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Faculty of Economics and Management

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Diploma Thesis

Unemployment and its social-economic impacts.

Case study: Kyrgyz Republic

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DIPLOMA THESIS ASSIGNMENT

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Economics and Management
Economics and Management

Thesis title

Unemployment and its social-economic impacts. Case study: Kyrgyz Republic

Objectives of thesis

The main purposes of the thesis is to review the level and policy fighting unemployment as an example in Kyrgyzstan. To achieve these goals, the following tasks are expected to be solved: to consider functions aimed at combating the state at the level unemployment, to study the main stages of the organization of the fight against unemployment and their ways (benefits, privileges, compensation, etc).

Methodology

This thesis consists of theoretical part, statistical analysis and impacts of unemployment. The work includes descriptive and comparative research methods. Statistical data was taken from the National Statistical Committee of KR and Internet information resources. Furthermore, there are SWOT analysis

The proposed extent of the thesis

35 – 40 pages

Keywords

Kyrgyz Republic, laws, unemployment, labor market, impacts

Recommended information sources

Estimating Structural models of Unemployment and Job duration By Dale T. Mortensen, George R. Neumann Edited by William A. Barnett, University of Texas

Law of the Kyrgyz Republic on Promoting Employment of the population of August 3, 2015 year no. 214
2. GANDOLFO, G. International finance and open-economy macroeconomics. Berlin: Springer, 2002. ISBN 3-540-43459-3.

Expected date of thesis defence

2020/21 WS – FEM (February 2021)

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Declaration

I declare that I have worked on my diploma thesis titled «*Unemployment and its social-economic impacts. Case study: Kyrgyz Republic*» by myself and I have used only the sources mentioned at the end of the thesis. As the author of the diploma thesis, I declare that the thesis does not break copyrights of any their person.

In Prague on November 30th, 2021 _____

Abstract

Unemployment is one of the important factors of any economy. The main target of this thesis is to analyse the socio-economic impact of the unemployment in Kyrgyz Republic. The reason behind why this particular country was used for this thesis is because it is my home country.

Thesis contains of two huge parts — theoretic and practical. Theory covers the idea of the unemployment and its types, whereas practice discloses the analysis of the unemployment rate in relation to socio-economic indicators as poverty, GDP and education. The central idea is to implement the statistical methods: descriptive statistics, regression analysis and correlation coefficient derivation in application to the chosen variables.

Keywords

Unemployment, GDP, poverty rate, tertiary education, regression analysis, OLSM method, correlation coefficient, R-squared

Přehled

Nezaměstnanost je jedním z důležitých faktorů každé ekonomiky. Hlavním cílem této práce je analyzovat socioekonomický dopad nezaměstnanosti v Kyrgyzské republice. Důvodem, proč byla pro tuto práci použita tato konkrétní země, je to, že je to moje rodná země.

Práce se skládá ze dvou velkých částí – teoretické a praktické. Teorie zahrnuje myšlenku nezaměstnanosti a jejích typů, zatímco praxe odhaluje analýzu míry nezaměstnanosti ve vztahu k socioekonomickým ukazatelům jako je chudoba, HDP a vzdělání. Ústřední myšlenkou je implementace statistických metod: deskriptivní statistiky, regresní analýzy a odvození korelačního koeficientu v aplikaci na vybrané proměnné.

Klíčová slova

Nezaměstnanost, HDP, míra chudoby, terciární vzdělání, regresní analýza, metoda OLS, korelační koeficient, R-squared

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Abbreviations

GDP - Gross Domestic Product

USD - US dollars

I. INTRODUCTION

Unemployment has become one of the most important macroeconomic indicators. The problem of unemployment is one of the main issues in the development of the economy all over the world. The level of unemployment affects such factors as the level of crime, the standards of living of the population, availability of skilled labor, level of migration in the country, etc.

There is always a certain level of unemployment in every country with no exception. However, when the it is too high, it can lead to devastating consequences. Hence, the aim of each country is to minimise the unemployment rate. In order to do this, there are number of various measures that can be taken: creation of new jobs, change in the education system corresponding to the modern labor market conditions, creation of favourable conditions for the development of small and medium-sized businesses, etc.

Despite the fact that this is a macroeconomic problem, it had a powerful impact on everyone. Losing a job for most people means a lower standard of living and causes serious psychological trauma.

II. OBJECTIVES AND METHODOLOGY

The major objective of the diploma thesis is to define the notion of unemployment give an overview of its forms and types, describe the major issues and consequences of unemployment and overview its relationship to the socio-economic indicators. In order to shorten the broadness of the topic, I have chosen to analyse the Kyrgyz Republic as an example. The reason why I chose this country as this is the country I was born in and also I am as a citizen is very concerned about the unemployment rate of the country as this is one of the important indicators that drives the economy.

The primary goal is to overview the historical change of unemployment in Kyrgyzstan from 2011 till 2020. The time series selection is 10 years. The major tools of analysis include statistical methods for data analysis for figuring out the relationships between the selected indicators: unemployment rate vs. GDP of the country, unemployment rate vs. poverty rate, unemployment rate vs. educational enrolment.

If the relationship turns to be positive, it will be assumed that these events are interconnected and have a close relationship with each other. Vice versa, the negative relationship would be observed in case if there is no connection of the two values.

In order to achieve all above mentioned aims it is important to:

- provide an insight on the unemployment, its types and forms;
- show the trends in Kyrgyzstan and define major issues;
- collect the available statistical data on the unemployment, GDP, poverty and education in Kyrgyz Republic;
- Make a descriptive analysis of the selected indicators;

- Perform the linear regression analysis or OLS method towards the indices;
- Analyse the results obtained and write a conclusion.

The research question would be as follows:

- Are there any relationship of unemployment rate of the country with socio-economic indicators such as poverty, GDP, education?

III. THEORETICAL PART

1. LABOR MARKET

1.1. Major understanding

Labor market is the point at which the supply and demand of and for the labor are met. The labor market can be affected both at the macro and micro levels (International Labour Office, 2008).

The macro stage implies local and world-wide market dynamics, whereas the micro stage is defined by the individual companies. The major examples of the macro-level factors affecting the supply and demand can be level of education, age, migration, etc (International Labour Office, 2008). The dynamics of them can be traced in such indicators as economic growth (measured by GDP), unemployment rate, total income, productivity of population.

On the contrary, micro-level examples might be on the employee turnover, which means on how often do the organisations hire, fire, promote their employees. All these factors might drastically affect the relationship between the supply and demand, which later has affect on whether employers cut or raise pay outs (salary, wages, additional benefits, etc.) and whether they increase the number of working hours.

1.2. Defining groups

As it was stated before, the labor market is associated with the supply and demand for economically active population. In this case employees represent the supply, while

employers are associated with the demand. This is the basic component of any economy. Typically speaking, the labor force is a sum of and contains of two categories: employed and unemployed people (Eurostat, 2021).

In simple terms, employed people is a group of population of those who have a job. They provide or produce goods and services for some profit. On the other hand, there is a group of unemployed people. These people do not have a job, however, do not lose hope to find one.

Besides, there is a group of economically inactive population which takes into account people who fall into the category of exceptions like students, retired, children, disabled people, etc.

2. TYPES OF UNEMPLOYMENT

In this part, the thesis will cover the three major types of unemployment — frictional, structural, cyclical, and additional types like — seasonal, institutional and voluntary. Practically speaking, they cannot be measured directly as they are closely related to each other and even intersect in terms. Meanwhile, description of its types allows to get the basic understanding of unemployment is constructed.

2.1. Frictional

Frictional unemployment is the term used to describe the population of being unemployment temporarily. This type is caused by the simple process of leaving one job in order to start with another. The time frame of the frictional unemployment is usually one of the shortest and includes the time which is needed to search for a new workplace. Jobseekers may not get hired immediately after leaving the previous job, thus have to

invest time and efforts in order to get employed again. Same happens with companies: they also require time for finding suitable candidates to fill the newly opened vacancies. Therefore, people currently looking for job did not match immediately with desired workplace may experience a short period of unemployment (Davidescu, Apostu and Marin, 2021).

It is a natural process happening not only at the uprisings and downfalls of the economy but even in a stable and prospering economy. Frictional unemployment is less dependent on the stage of the business cycle and less likely to influence wage rates and inflation. Besides, movement of labor force is very beneficial for the economy as it means that economically active population is aiming at looking for the better positions, contributing to more efficient allocation of the labor among the economy.

2.2. Structural

Structural unemployment is caused when there is again a mismatch between the supply and demand, occurring between existing open positions and current jobseekers. At this unemployment level, people commonly do not match with positions because they do not have the certain knowledge or skills for the particular position.

Also, there is another category of employees that might fall into this level of unemployment. People can easily become unemployed in case if they work in diminishing industries, or industries that are getting technologically advanced over the time and no longer require the physical labor force. For such people it is getting more and more complicated to find another job in a different industry, not even speaking about the same industry. These people are obliged to develop new skills or sometimes they have to migrate for more job opportunities and perspectives. In the modern world there is a very noticeable decrease in jobs for people performing manual work due to the fact that there is a

constantly developing technology advancements, e.g. manual work in factories, manufacturing, etc. For the past decades the share of these vacancies fell dramatically.

Due to the fact that this unemployment type might request more efforts to become a better fit for the new opening roles, structural unemployment is one of the longer term type. It might require even years in order to develop new skills, get acquainted with new industry, move to another city or country to find a good match. Thus, jobseekers because of the structural unemployment are likely to get into more than one-year unemployment category. Structural unemployment also takes place at the good economic conditions, meaning that it neither directly affects inflation rates along with wages.

2.3. Cyclical (demand-deficient)

Cyclical unemployment is a type of unemployment which relates to the changes in the economies over some business cycle. This is a medium term type of unemployment since it usually lasts from one to twelve months, not longer. Good examples of cyclical unemployment duration can be recession times, when unemployment rates go sharply up, however afterwards decline to the lowest levels.

To make it clear, during the economic recession, there is a decrease in the demand for goods, which consequentially leads to the lack of workplaces for those who are willing to work. Firms that have less demand are likely to shorten the number of hired employees by either hiring less or even firing the existing ones. As a result, the part of population which is seeking for a job experience more difficulties to get hired by any company.

A rise of the cyclical unemployment means that the economy operates below its potential. Population is facing a greater competition for the workplaces, but companies offer lower salaries, wages and potential increases. All these factors contribute to the lower inflation.

To combat cyclical unemployment, there is an expansionary monetary policy which can help in triggering the aggregate demand because companies having stronger demand are likely to hire more.

2.4. Other types of unemployment

- **Voluntary**

This type of unemployment occurs when people give the preference to being unemployed rather than get hired in the jobs which are available at the moment. For instance, if the benefits for unemployment are higher than the wages or the benefits are enough to cover the expenses, people voluntarily stay on the benefit sponsorship rather than go to work.

Based on the specificities of the frictional unemployment, we may also consider and put it as the type of voluntary group as people have a choice to wait before getting a better work.

- **Institutional**

Unemployment of this kind is conditioned by the fact when unemployment is the matter of the institutional regulations and agreements. Such regulations might include arrangements and laws related to higher minimum wage, discrimination related to the hiring. This type of unemployment can be a result from the permanent or long-term factors of country.

- **Seasonal**

This is the type of unemployment that speaks for itself. In this particular case, unemployment takes place only when the demand of workers for a particular work depends only on the certain season. Official statistics also use a seasonal adjustment to the unemployment data to make it more exact.

3. Consequences and effects

The unemployment is a notion that has a negative shadow and affects many factors of our everyday life. For instance, unemployment has a direct impact on the economic situation of the country. The longer time people are unemployed, the less budget they tend to spend, the lower the purchasing power of the person, hence, less contribution to country's economy .

On the other hand, unemployment is not only an economic problem but also a societal. It can affect on the person as on individual. Lack of job for a longer period of time can influence the physical and mental health of the person as well as relationships within the family (Davidescu, Apostu and Marin, 2021). The latter issue can be very crucial as lots of families and partners are threatened to divorce because of the financial problems.

4. Characteristics of Kyrgyzstan

4.1. Economy

The economy of the Kyrgyz Republic is concentrated on manufacturing and exporting goods due to the cheap labor force. There are a number of the goods they tend to export: gold, cotton, mercury, uranium, wool, clothing, meat, tobacco, etc. On the contrary, they import oil, automobiles, chemicals, food and pharmaceutical products. This is an interesting fact that despite Kyrgyzstan is exporting lots of products, they stopped mining

oil in their country and import it from the other partnership countries. Besides, the country is very dependent on the agricultural production. The economic growth of Kyrgyz Republic is quite stable since 2015 till 2019 before the emergency of COVID-19. After a drop it continues to grow again and reached 7.736 billion US dollars in last year, which represents 0.01% of the global economy (World Bank, 2021).

4.2. Population

The current population of Kyrgyzstan accounts nearly 6.7 million people (Worldometer, 2021), 900 thousands of which is concentrated in Bishkek, the capital city of Kyrgyz Republic, and 200 thousands in the Osh city. The rank of the cities is followed by Jalal-Abad (75 700 people), Karakol (70 171 people) and Tokmok (63 047 people). The rest of population is unequally distributed among the country. Due to the lack of jobs in smaller regions, people tend to migrate to the bigger ones, especially the capital of the country, or alternatively, to the other countries.

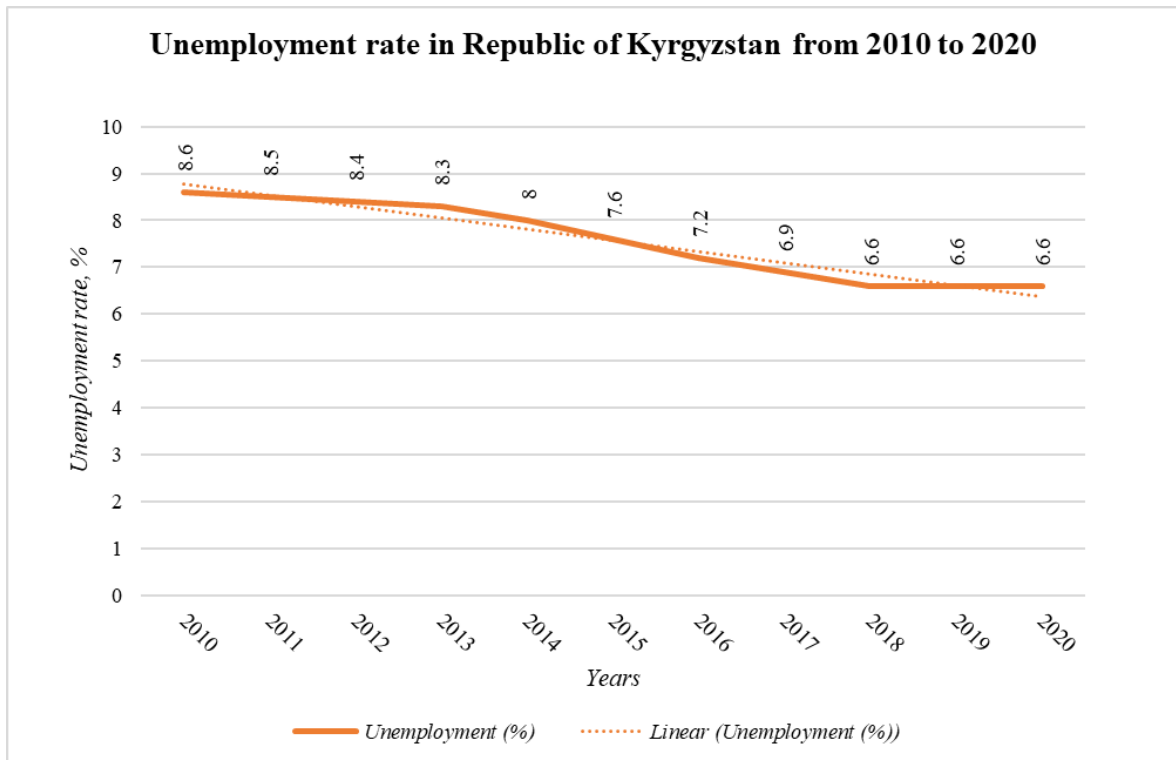
4.3. Current situation

4.3.1. Unemployment

Over the past years, the economically active population of the Kyrgyz Republic has increased by 4.8%, which has a positive effect on the socio-economic development of the country. At the same time, the number of employed population in the economy of the republic increased by 3.9%. It is important to note that the process of increasing the employed population is less intense than the increase in the number of the economically active population. This kind of situation on the labor market poses an important task for the government to significantly increase the use of the already formed labor potential of the country.

At the same time, it should be noted that the total number of unemployed in the republic in 2010-2020 decreased from 8.6% to 6.6% and remains more or less stable for the past 3 years (Figure 1). One of the typical characteristics for the Kyrgyz Republic is that there are more unemployed women than men. This is mostly associated with the customs of the Kyrgyz Republic that male are the people who primarily earn money for the families, hence, women tend to take care of the families and housing rather than going to work.

FIGURE 1. UNEMPLOYMENT RATE (%) FLUCTUATION IN KYRGYZ REPUBLIC, 2010-2020



Source: World Bank, 2021.

However, in spite of this, the unemployment rate of the Kyrgyz Republic is pretty much in a good shape among the Asian countries as well as worldwide and it keeps decreasing over the years, which is a very good trend though.

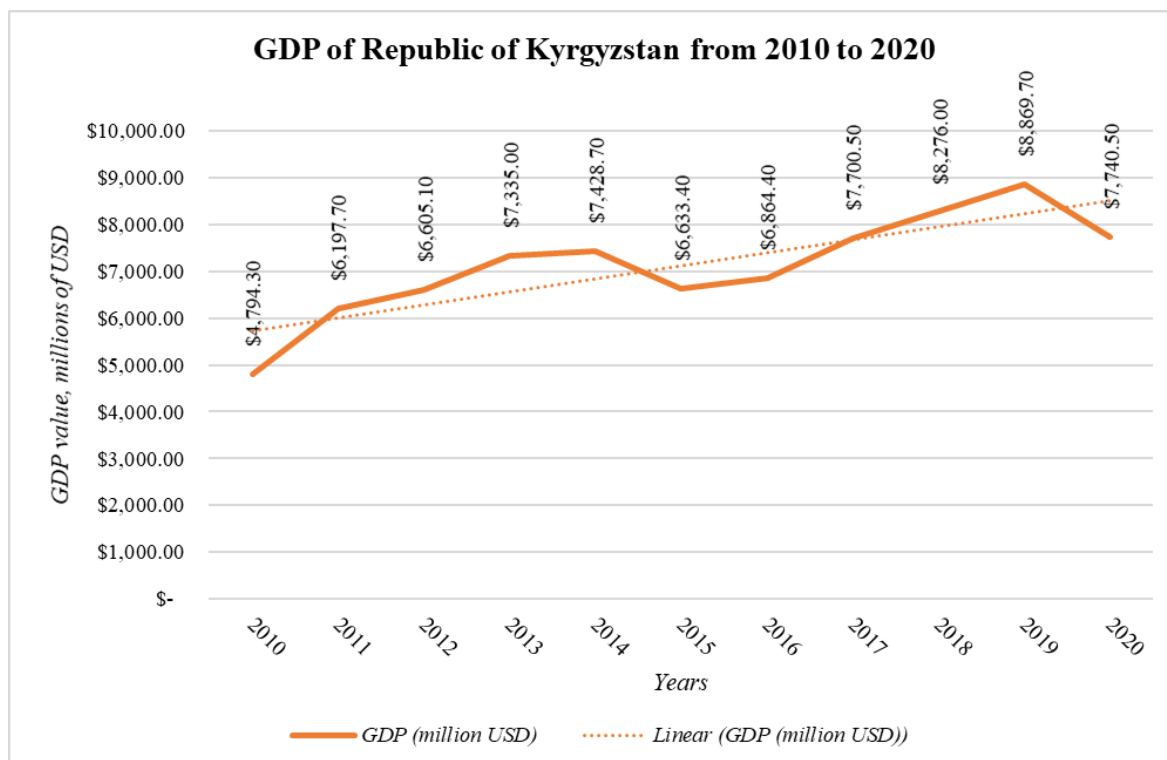
Unemployment being as the main subject of my thesis, general formula for calculating the unemployment rate is as follows: number of unemployed divided by labor force.

4.3.2.GDP

According to the Figure 2, the period from 2006 to 2019 had positive trend in the development of the country's economy, with an exception of 2010 and 2012, when there was a slight decrease in its growth. This is all due to the political appraisals in 2010, which disrupted economic activity. Domestic turmoil was exacerbated by the closure of borders with Kazakhstan and Uzbekistan, the main channels for trade (Alymkulova, Atabaev and Ganiev, 2016). Overall, the gross domestic product (GDP) fell by 0.5% in 2010. The economy began to recover in 2011. In 2011, the growth of the Kyrgyz economy was 5.7%. It was a success. International experts were amazed at how quickly the country recovered from the difficult events of 2010. It would seem that it will be easier further...

However, in 2012, gold production fell due to geological factors, resulting in a 0.9% decrease in GDP. On the other hand, other industries, construction and services saw notable growth as investor and consumer confidence and remittance flows recovered. In 2012, the volume of remittances continued to grow. In 2013, gold production is expected to recover. Unfortunately, the low gold production in 2012 led to a slowdown in economic growth. In 2012, the national currency depreciated. 2012 was the main disappointment for the entire presidency of Almazbek Atambayev (Alymkulova, Atabaev and Ganiev, 2016). Due to the drop in gold production at the Kumtor mine, GDP went into negative territory. Moreover, the government noted alarming signals from the very beginning of the year. But he could not do anything about that.

FIGURE 2. GDP (MILLION USD) FLUCTUATION IN KYRGYZ REPUBLIC, 2010-2020



Source: World Bank, 2021.

But the next year of 2013, was remembered for the record GDP growth of 10.9 percent. This has not happened in more than 20 years of Kyrgyz republic independence. The officials were so euphoric that they did not take decisive action to consolidate the result.

Between 2000 and 2019, the country’s average GDP growth rate was 4.4%, which allowed the Kyrgyz Republic to rise to the category of lower-middle-income countries by 2014. The economic approach that has allowed Kyrgyzstan to enter the category of lower middle income countries is not a sufficient tool for further climbing the country up the income ladder. In 2014-2015, the Kyrgyz Republic managed to avoid a recession caused by external shocks (for example, a drop in oil prices), the economy remains vulnerable to external economic shocks, given its high dependence on non-diversified export base, workers' remittances and external assistance (Ryzhov and Borodina, 2019).

In 2015, Kyrgyzstan joined the EAEU. This was supposed to mean that the economy would be re-built. The country had to urgently move away from re-export and develop production. However, data for 2015-2016 suggests that this did not happen. The service sector still takes the biggest share in the structure of GDP.

As for 2020, a significant decrease in GDP is due to the introduction of restrictive measures due to the epidemiological situation in the country. Covid-19 pandemic increased volatility and vulnerability of the main private sector growth drivers in Kyrgyzstan: commodities and migrant remittances.

While the scope and duration of the COVID-19 pandemic remains uncertain, its impact on small open economies dependent on services, remittances and natural resources is expected to be significant. The real GDP of Kyrgyzstan in 2020 decreased by 8.6%. The current account deficit is expected to widen to 13.1% of GDP due to a significant decrease in the flow of remittances from migrants as a result of the economic downturn in Russia (Kyrgyz statistics, 2021).

4.3.3. Poverty

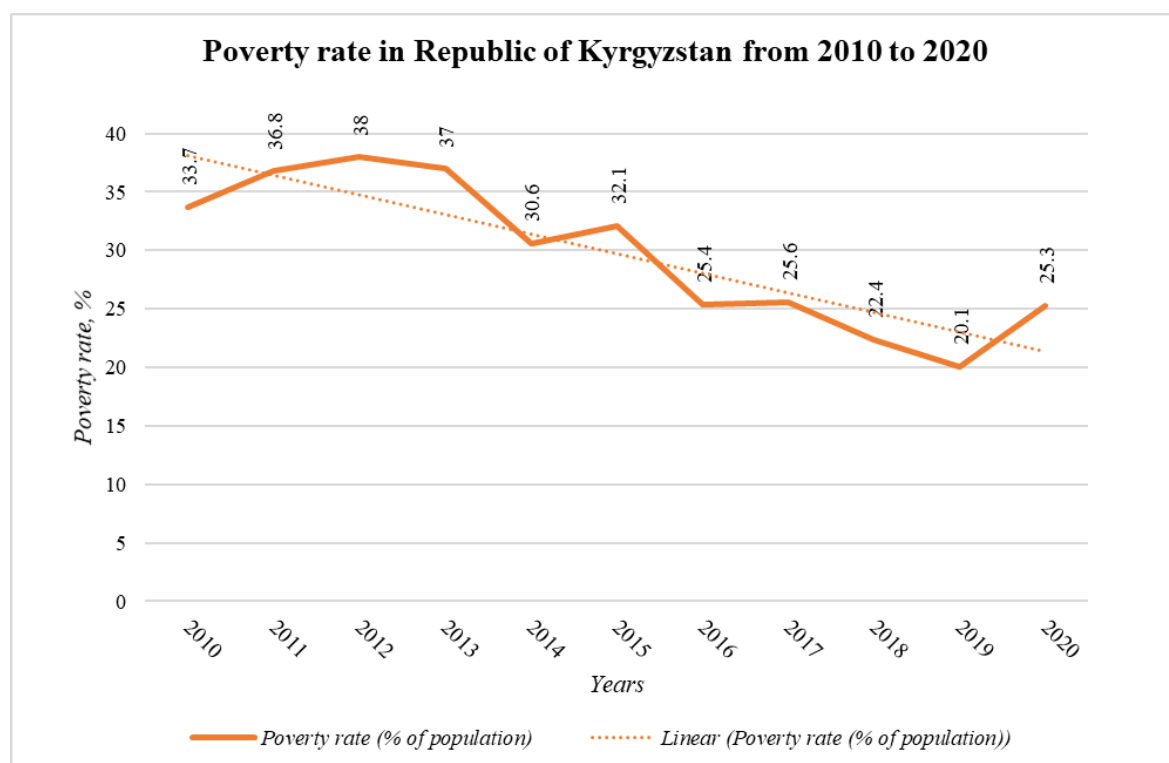
Based on the Figure 3, the overall tendency of the poverty in Kyrgyz Republic is decreasing. In 2009, the country was hit by the impact of the global food, fuel, financial and economic crises, with remittances and exports plummeting and prices rising. In 2010, political appraisals in the north of the country was accompanied by violence in the South.

These events seriously affected economic activity and caused an increase in poverty and extreme poverty, especially in the southern regions such as Osh and Jalal-Abad (Doklad, 2021). The consequences of the 2010 events, in particular the closure of the borders felt in

2011. Combined with high food prices and other economic factors, they have driven poverty up to 36.8%, despite renewed economic growth.

Since many households in the Kyrgyz Republic live just above or below the poverty line, this provides an opportunity for further rapid poverty reduction. At the same time, this also means that many households are at high risk of falling into poverty. Many of these people were hit hard in 2009-2011 by the political, social and economic crises and rising food prices. The poverty rate initially remained at the improved 2008 level and then rose, reaching 36.8% in 2011.

FIGURE 3. POVERTY RATE (%) FLUCTUATION IN KYRGYZ REPUBLIC, 2010-2020



Source: World Bank, 2021.

Within the period from 2015 to 2019, the poverty level significantly decreased due to the accession of Kyrgyzstan to the EAEU. After joining, the movement between the countries

of the economic union was facilitated and people of productive age were given the opportunity to go to work in the near abroad - Kazakhstan and Russia.

In Kyrgyzstan, over the past 15 years before the COVID-19 pandemic, the poverty rate dropped significantly from 39.9% in 2006 to 20.1% in 2019. The extreme poverty rate (according to the national extreme poverty line) dropped from 9.1% in 2006 to 0.5% in 2019. An increasingly important role in poverty reduction is played by remittances — that is an increasing proportion of the population relying on them to get out of poverty.

According to the National Statistical Committee (NSC), in 2019 remittances helped to reduce the national poverty rate by 11.1% (from 31.2% to 20.1%), in other words, in the absence of remittances, 715 000 people could be below the poverty line. In 2019, one in five vulnerable households reported receiving remittances, 28.8% of which households were headed by women.

In 2020, the poverty rate in Kyrgyzstan increased to 25.3%. A year earlier, it was 20.1%. Poverty has increased in both urban and rural areas. Poverty has increased on the back of two factors: loss of sources of income and inflation, especially food inflation.

Against the backdrop of the pandemic, 2020 was the worst year for the Kyrgyz economy over the past 26 years - the republic's GDP fell by 8.6%. Inflation reached 9.7% last year. Most of all, food and non-alcoholic drinks rose in price — by 17.6%. Real money incomes of the population in 2020 decreased by 5%.

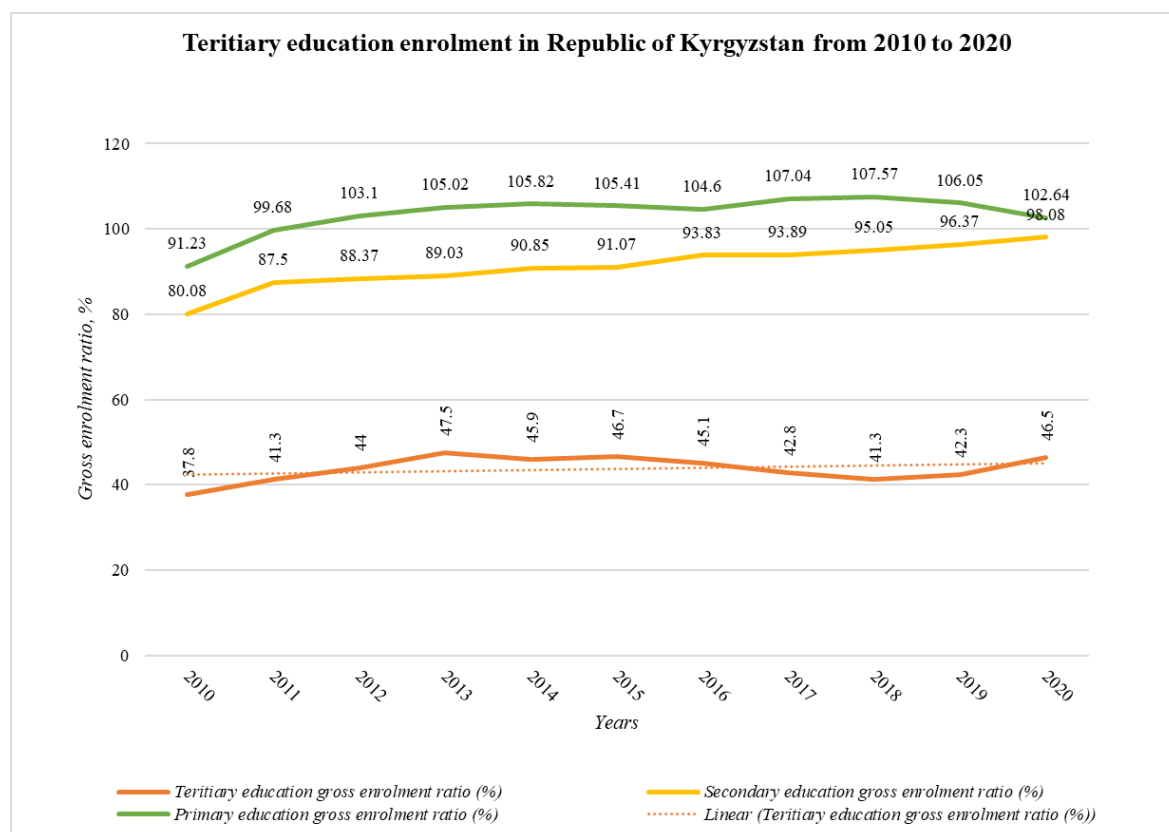
4.3.4. Education

Education level is also one of the most important indicator base on which the unemployment of rural and urban areas differ. The primary education in Kyrgyz Republic

is mandatory from 7 to 15 years old, meaning 9 years in general. After that, the student should choose the college and be educated there for 2 years in general, this is mandatory too, however, at least 10% of the population is not willing to enrol the secondary education.

The data which will be used in the practical part of the thesis is the percentage of people who is willing to enrol the higher education levels. The primary and secondary education have been added to graph (Figure 4) just for the demonstration of the number of people who get the tertiary education after completing primary and secondary levels.

FIGURE 4. COMPARISON OF EDUCATION LEVELS ENROLMENT IN KYRGYZ REPUBLIC, 2010-2020



Source: UNESCO, 2021.

Unfortunately, since the primary education is mandatory for all, people are less likely to abstain to give their children to the school. The secondary education seems to be more or less on the same level as primary, however, based on the lower range, we may assume that the poverty in the country forces the children to start to work earlier than they complete their education.

The higher education levels are very rare. In comparison with the primary and secondary educations, the high school line is falling by 50%, and this tendency is steady throughout the ages. And, this is understandable as the smaller cities or people in rural areas are less likely to get the high education because of no need — people are rather involved in the activities which do not require higher education.

IV. Practical Part

1. Input data

The particle part of this thesis analyses the relationship of the unemployment rate in relation to the socio-economic indicators such as GDP, poverty rate and involvement of people into tertiary educations. The majority of the studies confirm that such indicators as GDP, poverty rate and education level are interdependent and align with the unemployment of the country. The lower unemployment rate contributes to overall GDP of the country. Similarly, the higher unemployment rate can be one of the reasons for the poverty rate increase. In addition to that there is a number of studies that confirm a dependence of unemployment rate and enrolment in tertiary education.

TABLE 1. INPUT DATA FOR ANALYSIS: UNEMPLOYMENT, GDP, POVERTY RATE, EDUCATION ENROLMENT INDEXES FOR KYRGYZSTAN, 2010-2020

<i>Years</i>	<i>Unemployment (%)</i>	<i>GDP (million USD)</i>	<i>Poverty rate (% of population)</i>	<i>Tertiary education gross enrolment ratio (%)</i>
<i>2010</i>	8.6	\$ 4,794.30	33.7	37.8
<i>2011</i>	8.5	\$ 6,197.70	36.8	41.3
<i>2012</i>	8.4	\$ 6,605.10	38	44
<i>2013</i>	8.3	\$ 7,335.00	37	47.5
<i>2014</i>	8	\$ 7,428.70	30.6	45.9
<i>2015</i>	7.6	\$ 6,633.40	32.1	46.7
<i>2016</i>	7.2	\$ 6,864.40	25.4	45.1
<i>2017</i>	6.9	\$ 7,700.50	25.6	42.8
<i>2018</i>	6.6	\$ 8,276.00	22.4	41.3
<i>2019</i>	6.6	\$ 8,869.70	20.1	42.3
<i>2020</i>	6.6	\$ 7,740.50	25.3	46.5

Source: World Bank, 2021; UNESCO, 2021.

As it has already been mentioned before, this thesis is aimed at examining these relationships on the example of republic of Kyrgyzstan. The outcome of this part would be

the conclusion on the interdependence of the above mentioned indexes respectively to the unemployment rate.

The input data for this part might be found in the Table 1, which covers all indicators needed for the analysis for the period 2010 till 2020.

2. Statistical analysis

2.1. Unemployment rate

Based on the result of descriptive statistics, throughout the selected period from 2011 to 2020 unemployment rate as a percentage of population was fluctuating within the interval from 6.6% to 8.6% (Table 2). The average value, or the mean value in descriptive statistics, of the unemployment rate was 7.57%.

TABLE 2. DESCRIPTIVE STATISTICS OUTPUT FOR UNEMPLOYMENT RATE IN KYRGYZSTAN, 2011-2020.

<i>Unemployment (%)</i>	
<i>Mean</i>	<i>7.57</i>
Standard Error	0.25
Median	7.60
Mode	6.60
Standard Deviation	0.82
Sample Variance	0.67
Kurtosis	(1.93)
Skewness	(0.05)
Range	2.00
<i>Minimum</i>	<i>6.60</i>
<i>Maximum</i>	<i>8.60</i>
Sum	83.30
Count	11

Source: World Bank, 2021.

2.2. Economic growth

The output of descriptive statistics shows that at the period from 2011 to 2020, GDP value was ranging from 4.7943 billion USD to 8.8697 billion USD (Table 3). This is a very good result for the GDP rate since within 11 years, the GDP was able almost to double its value.

The mean value has been resulted in descriptive statistics at the point of 7.13139 billion USD.

TABLE 3. DESCRIPTIVE STATISTICS OUTPUT FOR GDP IN KYRGYZSTAN, 2011-2020.

<i>GDP (million USD)</i>	
<i>Mean</i>	<i>7,131.39</i>
Standard Error	331.48
Median	7,335.00
Mode	#N/A
Standard Deviation	1,099.39
Sample Variance	1,208,663.07
Kurtosis	1.08
Skewness	(0.61)
Range	4,075.40
<i>Minimum</i>	<i>4,794.30</i>
<i>Maximum</i>	<i>8,869.70</i>
Sum	78,445.30
Count	11

Source: World Bank, 2021

2.3. Poverty rate

The Table 4 shows the final output of descriptive statistics from 2011 to 2020 for the poverty rate as a percentage of population. The minimum value for this time period was 20.1% and the maximum value was 38%.

As it was stated before, the poverty rate started to drop up until the year of 2019, however, the major issue that it started to raise again in 2020. This might be because of the pandemics.

TABLE 4. DESCRIPTIVE STATISTICS OUTPUT FOR POVERTY RATE IN KYRGYZSTAN, 2011-2020.

<i>Poverty rate (% of population)</i>	
<i>Mean</i>	29.73
Standard Error	1.90
Median	30.60
Mode	#N/A
Standard Deviation	6.29
Sample Variance	39.53
Kurtosis	(1.50)
Skewness	(0.07)
Range	17.90
<i>Minimum</i>	20.10
<i>Maximum</i>	38.00
Sum	327.00
Count	11

Source: World Bank, 2021

I believe that the poverty rate is still a very high rate in comparison to the neighbouring countries.

2.4. Education level

The next Table 5 from the descriptive statistics analysis demonstrates that percentage of people enrolling to get the higher education. The minimum is 37.8% and maximum equals 47.5%. For me, being a master student the amount of people willing to get the higher education is extremely low in Kyrgyzstan.

TABLE 5. DESCRIPTIVE STATISTICS OUTPUT FOR TERTIARY EDUCATION RATE IN KYRGYZSTAN, 2011-2020.

<i>Tertiary education (%)</i>	
<i>Mean</i>	<i>43.75</i>
Standard Error	0.89
Median	44.00
Mode	41.30
Standard Deviation	2.95
Sample Variance	8.72
Kurtosis	(0.11)
Skewness	(0.62)
Range	9.70
<i>Minimum</i>	<i>37.80</i>
<i>Maximum</i>	<i>47.50</i>
Sum	481.20
Count	11

Source: UNESCO, 2021.

3. Formulas introduced

3.1. Regression analysis

As it has been stated before, the central idea is to understand if there is a relationship between the two variables: unemployment rate and other social economic indicators mentioned in the above tables and graphs. For calculation, I will be using the statistical methods such as simple regression analysis. This type of analysis allows to determine whether the two or more variables are relative to each other.

The formula for the regression analysis is as follows:

$$\mathbf{y = bx + a + \epsilon}$$

In this formula, **y** is a dependent variable, whereas **X** is independent. **a** in this particular case is Y-intercept, **b** is the slope and **ε** is the error term.

$$b = \frac{n \sum xy - (\sum x)(\sum y)}{n(\sum x^2) - (\sum x)^2}$$

$$a = \frac{\sum y - b \sum x}{n}$$

The **a** and **b** are calculated based on this formula: , in

which **n** is the number of observed years.

3.2. Coefficient of correlation

The regression model also has a term as correlation coefficient. This is the central aim of my thesis to be calculated.

$$r_{xy} = \frac{\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^n (x_i - \bar{x})^2} \sqrt{\sum_{i=1}^n (y_i - \bar{y})^2}}$$

The formula is as follows: , in which **r** is

the coefficient the author is aiming to find.

All above mentioned formulas are represented in mathematical terms, however, it is possible to simplify the task by entering the necessary data to the Excel and use the corresponding formula to perform the regression analysis.

The Excel formula would be **=CORREL(X,Y)** , in which we have o put the data range respectively to **X** and **Y**. The result of this formula can from -1 to 1. The meaning is straightforward: negative and positive correlation ratios. In case if the

relationship results in 0, then there is no relationship found between the two selected ranges.

3.3. R-squared

R-squared is also known as coefficient of determination. This is also an important variable to be discussed in this thesis as it shows the ability of the data to fit the model.

$$R^2 = 1 - \frac{SS_{RES}}{SS_{TOT}} = 1 - \frac{\sum_i (y_i - \hat{y}_i)^2}{\sum_i (y_i - \bar{y})^2}$$

The formula can be as is:

, however, R-squared can be simply derived from the coefficient of correlation. In this formula, **SSres** and **SStot** stand for squared errors residual sum and total sum of errors squared respectively. The output of this model should be high. The higher the value, the model fits better.

4. Measurement scale

To interpret the results obtained in a proper way, I will be using the ‘rule of thumb’ which was described by Mukaka (2012). In this scale, the range is distributed in 5 steps correspondingly, the range:

- between 0 and 0.19 is considered to be extremely weak;
- between 0.2 and 0.39 — weak;
- between 0.4 and 0.59 — moderate;
- between 0.6 and 0.79 — strong;
- between 0.8 and 0.9 and higher — very strong.

5. Calculation and analysis

5.1. Unemployment rate and GDP

Using the data earlier presented in Table 1, I used the regression analysis statistical tool to obtain the following results.

The first indicator that has been juxtaposed against the unemployment rate is GDP of the country.

TABLE 6. REGRESSION ANALYSIS OUTPUT UNEMPLOYMENT VS. GDP IN KYRGYZSTAN, 2011-2020.

SUMMARY OUTPUT: Unemployment vs. GDP

<i>Regression Statistics</i>	
Multiple R	0.78881582
R Square	0.622230397
Adjusted R Square	0.580255997
Standard Error	712.2703669
Observations	11

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	7520669.029	7520669.029	14.82404497	0.003905117
Residual	9	4565961.68	507329.0756		
Total	10	12086630.71			

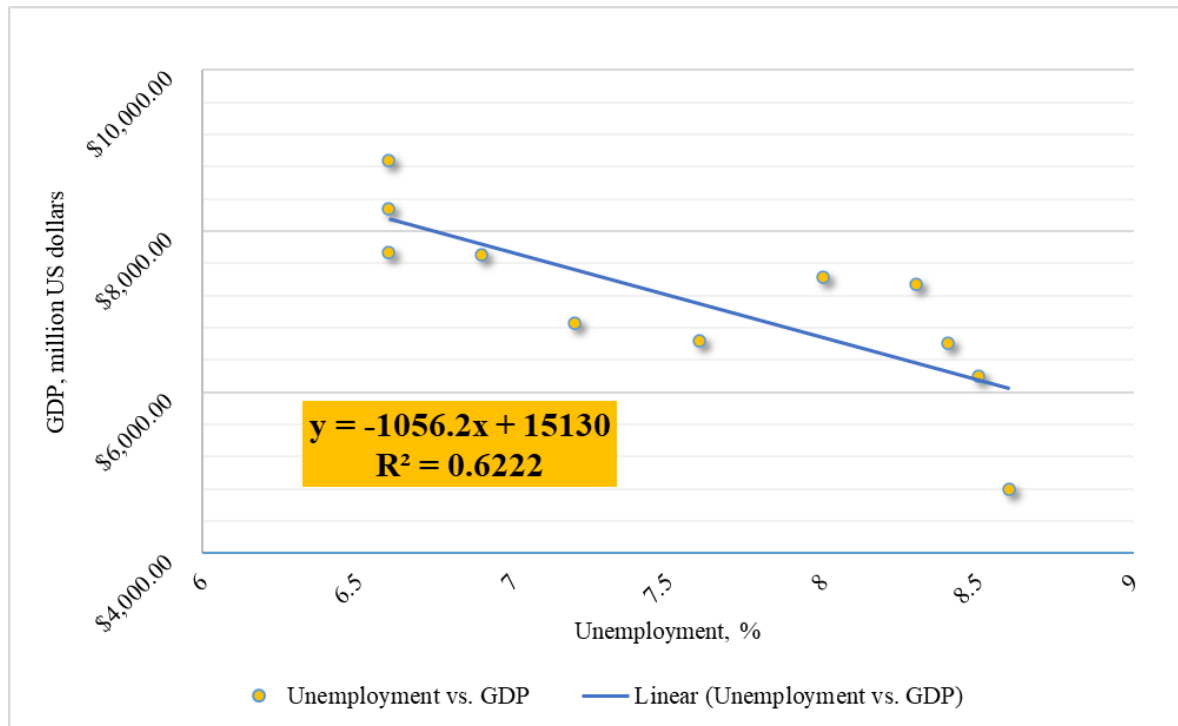
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	15129.5868	2088.416621	7.244525181	4.84474E-05	10405.26018	19853.91342	10405.26018	19853.91342
Unemployment (%)	-1056.184331	274.3192966	-3.85020064	0.003905117	-1676.737693	-435.6309695	-1676.737693	-435.6309695

Source: Author's proceedings.

In the Table 6 above, multiple R is **R** and R square is **R-squared**. Since all the calculations have been made via Excel, we get the R and R-squared automatically.

In this case, both R and R-squared values fall into the «strong» category, meaning that there is a strong relationship between the unemployment rate and GDP of the country. To visualise the relationship, the scatter diagram was constructed (Figure 5).

FIGURE 5. SCATTER DIAGRAM OF REGRESSION LINE UNEMPLOYMENT RATE VS. GDP OF KYRGYZSTAN, 2010-2020



Source: Author's proceedings.

According to the chart above, the tendency of the regression line is going down, which explains the notion why one of the intercepts is negative. The automatically calculated r-squared from the regression analysis tool pack matches with the derived equation on the Figure 5.

5.2. Unemployment and poverty rate

The demonstration of the Table 7 below R and R-squared have been calculated automatically as the matter of the regression analysis tool in Excel.

Based on the range by Mukaka (2012), both of the indicators are a very strong fit of the model. To represent the proceedings visually, there is a scatter diagram illustrated under Figure 6.

TABLE 6. REGRESSION ANALYSIS OUTPUT UNEMPLOYMENT VS. POVERTY IN KYRGYZSTAN, 2011-2020.

SUMMARY OUTPUT: Unemployment vs. Poverty

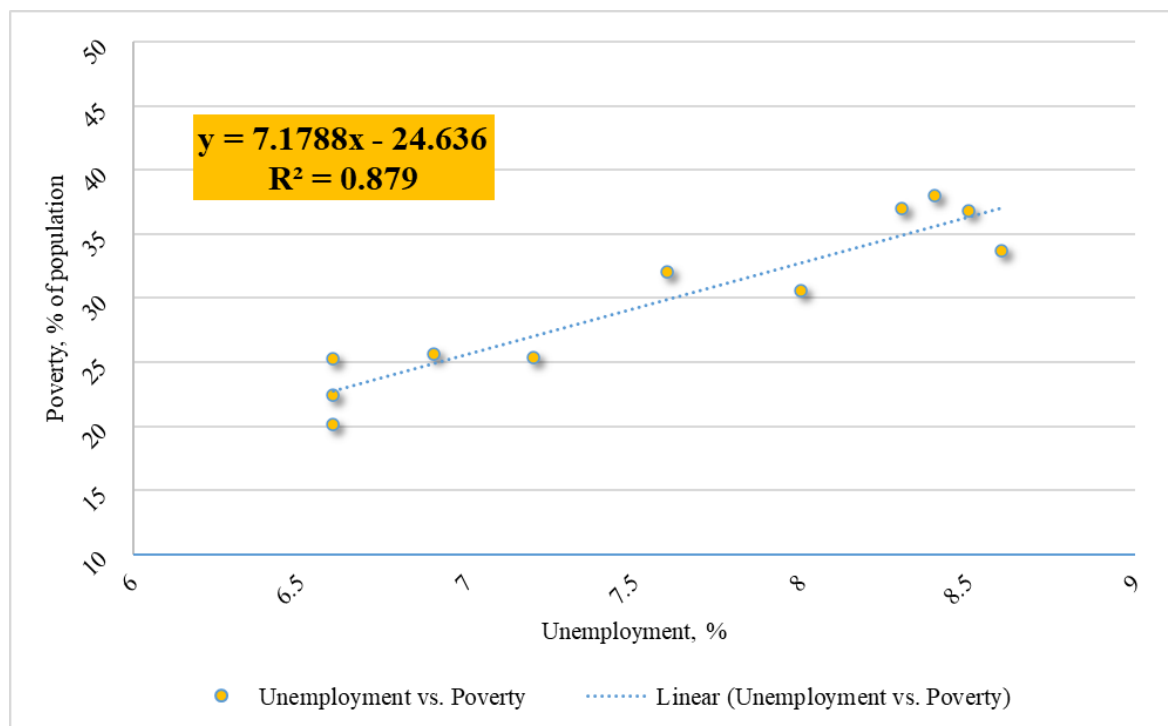
Regression Statistics	
Multiple R	0.937557898
R Square	0.879014812
Adjusted R Square	0.865572014
Standard Error	2.305086772
Observations	11

ANOVA					
	df	SS	MS	F	Significance F
Regression	1	347.4409929	347.4409929	65.38927174	2.0313E-05
Residual	9	47.82082524	5.313425027		
Total	10	395.2618182			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	-24.63584142	6.758643559	-3.645086652	0.005358315	-39.92495536	-9.346727487	-39.92495536	-9.346727487
Unemployment (%)	7.178802589	0.887766516	8.08636332	2.0313E-05	5.170535207	9.187069971	5.170535207	9.187069971

Source: Author's proceedings.

FIGURE 6. SCATTER DIAGRAM OF REGRESSION LINE UNEMPLOYMENT RATE VS. POVERTY RATE OF KYRGYZSTAN, 2010-2020



Source: Author's proceedings.

Figure 6 shows the regression line to be growing and overall there is a very positive relationship demonstrated on the scatter diagram.

5.3. Unemployment and education

The educational level showed very surprising results in regression analysis. The R and R-squared are extremely low and almost reach zero point.

TABLE 7. REGRESSION ANALYSIS OUTPUT UNEMPLOYMENT VS. EDUCATION ENROLMENT IN KYRGYZSTAN, 2011-2020.

SUMMARY OUTPUT: Unemployment vs. Education

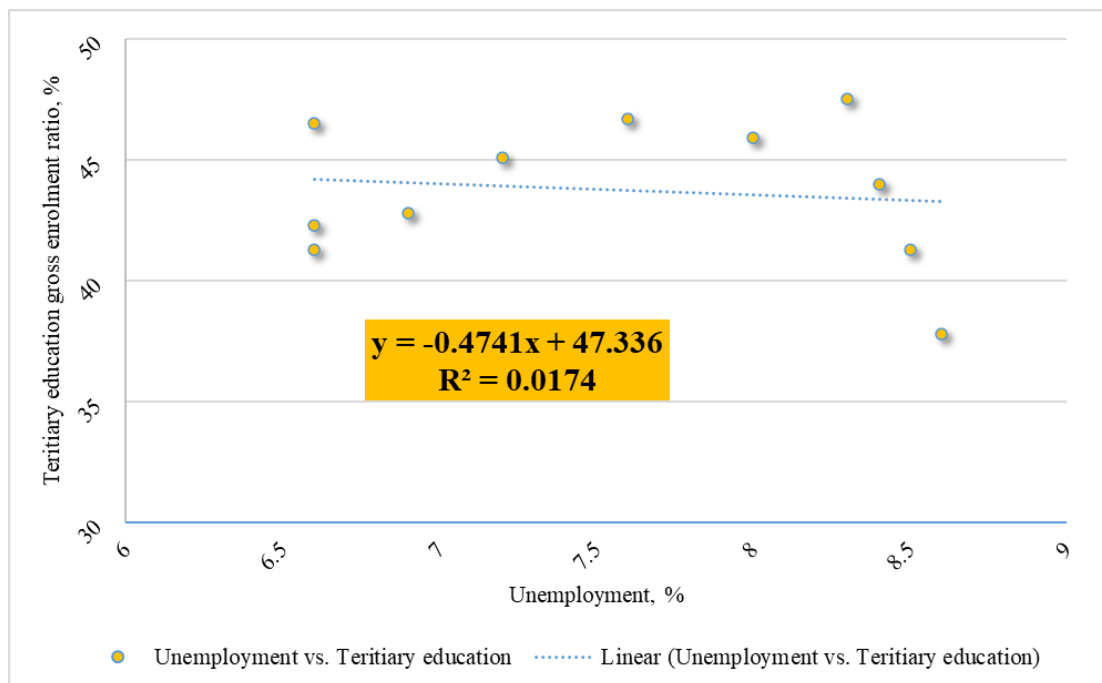
Regression Statistics	
Multiple R	0.131792815
R Square	0.017369346
Adjusted R Square	-0.091811838
Standard Error	3.08638308
Observations	11

ANOVA					
	df	SS	MS	F	Significance F
Regression	1	1.515428067	1.515428067	0.159087357	0.699296128
Residual	9	85.73184466	9.525760518		
Total	10	87.24727273			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	47.33576052	9.049448106	5.230789763	0.000541358	26.86448666	67.80703437	26.86448666	67.80703437
Unemployment (%)	-0.474110032	1.188670026	-0.398857565	0.699296128	-3.163068446	2.214848381	-3.163068446	2.214848381

Source: Author's proceedings.

FIGURE 6. SCATTER DIAGRAM OF REGRESSION LINE UNEMPLOYMENT RATE VS. POVERTY RATE OF KYRGYZSTAN, 2010-2020



Source: Author's proceedings.

According to the «rule of thumb» described earlier in this work, this relationship is considered to be extremely weak. From the observation, I might say that there is no relationship between these two indicators.

V. Results and Discussion

To sum up what has already been stated before as well as the result of my proceedings, I might conclude that unemployment rate definitely has a relationship with such socio-economic indicators as GDP and poverty.

Unfortunately, as a result of the calculations, I did not find any evidence of the tertiary education to be dependent on the unemployment rate. This is probably not the case of Kyrgyz Republic. Some of the countries do not hire people because they do not have the higher education and even two, nevertheless, Kyrgyzstan's unemployment rate does not correlate with this factor.

Based on the «rule of thumb» the rating is as:

The outcome of relationship of unemployment rate and GDP was **strong**:

$R = 0.79$ and $R\text{-squared} = 0.62$

The outcome of relationship of unemployment rate and poverty was very **strong**:

$R = 0.94$ and $R\text{-squared} = 0.88$

The outcome of relationship of unemployment rate and higher education was **extremely weak**:

$R = 0.13$ and $R\text{-squared} = 0.02$

VI. Conclusion

To conclude, the role of unemployment in the country is crucial. All in all, unemployment in the Kyrgyzstan has its own specificities, determined by the characteristics of the formation of underemployment; at the same time, it has many features of characteristic of developed countries.

In my opinion, there are a number of facts which have to be taken into account before talking about unemployment. First of all, these are the customs and traditions of the Kyrgyz Republic as the majority of the population is muslim. This religion is one of the strongest and in the strong believing families women tend not to go to work but rather they traditionally stay at home and take care of the house and children. The head of the family in this case is a man. Secondly, political instability and following economic instability do not allow people to have a stable job and certainty in the nearest future.

Besides, the fact of the non-obligatory higher education does not motivate the younger generations to enrol. The enrolled people rather live in the city capital of the country, where the pattern of the higher education is more valued than in the smaller regions or rural areas.

Despite the fact that higher education is not mandatory in Kyrgyzstan, I believe that the government should encourage the people to get enrolled to the universities and get the higher education.

Above all mentioned facts, the results of this thesis were very surprising as unemployment rate of the country was lower than my expectations were. The pandemics left its footprint

on the economics of the country and by that the unemployment started slightly increase again.

Nevertheless, my position is very optimistic and I believe that this is a temporary issue which will be fixed in the long-term perspective.

VII. References

2017. *Economic analysis of Kyrgyzstan*. [online] Available at: <<https://www.adb.org/sites/default/files/linked-documents/cps-kgz-2013-2017-ea-ru.pdf>>.

Alymkulova, N., Atabaev, N. and Ganiev, J., 2016. Var — analysis of global financial economic crisis impact on public budget and unemployment: evidence from the economy of the Kyrgyz republic. *Economy of Region*, pp.1090-1101.

Bernabe, S. and Kolev, A., 2003. Identifying vulnerable groups in the Kyrgyz labour market: some implications for the national poverty reduction strategy. *Centre for Analysis of Social Exclusion, London School of Economics and Political Science*, 71.

Davidescu, A., Apostu, S. and Marin, A., 2021. Forecasting the Romanian Unemployment Rate in Time of Health Crisis—A Univariate vs. Multivariate Time Series Approach. *International Journal of Environmental Research and Public Health*, 18(21), p.11165.

Doklad, 2021. *Unemployment in Kyrgyzstan*. [online] Learning materials. Available at: <<https://works.doklad.ru/view/MHUaci6D6Rg.html>>.

DORNBUSCH, R. a FISCHER, S. *Macroeconomics*. McGraw-Hill, 2001, ISBN 0-07-231485-0

Eurostat, 2021. *Glossary: Labour force — Statistics Explained*. [online] Ec.europa.eu. Available at: <https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Labour_force>.

International Labour Office, 2008. *Kyrgyzstan : economic growth, employment and poverty reduction*. Bishkek: ILO, p.ISBN: 9789221218548.

JACKMAN, R., LAYARD, R., NICKELL, S., 2005, *Unemployment – Macroeconomic Performance and the Labour Market*. 2nd edition. Oxford University Press. ISBN 01-99279-17-9.

KURAKOV, L.P., 2005. *Human resources and employment*. Moscow: Press servise.

Ryzhov, I. and Borodina, M., 2019. Main Priorities of Kyrgyzstan's Foreign Policy. *Russia and New States of Eurasia*, (3), pp.142-157.

Kyrgyz statistics, 2021. *Analysis of the modern labor market of Kyrgyz Republic*. [online] Stat.kg. Available at: <<http://www.stat.kg/media/files/bef540ff-d88d-4172-9fd8-a3c341a9861b.pdf>>.

SAMUELSON, P. A., NORDHAUS, W.D. *Economics*. 16th edition. McGraw – Hill Companies. 1998. ISBN 00-70579-47-4.

SCHILLER, B.R. *Macroeconomics today*. 8th McGraw-Hill College. 2000. ISBN 00-72429-57-7.

UNESCO, 2021. *Kyrgyzstan | UNESCO UIS*. [online] Uis.unesco.org. Available at: <<http://uis.unesco.org/en/country/kg>>.

World Bank, 2021. *GDP (current US\$) - Kyrgyz Republic | Data*. [online] Data.worldbank.org. Available at: <<https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=KG>>.

World Bank, 2021. *Poverty headcount ratio at national poverty lines (% of population) - Kyrgyz Republic | Data*. [online] Data.worldbank.org. Available at: <<https://data.worldbank.org/indicator/SI.POV.NAHC?locations=KG>>.

World Bank, 2021. *The World Bank in the Kyrgyz Republic*. [online] World Bank. Available at: <<https://www.worldbank.org/en/country/kyrgyzrepublic/overview#3>>.

Worldometer, 2021. *Kyrgyzstan Population (2021) - Worldometer*. [online] Worldometers.info. Available at: <<https://www.worldometers.info/world-population/kyrgyzstan-population/>>.