

Czech University of Life Sciences Prague
Faculty of Economics and Management
Department of Statistics



Bachelor Thesis

Various approaches to measuring the quality of life

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CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE

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BACHELOR THESIS ASSIGNMENT

Diana Nurbatyrova

Economics and Management

Thesis title

Various approaches to measuring the quality of life

Objectives of thesis

The aim of the bachelor thesis is to describe the state and the development of quality of life in the Russian Federation with comparison to selected EU countries. The bachelor thesis will focus on indicators connected to quality of life such as quality and availability of health care services, education, economic conditions, environmental conditions, living conditions, employment, and the implementation of constitutional rights.

Methodology

The bachelor thesis consists of two parts: theoretical and practical. Methodology for the theory is based on open-source publications, encyclopedias, and scientific articles of foreign authors. The literature review will introduce different approaches to measure the level of quality of life in selected countries, its advantages, and disadvantages.

The practical part consists of quantitative research and own calculations. Methods of time series analysis will be used to describe the development of selected indicators during the given period.

The proposed extent of the thesis

30-50 pages

Keywords

economic and social well-being, Quality of life, the Russian Federation, standard of living, time series analysis

Recommended information sources

- FIELD, A. Discovering statistics using IBM SPSS statistics. Thousand Oaks: SAGE Publications, 2013. ISBN 978-1-4462-4917-8.
- NISBET, R., ELDER, J., MINER, G. Handbook of statistical analysis and data mining applications. Amsterdam: Amsterdam, 2009. ISBN 978-0-12-374765-5.
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- ANDREEVA, O.N., Standard of living and quality of life: the content of concepts and their components In Ojkumena. Regionovedcheskie issledovaniya. 2012. No 4. pp. 68- 77.

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Declaration

I hereby declare

that I have compiled this final thesis on my own and all the quoted literature as well as other sources used in the thesis are listed in the bibliography. The electronic copy of the thesis is identical with the hard-bound copy. I approve that this diploma thesis is published pursuant to Section 47b Act No.111/1998 Coll., on Higher Education and on the amendment and modification of other acts (the Higher Education Act), as amended.

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Various approaches to measuring the quality of life

Abstract:

The bachelor thesis presents the topic “various approaches to measuring the quality of life”. Moreover, this dissertation is not written only for the students but also for everyone, who is interested in looking under the cap of what forms the quality of life of an individual or a society and how this phenomenon can be evaluated.

The aim of the chosen topic is to analyse through different approaches such as quantitative and qualitative the quality of life in the Russian Federation. However, what is the quality of live and how exactly it is measured? The goal is to define an importance of Human Development Index and what are the other variables that HDI is influenced by, I will analyse all the necessary economic factors that belong to measuring HDI.

The stated hypothesis was tested with the use of Multiple Linear Regression Model and demonstrated the contribution of each variable that was included in the model. The achieved results are written in the conclusion. The data of a statistical content are up to date, stored and retrieved accordingly.

Key words: Economic and social well-being, quality of life, HDI, GDP per capita.

Různé přístupy k měření kvality života

Souhrn

Bakalářská práce představuje téma “různé přístupy k měření kvality života”. Diplomová práce navíc není psána jen pro studenty, ale i pro všechny, kteří mají zájem nahlédnout pod pokličku toho, co tvoří kvalitu života jednotlivce či společnosti a jak lze tento jev hodnotit.

Cílem zvoleného tématu je analyzovat prostřednictvím různých přístupů jako je kvantitativní a kvalitativní kvalita života v Ruské federaci. Co je to však kvalita života a jak přesně se měří? Cílem je definovat důležitost indexu lidského rozvoje a jakými dalšími proměnnými je HDI ovlivněn, rozeberu všechny potřebné ekonomické faktory, které k měření HDI patří.

Uvedená hypotéza byla testována s použitím modelu vícenásobné lineární regrese a demonstrovala příspěvek každé proměnné, která byla v modelu zahrnuta. Dosažené výsledky jsou zapsány v závěru. Údaje statistického obsahu jsou aktuální, ukládají se a načítají se odpovídajícím způsobem.

Klíčova slova: Ekonomická a sociální pohoda, kvalita života, HDI, HDP na obyvatele.

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Abbreviations

CMEPSP - Commission for the Measurement of Economic Performance and Social Progress

EQLS – European Quality Life Survey

EU – European Union

GDI – Gross Domestic

GDP – Gross Domestic

GNP – Gross National Product

HDI – Human Development Index

UNDP – United Nation Development Program

1 Introduction

For the last twenty-four years, the Russian Federation has demonstrated an enormous economic growth, literally in every direction possible. This actively became an interesting object for Foreign Direct Investments (FDIs). But did it help to increase HDI, or maybe vice versa it decreased it? I am deeply interested what the numbers are, investigate the data and analyze them. The creation of a better society depends on so many things, as stated by Zhou (2017) it involves sociology, political science, economics and all the relevant studies of public policy. Nevertheless, Human Development is a theoretical concept, defined by United Nations Development Program. (UNDP) as presumes the following “expanding the richness of human life, rather than simply the richness and wellness of economy in which human-beings live”. He it is an approach that is focused on people and their opportunities and ability to choose. Certain types of policies have and effective and boosting economic growth, such as China’s “Reform and Opening-Up Policy of 2018. People aren’t clear whether these types of policies have a significant effect on human development. Theories argue that the right of political participation, as well as protections of free speech and association, are theoretically central capabilities, indispensable for human development. However, in comparison with the situation of Saudi Arabia, federation of hereditary absolute monarchies. India as another example of the largest population country, having a full democracy in the world, and still have according to the report of (UNDP,2020) ranked 131st. I am personally not able to correlate the standards of living with the political situation of countries. I am interested if the case might be applicable for Russian Federation. I am focused on figuring out all the important factors that actually influence human development. In order to do so, I used different literature, retrieved from internet and books that were also helpful to understand the concept of HDI better. Alkire & Foster (2010) explained that mixtures of all economical aspects make people happy, not particularly monetary aspect, but the aspect that you, as a human-being worth something for the rest of the world. My opinion that people should be happy in any case, regardless of its economic or political conditions, however the practical part will show the truth.

In 2020, Russia was ranked 52 in the world according to the report of (UNDP, 2020) after Norway, Australia, Netherlands, United States, Germany, and other developed countries, and also the countries which were in transition, such as: Slovenia, Slovakia, Poland, Estonia. It this regards, the country has to “catch-up” in the field of human potential, to be leading, be characterized as the developed country as well.

The bachelor thesis is organized and divided in the following way.

The bachelor thesis will consist of two parts, where the first part will be strictly dedicated to the theoretical frameworks, papers, and academic articles. This part will be analyzed by conceptual research, with the historical research and theories. In that particular chapter, I want to overview the historical concept of HDI and all factors relating to HDI, and how it has been changing overtimes. But also, I am interested in the European Quality of Life Survey (EQLS), which will be included as a theoretical source to understand and analyze the other factors that are essential for the human life-being.

The second part however will be dedicated to practical framework. Since I assume that Russian Federation has got enormous potential of improving their Human Development Index, comparing to EU countries, I will provide the detailed explanations on how to do so.

2 Objectives and Methodology

2.1 Objectives

The objective of the thesis is to find a relationship and describe the development of quality of life in Russian Federation. I took two main indicators that measure a quality of life, Human Development Index and as a comparison, Quality of Life Survey. Therefore, I also plan to shortly analyse economic indicators that might influence the Human Development Index based on secondary research. Additionally, I will define how economic and political factors might influence the quality of life in Russian Federation. However, quality of life could be measured differently. Human Development Index is one of the most used indicators that measures welfare, which is published annually. However, the other factors such as health and happiness are not considered in the Index. So, I base my paper on different literature reviews to see how exactly HDI with relation of economic indicators could explain the development of quality of life in Russian Federation.

2.2 Methodology

I plan to build a Multiple Linear Regression Model in a Gretl Software, where Human Development Index will be a dependent variable and explanatory variables will consist of social and economic factors. I will use a p-value of 5 percent to either reject or fail reject the hypothesis mentioned below.

I suggest the following hypothesis of the given thesis:

- 1) If FDI's inflows increases the Human Development Index will also increase (Positive Relationship)
- 2) If Unemployment rate increases, the Human Development Index will decrease (Negative Relationship)
- 3) If average income in USD increases, the Human Development Index will also increase (Positive relationship).

I will verify my hypothesis on the following assumptions:

Model Verification:

By evaluating p-value, at 0,05 alfa level and compare it with the output of each variable.

Autocorrelation:

It has to deal with the structure of residuals. I will use Durbin-Watson test whereas, The null hypothesis: No autocorrelation and vice versa. If d is closer to 0, it means a positive autocorrelation, however if d is closer to 4, meaning negative autocorrelation. We need to determine upper and lower

critical values for d , which consists of number of observations ($N = 20$), and number of independent variables ($k=3$).

Multicollinearity:

Multicollinearity when two or more explanatory variables are near perfect (0,9 is an indicator that detects a high and strong relationships between two explanatory variables, for the most part there are different ways to get rid of Multicollinearity, First-time difference, dummy variable)

Normality:

It shows that the residuals are normally distributed, it is necessary for valid hypothesis testing. It is a mandatory step of a linear regression model, whereas H_0 : Normally distributed; H_1 : Not normally distributed.

Heteroskedasticity:

It shows that the residuals are normally distributed, it is necessary for valid hypothesis testing. It is a mandatory step of a linear regression model, whereas H_0 : Normally distributed; H_1 : Not normally distributed. For that procedure, I plan to use the White's test whereas: H_0 : Homoskedasticity; H_1 : Heteroskedasticity.

3 Literature review

3.1 Concept of Human Development

In 1990, the UNDP launched the first Human Development Report, and in addition to it, the Human Development Index. As supposed, Human Development Report is published ever since, on an annual basis. The report entails the concept of human development in diverse themes, such as gender, poverty, globalization, cultural liberties and migrations, even environmental aspect is included. The HDRs also include a statistical index with the GDI and other relevant figures to human development for majority countries. So, 20 years the approach is still running and applying year-after-year, what is the human development? This section provides an overview of distinct literature on human development. It does introduce academic literature on the capability approach, which shows a conceptual explanation for human development.

Nussbaum (2011) claims that human development is a process of enlarging people's choices, followed by examples of what key choices might be – which in truth are called “dimensions” of human development. Zhou (2017) states that, the most critical ones are to lead a long and healthy life, to be educated and to enjoy a decent standard of living. Factors such as human rights, self-respect, or what Smith (1863) called the ability to mix others without being ashamed in public.

The 1990 Human Development Report, the report gave a clear and quite fundamental articulations of the concept for human development. It was the first ever report to focus on the concepts and measures of Human Development. The first ever chapter “Defining and Measuring Human Development”, was opened with the following words:

“People are the real wealth of a nation. The basic objective of development is to create an enabling environment for people to live long, healthy, and creative lives. This may appear to be a simple truth, but it is of the forgotten in the immediate concern with accumulation of commodities and financial wealth”. - HDR (1990).

Zhou (2017) states that opening section have been seen throughout the years, and yet still repeats itself, as if people need to remind themselves of what needs to be done. He assumes that this opening statement is related to the work of “Aristotle, Lagrange, Smith, Ricardo, and Marx, which in truth had relatively the same ideas to follow. Nussbaum & Sen (1993) argues that „ Human Development is a process of enlarging people's choices “. However, almost without hesitation, they

presented four principles which it argued to be “sensitive” to the human development: Productivity, Equity, Sustainability and Empowerment.

HDR of (1996) argues that there are far more important things beyond income and growth to reach the full extent of human capabilities. Nussbaum (2011) concluded that UNDP Institution, annually focuses on different factors of people’s live, tries to involve it into the society, slowly but surely. He showed a quite concise list of report published by UNDP annually, here you are:

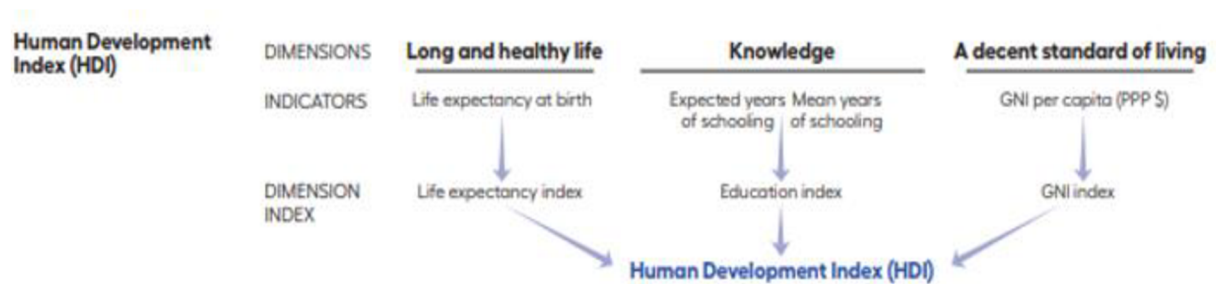
- Report on “People’s participation” – 1993.
- Report on “Human Security” – 1994.
- Report on “Gender” – 1995.
- Report on “Human development on eradicate poverty” – 1997.
- Report on “Consumption for human development” – 1998.
- Report on “Globalization” – 1999.
- Report on “Human rights and human development” – 2000.
- Report on “Making new technologies work for human development” – 2001.
- Report on “Deepening democracy in a fragmented world” – 2002.
- Report on “Millennium development goals” – 2003.
- Report on “Human Development report” and “Water scarcity” – 2006.
- Report on “Climate Change” – 2007 and 2008.
- Report on “Migration” – 2009.

Nussbaum (2011) concluded that all these reports, even though published annually, still kept the idea of highlighting education, living standards, health as main priorities for each year. Only with exception of one year, 2001. He noticed that work and employment are shown and reported under the names of “creativity and productivity”, for the period of five years. Additionally, the environment was only mentioned five years, nevertheless human development section is more important, and it was indisputable. Also, the description of human development as enlarging people’s choices are fundamental, it is not enough. It supposed to be followed by procedural principles such as equity, efficiency, sustainability, respect for human rights and responsibility. For human freedoms may well be expanded in ways that exacerbate inequality, wasteful, short-sighted, or infringe on the human rights of one group in order to expand the freedoms of another. Further the groups, certain ages categories, or geographical groups.

3.2 Concept of HDI

The HDI is an indicator, which published on an annual basis. It evolves many aspects and describes the performance for most countries of the world. Frey & Stutzer (2002) claim that HDI tries to construct an index of the total, overall performance of any country. They argue that HDI gives politicians the opportunity to have broader look on human development, particularly developed countries should work harder to reach goals in human development, whereas for developing countries it is as an extra incentive to adopt systems in their homeland to enhance the total human development. According to Sagar & Najam, (1998) HDI is a mixture of the following aspects, that finally produce separate indexes. See, Figure 1.

Figure 1: HDI concept



Source: UNDP (2007-2008).

By looking at this table, it might seem that all indicators are seemed to be perfectly linked to the human development Index. GDP is often used as a unique standard (Bondarenko,2016). On the other hand, Sen (2006), wasn't so sure if the Human Development Index was the right indicator to express all the complex ingredients of human development, but Haq insisted that only a simple number, instead of list of numbers, could have the power of describing an overall overview. He has however concluded that Human rights and physical security appear in nine report and mentioned in the "list" of dimensions. (See Figure 2). Social freedoms include dignity and respect, belonging and participation appear in six report and cultural liberties in another one. He has supported the "Range of possible dimensions" hence there is not any "fixed" list of dimensions of human development, the dimensions are following:

- Health and Life
- Education
- Decent Standard of Living
- Political Freedom and process Freedoms
- Creativity and Productivity
- Environment
- Social Relations
- Culture and Arts

Since the idea of human development was created together with the human capability approach, which was advanced by Sen (1985), he considered human capability as an approach that could be assessed by individuals, in order to “achieve outcomes that they value and have reason to value” (Sen, 1999). In comparison to Nussbaum’s list of “core capabilities” which includes life, bodily health, bodily integrity, imagination and thought, emotions, practical reason, affiliation, other species, play and control over environment (Nussbaum,2011). If people develop those capabilities, people can choose their own life paths, which describes that human development is about the real freedom ordinary people have to decide on who they want to be, what do they want to do and how they want to live (Measure of America,2016).

As it has been mentioned at the beginning of this chapter. The Human Development Index was introduced in 1990, by group of economists assembled by Mahbuh ul Haq, including Amartya Sen Subhir Anand, Meghand Desai, Keith Griffin, Frances Stewart, Paul Streeten and Gustav Ranis (Haq & Ponzio, 2008). The HDI is a summary measure of achievements in key dimensions of human development (See Appendix 1). HDI seemed to be a geometric mean of normalized indices for each of the three dimensions” (United Nations Development Program, 2015). As per say of Anand and Sen (2000), longevity and education are clearly valuable as aspects of good life and valued as constituents of abilities to do other things, the income component of the HDI was used as an indirect indicator of some capabilities to show, directly or indirectly, for the measure of longevity and education. “Anand & Sen, 2000”. Because of that, the calculation of that equations for each dimension is the following:

Figure 2: Dimension Index

$$\text{Dimension Index} = \frac{\text{Actual value} - \text{Minimum value}}{\text{Maximum Value} - \text{Minimum Value}}$$

Source: United Nations Development Program, 2015.

Anand & Sen, (2000) All values for the income index are in natural logarithm, if an individual income has a continuous increase in his income, the real economic benefit received by that individual is more likely to increase as well.

HDI as an indicator is hardly perfect, it has been discussed by so many critics and still, people measure their performance, based on HDI. Srinivasan (1994) claimed that it to be “conceptually weak and empirically unsound”. Some critics mentioned that involvement of the HDI’s choice of variables, functional form and redundancy and robustness (Klugman & Rodriguez, 2011). Because of these critiques, Human Development Report has made lots of changes in 2010 (Rahi, 2011), however new criticism arose immediately saying that “HDI is both, more complicated and more problematic in its tradeoffs across core dimensions”, an example is, new HDI’s evaluation on education was too much of a focus than on income, which finally gave too little weight on to life expectancy in underdeveloped countries (Mastruzzi, 2009). Nevertheless, these criticisms may not be appropriate when it recommends the Chakravarty equation” is an alternative metric, Zambrano (2011) concluded, there are too much difference in the results of the Chakravarty index and the HDI.

Additionally, the HDI report of (2010) has included the “Inequality adjusted GDI, IHDI” (Ayala, 2010). To obtain this index, researchers need to measure the levels of inequality in each dimension, adopt the average value of each dimension, and calculate the impairment of HDI due to inequality (Alkire & Foster, 2010). Gaye, Klugman, Kovacevic, Twigg & Zambrano (2010) additionally, effectiveness of measurement is Gender Inequality Index (GII), which among the dimensions, already including the HDI, demonstrating an important advance on existing global measures of gender equity”, showing economic and political participation, level of education and reproductive health. Klugman, Rodriguez & Choi (2011) stated, at the beginning of the study of HDI, there was never an intention to overreaching definitive measure of development. By design, the HDI

is a partial measure that uses imperfect indicator, that tries to represent a close overview of a country and makes conclusion on such factors as: (advancement of social life, happiness level, further capabilities, freedom and extra). It used the axioma of association-sensitive inequality approach (Seth, 2013).

3.3 European Quality of Life Survey

Over the last 60 years, several approaches to measuring subjective well-being have emerged. Welfare is a central element of the Beyond GDP Agenda, which arose from the recognition of GDP gaps as a measure of human well-being. The agenda was launched in the EU at a major conference in the European Parliament in 2007, and in 2009 the European Commission issued a report entitled "GDP and Beyond: Measuring Progress in a Changing World", which provides a roadmap for new areas of measurement. Shortly afterwards, a commission set up by then-French President Nicolas Sarkozy and Nobel laureate in economics Joseph Stiglitz made several widely accepted recommendations, such as shifting the focus from measuring economic output to measuring human well-being. (Stiglitz et al. 2009).

In 2012, an assessment of subjective well-being in the EU identified 11 countries with formal national surveys involving subjective well-being, including France, Germany, Italy, Poland, and the United Kingdom (Abdallah & Mahony, 2012). As a result, 32 formal or semi-formal surveys were found, including subjective indicators of well-being in Europe. These range from small studies with a sample of just over 1000 people. The Annual Survey of the UK Population, which has been conducted since 2011, includes data on the subjective well-being of 160,000 respondents annually.

3.3.1 Concept of the EQLS

The basic concept is based on questionnaire, where participant respond to the certain questions. Evaluation is based on answers on the participants. Is consist of two dimensions of subjectivity, objective and subjective (See Figure 3). Subjective well-being is occasionally referred to in this report as experienced well-being to highlight that it reflects people's experiences of their lives.

Figure 3: Dimensions of subjectivity by EQLS

	Objective substance	Subjective substance
Objective measurement	Objective assessment of overcrowding based on number of rooms and number of people living in the home.	How long individual stays in the house before moving.
Subjective measurement	Assessment of accommodation (for example, whether the home is overcrowded).	Self-reported housing satisfaction.

Source: Veenhoven (2002)

- Hedonic well-being

Also called "affect", it refers to the everyday feelings and moods of people. Both positive and negative feelings are measured and found to be not fully correlated (Diener et al, 1985). Typically, in surveys, respondents are asked to answer questions related to relatively short periods of time, such as a day or a week, to help remember. While this means that such metrics can suffer from significant temporal variability - as people's moods will rise and fall from day to day - large sample sizes and good survey design (not polling everyone on Monday, for example) should ensure that this is not will happen. systematically distort the assessments of the population. Indeed, some research suggests that these hedonic measures, when respondents are not asked to remember how they felt over a long period of time, may be the most resistant to cultural bias in response (Krueger et al, 2009).

- Evaluative well-being

Respondents are expected to make judgments that are more cognitively influenced by weighing different aspects of their lives. In the most frequently asked question, people are asked to report how satisfied they are with their life in general at the present time, thus not setting a rigid time frame. In another common question, respondents are asked to step on a rung of a ladder where the top represents the best possible life. Such questions are intuitively attractive because they explicitly ask

respondents for an overall rating, but they also implicitly have a relative effect because satisfaction is more likely to be compared to expectations. There is a risk of someone reporting that they are satisfied just because they have low expectations (Michalos, 1985).

- Eudemonic well-being.

Less commonly included in large-scale surveys, questions designed to obtain information about this form of well-being ask respondents about a number of concepts that are considered important to well-being, such as a sense of autonomy, relationships, meaning, and self-esteem. Eudaimonism's approaches draw on tradition dating back to Aristotle through various psychological and humanistic theories of (Deci & Ryan, 1980) and evidence demonstrating the universal significance of factors being measured. They are sometimes understood as preconditions for well-being (as measured by evaluative and hedonic approaches); sometimes they are seen as part of well-being itself. The New Economy Foundation has argued that measuring eudemonic well-being provides a more structured approach to analyzing well-being, leading to policy conclusions more naturally and ensuring that well-being is not seen solely as a result of happiness (Centre for Well-Being, 2011). A dynamic model of well-being. Here is a list of questions that are asked:

Q40e How satisfied you are with each of the following items? Your family life Family (satisfaction)(Evaluative)

Q40f How satisfied you are with each of the following items? Your health satisfaction (Evaluative)

Q40g How satisfied you are with each of the following items? Your social life Social life (satisfaction)(Evaluative)

Q41 Taking all things together, how happy would you say you are? Overall life (happiness)(Evaluative10)

Q45a, I have felt cheerful and in good spirits Positive emotion (cheerful) (Eudemonic)

Q45b, I have felt calm and relaxed Positive emotion (calm and relaxed) (Eudemonic)

Q45c, I have felt active and rigorous Vitality (active) Hedonic/(Eudemonic)

Q45d, I woke up feeling fresh and rested Vitality (rested) Hedonic/(Eudemonic)

Q46a, I have felt particularly tense Negative emotion (tense) (Hedonic)

3.4 Social and Economic Factors Influencing Human Development

3.4.1 Economic Factors

Many social, economic, and political variables can influence the human development process. If we regard human development as a part of the superstructure in a society, we expect the economic base would determine its progress Rothstein (2008), he argued that this might not be a one-way relationship.

Based on the example of (Ranis & Stewart, 2001) 1960 to 1992 regression analysis on data of Latin America, concluded that an increase in economic growth did not automatically result in advances in human development. Rather, they suggested that “human development has to happen simultaneously with improvements in economic growth if a country plans to reach a virtuous cycle. The opposite research illustrates however the two-way linkages between economic growth and human development, and that policymakers should have an early focus on human development, not only for its direct social benefits but also because of its significant effect on sustaining economic growth (Ranis Suri, Boozer 2004). Another example was evaluated and analyzed by Jager (2012) when the GDP increase in India, although the impact on the one particular indicator of human development was significantly high, it questioned life expectancy.

Some quantitative models have shown the significant effects on education of human development, example of schooling experience, book possession, health of children and health of teachers. Yonehara (2006) concluded, empirical research of the effects on education in Germany, using the Breen-Goldthrope model, explains how kid’s educational attainment, are influenced their parent’s social class and occupational positions. Jager & Holm (2007), even Scandinavian regions have recorded that regime, in Denmark specifically, the social class and cultural capital plays a much more important role that economic capital. Considering the influence of family background, we shall also consider the family extensions and roots such as: grandparents, uncles, aunts and cousins, and the various interactions between immediate and extended families.

Jager (2012) also estimated a panel model of fixed effects with relevant data for 74 countries developing countries from 1980 to 2012. Demographic transition has also a significant effect on HDI, based on various indices of global fertility and cultural transition (Chen, 2013).

Employment considers to be one of the most fundamental aspects of economic development, when unemployment rate is high, it might lead to the downward spiral in a countries community, the unemployed residents cannot receive an income which initially will reduce the consumer spending

and eventually reduces industry earnings, creating fewer jobs and so on. Hence, a healthy economy arrives as close to full employment as possible, creating industry growth and generating consumer spending in the community (Wennekers & Thurik, 1999). They assert that the economy and its quality is being dependent on the numbers of small companies and firms. With an inclusion of innovations, industry dynamics, job generations and total export of goods and services, yet they consider the following aspects such as a lower propensity to export employment, a qualitative change in the demand for capital and more diversity and product portfolio in the supply of products and services.

Thurik (1999) confirmed the research of a new establishments that contributes to a dynamical economy growth. Dynamism is an open-ended society where creativity and enterprise, operating under certain rules, and the progress which is generated in unpredictable ways. In his article, it was determined that the economic diversity is a component that demonstrate as a result a more qualitative life level, due to its developed economy and diverse industry range, it can provide more benefits to its residence. He stated that, per-capita income is an obvious and routinely used indicator of quality of life. Those, who has a higher per-capita income have better conditions and chances to purchase necessities as well as more disposable income to purchase luxuries.

Chen (2013) reminded that per-capita is not the best indicator that could initially demonstrate the economic development. He used focused on such variables as dynamism in business, continuous process of capital accumulation, and other social indicators.

The unemployment rate is another indicator that could show in details of how well economically developed the country is. That measure was used in many studies by (Phillips, 1990, Alpert 1963, Lucas 1988). All of them stated that both factors of basic and non-basic employment will eventually bring more money into the economy. Whereas non-basic jobs are the type of recycling money through the local economy. The unemployment rate and commute time for employment do not measure the same thing however, a resident may not be employed in its host country but is employed in the adjacent country, which in fact doesn't demonstrate an impact as long as those money are spent in its homeland country.

Shoup (2005) concluded, capital availability is also a vital part of the economy development. He explains the positive correlation between banks and entrepreneurial growth, accenting an overall effect on people, this financial help can be spread among the people, regardless its occupation and job position. He explains the bank effect as, creating loanable funds will help regional entrepreneurs to invest and grow further. These funds are important for a local community, because without them, new

businesses are not able to function, which eventually makes employment opportunities scarcer, and people are spending their savings as a result.

3.4.2 Social Factors

Safety of community and its peace are parts of quality of life. Crime and lack of protection might lead to bad circumstances of a country, its protection and security, are important factors. In order to understand public safety, it is important to know the availability of public services. As an example, I decided to take fire services, according to the (U.S Fire Administration,2008) fire killed more Americans than all-natural disasters combined". Fire services are obviously significant to any country, and its availability as well. Promoting ways and means of protection from fire-related occasions such as, house, car, school and job-related fires.

Shoup & Madema (2005) concluded that fire services have positive contribution to economic development, hence it increases the quality of life overall. All in all, fire protection is clearly an important stimulus to economic growth. Obviously, an availability as it has been mentioned above, is an important factor in people's lives, that maintaining higher public safety.

Police services availability in rural areas and counties is an important an important factor to prevent violent and property crimes towards its residents. Mladenka & Hill (1978) police staff are responsible in maintaining orders, enforcing laws, and preventing and detecting crime for the well-being and safety of its citizens. In Gyimah's (1989) analysis of police production, he uses the crime rate to measure community safety. He bases his empirical research on data that shows when "the crime rate is lower in A community than it is in community B, then it is, that is it quite obvious to postulate that community A is way safer than B". I can however conclude that based on the greater amount of policeman in a certain area, the people have a higher quality of life and safety.

Cebula and Vedder (1973) showed a quality-of-life study where crime level affected peoples' decisions when migrating to new areas. Higher crime rates should lower so immigrants can obtain safety and hence have better conditions to live in". Thus, one can conclude, that quality of life is usually lower when a crime rate is higher.

Charney (1993) stated, public safety expenditures reflect both the quality and cost of providing services. Even if public safety expenditures do not perfectly reflect the measure of the public services quality. For example, a country with a high public safety expenditure could signify an area that demands more safety spending, instead of measuring a high feeling of safety. However, it is a complex

measurement toll of public safety quality, even if a government starts to spend more money per capita for public services, fires and crimes will not reduce in its amounts. He also stated that public expenditure also includes ambulance services, that indeed might be a relevant factor to consider. Since the services' purpose is to help people who are injured or on the edge of death. As a result, again, availability of medical technology that comes from public expenditures might reflect the outcomes of a certain occasion, and also trust to the government and officials.

(Sofilda, Nurhayati & Hamzah, 2015) concluded that these communities that are served by a basic ambulance, versus advanced ambulance care, have a lower survival rate. Based on that, one can conclude that, public expenditures might reflect the quality of services in relation to medical, as vital, hence have a strong impact of quality of life.

Sufian (1993) put a lot of attention on secondary education and school system. The output of education means years of schooling, which is tightly linked with HDI. He examined the number of 16-year-olds enrolled in school and college and post-college graduates. In his model, educational aspect was influential on quality of life almost the same as if the Foreign Direct Investments in the research of (Reuveny & Li, 2003). However, he did not involve the variables which are part of educational attainments such as (educational expenditures, literacy rates and a simple access to education, distribution, segregation, discrimination, lifelong and alternative education).

3.5 Politics and policy factors in relation to quality of life

3.5.1 Policy factors

Basically, all the policy factors that are involved in this study have enormous influence on economic, political, and social parts, and are correlated among each other in various forms. Rigobon and Rodrik use the identification of heteroskedasticity (IH) method to test the complex relationships among the variables and conclude that trade openness has a strong negative effect on democracy level, with a positive effect on rules of law which can significantly increase national wages and incomes, there is a mutual reinforcement of both, rule of law and democracy (Rigobon & Rodrik, 2005). Additionally, the study of (Reuveny & Li, 2003) finds that democratic governance and trade are able to reduce income inequality, at the same time foreign direct investments may deteriorate income inequality.

In the era of globalization where international trade dictates all aspects of life, including human development. A research study of (Kabadayi, 2013) using panel data analysis with control variables

shows a strong positive effect on trade openness in developing countries, since living standards due to that are getting higher. Moreover, Deng (2013) argues for Southeast and East Asian countries, the positive impact of exports on human development has recorded a significant increase rather than imports, which confirms that multilateral trade agreements can help Asian people's livelihoods. Similarly, Davies and Quinlivan (2006), using generalized method of moments procedure and panel data have found a correlation between trade and human development is much stronger than expected, even though if the trade is not followed by a certain increase in household income, it can still extend life expectancy by increasing access to advanced medicines, medical apparatus, and instruments from overseas, improve the level of education and its structure by sharing global educational resources and expanding intercultural communication.

Sims, Gong and Ruppel (2012) have demonstrated how quality and structure of governance effect human development. As a key factor, they considered corruption and it turned out to be a negative correlation between human development and corruption in 68 countries. They argue that the strength of such relationships is contingent upon certain aspects of national culture and individualism. This agrees with the conclusion of another study which uses Corruption Perceptions Index as a proxy indicator of social capital, showing the effect on social capital on human development in Islamic countries (Razmi, Salimifar & Bazzazan, 2013). As shown a study on Indonesia during the New Order, when Indonesia's development was concentrated in the western part of the country, a centralized government and its expenditure can severely affect the degree of human development and its spatial distribution. (Sofilda, Nurhayati & Hamzah, 2015).

I agree with the statement of Popov and Plotnikov (2012) such policy makers should also be aligned with the with environmental performance. Thus, by testing the Resource Curse Hypothesis, applying the Environmental Kuznets Curve which assumes the dynamic effects of economic growth on the natural environment, et. el. Plotnikov (2012) found than environmental quality, economic growth and human development are indispensable to each other. In another case, an experiment following a volunteer project by Costantini & Monni (2008) "Viaje del Parnaso" finds that environment conversation programs can help participants with severe mental illness (SMI) improve their personal development, psychological well-being, and environmental awareness.

3.5.2 Politics in relation to quality of life

Quality of life is directly dependent on the political situation of a state. Well-being became a focus of so many political debates. That's why, wellbeing intensified in the wake of the financial crisis as politicians, officials and policy makers sought new narratives and new policy frames that challenge the importance of GDP growth as an indicator that signify the performance of a country. As Weiss (1999) observed that, politics arises from accepting the fact of the simultaneous existence of different groups, hence different interests, and traditions, and thus, such differences might be contested and reconciled. He concluded that politics is concerned with the process where power and resources are distributed, and sometimes it might not be equal. He bases that distribution by (Lasswell, 1936) "Who gets what, when and how".

Weiss (1999) & Rosendorff (2005) concluded that, the central to realizing the political process is dig in the layers of 3 I's: ideas, interests, and institutions. The idea entails to basic values of different groups or individuals, the notion of interests looks for winners and losers from different options and institutions is the forum through which the reconciliation of difference is sought.

However, debates on the "good life" and the role of society and the state are too many. Allin & Hand (2014) argues that GDP is the main indicator that measures the quality of life, the study was done only for Scandinavian countries, they concluded that HDI and Quality of Life are corresponding to the data of GDP. One can conclude that it is partly true but some institutions such as World Value Survey, doesn't not operate on this criterion and since I have covered HDI at the beginning I will avoid the following factor.

The commission established by President Sarkozy of France on the Measurement of Economic Performance and Social Progress of 2008-2009. The commission reported in 2009, still carries-out the same components that must be in line with a standard set by that commission. The following components are material living, standards, health, education, personal activities including work, political voice and governance and social connections to relationships, environment, security – economic and physical. (CMEPSP, 2009). It argued that all these components that shape people's well-being and quality of life, are still missing conventional income measures.

Government spending and its transparency. There is also good literature indicating that higher health care costs are associated with better health outcomes (Lobont, 2019). Poland, Coburn, Robertson, also seem to agree that higher health care spending should produce better results, but I

believe that his call for more government control over funding would be just as wasteful, if not more. than the current system. I believe that measuring health financing efforts gives the reader an overview of the system without making any judgments about what the system should be.

Measuring the quality of government, Kaufmann (2009) used a bureaucracy or corruption within European Union and compared regions and an average level. However, many researchers have doubts on how properly to measure the corruption, rule of law and bureaucratic efficiency. Nevertheless, researchers such as Rothstein & Teorell (2008) have concluded the relationships between high-quality government and democracy, the state which refers to an access of power, is needed such type of measurement. Kaufmann listed a few governance dimensions based on which, people can measure the quality of government:

- Control of corruption
- Government efficiency
- Rule of law
- Regulatory quality
- Political stability
- Absence of violence and terrorism.

Besides on the quality of government, these aspects also measure the public sector performance and allow a meaningful comparison across the EU countries, at the national level. All of the dimensions can be related and reflect the quality of life of each state. Kaufmann (2009) argues that it also comes down to the regime that state has, either democratic or authoritarian. Full democracy does not exist, it is always a mixture of everything and even a dictatorship (Collier, 2007).

Pre-conclusion of the Literature studies

Although, all the studies mentioned above provided proof and evidence based on the statistical data and different methodologies and arguments about relationships between certain policies and human development, those still do not provide a complete analysis for a robust conclusion, from a global perspective of how each of this policy factors influence the level of human development. All the studies that I have covered, suffer from important shortcomings. Because these researchers concentrate only on human development only in certain areas of the world, or just covers a study of a particular country, which cannot be concluded as a sufficient conclusion related to the whole world.

Second, these studies do not contain enough control over the variables to show the complexity and distinction of policy factors, and this may lead to omitted variables bias.

In contrast, the present study attempts to discover the effectiveness measure of Human Development Index and how the rest of the variables correspond with an influence on that measure in Russian Federation. The next few chapters will be dedicated to a description of Russian Federation concerning Human Development Index. In my practical part I will judge the Russian Federation as a state by the following criterion. I strongly believe that with the help of the stated literature reviews, methods, and theories, I will make a conclusion, based on the full acknowledgment.

Qualitative methods and its judgment on how Political regulations influence the quality of life of Russian Population. With an inclusion of social factors.

Quantitative methods will be demonstrated and based on the HDI data, Foreign Direct Investments and Average Income. The methods of analyzation and comparison to other states will be included as well, to express the difference.

4 Practical Part

In this chapter, I base my focus mostly on both qualitative and quantitative methods, by describing the progress of Russian Federation and its human development Index. I plan to build a model whereas the following data will be represented in order to either confirm or reject my hypothesis which were based on the theoretical framework that I found.

4.1 Briefing note for Russian Federation and its HDI progress

Russian Federation's HDI value for 2019 equals to 0,824 which is ranked as a very high performance of human development category, positioning it at 52 out of 189 countries and territories. (UNPD,2019).

Before 1990 and 2019, Russian Federation's HDI value increased from 0,73 to 0,82 an increase of 12,1 percent. Table 1 demonstrates the progress of Russian Federation in each of HDI indicators. Between 1990 and 2019, the life expectancy has increased by 4,5 years, mean years of schooling increased by 3 years, expected years of schooling by 2,2-year increase. GNI per capita has a growth of 21,6 percent, which corresponds with the ranking position (See Table 1.)

However, based on the studies of Dobrynin, Ivlev & Plotnikov (2006), HDI is just a number, which is not able to pass on a reality and real quality of life in Russia, it is just a descriptive statistic measure. Table1, has got a consistent time series data.

Table 1: Russian Federation's HDI trends

	Life expectancy at birth	Expected years of schooling	Mean years of schooling	GNI per capita (2017 PPP\$)	HDI value
1990	68.0	12.8	9.2	21,514	0.735
1995	66.0	11.8	10.0	13,247	0.702
2000	65.1	12.5	11.3	14,229	0.722
2005	65.8	13.8	11.4	19,601	0.753
2010	68.7	14.0	11.5	23,256	0.781
2015	71.5	14.8	11.8	24,847	0.809
2016	71.8	15.1	11.8	24,874	0.815
2017	72.1	15.2	12.0	25,311	0.820
2018	72.4	15.0	12.2	25,962	0.823
2019	72.6	15.0	12.2	26,157	0.824

Source: UNDP (2020).

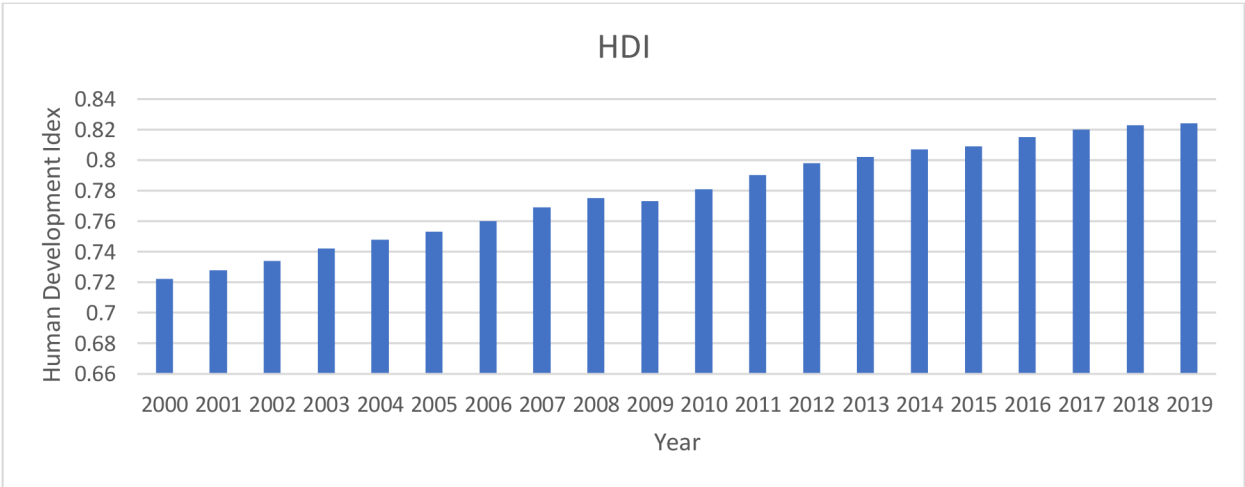
I assume that after the collapse of the USSR in 1991 had a major effect at the begging of its independence. All the variables (See Table 2). that are shown on the table above, were significantly low at beginning and started its development from the scratch.

4.1.1 Human Development Index

The human development Index has been progressing over the years starting from 2000 up to 2019. In my opinion Russian Federation started to ramp-up its development in every sphere of economy, hence it had a positive effect on overall performance of Human Development Index. Surely but slowly, the HDI has been growing from 2000 up to 2008, when eventually the global crisis has hit the economy of every state, Russian Federation was not an exception. The impact of the financial crisis is seen between 2008 and 2009. Obviously, it had a negative impact on households all over the world, people were not able to pay off its credits and banks went bankrupt. The macro indicators such as unemployment rate increased drastically. Unemployed people were not able to find a job, hence I might assume that the level of satisfaction of the whole population decreased.

After the crisis, Russian Federation has recovered quite fast, it took two years to get the Human Development Index increasing, and by the end of 2015, the HDI equalled 0,809. Meaning that Russian Federation ranked as a High Human Development country. As a results of that were the development of different social programs and social benefits. The government started to help young families our after the second-born baby in the amount of 500.000 thousand Rubbles, which equalled to over 10.000 thousand Euros. Nowadays, the government focuses on different social and homeless programs development, pays out the support wages for unemployed people and increases the pension rates. However, the big dispute was in 2017, when Russian government announced the increase of the pension age, from 62 up to 66 years old. It lasted for two years straight which in my opinion might have affected the development of human index with a negative impact.

Graph 1: Human Development Index, from 2000 - 2019.



Source: UNDP (2020), processed by the author.

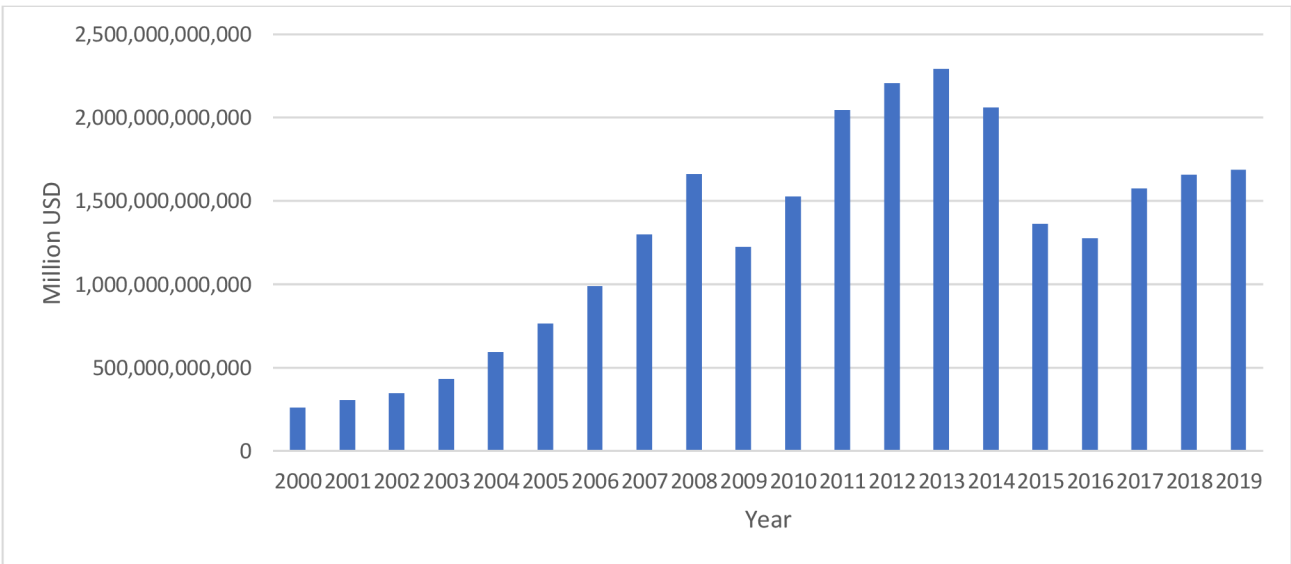
4.1.2 Gross Domestic Product

Gross Domestic Product is an indicator of an economic development of the whole country. Because of that, I want to analyze how exactly the GDP was developing over the years for the Russian Federation. Since it is measured as a quantitative indicator and I plan to relate the indicator to the HDI, I strongly believe that analysis of all variables will help me to understand the impact more clearly and may be somewhere I will link the fluctuation of GDP with the HDI.

In 2000’s Russian rapid economic growth was driven by energy exports. It provided lots of opportunities for foreign direct investors to settle in the territory of Russian Federation. It is seen that the GDP of Russian Federation is volatile and doesn’t have a stable growth. After the financial crisis, the annual change of GDP decreased by 8 percent, which was the highest out of G-20 countries. Still, the factor of politic and trade relationships effects the GDP performance for the past 5 years. Sanctions and prohibitions of imports from Russia for EU countries has also a negative effect on GDP.

Another obstacle of the slow GDP increase is the rules and regulations for the Foreign Direct Investments, the government argues that the year 2021 had to increase by 3 percent in the investment field. However, the covid situation has caused lots of obstacles, some foreign investors shout-down their businesses in Russia. Due to this fact, the HDI slam was inevitable.

Figure 2: Current GDP in USD

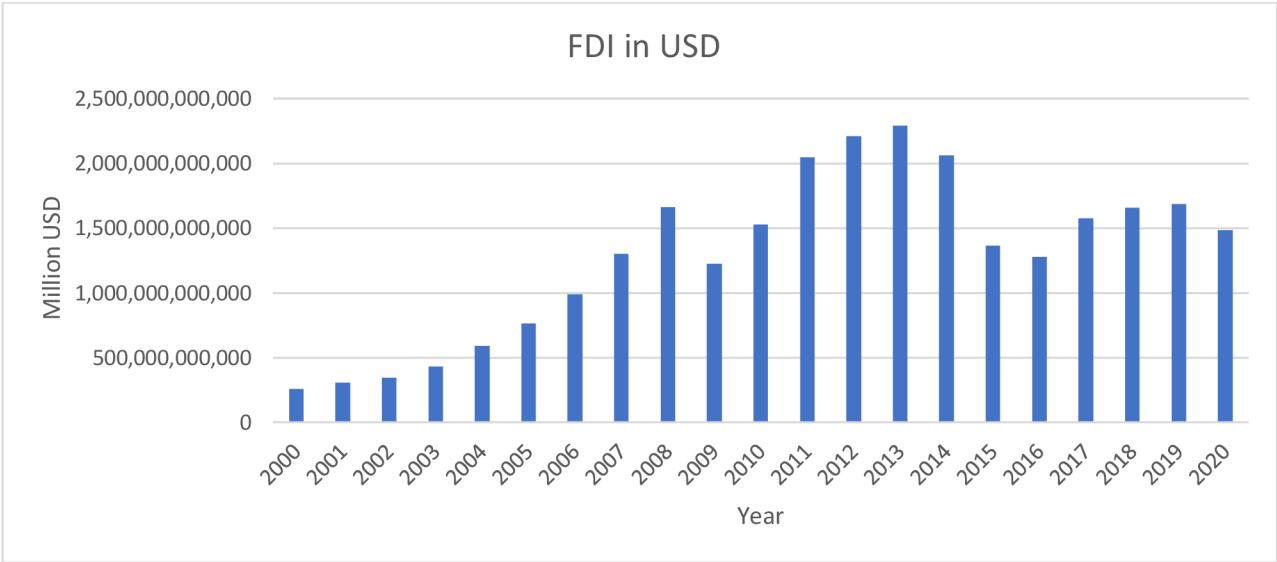


Source: World bank, processed by the author.

4.1.3 Foreign Direct Investments

In my opinion, the FID's impact the HDI the most of all macroeconomic indicators together with inflation level. The Russian Federation has an enormous advantage of its natural resources, especially oil and gas industry, tourism, banking systems, and lots of portfolio investments. However, natural wealth is the key sector of Russian Federation. Since 2000, Russia has been building its economic reforms, labour force was the main priority of all. Thus, when FDI's inflow are high, it provides lots of good jobs with relatively high wages. Russian Federation has a range of skilled and high-educated workers and a large portion of professional who are employed in public sectors. There is a big linkage between FDI's and Human Development Index which was studied in different countries, and I do believe that the inflow of FDI's has a positive effect on peoples live. There was a big slam in the year of 2008 and 2014, due to financial crisis and Ukraine conflict with Russian government, that turned things upside down. Which links to another factor of political relations and its decisions. The policy factors also linked with FDI's hence might impact HDI as well. The covid situation has also caused the FDI outflows, comparing the last year of 2020. Many companies, because of the logistic restrictions had to shout-down and were not able to trade with Russia. Which lead to the increase of unemployment rate which I cover in the next chapter.

Figure 4: FDI inflow in (USD)

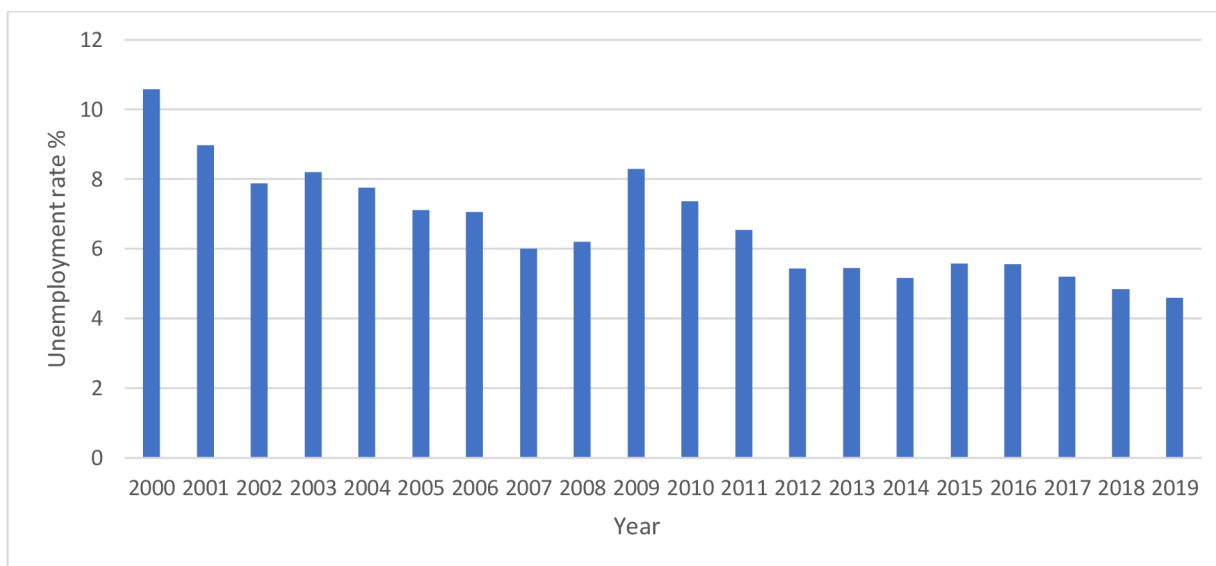


Source: World bank, processed by the author.

4.1.4 Unemployment

The unemployment is partly considered to be a sub-indicator of HDI. Hence, it is already ingrained and is a part of human development.

Figure 5: Unemployment rate (%)



Source: World bank, processed by author.

Institute of growth Economics by P.A. Stopylin monitors the unemployment rate every year. From the beginning the unemployment rate was high, but slowly and surely was decreasing as the Russian economy was progressing, based on the factors of FDI's inflows and potential disclosure of natural wealth and its export abroad. Hence it is deemed that oil and gas industry where 2,5 percent of population is involved for extraction and other administrative departments. Volatilities on the Figure 5 could be explained easily. The first drop was during the financial crisis, which again, had a negative impact on all variables mentioned above. The second increase in 2015, is explained by the oil price decrease in December 16, the ruble fell against other currencies. which tells me that Russian economy is dependent on the oil and gas industry, hence the development of population as well. In this situation is explained that labor productivity will slow down the economic growth, hence the job positions availability will slow down as well, which eventually impact people with the negative side-effect. There are, however, many factors influencing unemployment increase, such as drop in wages due to an increase of CPI, which decreases the real value of wages and hence, people have no money left to invest further.

4.2 Regression output

In this chapter I will build a model in Gretl Software, where number of observations will be 19, from 2000 up to 2019. The Graph – 4, includes the data for 2020, but I have reduced it because all the other variables are missing the data for the year 2020. I will use the following macro indicators to see how the variables correlate with each other. Based on the outcome of the model, I will either accept or reject my hypothesis (See Chapter 2.2)

The data were retrieved from official websites such as: WorldBank, UNDP, Rosstat.ru and extra. I can rely on this data. However, the study has a practical character and will not provide the precise outcome of the variables impact on HDI.

I applied the qualitative research and quantitative research to analyze my theoretical part and apply knowledge within my practical part.

I run the following model of multiple linear regressions model; the regression is demonstrated below based on the following equations:

$$\text{Economic model: } y_{1t} = B_0 + B_{1x_1} + B_{2x_2} + B_{3x_3} + u_t.$$

Where:

y_{1t} – Human Development Index

B_0 – Constanta

x_1 – Unemployment (in %)

x_2 – Average Income in (USD)

x_3 – Foreign Direct Investment (USD)

T – Time Vector

u_t – Random Error Term, (residual error).

T – Time of 19 years.

Figure 6: Multiple Linear Regression Model

Model 1: OLS, using observations 2000-2019 (T = 20)
 Dependent variable: HDIvalue

	coefficient	std. error	t-ratio	p-value	
const	0.737621	0.00645018	114.4	1.78e-023	***
Unemploymentrate	-0.00212875	0.000678442	-3.138	0.0068	***
averaincmUSD	1.38425e-05	8.06019e-06	1.717	0.1065	
FDI	0.000000	0.000000	1.240	0.2339	
Tvariable	0.00458122	0.000256005	17.90	1.57e-011	***
Mean dependent var	0.778650	S.D. dependent var	0.033268		
Sum squared resid	0.000065	S.E. of regression	0.002089		
R-squared	0.996888	Adjusted R-squared	0.996058		
F(4, 15)	1201.071	P-value (F)	1.34e-18		
Log-likelihood	97.92060	Akaike criterion	-185.8412		
Schwarz criterion	-180.8625	Hannan-Quinn	-184.8693		
rho	0.324400	Durbin-Watson	1.189476		

Excluding the constant, p-value was highest for variable 3 (FDI)

Source: Gretl – output, own processing.

Based on the model output, two variables turned-out to be statistically insignificant because they do not contribute to the model, according to the p – value, those Variables are:

- averageinmUSD, at 0,05 alfa level < 0,1065.
- FDI, at 0,05 alfa level < 0,2339.

In this case the author should re-run the model:

Figure 7: Simple Linear Regression Model

```

Model 3: OLS, using observations 2000-2019 (T = 20)
Dependent variable: HDIvalue

      coefficient  std. error  t-ratio  p-value
-----
const          0.744484    0.00836437  89.01    3.90e-024 ***
Unemploymentrate -0.00267976  0.000900275  -2.977    0.0085    ***
Tvariable       0.00496207  0.000239960  20.68    1.73e-013 ***

Mean dependent var  0.778650  S.D. dependent var  0.033268
Sum squared resid  0.000140  S.E. of regression  0.002872
R-squared          0.993331  Adjusted R-squared  0.992546
F(2, 17)          1266.047  P-value(F)          3.20e-19
Log-likelihood     90.30009  Akaike criterion    -174.6002
Schwarz criterion  -171.6130  Hannan-Quinn        -174.0171
rho                0.834957  Durbin-Watson       0.585706
    
```

Source: Gretl – output, own processing.

Based on the output of the model, all variables were significant at 0,05 alfa level, hance the model is the following:

$$y_i = 0,744 - 0,00267 * x_i + 0,00496TV$$

I plan to check the assumptions of SLRM of the following criterion:

- Model Verification

By evaluating p-value, we detect the significance of each variable at the alfa of 0,05 percent.

- Autocorrelation

It has to deal with the structure of residuals. I will use Durbin-Watson test whereas, The null hypothesis: No autocorrelation and vice versa. If d is closer to 0, it means a positive autocorrelation, however if d is closer to 4, meaning negative autocorrelation. We need to determine upper and lower critical values for d, which consists of number of observations (N = 20), and number of independent variables (k=3).

- Normality

It shows that the residuals are normally distributed, it is necessary for valid hypothesis testing. It is a mandatory step of a linear regression model, whereas H_0 : Normally distributed; H_1 : Not normally distributed.

- Heteroskedasticity

For that procedure, I plan to use the White's test whereas: H_0 : Homoskedasticity; H_1 : Heteroskedasticity.

First, I need to mention the purposed hypothesis (See Chapter 2.2) which can be rejected or failed to be rejected, based on the estimation of β .

I plan to detect the significance based on the variables that were processed by Gretl:

Table 2: Model Verification

Verification of chosen parameters at 5 % level of significance.

Variable	P – value	< ; >	Alfa	Reject/Fail to reject	Significant/Insignificant
X1	0.0085	<	0,05	Reject	Significant
X4	0.0001	<	0,05	Reject	Significant

Source: Based on the output of Gretl.

According to the p-value, we fail to reject the H_0 , for all variable, meaning that not all of them are significant, and Foreign Direct Investments and Average Income in USD do not contribute to the model, based on its p-value.

Figure 8: Autocorrelation

Durbin-Watson statistic = 0.585706

H1: positive autocorrelation

p-value = 1.36883e-005

H1: negative autocorrelation

p-value = 0.999986

Source: Gretl – output, own processing.

We confirm it by adding uha_1 variable, and according to its p – value it demonstrates a high autocorrelation problem.

Breusch-Godfrey test for first-order autocorrelation

OLS, using observations 2000-2019 (T = 20)

Dependent variable: uhat

	coefficient	std. error	t-ratio	p-value	
const	0.00341895	0.00616335	0.5547	0.5868	
Unemploymentrate	-0.000281236	0.000660704	-0.4257	0.6760	
Tvariable	-0.000180870	0.000180870	-1.000	0.3322	
uha_1	0.979934	0.245546	3.991	0.0011	***

Unadjusted R-squared = 0.498853

Test statistic: LMF = 15.926761,

with p-value = $P(F(1,16) > 15.9268) = 0.00105$

Alternative statistic: $TR^2 = 9.977060$,

with p-value = $P(\text{Chi-square}(1) > 9.97706) = 0.00159$

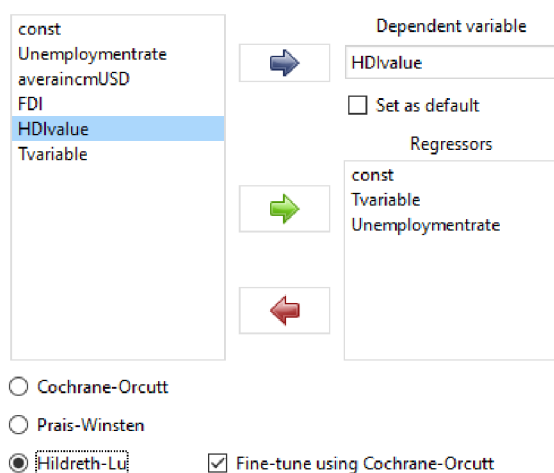
Ljung-Box Q' = 6.00137,

with p-value = $P(\text{Chi-square}(1) > 6.00137) = 0.0143$

Source: Gretl – output, own processing.

Let's use the Autocorrelation Correction – 1 in Gretl to see the results by applying

Figure 9: Autoregression



Source: Gretl – output, own processing.

Figure 10: Autoregression output - 1.

```

      rho      ESS      rho      ESS      rho      ESS
-0.99  0.000348927  -0.90  0.000323784  -0.80  0.000297252
-0.70  0.000272203  -0.60  0.000248642  -0.50  0.000226577
-0.40  0.000206011  -0.30  0.000186950  -0.20  0.000169392
-0.10  0.000153331   0.00  0.000138744   0.10  0.000125601
  0.20  0.000113855   0.30  0.000103463   0.40  9.43950e-005
  0.50  8.66475e-005  0.60  8.02409e-005  0.70  7.52101e-005
  0.80  7.15915e-005  0.90  6.94149e-005  0.99  6.87060e-005

ESS is minimized for rho = 0.999

Model 14: Hildreth-Lu, using observations 2001-2019 (T = 19)
Dependent variable: HDlvalue
rho = 0.999

              coefficient      std. error      t-ratio      p-value
-----
const          130.191         89.9117         1.448      0.1669
Unemploymentrate -0.00220976      0.000627450     -3.522      0.0028 ***
Tvariable      -0.123492         0.0889779     -1.388      0.1842

Statistics based on the rho-differenced data:

Sum squared resid    0.000069    S.E. of regression    0.002072
R-squared            0.996108    Adjusted R-squared    0.995622
F(2, 16)            8.661532    P-value(F)            0.002825
rho                 0.070376    Durbin-Watson         1.576346

Statistics based on the original data:

Mean dependent var    0.781632    S.D. dependent var    0.031314

```

Source: Gretl – output, own processing.

The author used Hildreth-Lu test, for autoregression errors. However, it showed that constant and Time Vector are insignificant in the model. Let's get rid-off time vector and test the model again, without insignificant variables.

Figure 11: Autoregression - 2

```

      rho      ESS      rho      ESS      rho      ESS
-0.99  0.00980225  -0.90  0.00888019  -0.80  0.00792899
-0.70  0.00705551  -0.60  0.00626041  -0.50  0.00554438
-0.40  0.00490810  -0.30  0.00435209  -0.20  0.00387649
-0.10  0.00348053   0.00  0.00316152   0.10  0.00291292
  0.20  0.00272084   0.30  0.00255813   0.40  0.00237708
  0.50  0.00210773   0.60  0.00168340   0.70  0.00111220
  0.80  0.000536613  0.90  0.000156644   0.99  7.19085e-005

ESS is minimized for rho = 0.98

Model 15: Hildreth-Lu, using observations 2001-2019 (T = 19)
Dependent variable: HDIvalue
rho = 0.98

      coefficient  std. error  t-ratio  p-value
-----
const          1.02461    0.0237453  43.15  8.18e-019 ***
Unemploymentrate -0.00224662  0.000606401 -3.705  0.0018 ***

Statistics based on the rho-differenced data:

Sum squared resid  0.000069  S.E. of regression  0.002015
R-squared          0.996100  Adjusted R-squared  0.995871
F(1, 17)          13.72588  P-value(F)         0.001759
rho               0.092291  Durbin-Watson      1.535185

```

Source: Gretl – output, own processing.

The Durbin – Watson test is now being close to 2, which eventually shows better results of no autocorrelation. However, the author assumes to stick with the previous results, the model has got a positive autocorrelation, as it is impossible to exclude the Time Vector from the model.

Test for normality

In order to perform the test for normality, I had to save the data so the extra variable would appear as uhat2 – residual from model 2. See below.

Whereas:

H0: Normally distributed.

HA: Not normally distributed.

Figure 12: Normality Test of Jarque - Bera

Test for normality of uhat2:

Doornik-Hansen test = 4.58171, with p-value 0.10118

Shapiro-Wilk W = 0.921555, with p-value 0.106159

Lilliefors test = 0.177092, with p-value ≈ 0.1

Jarque-Bera test = 4.33969, with p-value 0.114195

Source: Gretl – output, own processing.

I fail to reject the Null Hypothesis, which indicated that residuals are normally distributed according to the Jarque-Bera test.

Figure 13: Homoskedasticity/Heteroskedasticity by White's test.

```
White's test for heteroskedasticity
OLS, using observations 2000-2019 (T = 20)
Dependent variable: uhat^2

-----+-----+-----+-----+-----+
                coefficient   std. error   t-ratio   p-value
-----+-----+-----+-----+-----+
const                0.000213922   0.000469365   0.4558   0.6555
Unemploymentrate    -3.54778e-05   9.58556e-05   -0.3701   0.7168
Tvariable           -1.56718e-05   2.89407e-05   -0.5415   0.5967
sq_Unemploymentr~   1.50463e-06   4.89484e-06   0.3074   0.7631
X2_X3                1.10466e-06   2.86512e-06   0.3856   0.7056
sq_Tvariable        3.84541e-07   4.74375e-07   0.8106   0.4311

Unadjusted R-squared = 0.322621

Test statistic: TR^2 = 6.452426,
with p-value = P(Chi-square (5) > 6.452426) = 0.264650
```

Source: Gretl – output, own processing.

In this case, I fail to reject the Null hypothesis, which tells me that the model relates Homoskedasticity and here is why:

Based on the White's test, the null hypothesis is that residuals are homoscedastic. However, if p-value is 0,05 or smaller, in that case the null hypothesis would be rejected, which indicates evidence of a heteroscedasticity. In my case, the p-value is 0,16. Which means, I fail to reject the null hypothesis. The model is homoscedastic, which means that the model could be forecasted further on.

Considering the R-square and Adjusted R-square, I can conclude that these indicators tell us by how many percentages the model is explained. The dependent variable is explained by explanatory variables since our residuals are normally distributed.

5 Discussion

Based on the results of the MLRM which was run in Gretl Software I can conclude that all variables were checked according to my assumptions. All the stated variables such as unemployment rate (percentage measure, average income, and foreign direct investments). According to the t-ratio, the highest of all, is an average income in USD, which indicates a significance. However, not all the variables turned out to be significant in relation to HDI, and Foreign Direct Investments is the one.

Even though, not all variables demonstrated their impact towards HDI, the results are still not accurate as it doesn't involve all the macroeconomic indicators of an economy. However, all the variables that I have chosen are dealing with a monetary matter. I do believe that it really matters in a life of every person.

As stated by Reuveny & Li (2003) that FDI's have an impact on the overall performance of the Human Development Index. By running a model, I can not confirm that it does impact the HDI development in the Russian Federation based on the data retrieved, however based on the model output, there is a negative correlation between variables of HDI and FDI's. That could be explained by the fact that if foreign direct investments inflow increases, it might either have a positive influence on the population, but it is a very minor percent that the model doesn't consider. The rest of the population might be indifferent due to a lack of skills and knowledge required. And eventually, sometimes it might affect a certain percent of the population in a negative way, as those people could feel themselves slightly affected by the fact of losing their jobs or not getting a job within an FDI's project. But this is my assumption which might in fact be a reality in any country. However, based on the findings and the output of the data, the Foreign Direct Investments turned out to be insignificant.

Nevertheless, there are also many researchers who analyzed a relationship between unemployment and the Human Development Index (Phillips, 1990, Alpert 1963, Lucas 1988), and these two strongly correlate with each other as well. When the unemployment rate in the Russian Federation increases, the Human Development Index decreases, which makes total sense, and the model shows a negative correlation between the unemployment rate and the Human Development Index. Hence, my hypothesis was correct.

The average income in USD is another variable that turned out to be insignificant, based on the output of the model. Which doesn't approve the stated hypothesis in the beginning of the thesis. My assumptions were that all the monetary aspects might influence the Human Development Index, and, I think it is true, the more money you receive the more the HDI gets. Nevertheless, based on the

obtained results, it turned out to be wrong. The reason for that is that the model does not include many other variables that could potentially change the Foreign Direct Investments and Average Income in USD, even the currency rate could have impacted and eventually demonstrate different results, if KZT was taken, it could have been significant to the model, however it might be a good idea to test it in the further research.

6 Conclusion

Within this bachelor thesis of “Various approaches in measuring the quality of life”, I have achieved the stated goals which I set in the beginning. By studying relevant material of theoretical background of quality of life in Russian Federation and how economic and social aspects influences the quality of life. In my opinion, I do believe that Human Development Index with Quality of Life-Survey are good ways to measure quality of life in any country. However, Human Development Index is just a number which is measured from 0-1 and includes so many macro indicators, which are obviously relevant to consider when analyzing a quality of life. Therefore, I assume that it is to far from perfect since it doesn't involve such aspects as feeling, depression, illness and extra. As, those factors do influence the quality of life of every human being.

However, according to the development of macroeconomic analysis (See Chapter 4.1.1, 4.1.2, 4.2.3). The HDI was slowly but surely increasing as the other macroeconomic indicators were increasing beside unemployment rate, as it was confirmed by the model it has a negative correlation with HDI.

Another point of investigation is to look at the health indicator, which Human Development Index doesn't consider. Health, as it is considered globally, is also a main indicator of quality of life. Nevertheless, I confirmed only one hypothesis that I stated in the beginning out of three.

The Foreign Direct Investments Inflow as an economic indicator turned out to be negative in relation to HDI, which has questioned me and eventually it was not significant to my model at all, I have run it twice, and with the Time Vector, the output of the model has changed to “not significant variable”. In the further research, I might analyse how exactly Foreign Direct Investments Inflows influence the Human Development Index, either positively or negatively with the consideration of exchange rate and inflation rate. The dummy variable could be used to see the changed or lagged variable, which I used for this model with the FDIs.

The average income in USD has also showed an insignificant impact to the model. Which is explained in the Chapter 5.

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Dataset:

Unemployment rate(%)	avera.incm. USD	FDI	HDI value	T variable
10,58	87,02260327		0,722	1
8,98	120,6703911	2678030000	0,728	2
7,88	126,9656377	2847300000	0,734	3
8,21	159,6689895	3473830000	0,742	4
7,76	194,2363112	7928630000	0,748	5
7,12	252,2110849	15402990000	0,753	6
7,06	313,8724911	15508050000	0,76	7
6	386,4941712	37594770000	0,769	8
6,21	494,3448276	55873680000	0,775	9
8,3	440,302386	74782910000	0,773	10
7,37	547,4784426	36583100000	0,781	11
6,54	580,3079215	43167780000	0,79	12
5,44	636,9050466	55083630000	0,798	13
5,46	745,7321652	50587560000	0,802	14
5,16	673,3319519	69218890000	0,807	15
5,57	479,6335447	22031340000	0,809	16
5,56	581,6669308	6852970000	0,815	17
5,21	601,551221	32538900000	0,82	18
4,85	582,2103862	28557440000	0,823	19
4,6	675,0387816	8784850000	0,824	20

Source: WorldBank current year (2022) for Unemployment rate and FDI inflows

Source: UNDP (2021) for Human Development Index.

Appendix:1

Calculating the human development indices—graphical presentation

