfaction is not only about size or strength of those ties but the discussion is open for social contexts why the networks are forged and identity shared within those networks.

The recent publication of authors Huber, Nerudova and Rozmahel (2016) focused on competitiveness, social inclusion and heterogeneity of EU points out the diversity of EU and its impact on division of the EU countries and consequently policies strategy within the member states. Taking into consideration indicators beyond GDP it depends on the selected indicators to draw out division of the EU countries and implication of policy strategies related to dimensions covered within the indicators. The research also reveals possibility of gaining the comparative advantage of EU in sense that diverse implication of policy-making within the member states can bring improvements in learning from the results of different policies applied. However authors admit that it requires further investments in data and analytical tools. One of topics covered in publication is also EU sustainability issue that is related to following alternative indices: Better Life Index (BLI), Happy Planet Index (HPI), Ecological Footprint (EF) and Environmental Performance Index (EPI). The EU′s core countries reflect higher values for all mentioned indices in comparison with the CEE and the periphery countries. On the other hand the core countries struggle significantly with ecological issues. In final

recommendations authors emphasize supporting the social policies that focus on elimination of inequality, social exclusion or discrimination related to gender, ethnicity etc.

4 Methodology

4.1 Data

Data for empirical part of thesis are gathered from secondary sources as official online databases and statistics of the institutions that provide information about individual indexes.

In following table is overview of the alternative measures to GDP and their availability from year 2005 to 2015 used in correlation and cluster analysis.

Tab. 3 Overview of alternative indexes availability from 2005 to 2015

Index/year	05	06	07	08	09	10	11	12	13	14	15
HDI	x	x	x	x	x	x	x	x	x	x	x
BLI							x	x	x	x	
CPI	x	x	x	x	x	x	x	x	x	x	
HPI								x			
ANS	x	x	x	x	x	x	x	x	x		
LS	x	x	x	x	x	x	x	x	x		x
SSI		x		x		x		x		x	

Source: Own elaboration based on information from official databases

Note: Sign „x" reflects that data are available for the index in particular year. Data of ANS (% of GNI) in year 2006 and 2014 are not available so in analysis the data of 2005 and 2013 will be used instead. In year 2009 ANS is given in monetary equivalent.

GDP/PC and ANS are extracted from database of The World Bank (2016). In further parts of the thesis GDP is considered to be GDP per capita. HDI indicator is gathered from Human Development Reports released by UNDP (2016) and BLI indicator is available at OECD.Stat (2016). Indicators as CPI, HPI, LS and SSI are gathered from individual websites that focus directly only on each of the indicators as CPI statistics is covered by Transparency International (2016), HPI data are provided by The New Economics Foundation (2016), LS is found at World Database of Happiness (2016) and SSI data provides Sustainable Society Foundation (2014).

Because of the limited scope of the thesis only 5 years are selected to analyse based on the availability of data related to different periods of time, particularly year 2006 to reflect the relationship of indexes to GDP before financial crises in 2009, year 2009 to observe the same relationship during financial crises and year 2010 to see similarities of differences after recovering from the financial slowdown. The year 2012 is analysed mainly because in this

year all the indexes are available and year 2014 is the period when the latest data are shown.

Data have cross-sectional character for every year and the analysis is done for EU28 as to be the best intersection of data availability because not all the indexes are released for all European countries. In years 2012 and 2014 for BLI only 21 countries of EU28 are available because BLI was released for 34 OECD countries.

Variable GDP is adjusted with logarithmic function to better reflect the relationship among variables. By logarithm the stabilization of variance is reached that leads to better homogenization of data set. Logarithm function serves also as prevention of heteroscedasticity that can occur while building regression models.

Data set for building the new proposed index is gathered from Eurostat (2016) database, the World Bank (2016) database, Special Eurobarometer survey (2010) and mipex.eu (2016). It is important again to emphasise the limited availability of data set while considering the parts of the new index. Based on the availability of data and being comparable with time periods of previous analysis the new index is built primarily from data of the year 2014 however data not available for this year are used from previous ones assuming that areas covered in analysis remain stable within short periods of time.

The following Table 4 provides the availability of data for selected dimensions. The arguments for variables selection are described in subchapter related to new index formation. The variables have same weight of 10 % therefore using data of previous time period is supposed to have no significant impact on final new index. However the variable *Healthcare expenditures* is omitted in empirical part of the thesis as 4 countries are not included in data set particularly Ireland, Italy, Malta and Netherlands. Malta is excluded from new index formation because data of disposable income of households is not available.

All the dimensions are expressed in relative units. Regarding household income, data of Luxembourg are from 2012, data of Bulgaria and Netherlands are from 2013. Data representing gender inequality in case of Ireland are from 2012 and data of Greece are from 2010. Data of 2013 are used in case of health care access dimension, education graduates and social interaction dimension.

Tab. 4   Overview of variables availability in selected dimensions for new index formation from 2010 to 2015

Variable/year	05	06	07	08	09	10	11	12	13	14	15
Household income	x	x	x	x	x	x	x	x	x	x	x
Children poverty		x	x	x	x	x	x	x	x	x	
Income inequality		x	x	x	x	x	x	x	x	x	
Gender inequality					x	x	x	x	x	x	
Healthcare quality						x					
Healthcare access						x	x	x	x		
Healthcare expenditures					x	x	x	x			
Education graduates									x		
Youth unemployment rate	x	x	x	x	x	x	x	x	x	x	x
NEETs	x	x	x	x	x	x	x	x	x	x	
Migrant integration		x	x	x	x	x	x	x	x		
Social interactions									x		

Source: Own elaboration based on Eurostat (2016), World Bank databases (2016) ,Special Eurobarometer (2010) and mipex.eu (2016)

4.2   Tools

To reach the objectives of the thesis the statistical methods and tools are used. To find the strength of relationship among alternative measures and GDP the correlation analysis is applied. In correlation analysis the Pearson and Spearman correlation coefficients are calculated using statistical software Gretl[11]. The Pearson coefficient uses original values while Spearman coefficient uses the rank of the values to determine the relationship among variables. The Spearman coefficient works as control mechanism for outcome correctness of Pearson coefficient in case the data have no normal distribution (e.g outlying values of Luxembourg). To find out the one-way dependence the Granger causality could be used but because it requires calculation with data of longer periods of time this analysis cannot be proceed. In empirical analysis the strength of correlations is depicted by different shades of blue colour.

0.37 – 0.59
0.60 – 0.79
0.80 – 1.00

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[11] For more information visit http://gretl.sourceforge.net/

After assessment of relationship among individual indicators the cluster analysis follows using software Statistica[12]. Cluster analysis provides information how 28 countries in EU cluster around each other to have similar relationship with GDP and other variables. The clusters are observed for all selected time periods and changes are described. In empirical analysis only the dendrograms of variables (GDP, HDI, CPI, ANS and LS) appearing every period of time are placed, other dendrograms of extended analysis about the additional indexes are placed in appendix A. Clustering specifies the groups of the countries that have homogeneous characteristics therefore for those groups of countries the perception of alternative measures usage may vary. Before clustering the data are adjusted by standardization to eliminate variance because data are in different measure units. In clustering the Ward´s method is preferred from all the methods because of its efficiency characteristics. It measures the distances among clusters using variance principles to minimize sums of squares at each step of any two clusters. The results are more accurate than using the single linkage method. The distance at which the clusters are defined is set based on the shape of the Euclidean distance curve, see Ferreira and Hitchcock (2009).

The last analysis is the proposal of new index based on the literature review, latest studies related to alternative measures and current challenges that EU faces from social point of view. The new proposed index represents the alternative measure to GDP including social aspects of economy performance. It includes 10 dimensions given in table of data description. The raw variables (x) of dimensions are transformed into a unit-free index by formula:

$$index = \frac{x - \min(x)}{\max(x) - \min(x)}$$

The index occurs between 0 and 1. The individual indexes are summed together and ranked for all the countries of EU27. The same method was used for calculation of HDI before year 2010. The comparison of new index ranking is compared to ranking of GDP and HDI of the EU27. The main findings are discussed and conclusion of the empirical part is drawn.

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[12] For more information visit http://www.statsoft.com/Products/STATISTICA/Product-Index

5 Empirical part

This chapter provides the main findings of the own elaboration related to objectives of the thesis. In last subchapter the new alternative index is proposed to eliminate disadvantages of GDP with emphasis of social aspects of economy performance in EU.

5.1 Correlation analysis

The correlation analysis is divided into 3 main parts observing different periods of time. The central point is the period of financial crisis that appeared during years 2008 – 2009 as reported by European Commission (2009). In all following tables above the diagonal the values of Pearson coefficient are depicted and underneath the Spearman coefficient values can be observed. The not coloured values are not significant.

5.1.1 Before the crisis

The first time period to be examined is year 2006. For the analysis are selected variables: GDP, CPI, ANS, HDI, LS and parts of SSI. The critical value for the correlation analysis is 0.37 meaning that all of the absolute values higher that critical value are statistically significant.

Tab. 5   Correlation matrix of variables in year 2006

GDP_{ln}	CPI	ANS	HDI	LS	SSI_{HW}	SSI_{EnW}	SSI_{EcW}	2006
1	0.84	0.71	0.91	0.86	0.31	-0.68	0.47	GDP_{ln}
0.88	1	0.65	0.79	0.78	0.42	-0.66	0.64	CPI
0.69	0.70	1	0.69	0.74	0.38	-0.63	0.56	ANS
0.89	0.81	0.68	1	0.83	0.50	-0.67	0.52	HDI
0.86	0.79	0.79	0.78	1	0.29	-0.68	0.49	LS
0.32	0.45	0.39	0.52	0.33	1	-0.12	0.55	SSI_{HW}
-0.63	-0.64	-0.64	-0.61	-0.63	-0.21	1	-0.37	SSI_{EnW}
0.53	0.66	0.60	0.52	0.53	0.47	-0.37	1	SSI_{EcW}

Source: Own elaboration
Note: Values of Pearson correlation coefficient are depicted above the diagonal of matrix and values of Spearman correlation coefficient are below the diagonal.

In Table 5 the Spearman coefficient confirms the similar values of the Pearson coefficient therefore the results are trustworthy. The strongest positive correlation is among GDP and corruption cleanliness of the countries (0.84), human development (0.91) and life satisfaction (0.86). Adjusted net savings (0.71) have moderate positive correlation with GDP and environmental part of SSI (-0.68) is negatively correlated with GDP. The weakest correlation proved to be between economic part of SSI (0.47) and GDP. In year 2006 the correlations are in line with theory. The less corrupted countries demonstrate higher level of GDP and reversed. HDI is highly correlated with GDP mainly because of the income part that includes. In comparison with economic dimension of SSI the correlation in case of HDI and GDP is much stronger as SSI includes information about public debts and genuine savings. Regarding the sustainability the relationship is weaker, or even not possible to define as in case of human well-being dimension of SSI. Moreover the environmental issue is negatively correlated with GDP and all the other indicators. An interesting observation is the relationship between LS and GDP. As it is a subjective measure that relates directly to people´s life it seems like the amount of GDP has positive impact on the situation how much are people satisfied or people are satisfied enough to generate particular level of GDP.

The analysis provides also insight about considering human well-being in terms of areas covered within the indexes and taking into account sustainability issue. When compared HDI to SSI$_{HW}$ and SSI$_{EcW}$, those indicators explain similar dimensions but SSI is more complex within the dimensions and is focused on sustainability. This distinction is observed by correlation coefficients among those indicators that is 0.50 and 0.52 separately and may bring different perception in terms of social aspects of economy performance.

5.1.2   During the crisis

The year 2009 was known for the economic downturn and financial crisis starting in USA and later also affecting the countries of European continent. In the Table 6 are depicted correlation coefficients for that period, omitting SSI indicator because data are available only every two years. In comparison with year 2006 results there is no significant change in correlations apart from ANS. However change of ANS cannot be assessed because data for the year 2009 excludes emission damage and are not comparable to other years. It can be understood that all the other alternative indexes copy the economic development from social point of view. Changes in GDP resulted in almost same changes in other alternative variables.

Tab. 6   Correlation matrix of variables in year 2009

GDP$_{In}$	CPI	ANS	HDI	LS	2009
1	0.81	0.57	0.90	0.81	GDP$_{In}$
0.84	1	0.80	0.80	0.87	CPI
0.56	0.70	1	0.65	0.68	ANS
0.88	0.81	0.66	1	0.82	HDI
0.84	0.89	0.65	0.84	1	LS

Source: Own elaboration
Note: Values of Pearson correlation coefficient are depicted above the diagonal of matrix and values of Spearman correlation coefficient are below the diagonal.

In year 2010 the indicators CPI, HDI and LS proved to be highly correlated with GDP as depicted in Table 7. Based on the correlation analysis using Pearson coefficient the relationship of ANS and SSI to GDP became statistically insignificant apart from the SSI$_{EnW}$. Significant weak correlation is confirmed by Spearman coefficient when observing ANS and GDP relation. Sustainability indicators of human well-being and economic well-being have low correlation with GDP also with HDI but the results are statistically insignificant.

Tab. 7   Correlation matrix of variables in year 2010

GDP$_{In}$	CPI	ANS	HDI	LS	SSI$_{HW}$	SSI$_{EnW}$	SSI$_{EcW}$	2010
1	0.81	0.34	0.92	0.80	0.18	-0.55	0.23	GDP$_{In}$
0.82	1	0.68	0.79	0.86	0.35	-0.55	0.50	CPI
0.44	0.70	1	0.45	0.60	0.43	-0.39	0.54	ANS
0.90	0.82	0.55	1	0.82	0.34	-0.63	0.37	HDI
0.85	0.90	0.59	0.84	1	0.26	-0.61	0.53	LS
0.25	0.40	0.46	0.4	0.34	1	-0.12	0.45	SSI$_{HW}$
-0.52	-0.56	-0.46	-0.62	-0.6	-0.21	1	-0.26	SSI$_{EnW}$
0.25	0.5	0.41	0.38	0.48	0.44	-0.28	1	SSI$_{EcW}$

Source: Own elaboration
Note: Values of Pearson correlation coefficient are depicted above the diagonal of matrix and values of Spearman correlation coefficient are below the diagonal.

5.1.3   After crisis

The correlation analysis in year 2012 is extended by alternative measures of HPI and BLI, see Table 8. Starting with evaluation of the basic data set that is available for all the tracked periods of time the correlation of the alternatives

like CPI, HDI, LS is stable for all the observed time periods. There is slight weakening of LS vs. GDP relationship.

ANS became statistically insignificant with almost no correlation to GDP (0.05) and also to other indicators. Sustainability indicators are diverse in correlation to GDP and other alternatives while economic well-being dimension (0.15) is statistically not significant with low level of correlation. Human well-being dimension is weakly and positively correlated with all the measures apart from ANS. Environmental part stays unchanged also for year 2012.

To analyse HPI relationship with GDP two separate indicators of composite HPI were selected that include social aspects, particularly life expectancy and well-being[13]. HPI alone that includes also ecological footprint area proved to be statistically insignificant for observed EU28 countries. Life expectancy is strongly correlated with GDP (0.84) and HDI (0.79). High correlation with HDI is not surprising as life expectancy dimension is also part of HDI. However it is interesting to observe LS and HPI_{WB} as two subjective well-being measures in relationship to GDP. Well-being part of HPI_{WB} is positively correlated with almost all the alternatives including GDP. The correlation is even higher for HPI_{WB} (0.92) than LS (0.74) and reflects broader area of well-being not only life satisfaction. Mutual correlation is significant as well with coefficient 0.85. In comparison with SSI_{HW} that includes aspect of sustainability and it is objective measure the correlation is moderate for both LS (0.50) and HPI_{WB} (0.48). It opens the space for discussion about relationship of alternative measures to GDP considering the objectivity and subjectivity of well-being and complexity of factors that data represent related to well-being.

BLI is composite index that includes 24 indicators in 11 categories. For the analysis were selected 4 to represent social point of view. BLI_{WLB} represents work-life balance in amount of working hours over 50 per week. The correlation is statistically insignificant. BLI_{EA} and BLI_{SS} reflect educational level within the countries while BLI_{EA} expresses the educational attainment of at least secondary education and BLI_{SS} explains student scores in the end of compulsory education. The relationship with GDP is insignificant. Purpose of selection of both indexes is to find out difference in correlations regarding amount of population that achieve at least secondary education (BLI_{EA}) and quality of the education in basic areas (BLI_{SS}). There is no difference compared to GDP however there are slight changes in correlations with other indicators like CPI, SSI_{HW} or SSI_{EcW}. BLI_C describes the support of the network that people have in

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[13] Subjective well-being based on the average mean of individual responses to the Ladder of Life questions in the Gallup World Poll

country and can rely on in case of trouble. This is positively correlated with all the basic indicators observed for all the periods including HPI$_{WB}$. The strongest relation is with LS what confirms also general perceptions of community support that influences life satisfaction or reversed.

Tab. 8   Correlation matrix of variables in year 2012

GDP$_{ln}$	CPI	ANS	HDI	LS	SSI$_{HW}$	SSI$_{EnW}$	SSI$_{EcW}$	HPI$_{LE}$	HPI$_{WB}$	HPI	BLI$_{WLB}$	BLI$_{EA}$	BLI$_{SS}$	BLI$_C$	2012
1	0.78	0.05	0.92	0.74	0.43	-0.62	0.15	0.84	0.92	0.31	-0.20	-0.09	0.12	0.64	GDP$_{ln}$
0.81	1	0.38	0.75	0.85	0.55	-0.6	0.36	0.53	0.77	0.17	-0.35	0.16	0.60	0.62	CPI
0.16	0.39	1	0.15	0.39	0.05	-0.15	0.40	-0.17	0.19	0.01	-0.38	0.45	0.45	0.63	ANS
0.91	0.79	0.31	1	0.76	0.50	-0.68	0.20	0.79	0.91	0.40	-0.17	0.11	0.28	0.73	HDI
0.80	0.89	0.37	0.83	1	0.44	-0.64	0.53	0.48	0.85	0.21	-0.19	0.45	0.45	0.82	LS
0.42	0.54	0.13	0.51	0.50	1	-0.5	0.28	0.37	0.48	0.29	-0.22	0.41	0.63	0.03	SSI$_{HW}$
-0.63	-0.64	-0.27	-0.70	-0.69	-0.51	1	-0.26	-0.44	-0.64	0.04	0.35	-0.45	-0.45	-0.43	SSI$_{EnW}$
0.14	0.30	0.41	0.18	0.43	0.27	-0.28	1	-0.08	0.31	-0.19	-0.16	0.62	0.25	0.27	SSI$_{EcW}$
0.80	0.53	-0.01	0.76	0.53	0.34	-0.41	-0.13	1	0.78	0.59	0.04	-0.46	-0.07	0.32	HPI$_{LE}$
0.93	0.80	0.27	0.92	0.88	0.48	-0.68	0.32	0.75	1	0.43	-0.15	0.22	0.26	0.74	HPI$_{WB}$
0.40	0.27	-0.05	0.46	0.33	0.30	-0.07	-0.17	0.72	0.46	1	0.38	-0.06	0.09	0.22	HPI
0.30	0.38	0.42	0.20	0.25	0.26	-0.37	0.16	-0.07	0.23	-0.37	1	0	-0.29	-0.01	BLI$_{WLB}$
-0.27	0.01	0.32	-0.11	0.20	0.37	-0.28	0.71	-0.52	-0.04	-0.13	0	1	0.32	0.33	BLI$_{EA}$
0.05	0.54	0.51	0.33	0.47	0.59	-0.45	0.15	-0.15	0.22	0.08	0.29	0.29	1	0.38	BLI$_{SS}$
0.75	0.69	0.50	0.79	0.78	0.09	-0.41	0.11	0.41	0.76	0.30	0.06	-0.05	0.37	1	BLI$_C$

Source: Own elaboration

Note: Values of Pearson correlation coefficient are depicted above the diagonal of matrix and values of Spearman correlation coefficient are below the diagonal.

Tab. 9   Correlation matrix of variables in year 2014

GDP$_{ln}$	CPI	ANS	HDI	IHDI	LS	SSI$_{HW}$	SSI$_{EnW}$	SSI$_{EcW}$	BLI$_{WLB}$	BLI$_{EA}$	BLI$_{SS}$	BLI$_C$	2014
1	0.80	0.03	0.91	0.85	0.76	0.25	-0.62	0.05	-0.22	-0.10	0.17	0.44	**GDP$_{ln}$**
0.80	1	0.35	0.78	0.8	0.85	0.47	-0.64	0.36	-0.29	0.18	0.54	0.58	**CPI**
0.09	0.32	1	0.14	0.19	0.32	0.3	-0.05	0.48	-0.47	0.33	0.53	0.67	**ANS**
0.93	0.80	0.22	1	0.94	0.78	0.4	-0.68	0.12	-0.28	0.13	0.37	0.50	**HDI**
0.84	0.77	0.24	0.93	1	0.83	0.53	-0.67	0.31	-0.33	0.43	0.41	0.59	**IHDI**
0.81	0.86	0.24	0.82	0.84	1	0.45	-0.57	0.38	-0.29	0.40	0.50	0.75	**LS**
0.31	0.40	0.38	0.43	0.60	0.42	1	-0.24	0.34	-0.34	0.48	0.26	0.28	**SSI$_{HW}$**
-0.63	-0.66	-0.14	-0.73	-0.69	-0.65	-0.33	1	-0.20	0.39	-0.24	-0.53	-0.11	**SSI$_{EnW}$**
0.05	0.31	0.45	0.16	0.31	0.32	0.29	-0.21	1	-0.34	0.65	0.21	0.35	**SSI$_{EcW}$**
0.32	0.32	0.52	0.34	0.43	0.34	0.28	-0.36	0.38	1	-0.16	-0.11	-0.06	**BLI$_{WLB}$**
-0.29	0.05	0.28	-0.10	0.27	0.22	0.42	-0.11	0.69	0.05	1	0.24	0.19	**BLI$_{EA}$**
0.17	0.55	0.47	0.37	0.43	0.48	0.18	-0.53	0.14	0.07	0.15	1	0.55	**BLI$_{SS}$**
0.65	0.59	0.51	0.73	0.70	0.71	0.39	-0.15	0.11	0.08	-0.03	0.54	1	**BLI$_C$**

Source: Own elaboration

Note: Values of Pearson correlation coefficient are depicted above the diagonal of matrix and values of Spearman correlation coefficient are below the diagonal.

The last year to be analysed is year 2014. In the correlation matrix in Table 9 is included apart from the HDI also inequality adjusted HDI. In comparison to HDI (0.91) this IHDI (0.85) has still strong correlation with GDP but it is weaker. However IHDI proves to be more correlated than HDI with the most of the alternatives like LS. SSI_{HW}, BLI_{EA}, BLI_{SS} and BLI_C ranging from 5 to 30 %.

In fact the correlation results are similar to previous year 2012. SSI_{HW} (0.25) became statistically insignificant in relationship to GDP. All the correlations of BLI and GDP are not statistically significant apart from BLI_C that declined compared to year 2012 about 20 %. Also other correlations of all the versions of BLI are same or smaller compared to year 2012.

5.1.4 Correlation analysis summary

The main findings of correlation analysis are following:
- in tracked periods of time the dynamics of correlation results is very similar to each other with small deviations except from ANS, meaning that the economy performance (GDP) is followed by similar changes in alternative measures or reversed, assuming the correlations are statistically significant,
- when evaluating the relationship among GDP and alternatives the complexity of factors included in variables matters as well as the objective or subjective character of variables, the more complex indicator the lower correlation is proved with GDP,
- subjective alternative measures of well-being are highly correlated with GDP all observed periods of time that leads to consideration of income to be important part of the human lives. It also does not confirm Easterlin paradox hypothesis, however objective measures including aspect of sustainability reflect weak or no correlation with GDP,
- negative correlations to GDP are observed in case of $SSI_{EnW.}$ The better the economy performs the higher environmental damage brings to the country,
- even though the analysis is focused preferably on social aspects of human well-being, it cannot be omitted to emphasise the relationship of GDP growth with sustainability development or environment that is part of the analysis.

It is important to notice that the correlation analysis is limited by the number of countries within EU28. The results are under this assumption and cannot be general for all the countries worldwide.

5.2   Cluster analysis

As the Europe is diverse with different languages and cultures it is as well with economy performance and level of social well-being. The cluster analysis is proceed to observe how countries within EU gather together based on similar characteristics of GDP and alternative measures behaviour. These individual clusters can be used in further analysis where the relationship of GDP and alternative measures can be quantified to serve future implication of government policies or business decision making in sense how much the one can rely on the GDP growth results and to which extent the consideration of alternative measure is important.

Starting with year 2006 within the current EU28 the 25 countries were members of European Union. The countries are grouped in 4 following clusters as depicted on Figure 6 based on the linkage distance 5:
1. Italy, Greece, Czech Republic, Malta, Estonia, Spain, Slovenia, Cyprus
2. Portugal, Slovakia, Lithuania, Latvia, Hungary, Poland, Croatia, Romania, Bulgaria
3. Luxembourg, Ireland, Sweden, Finland, Denmark
4. UK, Netherlands, Germany, France, Belgium, Austria

The countries across the clusters are formed mainly based on geographical aspect including some exemptions. In the first cluster 3 of 5 PIIGS countries[14] are placed, second one includes 3 of V4 countries and most of Central and Eastern European countries, third cluster consists of Northern countries, Luxembourg, Ireland and the last one includes Western European countries, UK and Austria.

In extended analysis on Figure 11[15] including SSI variable reflecting sustainability aspect the Northern and Western European cluster that was more separated in basic set of alternatives is more homogeneous with countries of the first cluster.

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[14] Portugal, Italy, Ireland, Grece, Spain
[15] See appendix A
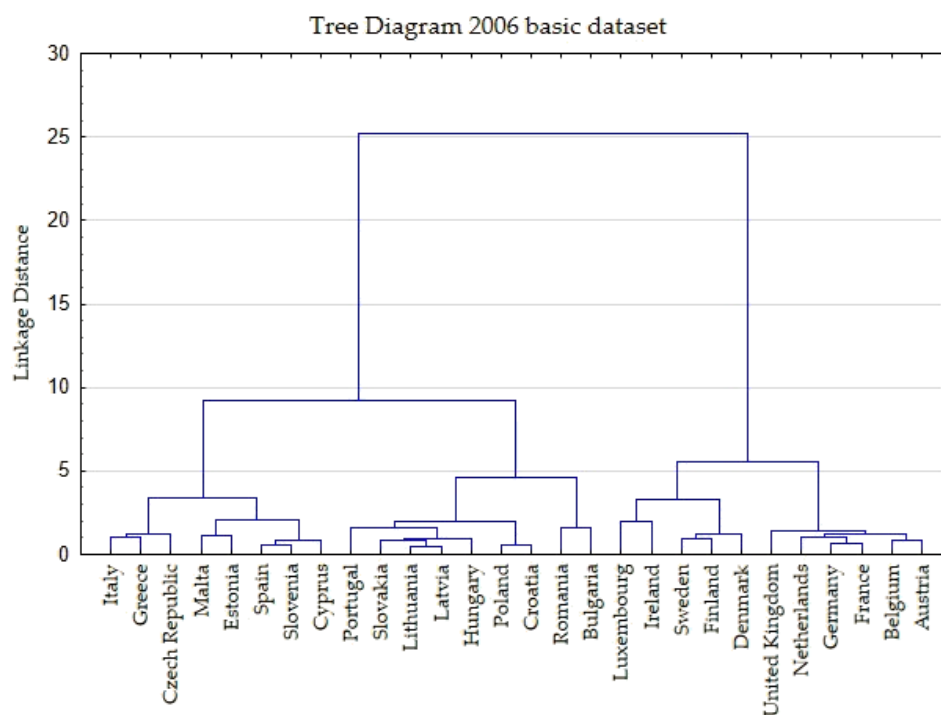
Fig. 6   Clusters of EU countries in 2006[16]
Source: Own elaboration
Note: ANS data is from 2005

Year 2009 is known for period of financial crisis and the worsening of economy situation was observed almost in every country within the European continent. The cluster analysis depicted on Figure 7 points out that countries show lower variability in all variables compared to year 2006. Taking into consideration the same linkage distance of 5 only three clusters appear, reflecting that countries become more homogeneous. On the other hand the distance between the two largest groups is at distance 29 while in year 2006 is that distance at level of 25 so it leads to conclusion that even though the similarity of groups at lower distances is higher the larger heterogeneity of clusters is reached at the highest distance level.

To compare the groups of countries in year 2009 with year 2006 the first cluster left Estonia, Malta and Greece to move to the big group of countries in Central and East Europe. Romania and Bulgaria are outliers in this group as expected but not very distant. Last group of countries is not changed and gathers two last clusters from previous analysis. Only Luxembourg has individual position.

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[16] Variables included: GDP, HDI, CPI, LS and ANS
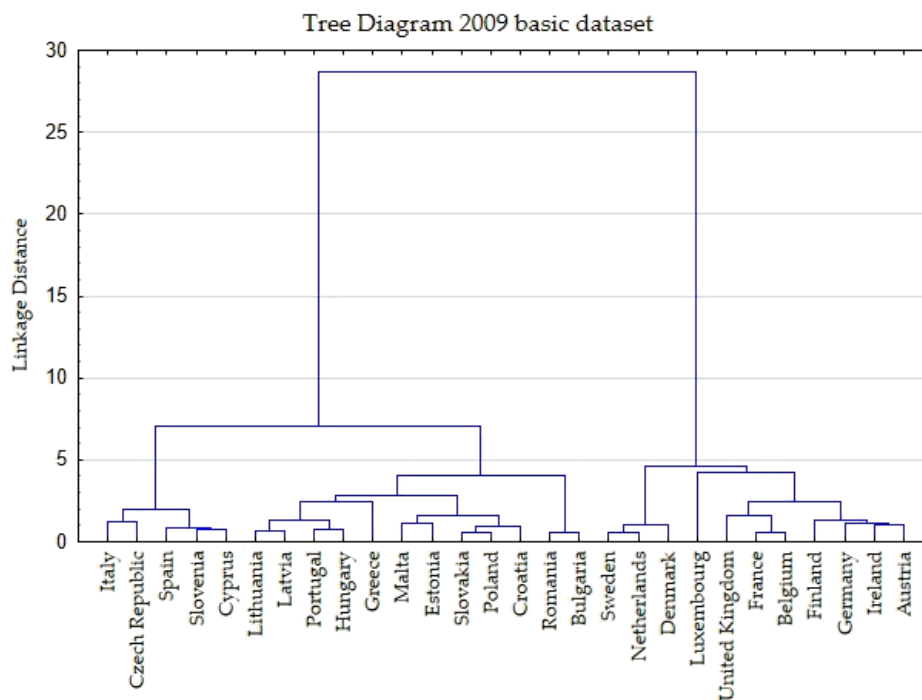
Fig. 7   Clusters of EU countries in 2009
Source: Own elaboration

In following year 2010 as shown on Figure 8 the first cluster is extended by France. Individual positions have Greece and Portugal. There is no significant change in cluster of CEE neither in last cluster of Northern and West countries.

In extended analysis on Figure 12[17] of 2010 including SSI the cluster analysis compared to 2006 has higher variability in distances at lower level but the distance between two largest groups is slightly above 14 compared to extended analysis of 2006 that is slightly below 25. So the clusters are more homogeneous in 2010. Considering sustainability issue countries as Estonia, Czech Republic and Slovenia moved in to the Northern and Western European cluster and on the other hand Ireland and UK moved out.

[17] See appendix A
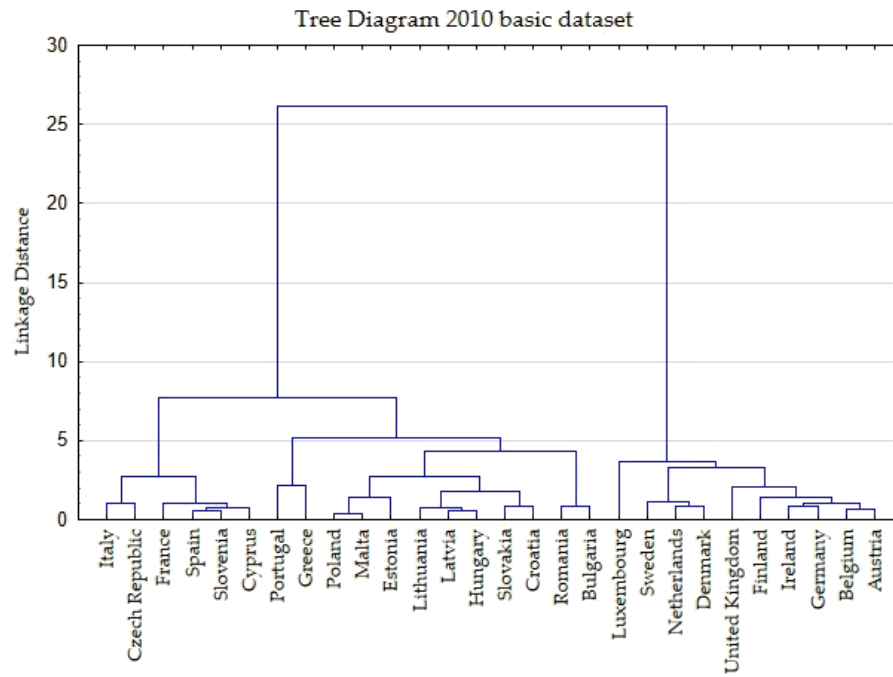
Fig. 8   Clusters of EU countries in 2010
Source: Own elaboration
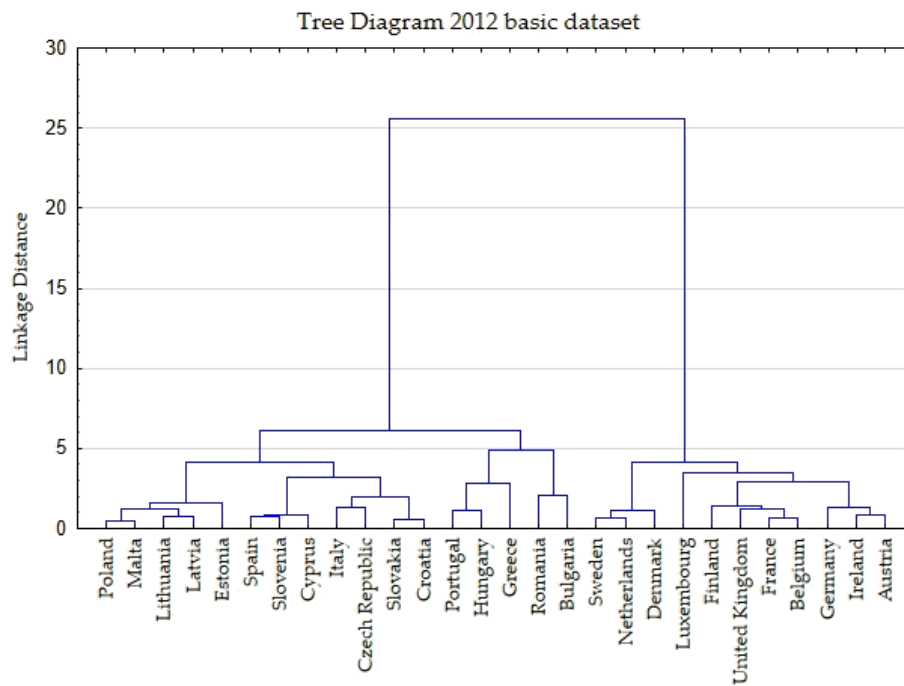
Fig. 9   Clusters of EU countries in 2012
Source: Own elaboration

In year 2012 more homogenous are countries of CEE and Southern European countries, see Figure 9. Individual cluster of Portugal, Greece together with Hungary and other cluster of Romania and Bulgaria seems to be more separated.

Sustainability aspect in year 2012 brings similar cluster distribution as in basic set of variables as demonstrated on Figure 13[18]. On the other hand considering adding HPI variable to analysis as observed on Figure 14[19] the Northern and Western European countries lose the individual position and countries as Malta, Italy, Spain or Cyprus are moved to that group.
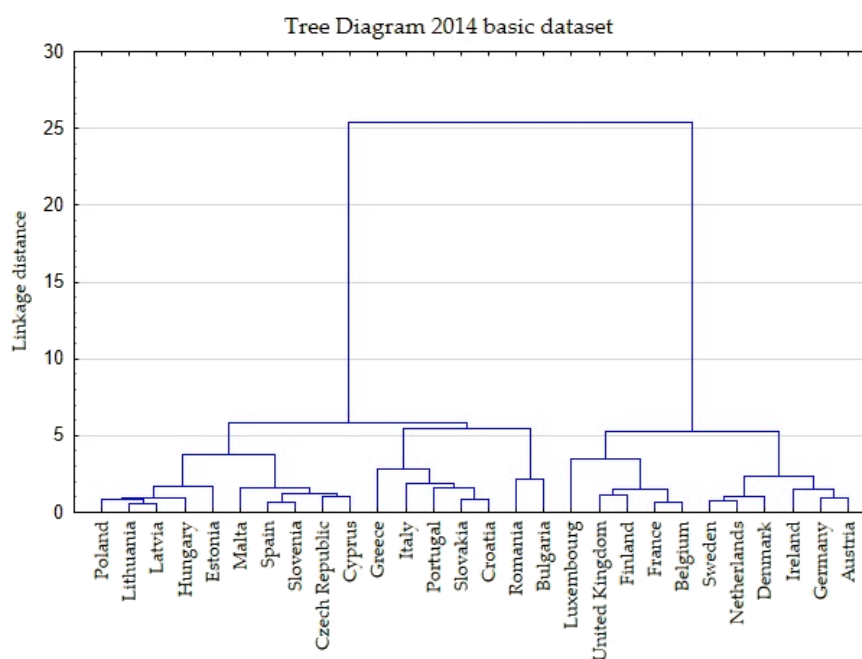
Fig. 10   Clusters of EU countries in 2014
Source: Own elaboration
Note: ANS data is from 2013

Cluster analysis in year 2014 seems to be more symmetric. It has 2 main clusters of countries and each one consists of another 2 clusters that have again 2 another clusters as depicted above on Figure 10. Slovakia and Croatia moved to 3 PIIGS countries and all the CEE and Southern European countries remain to be positioned same like in previous analysis of 2012. The last cluster remains unchanged as well.

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[18] See appendix A

[19] See appendix A

Taking into consideration the sustainability index SSI the cluster of Northern and Western European countries remains the same. Among those countries Czech Republic and Estonia appear similarly like in extended analysis of 2010 in exchange of UK, Ireland and France. Approximation of PIIGS countries is visible but not unambiguous as shown by Figure 15.

5.2.1   Cluster analysis summary

The main findings of the analysis are summarized as following:
- In all the observed periods of time considering basic data set of variables GDP, CPI, LS, HDI and ANS there are two clusters of countries that are significantly distant from each other with no significant changes during observed time periods. The Northern and Western European countries including Ireland, UK and Austria have homogeneous behaviour of those variables in comparison with rest of the European countries.
- Assuming aspect of sustainability (SSI) or more complex indicator as HPI in extended analyses brings ambiguous results in homogeneity of groups of countries. Related to sustainability countries move across the clusters. In years 2006, 2010 and 2014 some of the countries approached the group of Western and Northern countries of EU but in year 2012 those countries took the same positions again, e.g. Czech Republic, Estonia, Slovenia.
- When observing the analysis including HPI in 2012 to the stable cluster of Northern and West European countries[20] are added countries that are completely different from those that appear in extended analysis including SSI in years 2006, 2010 or 2014, e.g Malta, Spain, Italy, Cyprus.
- The expected distribution of clusters based on their economic environment like PIIGS or V4 countries was not confirmed unambiguously in relation to variables of GDP and selected alternatives. It leads to discussion if the changes of the monetary variable as GDP reflect similar direction also for alternative measures in those countries.
- The relationship among countries is more difficult to be determined as the complexity of alternative measure is increasing as shown in results of cluster analysis while the basic data set of alternatives consists of very specific measures[21] and at least division at highest level of distance is possible. The more complex the alternative measure is the more difficult is evaluation of the homogeneity of countries and more ambiguity is

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[20] Including Ireland, UK, Austria
[21] GDP, ANS, LS, HDI and CPI

brought to determine the groups of countries with homogeneous characteristics.

There is not definite solution for grouping the countries at lowest possible level based on their homogeneity as the clusters are changing within the time periods. In case of analysis of countries with variables available for all years the countries can be divided into two main categories as Northern and Western European countries including Ireland, UK and Austria and the rest of the EU28 countries. Considering sustainability or HPI the results vary more depending on the observed time period.

5.3   Alternative index proposal

Based on the information gained from the theoretical part of thesis, particularly GDP disadvantages, current studies overview and the actual problems that EU faces in terms of society that are also included in strategy Europe 2020 the new alternative index is proposed.

5.3.1   Dimensions of new index proposal

The dimensions selected to be part of new alternative index are following:

- Household income,
- Poverty or social exclusion,
- Income inequality,
- Gender inequality,
- Healthcare,
- Education,
- Youth unemployment
- NEET´s
- Migration and ethnical minorities integration,
- Social networks

The only economic aspect of the new index is income. Based on results of correlation analysis income was highly correlated also with subjective well-being so it is considered doubtless to be important part of human lives. To reflect disadvantages of the GDP income is represented by data of *real adjusted disposable income of households*[22] that focuses more on possible consumption of individuals within households rather than on overall production.

Poverty or social exclusion represents data of *children at risk of poverty or social exclusion* as percentage of total population. The child poverty is chosen because it better reflects the future direction of this dimension and it is usually

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[22] data of Luxembourg are from 2012, data of Bulgaria and Netherlands are from 2013

higher than the poverty percentage of all population[23]. Moreover by this indicator may be better reflected intergenerational transmission of disadvantage.

Inequality is considered to be important social concern as already mentioned by authors in chapter of studies overview. Both types of inequality aspects are included in proposed index - income inequality as inequality of outcomes and gender inequality as inequality of opportunities. To reflect income inequality *Gini coefficient of equalised disposable income* is used in analysis. Even though authors suggest the adjustment of Gini coefficient to reflect also wealth distribution and possibility to move among social groups the data are not available. The higher the coefficient is between range from 0 to 1 the higher level of income inequality country performs. In relation to final ranking of countries Gini coefficient contributes by inverse proportion to new proposed index. Gender inequality is represented by *gender gap pay*.

Healthcare area consists of two components as healthcare access and healthcare quality. Healthcare access is expressed by variable *self-reported unmet needs for medical examination* with reasons that medical examination is too expensive, too far to travel or person is on waiting list. Healthcare quality was assessed based on survey of Special Eurobarometer (2010) related to patience safety.[24] Both variables are subjective.

Education dimension is measured by variable of *graduates in tertiary education* to balance the criticism of the service measurement where primary focus is on input via the enrolment of students rather than on output via graduates.

Youth unemployment rate reflects the persons aged from 15 to 24 years. Apart from this variable the proposed index includes also the youth aged from 15 to 24 year that are not employed nor in education or training represented by variable *NEET´s*. *NEET´s* variable ranges widely from 5.5 % for Netherlands to 22.1 % for Italy.[25] Low integration of those persons is connected to high economic costs of countries and disengagement from society.

As inspired by the studies overview where social networks may have positive impact not only on economic development but also on happiness and subjective satisfaction of individuals, in new proposed index are incorporated

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[23] see Eurostat database

[24] The question asked in survey: „How would you evaluate overall quality of healthcare in our country?"

[25] See Table 16 in appendix

social interactions in form of *trust in others and in institutions* that can individuals rely on in case of need.

Last but not least dimension of the proposed index is migrants and ethnical minorities' integration. It is represented by *Migrant Integration Policy Index* that explains the level of integration of those social groups within the observed countries.

5.3.2   New proposed index summary

The new proposed index is complex indicator composing of 10 dimensions including 9 social aspects and income consideration. It is only applicable to countries of EU27[26] and focuses on current challenges within EU policy. The distinction among proposed index ranking and GDP, HDI rankings serves to see to what extent the countries should consider alternative measures of economy performance to reflect the social issue within the countries.

Position change of GDP and HDI ranks compared to new proposed index is quite similar; usually the change is from 2 to 5 positions and always in same proportion with exemptions of Denmark, Netherlands, Luxembourg, Austria, and France.

All the Northern countries, Benelux countries stay separated at the top of the ranking including Germany, Austria and France. Even though the positions of countries are mixed the countries are located within top 10 ranks.

The new proposed index brings significant position changes in case of countries as Sweden, Finland, Luxembourg and Belgium. Sweden stands for the position number 1 in overall ranking. The position of Finland is improved by 6 positions compared to GDP and 8 positions compared to HDI. Luxembourg loses its positions considering selected social aspects by 4 positions. So despite of high number of GDP per capita within the observed EU27 it does not bring the same position in relation to social dimensions included in new proposed index however the position is better compared to HDI rank. Belgium positioning is better by 4 positions compared to GDP.

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[26] excluding Malta

Tab. 10   Comparison of new proposed index, GDP and HDI country ranking.

EU27	New index	GDP Rank	Position change	HDI Rank	Position change
Sweden	1	4	3	5	4
Denmark	2	3	1	1	-1
Finland	3	9	6	11	8
Netherlands	4	5	1	2	-2
Luxembourg	5	1	-4	7	2
Belgium	6	10	4	8	2
Slovenia	7	15	8	12	5
Germany	8	8	0	3	-5
Austria	9	7	-2	10	1
France	10	11	1	9	-1
Czech Republic	11	19	8	15	4
United Kingdom	12	6	-6	6	-6
Slovakia	13	18	5	19	6
Portugal	14	16	2	22	8
Poland	15	22	7	20	5
Ireland	16	2	-14	4	-12
Lithuania	17	23	6	21	4
Spain	18	13	-5	13	-5
Italy	19	12	-7	14	-5
Hungary	20	21	1	23	3
Estonia	21	20	-1	17	-4
Croatia	22	24	2	25	3
Romania	23	26	3	26	3
Latvia	24	25	1	24	0
Cyprus	25	14	-11	18	-7
Bulgaria	26	27	1	27	1
Greece	27	17	-10	16	-11

Source: Own elaboration
Note: The positions of the countries are labelled by intensity of range from green to red shadows while green reflects better positioning of the country in new proposed index and red reversed.

Very significant change of positions are further in case of Slovenia, Czech Republic, UK, Slovakia, Portugal, Poland, Lithuania, Spain and Italy. Slovenia is

placed on 7th position in new proposed index compared to 15th position within GDP ranking and 12th position of HDI ranking. Almost same position change is in case of Czech Republic. Similarly as Czech Republic, Slovakia and Poland improved their positions in new proposed index on the other hand UK, Spain and Italy occupy significantly lower positions in new proposed index.

The most visible movements within the ranking are by countries Ireland, Cyprus and Greece as depicted in Table 10.

The analysis provides the overview how countries perform in overall assessment of individual dimensions included in the proposed index. However it is necessary to observe changes in more detailed analysis as the new proposed index gives only the first insight about significant changes. For instance taking into consideration the most significant positive changes in raking of countries as Sweden, Finland, Slovenia, Czech Republic, Poland or the most visible negative changes of UK, Ireland, Spain, Italy, Cyprus and Greece to find out the actions of country policies that could lead to different positioning compared to GDP or HDI ranks.

6 Discussion

In this chapter is discussed importance of the topic, findings of empirical part of thesis compared with literature review and studies overview in chapter 3. Further possible research of the topic is suggested and recommendations are placed.

6.1 Correlation analysis

The correlation analysis was proceeded using Pearson (r) and Spearman (rs) correlation coefficients. These coefficients were used also in study *Measurement of social development* by Ray (2007) to find relationship between HDI and GDP per capita related to consideration of OECD and non-OECD countries. The correlation analyses for observed 5 time periods proved slightly higher values in favour of Spearman coefficient, particularly in 65 % of correlation observations between GDP and alternative measures[27] similarly as in study of Ray (2007). It is however questionable if it is enough to consider ranking of countries related to measures more important than magnitude of measures.

Ray (2007) also proves high correlation between HDI and GDP of 0.81 (r), 0.94 (rs). He also proposes new multidimensional index focused on different social dimensions called SDI that proves to have higher correlation with GDP in case of Pearson coefficient 0.88 and slightly lower Spearman coefficient 0.92 compared with HDI. This does not correspond with results of the correlation analysis in empirical part where more complex indicators proved to have lower correlation with GDP. This distinction can be influenced by selected partial variables included in alternative indexes and also by set of countries included.

Within the studies overview the Easterlin paradox is discussed. To compare results with authors Bartolini and Sarracino (2014), De Neve and Norton (2014), Stevenson, Betsey and Wolfers (2008) the outcome of the thesis correlation analysis inclines to Stevenson, Betsey and Wolfers (2008) conclusion that subjective well-being is positively correlated with economic growth. Subjective well-being reflected by indicators of LS and HPI$_{WB}$ is highly correlated with GDP all the observed periods of time. De Neve and Norton (2014) looked at the Easterlin paradox from view of economic fluctuations. In this consideration there is slight weakening of LS and GDP correlation in years

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[27] Alternative measures – CPI, ANS, HDI, LS, SSI

2012 and 2014, not in periods of economic downturn as was proved by De Neve and Norton (2014) however it is questionable if there is any time lag.

6.2   Cluster analysis

The objective of the cluster analysis was to identify the groups of countries that bear homogeneous characteristics related to observed variables. The results of the correlation analysis are ambiguous. As authors Huber, Nerudova and Rozmahel (2016) claim that to make division of countries based on indicators beyond GDP depends on selection of the indicators. In cluster analysis of EU28 only within particular data set was visible major distinction of countries however by extending the data set by other indicators the grouping of countries was ambiguous in observed periods of time and countries moved in and moved out the different clusters.

Authors like Drennan (2009), Madhulatha (2012), Mooi and Sarstedt (2011) emphasize the limitations of cluster analysis. First of all Drennan (2009) points out the determination of clusters amount. It requires experimentation of analyst and possibly some other knowledge to decide. Clusters may differ also using different cluster algorithm. The problematic analyst´s objective evaluation is also emphasized by Madhulatha (2012). He concludes that groups of countries cannot be generalized because clusters are created on information of variables included. Therefore in case of the results of cluster analysis in empirical part the groups of countries could be changed considering other alternative measures. Another point of view offer Mooi and Sarstedt (2011) that evaluate the impact of correlations among variables included in cluster analysis on reliability of results. Both authors state that absolute correlation above 0.90 among variables may be problematic and over represent the solution of analysis. The results in empirical part should not be overrepresented based on the Mooi and Sarstedt (2011) because all the absolute correlation among variables are less than 0.90 with exception of HDI and GDP. They also put emphasize on size of sample. Even though there is not written rule about minimum sample size in relation to variables included it is recommended at least 2^m sample, where m corresponds the amount of variables. Taking into consideration this point of view it could be problematic especially in cluster analyses including extended data sets of variables in empirical part.

6.3   New index proposal

The new index proposal is alternative index based on the theory knowledge from literature review and selected current social issues within EU.

The country ranking of new proposed index compared to HDI and GDP rankings provides few interesting points to consider for discussion. One of the first observations is position change of GDP and HDI ranks compared to new proposed index that is quite similar. It confirms also the correlation analysis where HDI was highly correlated with GDP. Even though it is alternative measure that contains dimensions as education and life expectancy it cannot be fully considered for alternative measure that takes into consideration the social aspects of human well-being.

Positioning of Western and Northern countries corresponds to the results of cluster analysis where all those countries gathered across all the periods of time in separated cluster considering basic data set. Interesting is positioning of Czech Republic and Slovenia. Those two countries approached in cluster analysis in 2010 all the top placed countries of new proposed index ranking considering extended data set, see Figure 12 appendix A. However it is questionable if there is any interconnection as the analyses are in different time periods and different alternative indicators are compared.

Discussion-worthy are the most dramatic moves within new index rankings in particular Ireland, Cyprus and Greece. It is very difficult to identify areas that had significant influence of positions change but at least it is sign that in those countries social policy decision-making is not in line with economic development of countries. Expect from Cyprus both Ireland and Greece had problems to refinance their government debt during debt crisis. However Ireland managed more successfully to deal with the crisis compared to Greece taking into consideration GDP growth and unemployment but it obviously does not have to be in line with other social dimensions included in new proposed index. Even though Ireland crisis recovery was more successful compared to Greece the position change within new index is very similar therefore deeper analysis is needed to consider the impact of austerity programme to tackle debt crisis on social areas on economy included in new proposed index. The first position in new ranking belongs to Sweden. Even though it is not very significant change compared to GDP and HDI ranks Sweden may be kind of inspiration in implementation of social policies for other members states. As it is mentioned in Social Europe Guide (2013) Sweden supports family friendly employment, generous parental leave, innovative healthcare system e.g. ePrescriptions to increase security and quality of

medication. It is assumed that member states are not homogeneous and the same policy implications may have different results but countries can learn and learn from Sweden and all top placed countries in social point of view.

Weaknesses of new proposed index are found in equal weight added to individual variables. To eliminate this disadvantage the DEA method suggested by Mizobuchi (2014) could be used. DEA method would evaluate the efficiency of outcomes for individual dimensions included in new proposed index and those dimensions would bear different weight in overall index to better reflect the progress of dimension related to its productive base. Another disadvantage of new proposed index is only one time analysis for year 2014. It is therefore necessary to observe the countries performance within more periods of time to clearly see the outcomes of new proposed index and deviations in ranking. Above all the results are drawn based on comparison only with GDP and HDI therefore comparison also with other alternative measures is suggested.

The results of the new proposed index are not suitable for comparison with other research paper dedicated to this topic as proposed index includes unique dimensions and those dimensions may be part of other alternative measures but may be reflected by other indicators and variables therefore comparison may be misleading.

6.4   Further research

Even though the objective of the thesis is fulfilled there is always space for improvements and deeper analysis in examined area. After identification of clusters the regression analysis may be proceed to quantify the relationship of GDP and alternatives. The regression analysis would determine if there is any difference in results with or without consideration of clusters that were formed in clustering. Results would also provide information which groups of countries could possibly rely on GDP growth as indicator of economy performance and those in need of alternatives to better reflect the situation in different areas of economy and consequently better implement the government policies or business related actions. Regression analysis would determine also significance of alternative measures. To generalize the outcomes of the empirical part of the thesis data set of more countries has to be considered to eliminate misguided results.

In relation to new proposed index more deeper analysis is suggested to examine the changes or policies within the countries in respect to dimensions included in index that could help improve positioning of countries or reversed.

The thesis provides social view of economy performance from macroeconomic perspective it would be interesting to observe in further research how businesses contribute to social aspects of economy eg. via Corporate Social Responsibility. As businesses have impact on the environment and society they may positively influence the well-being within society. Some areas observed and improved like gender equality of employees, support of family friendly employment, training and education during employment, integration of ethnical minorities and immigrants, employment of graduates and youth etc.

7 Conclusion

The thesis deals with topic of social view on economy performance in European countries. The literature overview provides insight to topic, classifies alternative measures to reflect social well-being of individuals in economy and summarize recent studies related to this area.

In the first part of empirical part are observed correlations among GDP per capita and available alternative indices, followed by searching for homogeneous groups of countries within current EU28 regarding GDP and alternative measures. In the last part is proposed new index reflecting elimination of GDP disadvantages and taking into consideration current challenges EU faces. Within empirical part are used methods of correlation and cluster analysis considering 5 periods of time.

In all tracked periods of time the dynamics of correlation results is mostly similar regarding the observed indicators therefore we may conclude that alternative measures follow the changes of GDP or reversed with small deviations also in time of economic downturn. The more complex indicator is, including more dimensions within the index, the lower correlation is proved with GDP. Income proved to be important part of subjective well-being and hypothesis about Easterlin paradox was not confirmed however it is questionable if the observed periods of time and used indices are sufficient to make conclusion of the hypothesis. Objective alternative measures reflecting sustainability aspect proved to have weak or no correlation with GDP. Negative relationship to GDP was observed in case of environmental part of SSI that reflects sustainability in this area.

With clustering the homogeneous groups of countries within EU28 were detected. Considering basic data set available for all periods of time two clusters of Northern and Western Europe including Ireland, UK and Austria were significantly distant from the rest of the EU28. By adding more indicators to analysis e.g. SSI or HPI the analysis brings ambiguous results. The countries move in and out across the clusters. The results could be further used to better quantify the relationship of GDP and alternatives.

The new proposed index includes social dimensions that are challenging to be solved for current EU28 and possibly eliminates disadvantages of GDP as indicator of economy performance. By changes in country ranking new proposed index revealed limitation not only of GDP but also of well-known alternative measure HDI. Western and Northern countries are placed in the top of the ranking with Czech Republic and Slovenia approaching those countries.

The most significant changes are in case of Ireland, Cyprus and Greece. It gives insight for further research that social policy decision-making in particular social dimensions does not have to correspond to economic development of the country.

The observation of the social aspects in economy performance has its limitations as the importance of social issues is difficult to be evaluated and it is changing within time. For instance in one period of time the most important for countries may be solve the unemployment or health care issue in other immigrants' integration or terrorism threats. Therefore to evaluate such an analysis it is necessary to consider limitations of time, countries and weights of particular dimensions. The diploma thesis looked at the economy performance indicators from economist point of view considering not only monetary aspect of GDP growth that is mostly success indicator from political point of view but critically evaluated its disadvantages and proposed possible further research within area of social well-being.

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Appendices

A Dendrograms
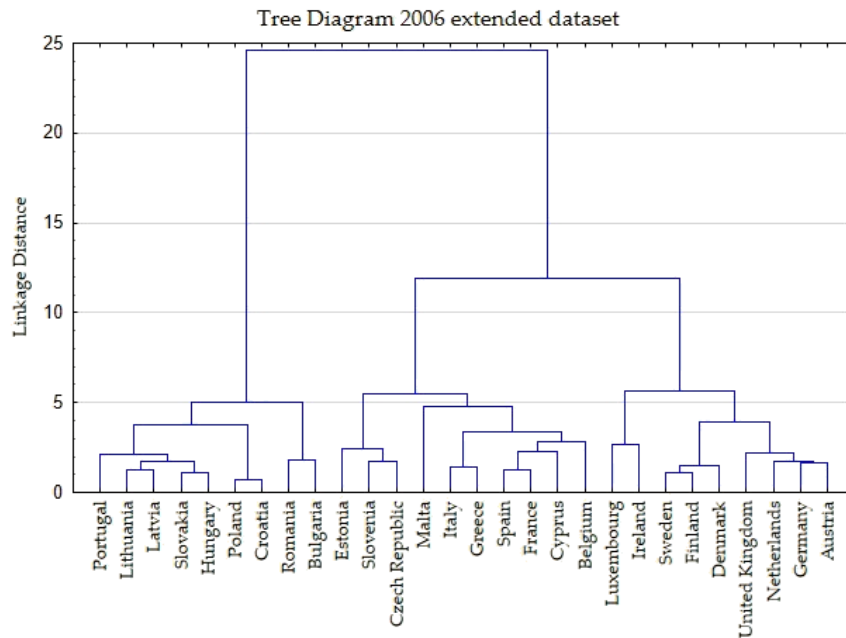
Fig. 11   Clusters of EU countries including SSI variable in 2006
Source: Own elaboration
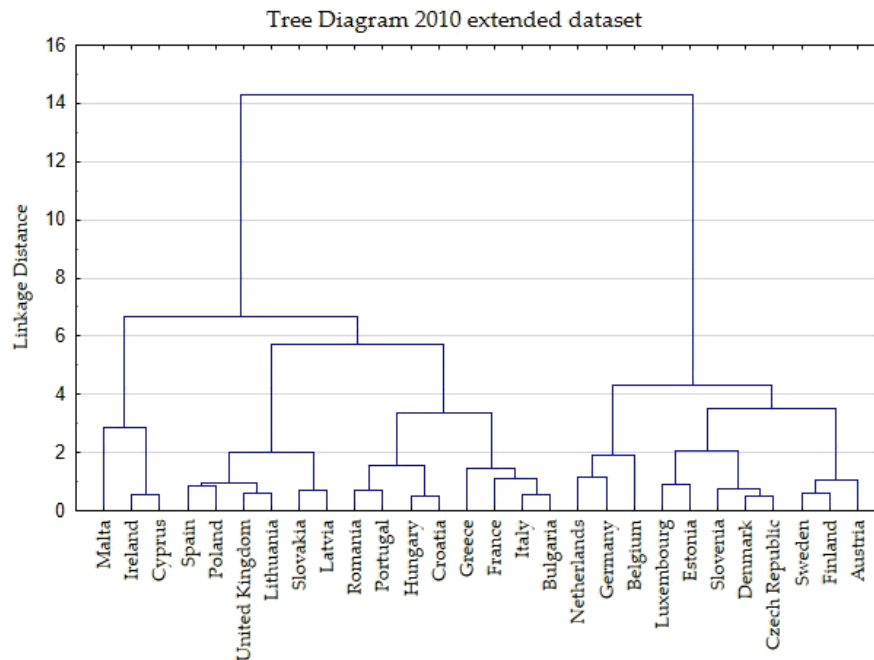
Fig. 12   Clusters of EU countries including SSI variable in 2010
Source: Own elaboration
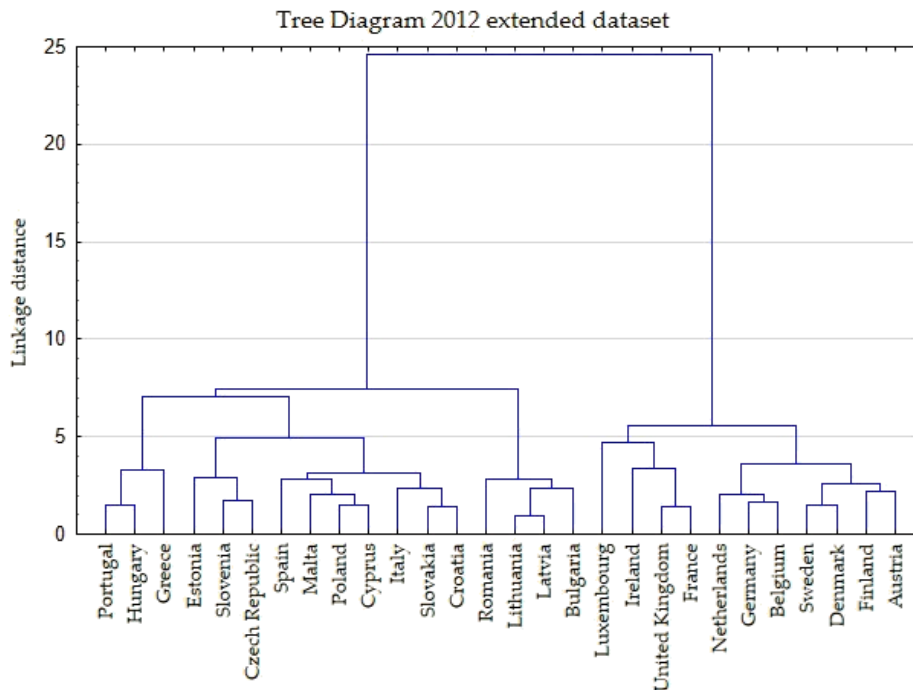
Fig. 13   Clusters of EU countries including SSI variable in 2012
Source: Own elaboration
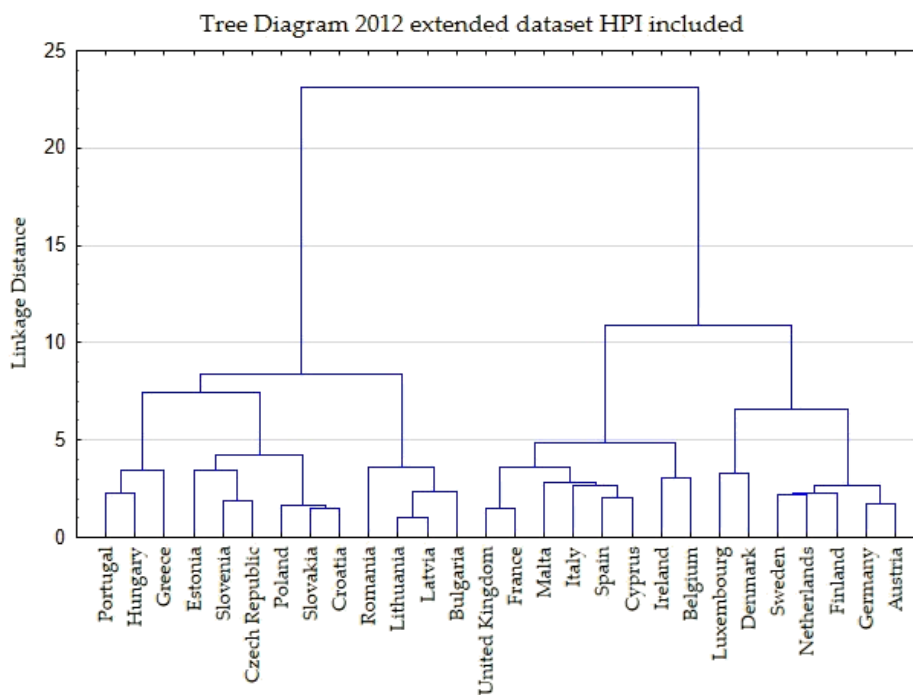
Fig. 14   Clusters of EU countries including SSI and HPI variable in 2012
Source: Own elaboration
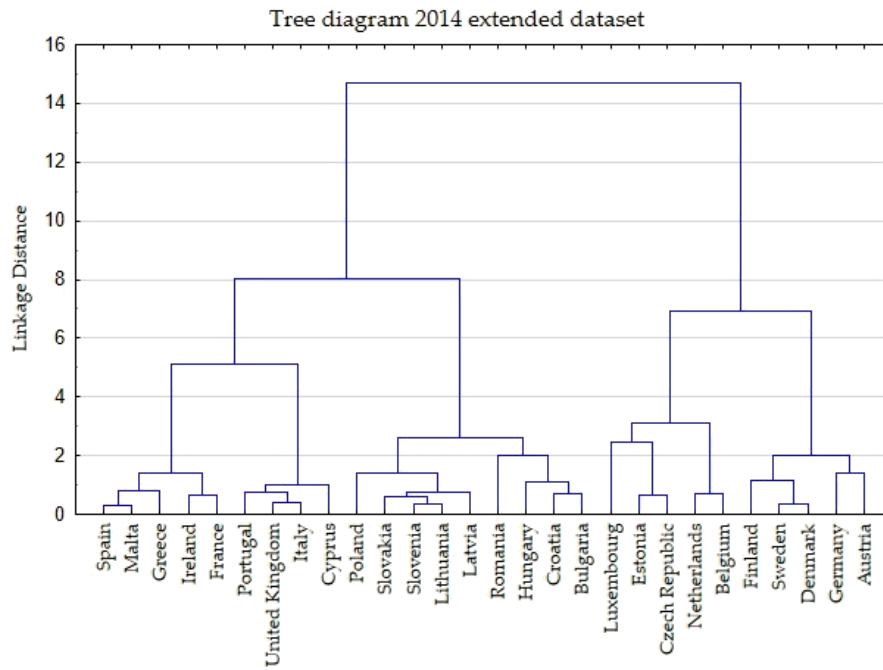
Fig. 15   Clusters of EU countries including SSI variable in 2014
Source: Own elaboration

B Data set

Tab. 11   Data used in correlation and cluster analysis in year 2006

					YEAR 2006			
Countries EU	**GDP/PC**	**CPI**	**HDI**	**ANS**	**LS**	**Human WB**	**Environ WB**	**Economic WB**
Austria	40 431,00	8,6	0,86	14,10	6,62	8,4	3,1	7,0
Belgium	38 852,40	7,3	0,87	14,80	7,1	8,5	2,2	4,1
Bulgaria	4 455,70	4	0,75	3,70	4,03	7,8	4,0	3,8
Croatia	11 363,40	3,4	0,79	9,30	5,97	7,9	3,9	4,1
Cyprus	26 455,10	5,6	0,83	13,30	6,98	7,2	3,2	4,8
Czech Republic	15 159,10	4,8	0,85	9,60	6,31	8,4	2,5	7,3
Denmark	52 041,00	9,5	0,89	14,70	8,2	8,7	2,6	7,6
Estonia	12 595,40	6,7	0,83	16,00	5,95	7,8	2,2	7,2
Finland	41 120,70	9,6	0,87	16,10	7,28	9,0	2,6	7,3
France	36 544,50	7,4	0,87	11,10	6,51	8,1	3,1	5,3
Germany	36 447,90	8	0,90	10,00	6,44	8,7	3,0	5,7
Greece	24 561,40	4,4	0,86	3,20	5,79	8,0	2,9	4,0
Hungary	11 392,10	5,2	0,81	4,60	5,05	8,5	4,1	6,0
Ireland	54 285,80	7,4	0,90	24,70	7,28	7,7	2,8	6,3
Italy	33 426,20	4,9	0,86	8,30	6,11	7,9	3,4	4,9
Latvia	9 651,70	4,7	0,80	8,00	5,55	8,0	3,7	6,8
Lithuania	9 240,60	4,8	0,81	8,20	5,47	8,3	3,2	5,9
Luxembourg	88 680,20	8,6	0,88	25,50	7,56	8,0	1,9	7,6
Malta	15 705,30	6,4	0,80	-	6,5	6,4	2,5	3,5
Netherlands	44 454,00	8,7	0,90	13,50	6,75	8,4	2,2	6,9
Poland	8 999,70	3,7	0,81	7,10	6	8,0	4,0	4,2
Portugal	19 821,40	6,6	0,79	2,90	5,22	7,6	3,8	6,3
Romania	5 828,70	3,1	0,76	4,80	4,79	7,6	4,2	4,8
Slovakia	13 100,40	4,7	0,81	4,30	5,82	8,2	4,0	5,4
Slovenia	19 726,10	6,4	0,86	12,90	6,86	8,5	3,3	7,6
Spain	28 482,60	6,8	0,85	12,00	6,85	7,8	2,8	6,1
Sweden	46 256,50	9,2	0,89	20,10	7,72	8,9	3,0	7,5
United Kingdom	42 534,30	8,6	0,89	6,40	7,08	8,0	3,2	7,2

Tab. 12   Data used in correlation and cluster analysis in year 2009

YEAR 2009					
Countries EU	**GDP/PC**	**CPI**	**ANS**	**HDI**	**LS**
Austria	39 454,70	7,90	6 253,48	0,87	6,55
Belgium	37 433,90	7,10	4 079,40	0,87	7,05
Bulgaria	4 659,40	3,80	620,61	0,77	4,41
Croatia	10 678,70	4,10	966,00	0,80	5,81
Cyprus	25 161,00	6,60	1 727,42	0,85	6,88
Czech Republic	14 353,60	4,90	913,65	0,86	6,33
Denmark	47 237,00	9,40	6 280,39	0,90	8,38
Estonia	10 057,60	6,60	1 848,51	0,83	5,84
Finland	38 722,10	8,90	4 783,05	0,87	7,54
France	34 706,30	6,90	3 161,39	0,88	6,71
Germany	35 691,00	8,00	4 377,53	0,90	6,70
Greece	23 050,20	3,80	1 922,05	0,86	4,98
Hungary	11 028,70	5,10	708,04	0,82	4,59
Ireland	48 280,40	8,00	6 147,84	0,90	7,03
Italy	30 364,00	4,30	1 772,71	0,87	5,74
Latvia	8 018,90	4,50	1 793,59	0,81	5,13
Lithuania	8 616,00	4,90	938,37	0,83	5,33
Luxembourg	79 409,80	8,20	349,88	0,88	7,54
Malta	15 635,30	5,20	-	0,82	6,51
Netherlands	43 129,90	8,90	6 942,05	0,90	7,72
Poland	9 688,00	5,00	983,35	0,82	6,13
Portugal	18 890,80	5,80	111,34	0,81	4,94
Romania	5 697,20	3,80	448,36	0,78	4,79
Slovakia	13 929,40	4,50	194,75	0,83	5,97
Slovenia	19 177,60	6,60	2 139,70	0,88	6,67
Spain	26 309,20	6,10	2 841,40	0,86	6,18
Sweden	42 704,60	9,20	7 934,03	0,89	7,68
United Kingdom	39 009,40	7,70	813,64	0,89	7,28

Tab. 13   Data used in correlation and cluster analysis in year 2010

YEAR 2010

Countries EU	GDP/PC	CPI	ANS	HDI	LS	Human WB	Environ WB	Economic WB
Austria	40 119,10	7,90	13,50	0,88	6,63	8,6	3,6	7,4
Belgium	38 006,90	7,10	11,60	0,88	6,95	8,4	2,2	4,6
Bulgaria	4 692,70	3,60	8,40	0,77	4,34	8,1	3,8	4,9
Croatia	10 523,90	4,10	5,70	0,81	5,99	8,2	4,4	5,3
Cyprus	24 852,40	6,30	8,90	0,85	6,74	7,5	2,8	6,2
Czech Republic	14 640,30	4,60	4,10	0,86	6,19	8,4	2,7	8,2
Denmark	47 791,90	9,30	12,50	0,90	8,32	8,7	2,8	8,3
Estonia	10 328,80	6,50	12,50	0,83	5,87	8,2	2,5	8,0
Finland	39 698,80	9,20	10,30	0,88	7,30	9,0	3,3	7,9
France	35 214,10	6,80	7,70	0,88	6,47	8,3	3,3	5,4
Germany	37 204,10	7,90	11,60	0,90	6,69	8,8	2,9	6,2
Greece	21 853,00	3,50	7,90	0,86	4,62	8,1	3,2	3,8
Hungary	11 135,80	4,70	5,70	0,82	4,91	8,4	4,3	5,0
Ireland	48 209,50	8,00	14,30	0,90	7,02	7,2	2,9	6,1
Italy	30 788,50	3,90	3,60	0,87	5,81	7,9	3,8	5,0
Latvia	7 878,00	4,30	7,00	0,81	5,37	7,9	4,3	7,4
Lithuania	8 942,90	5,00	8,30	0,83	5,15	8,1	3,4	7,2
Luxembourg	82 399,60	8,50	6,80	0,88	7,46	7,8	2,5	7,7
Malta	16 227,70	5,60	-	0,82	6,40	6,6	3,2	4,0
Netherlands	43 505,00	8,80	14,70	0,90	7,70	8,6	2,3	6,8
Poland	10 075,10	5,30	8,10	0,83	6,28	8,0	3,6	6,1
Portugal	19 240,70	6,00	0,90	0,82	4,67	7,8	4,5	4,8
Romania	5 685,40	3,70	4,20	0,78	4,41	7,8	4,7	5,7
Slovakia	14 623,60	4,30	2,50	0,83	6,15	8,2	4,1	7,2
Slovenia	19 330,50	6,30	7,50	0,87	6,61	8,5	3,2	8,2
Spain	26 192,00	6,10	7,70	0,86	6,21	7,7	3,3	6,6
Sweden	44 877,90	9,20	18,80	0,90	7,68	8,8	3,6	8,1
United Kingdom	39 301,00	7,60	4,50	0,90	7,25	7,9	3,7	7,2

Tab. 14   Data used in correlation and cluster analysis in year 2012

YEAR 2012							
Countries EU	**GDP**	**CPI**	**ANS**	**HDI**	**HPI$_{LE}$**	**HPI$_{WB}$**	**HPI**
Austria	41 229,70	6,90	14,20	0,88	80,90	7,35	47,09
Belgium	38 024,20	7,50	9,90	0,88	80,00	6,85	37,09
Bulgaria	4 837,00	4,10	8,90	0,78	73,40	4,22	34,15
Croatia	10 626,10	4,60	4,90	0,81	76,60	5,60	40,62
Cyprus	23 351,90	6,60	5,30	0,85	79,60	6,39	45,51
Czech Republic	14 742,70	4,90	6,10	0,86	77,70	6,15	39,35
Denmark	47 648,80	9,00	12,80	0,90	78,80	7,77	36,61
Estonia	11 765,60	6,40	15,80	0,84	74,80	5,14	34,95
Finland	39 763,40	9,00	7,50	0,88	80,00	7,39	42,69
France	35 676,00	7,10	7,00	0,88	81,50	6,80	46,52
Germany	39 372,50	7,90	12,00	0,91	80,40	6,72	47,20
Greece	18 508,30	3,60	5,60	0,85	79,90	5,84	40,53
Hungary	11 229,60	5,50	5,30	0,82	74,40	4,73	37,40
Ireland	49 243,20	6,90	16,60	0,90	80,60	7,26	42,40
Italy	29 963,90	4,20	3,10	0,87	81,90	6,35	46,35
Latvia	8 973,00	4,90	11,80	0,81	73,30	4,67	34,87
Lithuania	10 208,10	5,40	10,60	0,83	72,20	5,07	34,55
Luxembourg	80 011,10	8,00	6,10	0,88	80,00	7,10	28,99
Malta	16 439,70	5,70	-	0,83	79,60	5,77	43,10
Netherlands	43 396,70	8,40	15,60	0,92	80,70	7,50	43,09
Poland	10 739,20	5,80	9,70	0,83	76,10	5,78	42,58
Portugal	18 228,70	6,30	1,00	0,82	79,50	4,87	38,68
Romania	5 836,70	4,40	20,50	0,78	74,00	4,91	42,18
Slovakia	15 222,70	4,60	3,90	0,83	75,40	6,05	40,13
Slovenia	18 848,20	6,10	6,40	0,87	79,30	6,08	40,17
Spain	25 144,70	6,50	7,00	0,87	81,40	6,19	44,06
Sweden	45 260,00	8,80	17,30	0,90	81,40	7,50	46,17
United Kingdom	39 954,20	7,40	3,60	0,89	80,20	7,03	47,93

YEAR 2012

Countries EU	GDP	BLI$_{WLB}$	BLI$_{EA}$	BLI$_{SS}$	LS	BLI$_C$	Human WB	Environ WB	Economic WB
Austria	41 229,70	0,09	0,82	487	6,63	0,94	8,74	3,68	6,61
Belgium	38 024,20	0,04	0,71	509	6,97	0,94	8,59	2,17	4,64
Bulgaria	4 837,00				4,44		7,92	4,24	5,13
Croatia	10 626,10				5,84		7,98	4,53	5,63
Cyprus	23 351,90				6,43		7,97	3,30	5,69
Czech Republic	14 742,70	0,09	0,91	490	6,06	0,91	8,40	2,79	7,77
Denmark	47 648,80	0,02	0,76	499	8,35	0,96	8,41	3,04	7,54
Estonia	11 765,60	0,04	0,89	514	5,82	0,91	8,38	2,36	6,56
Finland	39 763,40	0,04	0,82	543	7,19	0,94	9,07	3,10	7,27
France	35 676,00	0,09	0,70	497	6,56	0,92	8,49	3,28	4,58
Germany	39 372,50	0,05	0,85	510	6,89	0,95	8,83	3,08	5,23
Greece	18 508,30	0,05	0,61	473	3,93	0,85	8,14	3,72	3,13
Hungary	11 229,60	0,03	0,81	496	4,68	0,89	8,55	4,28	4,30
Ireland	49 243,20	0,04	0,72	497	6,73	0,98	7,81	3,09	3,33
Italy	29 963,90	0,05	0,54	486	5,27	0,91	8,09	4,11	4,88
Latvia	8 973,00				5,67		7,70	4,83	5,82
Lithuania	10 208,10				5,61		7,76	4,30	5,82
Luxembourg	80 011,10	0,04	0,77	482	7,38	0,93	7,92	2,51	7,66
Malta	16 439,70				6,34		8,35	3,44	3,69
Netherlands	43 396,70	0,01	0,73	519	7,67	0,94	8,91	2,16	6,22
Poland	10 739,20	0,07	0,88	501	6,10	0,90	8,19	3,77	6,02
Portugal	18 228,70	0,05	0,30	490	4,14	0,86	8,34	4,88	3,69
Romania	5 836,70				4,77		7,59	5,35	5,80
Slovakia	15 222,70	0,06	0,91	488	5,80	0,92	8,32	3,89	6,55
Slovenia	18 848,20	0,06	0,83	499	6,61	0,93	8,60	3,90	7,58
Spain	25 144,70	0,07	0,52	484	5,92	0,94	7,35	4,02	5,04
Sweden	45 260,00	0,01	0,86	496	7,77	0,92	8,83	3,45	7,83
United Kingdom	39 954,20	0,12	0,74	500	7,29	0,96	8,25	3,96	4,86

Tab. 15   Data used in correlation and cluster analysis in year 2014

YEAR 2014

Countries EU	GDP	CPI	ANS (2013)	HDI	IHDI	BLI_{WLB}	BLI_{EA}	BLI_{SS}	BLI_C	LS
Austria	41 000,10	7,20	12,80	0,89	0,82	8,61	82,00	498,00	95,00	7,15
Belgium	38 210,30	7,60	7,00	0,89	0,82	4,41	71,00	507,00	91,00	7,03
Bulgaria	5 031,30	4,30	8,80	0,78	0,70					4,58
Croatia	10 547,20	4,80	5,00	0,82	0,74					5,79
Cyprus	21 852,10	6,30	4,60	0,85	0,76					6,63
Czech Republic	14 955,20	5,10	4,80	0,87	0,82	7,14	92,00	496,00	87,00	6,43
Denmark	47 525,30	9,20	14,30	0,92	0,86	2,06	77,00	500,00	96,00	8,41
Estonia	12 382,10	6,90	14,80	0,86	0,78	3,59	89,00	523,00	89,00	6,17
Finland	38 802,70	8,90	6,40	0,88	0,83	3,70	84,00	529,00	93,00	7,36
France	35 666,60	6,90	6,60	0,89	0,81	8,71	72,00	499,00	91,00	6,59
Germany	39 891,50	7,90	11,60	0,92	0,85	5,60	86,00	514,00	93,00	7,04
Greece	18 255,70	4,30	5,10	0,87	0,76	5,65	67,00	468,00	68,00	4,37
Hungary	11 932,60	5,40	9,00	0,83	0,77	2,92	82,00	486,00	87,00	5,48
Ireland	52 252,00	7,40	18,20	0,92	0,84	4,17	73,00	518,00	95,00	7,26
Italy	28 451,10	4,30	3,70	0,87	0,77	3,70	56,00	489,00	91,00	5,57
Latvia	9 671,20	5,50	11,60	0,82	0,73					5,95
Lithuania	11 107,80	5,80	12,70	0,84	0,75					5,96
Luxembourg	82 960,10	8,20	6,30	0,89	0,82	3,18	77,00	487,00	88,00	7,42
Malta	16 759,00	5,50	-	0,84	0,77					7,24
Netherlands	43 361,60	8,30	14,50	0,92	0,86	0,59	72,00	522,00	92,00	7,83
Poland	11 257,60	6,10	10,00	0,84	0,76	7,58	89,00	520,00	89,00	6,40
Portugal	18 391,40	6,30	3,10	0,83	0,74	9,31	35,00	488,00	85,00	4,92
Romania	6 256,50	4,30	20,70	0,79	0,71					5,17
Slovakia	15 797,50	5,00	3,50	0,84	0,79	6,48	91,00	469,00	88,00	5,97
Slovenia	19 170,20	5,80	8,80	0,88	0,83	5,72	84,00	497,00	93,00	6,61
Spain	25 259,70	6,00	7,80	0,88	0,78	5,95	54,00	490,00	92,00	6,12
Sweden	46 066,70	8,70	17,60	0,91	0,85	1,14	87,00	484,00	91,00	7,79
United Kingdom	41 489,60	7,80	3,40	0,91	0,83	12,27	77,00	505,00	94,00	7,46

Tab. 16   Data used in construction of new proposed index

EU28	Household income	Poverty %	Gini coefficient	Gender gap	Health care quality	Health care access	Health care expend
Austria	25850	19,2	27,6	22,9	95	1	2,67
Belgium	23924	21,2	25,9	9,9	97	5,5	2,7
Bulgaria	8921	40,1	35,4	13,4	28	21,1	3,5
Croatia	12339	29,3	30,2	10,4	52	7,8	1,44
Cyprus	16252	27,4	34,8	15,4	73	6,7	3,89
Czech Republic	15567	14,8	25,1	22,1	78	1,9	1,21
Denmark	22216	17,9	27,7	15,8	87	1,6	1,56
Estonia	13074	26	35,6	28,3	70	10,8	1,17
Finland	23057	17,3	25,6	18	94	6	2,27
France	24283	18,5	29,2	15,3	91	5,7	2,63
Germany	26736	20,6	30,7	21,6	86	1,8	2,62
Greece	14703	36	34,5	15	25	14,9	2,92
Hungary	13102	31,8	27,9	15,1	28	6,5	2,98
Ireland	18847	27,4	30,7	14,4	53	3,8	
Italy	20733	28,3	32,4	6,5	54	14,6	
Latvia	11802	32,7	35,5	15,2	37	25,4	2,46
Lithuania	15074	27,3	35	14,8	40	4,6	2,08
Luxembourg	38490	19	28,7	8,6	88	2,5	1,19
Malta		23,8	27,7	4,5	81	1,4	
Netherlands	22436	16,5	26,2	16,2	91	0,8	
Poland	14062	24,7	30,8	7,7	30	11,8	2,05
Portugal	16822	27,5	34,5	14,5	42	5,1	3,58
Romania	9152	40,2	34,7	10,1	25	14	1,1
Slovakia	15653	18,4	26,1	21,1	53	2,9	2,31
Slovenia	16149	20,4	25	2,9	69	0	2,33
Spain	18340	29,2	34,7	18,8	81	1,6	2,63
Sweden	23579	16,9	25,4	14,6	90	3,2	1,8
United Kingdom	22086	24,1	31,6	18,3	86	1,5	

EU28	Education graduates	Youth unemployment ratio	NEETs	Migrant integration policy index	Social interactions trust
Austria	5,4	13,1	7,7	48	5,9
Belgium	5,4	23,6	12	70	5,7
Bulgaria	5	25,9	20,2	44	4,2
Croatia	6,6	45,9	19,3	44	5,1
Cyprus	2,4	35,7	17	36	4,5
Czech Republic	6,9	16,7	8,1	45	5,3
Denmark	5,9	12,4	5,8	59	8,3
Estonia	4,9	17	11,7	49	5,8
Finland	6,9	19,2	10,2	71	7,4
France	9	23,9	11,4	54	5
Germany	5,8	7,6	6,4	63	5,5
Greece	2,7	53,9	19,1	46	5,3
Hungary	2,9	21	13,6	46	5,3
Ireland	3,4	25,8	15,2	51	6,4
Italy	5,5	44,1	22,1	58	5,7
Latvia	3,2	19,3	12	34	6,5
Lithuania	4,7	21,5	9,9	38	6,1
Luxembourg	1,7	16	6,3	60	5,5
Malta	2,7	13,6	10,5	39	6,2
Netherlands	2,7	11,1	5,5	61	6,9
Poland	6,3	24	12	43	6
Portugal	8,7	36,8	12,3	80	5,3
Romania	5,9	25,1	17	45	6,4
Slovakia	8,2	31,1	12,8	38	5,8
Slovenia	5,3	20,8	9,4	48	6,5
Spain	6,6	57,9	17,1	61	6,3
Sweden	6,5	22,8	7,2	80	6,9
United Kingdom	5,6	16,7	11,9	56	6,1