Czech University of Life Sciences Prague

Faculty of Economics and Management

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Bachelor Thesis

Statistical analysis of unemployment in Switzerland from 1991 to 2021

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Faculty of Economics and Management

BACHELOR THESIS ASSIGNMENT

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Business Administration

Thesis title

Statistical Analysis of Unemployment in Switzerland

Objectives of thesis

The main objectives of this thesis are to analyze the changes in the unemployment rate in Switzerland from 1991 to 2021, find the factors that affect it, and compare a prediction model of the COVID-19 years with an actual one.

The specific objectives are to find the main reasons for low unemployment in Switzerland; to compare unemployment between various demographic groups, and to find how COVID–19 affected the unemployment situation in Switzerland.

Methodology

This bachelor thesis will employ a quantitative research design to analyze historical unemployment rate data in Switzerland spanning from 1991 to 2021. The theoretical segment of the bachelor thesis will be grounded in a comprehensive review of scientific articles, research papers, and databases from relevant and accessible sources. Time series analysis will be utilized to examine historical changes in the unemployment rate and make predictions for further transformations. The statistical results will be interpreted and discussed within the context of the research objectives.

The proposed extent of the thesis

30-40 pages

Keywords

Correlation, Covid-19160 years of aggregate supply and demand in Switzerland, regression model, Switzerland, time series, unemployment, unemployment policy

Recommended information sources

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Prague on 30. 11. 2023

Declaration

I declare that I have worked on my bachelor thesis titled "Statistical analysis of unemployment in Switzerland from 1991 to 2021" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the bachelor thesis, I declare that the thesis does not break any copyrights.

In Prague on 30.11.2023 _____

Statistical analysis of unemployment in Switzerland from 1991 to 2021

Abstract

This bachelor thesis conducts a comprehensive statistical analysis of Switzerland's unemployment rate spanning the period from 1991 to 2021. Thesis covers the causes of changes in unemployment, reasons of lower unemployment in Switzerland among other European countries, disparities among different demographic groups, the impact of COVID-19 and how unemployment could have changed without pandemic.

In the practical part data, collected from the Swiss Federal Statistical Office (FSO), shows changes of the unemployment rate. The analysis examines difference in index among several groups identified by gender, nationality, and age. Prediction model is built based on the data from the years 1991 – 2019. It depicts possible changes of unemployment if it was not affected by COVID – 19. As a result, the study showed that main reasons of low unemployment in Switzerland among other countries are constant tourist flow, high level of education, good system of social security. Foreign citizens, women and young adults are individuals who are affected by unemployment the most. Prediction model shows that if there would be no irregular fluctuations starting in 2020 and following, due to the pandemic, unemployment rate would continue to decrease resulting in unemployment rate being equal to 3%, assuming that trend will continue to decrease.

Keywords: COVID – 19, demographic groups, economic sectors, prediction model, unemployment, Switzerland, unemployment benefit.

Statistická analýza nezaměstnanosti ve Švýcarsku od roku 1991 do roku 2021

Abstrakt

Tato bakalářská práce provádí komplexní statistickou analýzu míry nezaměstnanosti ve Švýcarsku v období od roku 1991 do roku 2021. Práce se zabývá příčinami změn nezaměstnanosti, důvody nižší nezaměstnanosti ve Švýcarsku mezi ostatními evropskými zeměmi, rozdíly mezi různými demografickými skupinami, vlivem COVID-19 a tím, jak se mohla nezaměstnanost změnit bez pandemie.

V praktické části jsou uvedeny údaje získané ze Švýcarského federálního statistického úřadu (FSO), které ukazují změny míry nezaměstnanosti. Analýza zkoumá rozdíly v indexu mezi několika skupinami identifikovanými podle pohlaví, národnosti a věku. Predikční model je sestaven na základě údajů z let 1991 až 2019. Zobrazuje možné změny nezaměstnanosti, pokud by nebyla ovlivněna COVID - 19. Výsledkem studie je zjištění, že hlavními důvody nízké nezaměstnanosti ve Švýcarsku mezi ostatními zeměmi jsou stálý turistický ruch, vysoká úroveň vzdělání, dobrý systém sociálního zabezpečení. Cizinci, ženy a mladí dospělí jsou jedinci, kteří jsou nezaměstnaností postiženi nejvíce. Predikční model ukazuje, že pokud by od roku 2020 a dále nedocházelo k nepravidelným výkyvům v důsledku pandemie, míra nezaměstnanosti by nadále klesala a výsledkem by byla míra rovnající se 3 %.

Klíčová slova: COVID - 19, demografické skupiny, ekonomické sektory, nezaměstnanost, podpora v nezaměstnanosti, predikční model, Švýcarsko.

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Introduction

In today's interconnected and rapidly changing global economy, the issue of unemployment holds a prominent place on the agendas of governments, policymakers, and economists worldwide. Switzerland, renowned for its economic stability and high standard of living, is no exception to the global economic realities. Since the beginning of the 21st century, the Swiss labor market is facing unique challenges in an era characterized by globalization, technological progress, and the consequences of the COVID-19 pandemic. This bachelor thesis aims to investigate the fundamental trends and causes of unemployment in Switzerland through a thorough statistical analysis.

The unemployment situation in Switzerland is unique in a lot of ways. With a population of about 8.5 million, a varied economy encompassing the banking, pharmaceutical, and tourism sectors, as well as a long history of training programs and vocational education, the Swiss labor market displays a complex interplay of factors influencing its dynamics related to unemployment.

In the wake of the global financial crisis of 2008 and the recent COVID-19 pandemic, the Swiss labor market has faced considerable challenges. The consequences of these economic shocks have spurred discussions around the efficacy of social safety nets, workforce development initiatives, and labor market regulations in Switzerland. Addressing these challenges requires a comprehensive understanding of the statistical underpinnings of unemployment, from the overall national rate to regional variations, age, and education-related disparities.

First, there will be a review of existing literature on unemployment in Switzerland, outline of relevant data sources, and establishment of the theoretical framework for the statistical analysis. Second, the unemployment rate and its changes among different demographic groups identified by gender, nationality and age will be examined. A statistical approach will be employed to create a prediction model to analyze forecasted model based on the data from

1991 to 2019. Through data-driven exploration and analysis, this research seeks to provide insights into the dynamics of unemployment in Switzerland, contributing to the understanding of its underlying causes.

In the conclusion, researching unemployment in Switzerland is an important academic and applied field of study. This bachelor's thesis aims to make a significant contribution to the continuing discussion on labor market issues and solutions in Switzerland by explaining the changes in the unemployment in this wealthy country.

1. Objectives and Methodology

1.1. Objectives

Main objectives of this thesis are to analyze the changes of the unemployment rate in Switzerland from 1991 to 2021, find the factors that affect it and compare a prediction model of the covid years with an actual one.

The specific objectives are to find main reasons of low level of unemployment in Switzerland; to compare unemployment between various demographic groups; to find how COVID – 19 affected unemployment situation in Switzerland.

1.2. Methodology

This bachelor thesis will employ a quantitative research design to analyze historical unemployment rate data in Switzerland spanning from 1991 to 2021. The theoretical segment of the bachelor thesis will be grounded in a comprehensive review of scientific articles, research papers, and databases from relevant and accessible sources. Additionally, works from the university library addressing similar and pertinent topics will be consulted for a deeper understanding of the covered subject.

In the practical part, data will be collected from reputable sources such as the Swiss Federal Statistical Office (FSO), Statista, and MacroTrends.net. To ensure data quality, a thorough cleaning and organization process will be implemented, addressing issues such as missing values, outliers, and inconsistencies.

To facilitate further analysis, the data will be standardized into a consistent time series format – by years and quarters. Time series analysis will be utilized to examine historical changes in the unemployment rate and make predictions for further transformations. The statistical results will be interpreted and discussed within the context of the research objectives.

The data calculation and analysis will be conducted using 'IBM SPSS Statistics 29' and 'MS Excel 2020'.

1.2.1. Prediction model

Time Series

Time series is a list of values measuring a single item at regular intervals over time.

The components of time series:

- Trend (Tt) – long term pattern of a time series.

- Seasonal (St) – regular fluctuations due to seasonal factor.

- Cyclical (Ct) – pattern showing an up and down movement around a given trend.

- Irregular (Et) – sudden changes occurring in a time series which are unlikely to be repeated.

(Toppr, 2018).

Figure 1. The components of Time Series
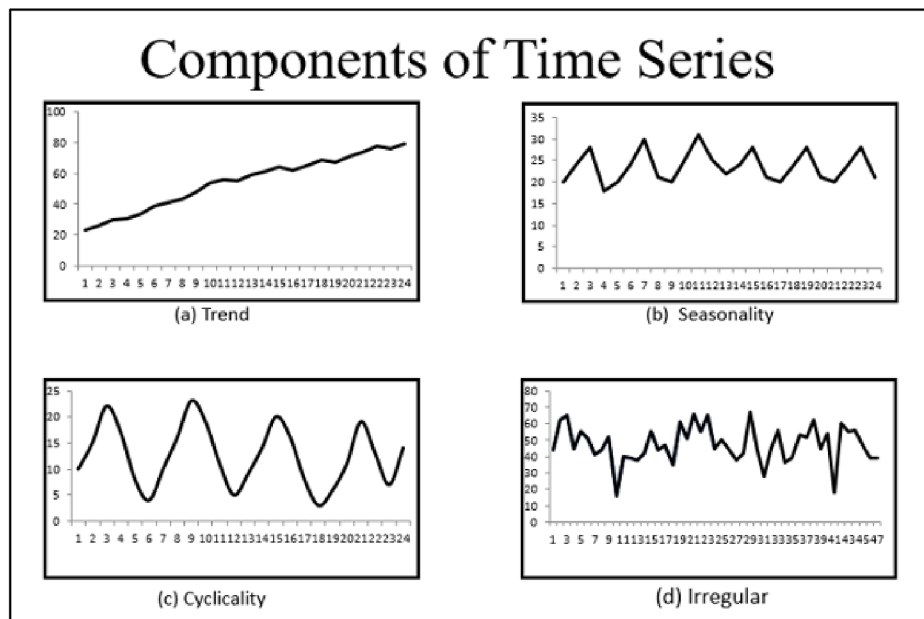
Source: Shukla, 2023

- **Trend**

The trend displays the data's overall propensity to increase or decrease over an extended period of time. Trends can be presented as various type of tendencies – smooth, long-term, general, average. The increase or decrease can be in different directions over a certain time frame. The tendencies

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fluctuate throughout time, increasing, decreasing, or remaining constant. Nonetheless, the general trend must be either stable, upward or downward.

Trends can be either linear or non-linear depending on how the set of data appears on the graph. If the set of data is formed in more of a straight line, then it is linear trend, otherwise – non-linear (Toppr, 2018).

- **Seasonal variation**

These fluctuations change in a regular and periodic manner over no more than one year. The pattern in the series will be mostly the same in the period of twelve months. If the data is captured hourly, daily, weekly, quarterly, or monthly, this variance will be visible.

These variances occur as a result of natural forces or man-made conventions. Seasonal fluctuations are influenced by the various seasons or climatic conditions. (Toppr, 2018).

For example, colder areas in a country with snow and mountains will be most popular during winter months, thus the most profitable.

- **Cyclical variation**

These variations are similar to seasonal but they operate on a larger scale, a time period over the year. The fluctuations repeat themselves in a period of more than a year. Cycle finishes by the end of the period. The cycle consists of four stages – prosperity, recession, depression, and recovery (Toppr, 2018).

- **Irregular variations**

These changes are not regular or predictable and very random. Such fluctuations are caused by unforeseen forces, such as natural disasters, wars, diseases. One of the most recent examples is COVID-19.

Decomposition Models

According to (Eberly College of Science), in time series analysis, decomposition techniques are employed to analyze and describe the underlying trend and seasonal components. In more comprehensive decompositions, additional factors such as long-run cycles, holiday effects, and day of week effects may also be considered. The primary goal of a decomposition analysis is to estimate the seasonal effects, which can then be utilized to generate and present seasonally adjusted values. By removing the seasonal effect from a given value, a seasonally adjusted value allows for a clearer identification of underlying trends.

Two structures are taken into account when constructing basic decomposition models: additive and multiplicative models.

- Additive

This model segregates the impacts of individual components and combines them to formulate the data representation.

Equation 1. Additive model

$$Xt = Trend + Seasonal + Irregular \qquad (1)$$

Source: Eberly College of Science

The additive model should be selected when the magnitude of the seasonal pattern in the data is independent of the data's magnitude. This means that the size of the seasonal pattern remains constant, regardless of whether the series rises or falls.

- Multiplicative

Equation 2. Multiplicative Model

$$Xt = Trend * Seasonal * Random \qquad (2)$$

Source: Eberly College of Science

This model operates under the assumption that an increase in data corresponds to a rise in the seasonal pattern, a characteristic commonly observed in most time series plots. In this model, the trend and seasonal components are multiplied together, and the error component is subsequently added.

To adjust seasonal effects, two common approaches are employed: additive decomposition aims to average the effects to zero, while multiplicative decomposition aims to average them to one.

The initial stage involves estimating the trend, for which two methods can be employed, each with various variations. One method involves smoothing techniques like moving averages, which avoid the use of an equation to describe the trend. The alternative method involves modeling the trend through a regression equation.

After estimating the trend, the series is "de-trended." In the case of additive decomposition, this involves subtracting the trend estimates from the series, while in the case of multiplicative decomposition, it involves dividing the series by the trend values.

Next, seasonal factors are estimated using the de-trended series. For monthly or quarterly data, effects are being determined for each corresponding period. The simplest method is to average the de-trended values for a specific season. Seasonal factors are a way of analyzing

data to reveal regular recurring changes associated with the calendar. A seasonal factor measures the percentage amount that on average, a month is above or below norm.

The final step is to calculate the irregular component. In the additive model, this is computed as the series minus the trend minus the seasonal component. In the multiplicative model, it is determined as the series divided by the product of the trend and seasonal components.

Analyzing the random component may involve examining its mean location, mean squared size (variance), and assessing whether it truly exhibits randomness or could be modeled with an ARIMA model, which 'IBM SPSS Statistics 29' is able to create (Eberly College of Science).

Figure 2. Example of additive and multiplicative models
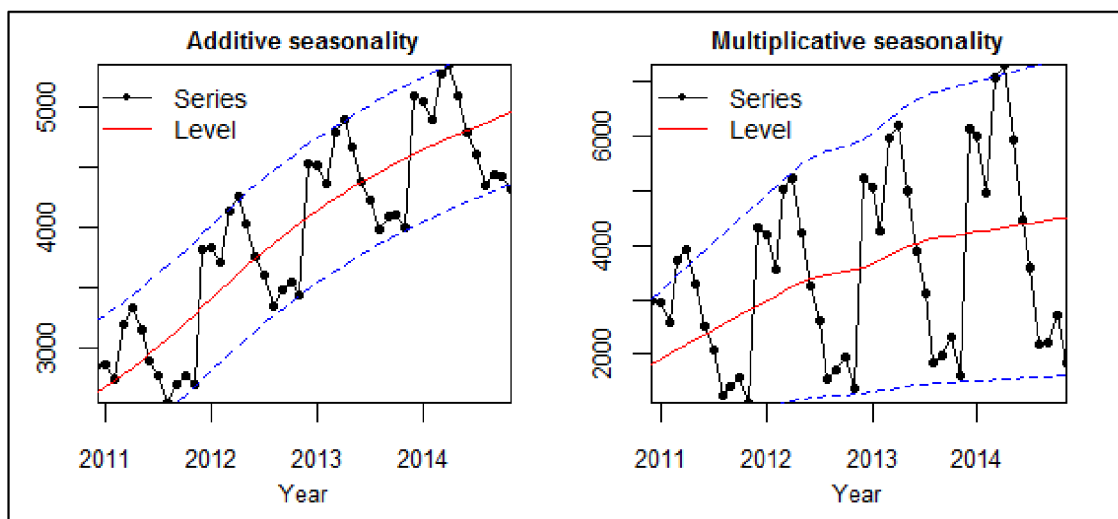
Source: Kourentzes, 2014

ARIMA model

The ARIMA model is a widely used time series analysis technique that allows for the identification and forecasting of temporal patterns and trends in data. The ARIMA model is a combination of three components: autoregressive (AR), differencing (I), and moving average (MA). The AR component captures the relationship between the current observation and past observations, while the MA component accounts for the relationship between the

current observation and past forecast errors. The differencing component helps stabilize the data by removing trends and seasonality.

In this study, the ARIMA model will be applied to create a prediction model based on the observed values of the unemployment rate from 1998 to 2019. The data will be examined for stationarity, and differencing will be applied to achieve stationarity. The appropriate order of the ARIMA model will be determined through the analysis of autocorrelation and partial autocorrelation functions. The model will be estimated using maximum likelihood estimation, and diagnostic tests will be conducted to evaluate the model's goodness of fit.

The coefficients of the AR and MA terms will indicate the strength and significance of the relationships between past observations and forecast errors. The significance of the model's parameters will be assessed using p-value. Fit statistics, such R – squared, MAPE and diagnostic tests, such as the Ljung-Box test for residual autocorrelation will be conducted to evaluate the adequacy of the model (My Data Analysis Site, 2020).

Metrics considered in Time Series

There are several statistical metrics that can help determine if a model fits the data well. Here are some of the most commonly used ones:

- R-squared - is a statistical measure that represents the proportion of the variance for a dependent variable that's explained by an independent variable or variables in a regression model. The closer the R-squared value is to 1, the better the model fits the data.

- MAPE (Mean Absolute Percentage Error) - measures the average percentage difference between the predicted and actual values of a time series. MAPE is typically expressed as a percentage, and a lower MAPE indicates a better fit between the predicted and actual values.

- P-value: In hypothesis testing, the p-value helps determine the significance of your results. A small p-value (typically ≤ 0.05) indicates strong evidence that the model is a good fit.

- The Ljung-Box test is a statistical test that is used in time series analysis to check whether there is autocorrelation in the residuals. It is commonly used for checking the randomness in time series data and for the validation of ARIMA models. The null hypothesis (H0) of the Ljung-Box test is that the data are independently distributed, meaning that it is assumed that the autocorrelations up to a certain lag are equal to zero. The alternative hypothesis (Ha), on the other hand, is that at least one of the autocorrelations up to a certain lag is not equal to zero, indicating that the data are not random.

  In this bachelor thesis critical level is considered at 0.05. Thus, if $p \leq 0.05$ - H0 is rejected, if $p > 0.05$ – H0 is failed to reject.

  (Statology, 2020).

2. Literature Review

2.1. Unemployment rate

The unemployment rate is a crucial part of the economics of any country and is considered to be one of the most important economic indicators. It shows the number of people who do not have a job and are actively looking for it. This measure does not include people who have not been looking for a job in the past 4 weeks. It is also important to know that rate shows the percentage of unemployed people in the labor force, it includes only employed and unemployed people, not the entire population. (Economic Policy Institute, 2022) The unemployment rate is found by dividing unemployed people by labor force and multiplying by 100.

Formula 1. Unemployment Rate

$$Unemployment\ rate = \frac{Number\ of\ unemployed}{Labor\ force} \times 100 \qquad (1)$$

Source: Lee, 2022

Unemployment is disadvantageous not only for the workers but for the government itself as well. If a person is unemployed, then he and his family lose wages and their spending power decreases. At the same time, a country does not have goods and services that could have been produced. Moreover, as soon as the purchasing power of the worker is lost, this leads to potential unemployment of others. Thus, the cycle might be endless. Statistical analysis shows data and answers many questions about unemployed workers – their gender, nationality, age, educational level, location. These statistics combined with other economic data allows policymakers to determine the economic situation of the country and take action in order to influence the future economy state and target ones who are unemployed. (U.S. Bureau of labor statistics, 2015)

2.2. Definition of unemployment

According to (Corporate Finance Institute, 2022) the term 'unemployment' refers to the individuals who can be employed and are looking for a job, however, are unable to find it. People who are working but do not have the appropriate job are also included in this category. Unemployment is measured by the unemployment rate.

It is important to distinguish who falls into this category and corresponds to this term – 'unemployment'. For example, it includes people who are waiting to return to the job, however, people who have not been looking for a job in the past 4 weeks due to retirement, personal issues, disability or plans to pursue higher education – are not considered unemployed.

Moreover, for more specific situations other categories exist such as 'discouraged workers' or 'marginally attached to the labor force'. (Corporate Finance Institute, 2022)

'Marginally attached to the labor force' are people who want and are available for a job and have searched for a job sometime in the last 12 months. However, they are not part of the labor force. This group includes discouraged workers.

'Discouraged workers' are people who are able to find a job but decided to drop out of the labor force because they believe that they will not be suitable for any of the positions. There are several reasons why workers give up looking for a job – it can be due to their outdated skills and knowledge, absence of appropriate training, their feeling that they are not the favorable target workers due to age, their nationality or gender. (Amadeo, 2022)

2.3. Types of unemployment

Different sources distinguish different number of types of unemployment. The most popular and known types are cyclical, structural and frictional unemployment.

2.3.1. Cyclical unemployment

Cyclical unemployment is a common phenomenon during periods of economic downturn, brought about by shifts in the business economic cycle. When the demand for goods and services decreases, businesses are compelled to adopt austerity measures to maintain their operations, which often leads to a significant revenue reduction. In order to gather necessary funds, businesses frequently resort to workforce downsizing, hence lowering labor costs. The rate of cyclical unemployment is calculated by the proportion of dismissed employees in relation to the total working population (Nickolas, 2022).

2.3.2. Structural Unemployment

Structural unemployment is characterized by extended periods of joblessness, often spanning several years. A variety of factors contribute to this form of unemployment, such as the workforce's deficiency in the necessary skills for job vacancies. For example, technological advancements may demand specialized training and knowledge to operate machinery or utilize computer software. Structural unemployment emerges when there is a discrepancy between the skills needed and the worker's current capabilities. Contemporary challenges in this sphere originate from technological progress, automation, and the emergence of artificial intelligence, frequently leading to significant job reductions. Remarkably, structural unemployment may persist even after an economic downturn has ceased and a nation has returned to growth, potentially leading workers to experience poverty or earn modest wages as technology continues to evolve (Nickolas, 2022).

2.3.3. Frictional Unemployment

In comparison to structural unemployment, frictional unemployment is a short-lived event and is generally deemed less concerning from an economic perspective. This type of unemployment arises when individuals willingly resign from their jobs to pursue other employment opportunities. It also includes workers who are relocating or altering their workplace and recent graduates who are entering the job market. Frictional unemployment is a natural result of market processes, where aspects like the recruitment cycle require time.

A surge in frictional unemployment indicates an abundance of job vacancies and opportunities, signifying a robust state of the economy (Miles, 2022).

2.4. What factors affect unemployment?

There are many various factors that can affect the unemployment rate. Almost all of them can be divided into three groups – demographic, technological and economic factors.

2.4.1. Demographic factors

This category includes such indicators as birth rate, death rate, gender and age structure of a population, average life expectancy, direction, and volumes of migration flows. The change in these factors directly affects the economy and causes a change in the share of the economically active population. According to Eurostat, the statistical office of the European Union, "economically active population includes both employed (employees and self-employed) and unemployed people, but not the economically inactive, such as pre-school children, school children, students and pensioners" (Eurostat, 2020).

2.4.2. Technological and economic factors

Technological unemployment refers to job losses caused by automation and advances in technology. It can lead to economic inequality, necessitate new skills, and raise ethical and policy questions. While it can enhance productivity, addressing its challenges is crucial to ensure a fair and inclusive workforce (Otto Motors, 2023).

Economic factors affecting the unemployment rate include economic growth, business cycles, technology, global economic conditions, government policies, industry-specific dynamics, demographics, wage levels, inflation, and labor force participation. These factors collectively influence the availability of jobs and the rate of unemployment in an economy (Rayhan, Rusdarti, Yanto, 2020).

2.5. Switzerland

2.5.1. Economically active and inactive population

There are two types of people in Switzerland: those who are economically active and those who are not. According to the International Labor Organization's definition, economically active people who represent the labor supply include both employed people as well as the unemployed. The employed people, as shown in Graph 1, consist of the self-employed, family members working in a family business, employees, and apprentices. Pensioners, homemakers of all sexes, and those in education comprise the demographic of economically inactive people.

Graph 1. Economically active and inactive population in Switzerland
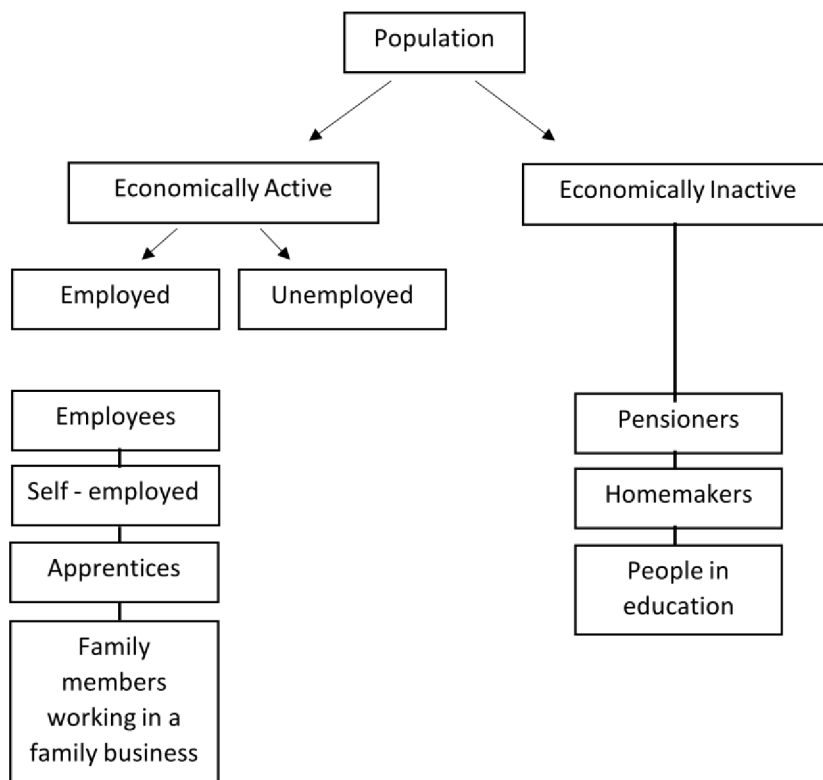
Source: The Federal Council, own work

2.5.2. Unemployment history in Switzerland

Switzerland is traditionally considered to be a "zero unemployment" country, it has one of the most stable, advanced and highly developed economies. Primarily, Switzerland thrives due to its service sectors which are highly depended on high level of tourism. Due to low population, the country can maintain a low unemployment rate. Moreover, it is possible for the country to offer high-end jobs, as the majority of the population maintains a high level of education.

Overall, the country's traditional sectors, such as agriculture and tourism, provided steady employment for the nation but there were several historical and economic records which caused changes in Switzerland's unemployment history.

The unemployment statistics are maintained by the State Secretariat for Economic Affairs (SECO) and the International Labor Organization (ILO). These statistics indicate the number of registered unemployed, the number of newly registered unemployed and the number of formerly registered unemployed. SECO definition includes only "registered unemployed persons", people who have registered with a regional placement office. By the ILO definition, "the unemployed are defined as permanent residents who do not have a job, who are looking for work and who can start work within a short period of time. "The Unemployment Statistics (ILO-based) have provided monthly unemployment figures since 1991" (Federal Statistical Office, 2023).

Graph 2. Change in unemployment and employment rates in Switzerland from 1910 to 2020 (SECO definition)
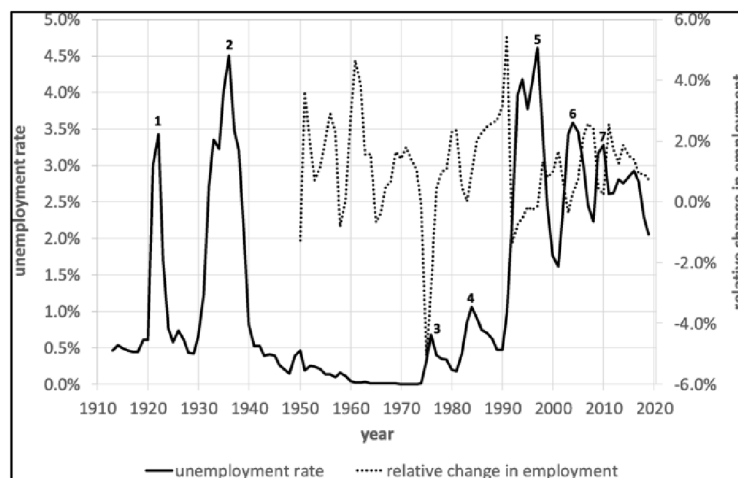
Source: Sheldon, 2020

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- **Beginning of the 20th century**

According to (Sheldon, 2020) it is considered to count seven major declines in employment in Switzerland's known history for the past 100 years. The first took place in the 1920s when the Swiss National Bank decided to go back to the previous gold standard and end the massive inflation that resulted from abandoning the gold standard in order to finance the shortages brought on by World War I. Following a period of economic well-being, Switzerland experienced next global economic downturn in 1931, during The Great Depression, resulting in a notable increase in the average unemployment rate. Fortunately, this economic setback was short-lived, partly due to the devaluation of the Swiss currency and a large-scale military expansion financed by a substantial bond issue in 1936.

- **Post WWII period**

After World War II, there was almost no unemployment for a long while due to a strong and broad economic expansion. Rather, a severe labor shortage developed, which led to a large influx of foreign labor.

However, the first oil price shock in 1973 - 1974 and the second shock in 1982 both severely interrupted the post–World War II period of economic prosperity. Employment fell by about 8% in the wake of the first shock, the most job loss suffered by any OECD nation during that first oil crisis. Despite this, less than 1% of people were unemployed. The fact that Switzerland did not require universal unemployment insurance until April 1977 was one of the contributing factors. As a result, during the initial shock to oil prices, nearly 80% of the labor force was uninsured. Because they were unable to obtain benefits, many people made the decision not to notify the authorities of their unemployment, which led to an unreported rate of unemployment.

Another, and statistically more important, factor contributing to the comparatively slight rise in unemployment was the large number of international employees with temporary work permits. When they lost their positions, these permits made it necessary for them to leave Switzerland, and they took on almost 80% of the job losses.

After the second oil price shock in the 1980s, the unemployment rate did indeed surpass 1%. As it is shown in Graph 2, even though there was a decline in the growth of employment, it

was not its absolute level. This can be attributed to the implementation of universal unemployment insurance in 1977, which mandates registering at an employment office to access benefits (Sheldon, 2020).

- **End of the 20th century**

The subsequent major economic downturn occurred in the early 1990s, taking the form of a double-dip recession. The initial decline was the result of a restrictive monetary policy implemented to counteract high inflation, which had arisen from an unintended monetary expansion linked to the introduction of a new electronic interbank clearing system and changes in liquidity requirements for Swiss banks. Conversely, the second contraction in 1994 -1995 resulted from a miscalculation of the business cycle by the Swiss National Bank and a subsequent excessively restrictive monetary policy. The combined impact of both shocks led to an increase in the unemployment rate to levels exceeding 4.5%, a level not observed since the Great Depression. This substantial increase can be attributed, at least in part, to expanded unemployment insurance coverage and the less mobile foreign labor force (Sheldon, 2020).

- **Beginning of the 21st century**

The final two causes of lower employment were the dotcom bubble burst in the early 2000s and the global financial crisis of 2008 – 2009. Nonetheless, in contrast to the substantial swings in GDP, the employment sector's reaction to these recessions was rather mild. There were empirical studies of the Okun relationship and it has been confirmed that the relationship has been gradually declining since 1990. According to (Kenton, 2022) "Okun's Law is an empirically observed relationship between unemployment and losses in a country's production. It predicts that a 1% increase in unemployment will usually be associated with a 2% drop in GDP. Although the exact cause of the loss is yet unknown, it may be related to the continuous decrease in production jobs, which usually react more strongly to changes in the business cycle (Sheldon, 2020).

- **Summary and Outlines**

In comparison to historical trends, an unemployment rate of 4.1%, projected for 2021 by the State Secretariat for Economic Affairs, doesn't appear particularly high or exceptional. Nonetheless, it's essential to acknowledge the limitations of the data shown in Graph 2. The quality of unemployment data is questionable before the implementation of mandatory unemployment insurance in April 1977. Furthermore, there are no yearly employment statistics available for the years before 1948. The national censuses from 1910, 1920, 1930, and 1941 must be used to compute the unemployment rate, which is defined as the proportion of unemployed people in the labor force or the total of employed people and unemployed people, for the years prior to 1948. This leaves significant gaps for the years in between. Even worse, it is hard to determine the precise number of jobs lost in the wake of the Great Deflation in the 1920s or during the Great Depression in the 1930s because the census employment records from those years show a positive trend (Sheldon, 2020).

2.5.3. Swiss migration policies

Migration policies play an important role in Swiss labor market as it affects unemployment history of foreigners. Based on Federal Statistical Office, in the observed period from 1991 to 2021 average unemployment rate of foreigners is 7.4%, which is higher by 4.5% than Swiss citizens.

As from 1990's government started implementing new policies in order to minimize immigration from other countries.

By March 25th, 2020, the immigration restriction has been placed on all countries, creating a challenge in employment situation for foreigners (Pazhenkottil, 2020).

- **1991**

The introduction of the "Three - Circle Model" in 1991 played a key role in this strategy. This model governed the admission of labor migrants to Switzerland, taking into account their country of origin and perceived "cultural proximity." Individuals deemed "culturally close" were considered more likely to assimilate into Swiss culture compared to those deemed "culturally distant," who were perceived as having a lower probability of

assimilation. The model categorized foreigners into three groups: Labor migrants from EU and EFTA states were prioritized ("first circle"), while the number of labor migrants from "second circle" countries (such as the USA, Canada, Middle and Eastern European states) was limited. Immigration from "all other states" ("third circle") was restricted to highly skilled individuals. In 1998, the "Three-Circle Model" was discarded and replaced by a dual admission system. This new system continued to favor immigration from EU and EFTA states while placing constraints on immigration from third countries. The "Federal Act on Foreign Nationals," implemented in 2008, maintained this dual admission model. To this day, labor migration from third countries remains restricted to highly skilled workers (Huter, 2021).

- **Early 2000's**

The agreement on the free movement of persons, inked between Switzerland and the European Union on June 21, 1999, facilitated the residence and employment of European Union and European Free Trade Association (EFTA) citizens in Switzerland. Effectuated on June 1, 2002, the agreement underwent extensions in 2006, 2009, and 2017 to encompass citizens from newly added European Union member states. In addition to the liberty of movement, this right is accompanied by the reciprocal acknowledgment of qualifications, property acquisition entitlement, and the harmonization of social security systems (Bassam, 2020).

2.5.4.   Unemployment benefits in Switzerland

As per official Swiss citizen's portal (Ch.ch) Switzerland's whole working population, except for the self-employed individuals, is required to be insured for unemployment.

To receive unemployment benefits, a person must meet certain requirements.

First, it is mandatory to have a termination notice to show that a worker has been fired legally.

Second, an individual must meet certain conditions to be entitled to compensation:

- To be completely or partially unemployed.

- To have worked on the job for at least twelve months in the past two years.
- To be Swiss resident; in case of foreigners there is a different procedure which depends on the type of visa and documentation.
- To be older than fifteen years old, passing the age of the compulsory education, and no older than sixty-four – for men and sixty-five for women, as it is a retirement age in Switzerland.

Moreover, the unemployed must be interested and ready to accept the job as soon as possible, if his profile and skills are suitable; start looking for a new job during the notice period; and, if an employee is on a fixed-term contract, begin looking for work three months before the end of the contract.

Third, an individual has to apply for the benefit as soon as possible, but no longer than the first day he wishes to receive the compensation. After, the meeting is conducted where the decision is made.

Usually, benefits are paid out in the amount of seventy percent of the covered salary, or an average wage for the preceding six months (or twelve months if that is more advantageous to the unemployed).

A person receives eighty percent of the salary if one of the requirements met:

- Being the parent of dependent children under 25.
- The insured wage does not exceed CHF 3,797 per month.
- Receiving at least a 40% invalidity rating.

2.5.5.   Why unemployment in Switzerland so low

Switzerland is known for its low unemployment rate among other countries. Graph 3 shows unemployment rate of ten years (2011 – 2021) of Switzerland and countries closest to it – France, Germany, Italy, Austria.

Graph 3. Unemployment rate in Switzerland, Germany, France, Italy and Austria from 2011 to 2021 (ILO definition)
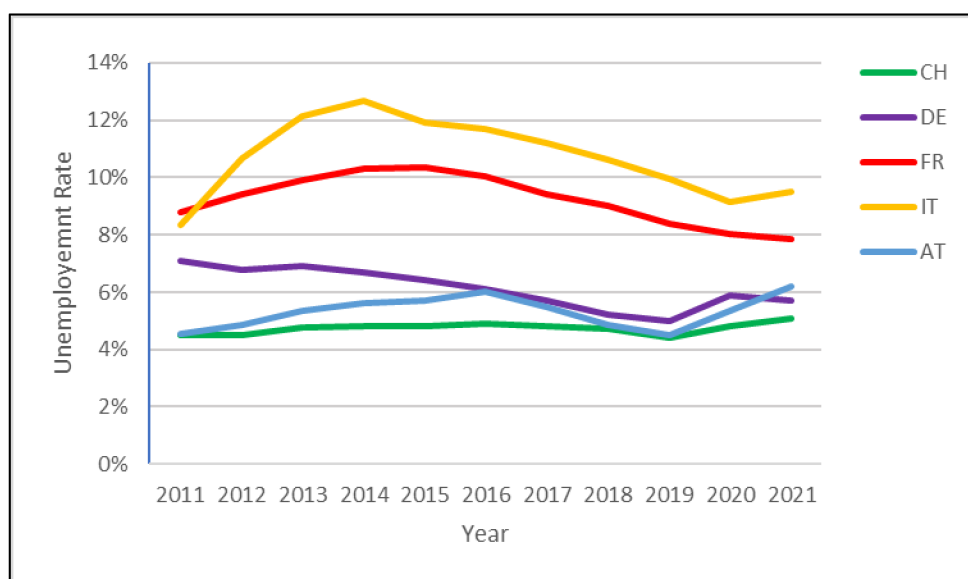
Source: Statista, own work

Switzerland's unemployment rate almost does not change throughout the years, even during unforeseen circumstances, such as pandemic.

There are several factors that contribute to the country's stable economic situation and low unemployment rate.

First, Switzerland's economy is mostly driven by its services sector, which also benefits from significant tourism and manufacturing. Due to historical sightseeing, festivals, pleasant and variative climate and stunning views, Switzerland attracts tourists almost the whole year. During winter and spring Switzerland is open for lovers of winter sports as ski season is open from the mid of November and finishes by March or even

April. As from May, it becomes warmer and during summer the high season begins. Tourists come to explore different country's areas, swim, and visit festivals. In July Switzerland holds one of the most popular jazz festivals – Montreux Jazz Festival. Autumn is in demand with tourists due to quieter and less busy season and beautiful sceneries (Stapylton-Smith, 2020).

Second, another reason for low unemployment can be the result of a relatively low population compared to other European countries. A low population has advantages for an economy: reduced demand on resources, less income inequality, improved public services and, with lower competition for jobs and higher productivity, lower unemployment rate (Bailey, 2019).

Third, most of employed individuals living in Switzerland have a comparatively high level of education and special skills, thus the nation is able to offer high-end positions at higher wages, which frequently translate into higher levels of production and efficiency.

In Switzerland, 44% of those between the ages of 25 and 64 have completed postsecondary education, which includes both university and higher vocational training. "Since 1996, the proportion of graduates from universities has more than doubled". Switzerland values education level of citizens a lot and "the public sector spends around CHF 38 billion a year on education, which corresponds to 5.7% of GDP" (The Federal Council, 2021).

2.6.   The impact of COVID – 19 on the unemployment in Switzerland

The lockdown that was implemented in the wake of the Covid-19 pandemic on March 16, 2020, have had a dramatic effect on the Swiss labor market. In the aftermath of the shutdown, on average, 30,000 people who were working lost their employment between March and April. Following the financial crisis, the unemployment rate rose in just those two months, nearly as much as it did throughout 2010. During that period there were concerns that Switzerland may face its most severe recession in history in the months ahead (Sheldon, 2020).

The pandemic led to a sudden and severe economic downturn in Switzerland. As businesses faced restrictions and reduced economic activity, many had to lay off employees or reduce their working hours. This resulted in a surge in unemployment. Switzerland experienced a notable increase in the number of people registering for unemployment benefits. The demographic group that was affected the most is young adults. During May the number of

unemployed young workers rose to 76.7% compared to 2019, having the rate of unemployment – 3,4%. The further increasement in August up to 3,9% was stabilized by October resulting in 3,3%. (Arni, 2020)

To lessen the effects of employment losses, Switzerland implemented the "Kurzarbeit program". Through this program, firms were able to lower employee work hours while receiving government funding to make up a portion of the lost income. It was intended to shield companies from severe layoffs and help them get through the financial crisis. This initiative benefited a sizable section of the labor market and contributed to some degree of job stability (Jagmetti, 2023).

The pandemic had a disproportionately large impact on some Swiss economic sectors. There were major employment losses as a result of stringent restrictions and a steep decrease in demand in industries like hospitality, tourism, and the arts. Conversely, certain industries, like technology and healthcare, saw growth or at least relative stability.

The Swiss government implemented various financial support measures to assist businesses and individuals. These included subsidies, loans, and grants to help companies weather the economic storm and to provide income support for those who lost their jobs.

The employment situation in Switzerland remained fluid due to the ongoing uncertainty surrounding the pandemic. The emergence of new variants and potential future waves of the virus continued to impact the labor market and job prospects (Grampp, 2023).

Now, past 2020, it is possible to analyze the whole picture and compare it to other countries. The 2022 national assessment of Switzerland's economic performance gave Switzerland a favorable rating for its management of the pandemic, emphasizing the Swiss economy's robustness during the crisis. As per the OECD evaluation, Switzerland gained advantages from its strong economic foundations, globally competitive sectors and corporations, and a limited reliance on the tourism and entertainment industries for its economic well-being. The country's effective handling of the pandemic is attributed to both ample state support measures and less stringent health policy restrictions compared to other nations. Additionally, the OECD report commends Switzerland for maintaining sound public finances and comparatively low levels of public debt, despite the challenges posed by the pandemic (The Federal Council, 2022).

3. Practical Part

3.1. Unemployment rate

In general, from 1991 to 2021 Switzerland experienced an increase in unemployment rate, as it is shown in Graph 4.

Graph 4. Unemployment rate in Switzerland in % of economically active population, from 1991 to 2021
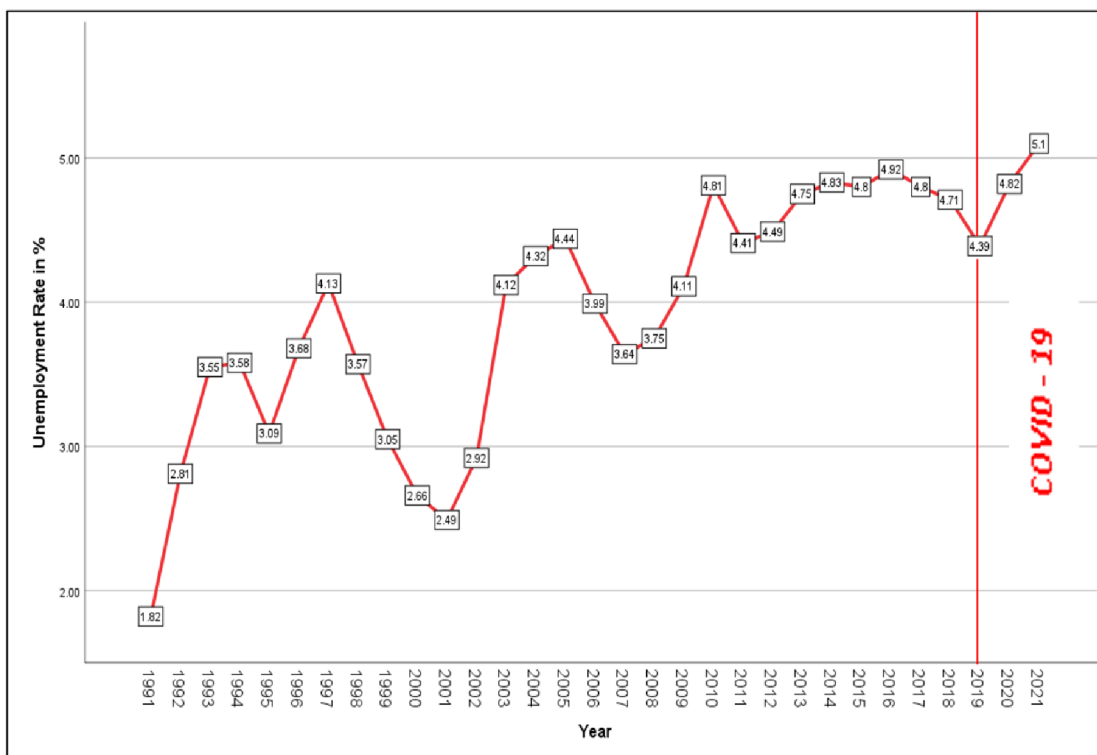
Source: MacroTrends.net, own work

To have a better look on unemployment history, the data will be analyzed by year groups. There will be more focus on changes in the rate, rather than causes of these changes, as economic events that affected unemployment were discussed earlier in "Unemployment history of Switzerland".

- **1991 - 2000**

From 1991 to 1994 there was an annual increase of around 1 %. The economy was adjusting to the aftermath of the crisis, leading to challenges in the labor market. From 1994 to 1995 there was a slight decrease of 0.49 %. From 1995 to 1997 there was a subsequent increase from 3.09% to 4.13%, indicating ongoing economic adjustments and potential challenges in job creation. From 1997 there Switzerland experienced a significant decrease in the unemployment rate that persisted for four years. This decline resulted in a relatively low unemployment rate of 2.49% in 2001, reflecting a period of economic stability and growth which resulted in unemployment.

- **2001 – 2010**

There was a growth in the unemployment rate from 2001 to 2005 of 1.95 %, with a very rapid increase of 1.2% from 2002 to 2003. From 2005 to 2007 there was a slight decrease, followed by an increase which ended in 2010.

- **2011 – 2019**

During the next years, from 2011 to 2019, the unemployment situation was stable, with the average rate equal to 4.69%.

- **2020 - 2021**

In the next years – 2020 and 2021 there was an increase caused mainly by COVID-19 pandemic. In 2021 the unemployment rate reached the highest point known to Swiss unemployment history resulting in 5.1%.

To summarize, in current observation the lowest unemployment rate was in 1991 equal to 1.82% and the highest rate was recorded in 2021, being equal to 5.1%.

3.2. Quarterly Analysis

To better understand the causes of the unemployment situation in Switzerland and relationship between them, the pattern of unemployment rate throughout years, presented in Graph 5, is being observed. For the easier analysis the time span of only 8 years sectored by quarters, years from 2011 to 2019, was considered. To analyze the usual unemployment rate pattern, the covid years were excluded from current observation as they create an irregular fluctuation.

Graph 5. Quarterly unemployment rate in % in Switzerland from 2011 to 2021
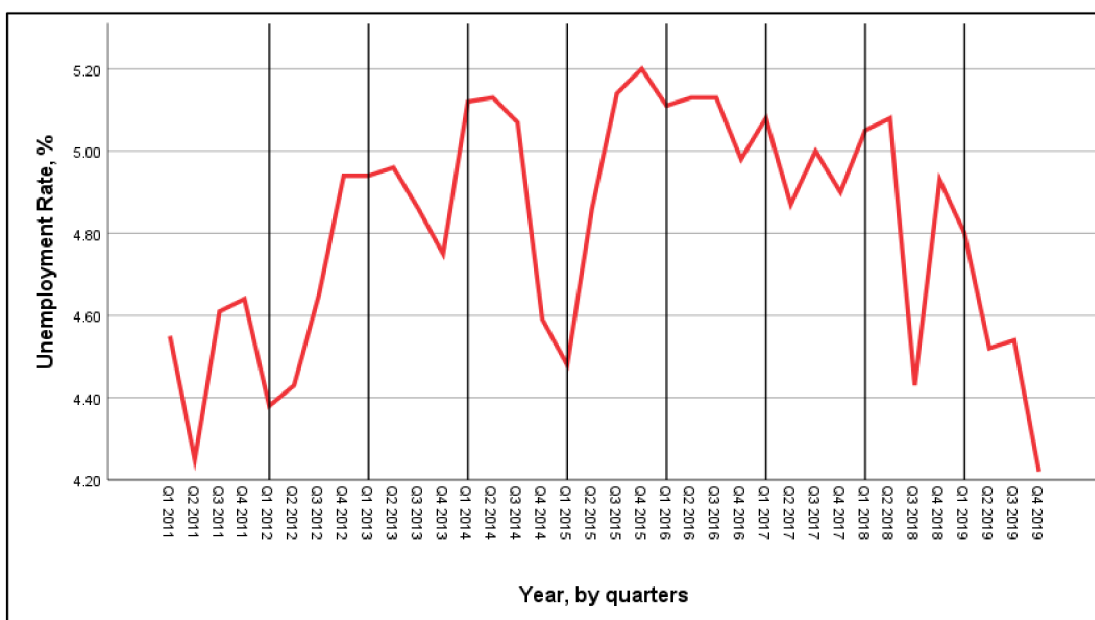
Source: FRED, own work

In graph 5 it is challenging to denote periodical fluctuations – each year the highest and lowest points fall into different quarters; thus, it is not possible to analyze the pattern of this graph.

To further analyze changes in the labor market, the opposite variables have been considered. For the next analysis observations of employment rate of different economic sectors in

Switzerland have been used. The unemployment rate by sectors cannot be found in the open sources, therefore, the work will be continued with the opposite variables.

3.3. Employment by economic sectors

Switzerland, a country with a highly advanced and diverse economy, is characterized by a well-balanced mix of primary, secondary, and tertiary economic sectors.

3.3.1. Primary Sector

The primary sector in Switzerland, although contributing a minor percentage to the country's GDP, holds significant importance. This sector primarily includes agriculture, forestry, and fishing. Despite its relatively small contribution to the GDP, the primary sector is an integral part of Switzerland's economic fabric. The country's landscapes are dotted with farms, reflecting the importance of agriculture. Swiss agriculture is renowned for its high efficiency and quality. The country produces a variety of dairy products, cereals, and specialty crops, contributing to the local and international markets. While forestry and fishing play a smaller role, they are still essential elements of the primary sector, contributing to the country's economic diversity (Swiss Confederation, 2019).

Graph 6 shows number of employed persons, in thousands, in the primary sector in Switzerland from 2011 to 2019, quarterly.

Graph 6. Number of employed, in thousands, primary sector, in Switzerland 2011 to 2019, by quarters
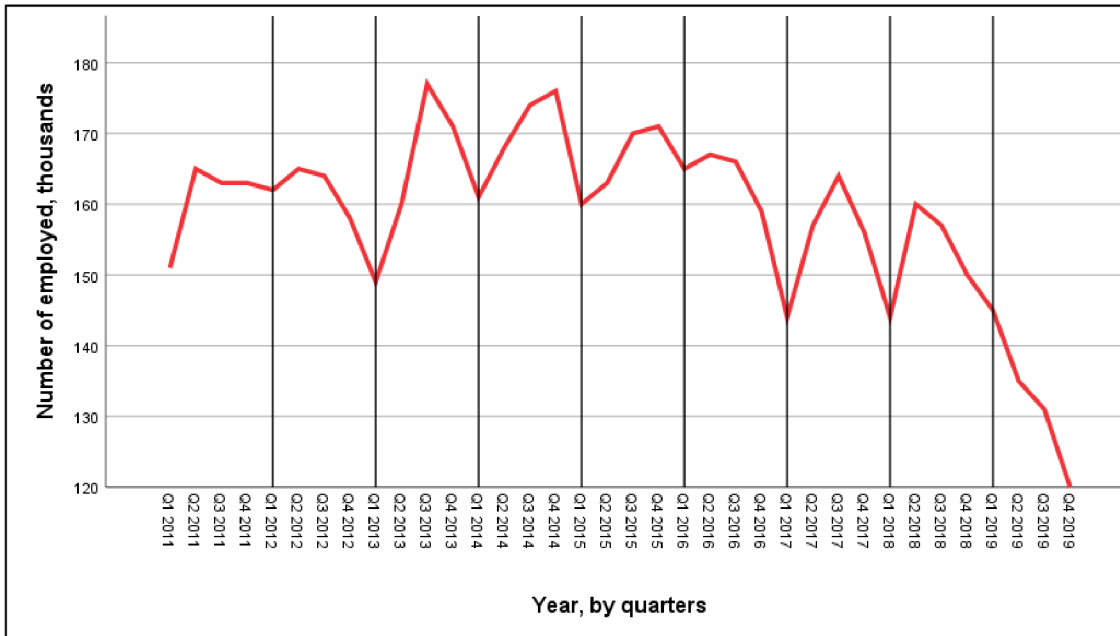
Source: Federal Statistical Office, own work

It is noticeable that the current graph shows the seasonality pattern. Usually, the smallest number of employed people falls into the winter period (Q1) and the highest demand is in summer and autumn (Q3, Q4), which can be reasonably explained as the primary sector is dependent on natural resources. To quantify the seasonality, seasonal factors are calculated in 'IBM SPSS Statistics 29', multiplicative time series model is considered.

Table 1 shows the results of calculations.

Table 1. Seasonal Factors, by quarters, for Primary Sector

Period	Seasonal Factor (%)
1	96.0
2	100.1
3	102.8
4	101.1

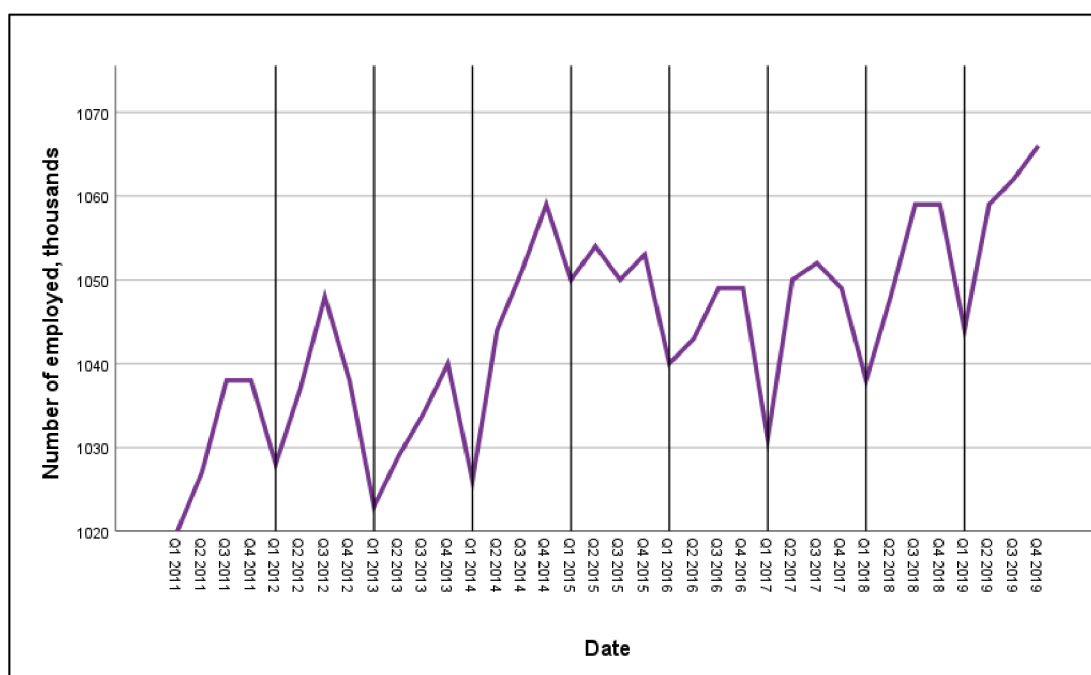*Source: Federal Statistical Office, own work*

Employment in the first quarter is, approximately, 4% lower from the average trend value, therefore, unemployment of the Primary Sector will be the highest in the first quarter.

3.3.2.   Secondary Sector

The secondary sector in Switzerland, which includes manufacturing and industry, plays a pivotal role in shaping the nation's economy. The secondary sector is marked by the production of high-quality goods. Swiss watches, pharmaceuticals, and precision machinery are particularly acclaimed globally. The Swiss manufacturing industry is celebrated for its precision and innovation, contributing significantly to the nation's economic prosperity. The Swiss pharmaceutical and chemical industries are global frontrunners, known for their superior quality products and innovative research. Swiss watches are a symbol of accuracy and quality, reflecting the nation's commitment to producing superior quality goods (Swiss Confederation, 2019).

Graph 7 shows number of employed persons, in thousands, in secondary sector in Switzerland from 2011 to 2019, quarterly.

Graph 7. Number of employed, in thousands, secondary sector, in Switzerland 2011 to 2019, by quarters

Source: Federal Statistical Office, own work

The pattern of employment in the secondary sector is similar to the primary one. Typically, the highest index is in the summer or autumn (Q3, Q4), and the lowest is in the winter (Q1). To quantify the seasonality, seasonal factors are calculated in 'IBM SPSS Statistics 29', multiplicative time series model is considered.

Table 2 shows the results of calculations.

Table 2. Seasonal Factors, by quarters, for Secondary Sector

Period	Seasonal Factor (%)
1	99.1
2	100.0
3	100.5
4	100.4

Source: Federal Statistical Office, own work

However, based on the results of calculations, the seasonal factor throughout all quarters is practically the same, being slightly less in the first quarter. Therefore, it is possible to assume that employment in this sector is not influenced by seasonal changes, nor is unemployment.

3.3.3. Tertiary Sector

The tertiary sector, which includes services such as finance, banking, insurance, information technology, tourism, and healthcare, is the backbone of the Swiss economy.
Switzerland's tertiary sector is highly developed and sophisticated. Zurich and Geneva, in particular, are famed as global financial hubs. Switzerland's financial sector, which includes banking and insurance, enjoys global renown, hosting major international banks and financial institutions. The nation's scenic landscapes and superior quality of life attract a significant number of tourists each year, contributing to the thriving tourism sector. Switzerland's healthcare and education sectors are well-developed, contributing to the superior standard of living and well-being of its residents (Swiss Confederation, 2019).

Graph 8 shows number of employed persons, in thousands, in tertiary sector in Switzerland from 2011 to 2019, quarterly.

Graph 8. Number of employed, in thousands, tertiary sector, in Switzerland 2011 to 2019, by quarters
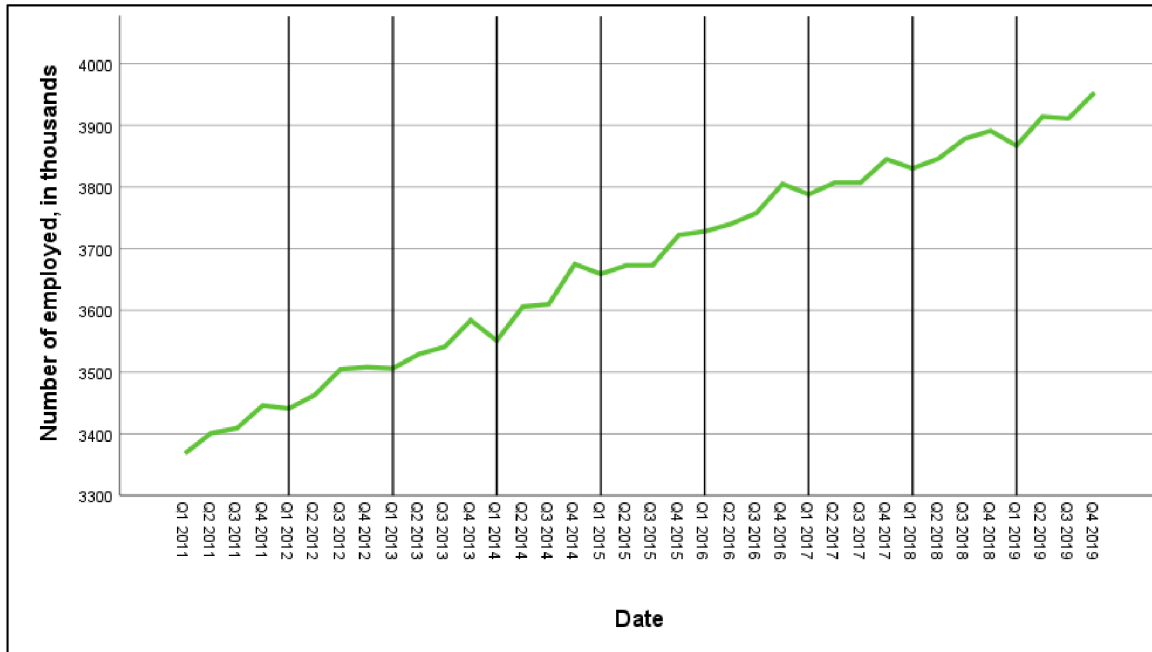
Source: Federal Statistical Office, own work

In this graph, it is noticeable an annually increasing demand in employees. The season with the highest number of employed people usually falls into the fourth quarter and the lowest season is the first quarter. To quantify the seasonality, seasonal factors are calculated in 'IBM SPSS Statistics 29', multiplicative time series model is considered.

Table 3 shows the results of calculations.

Table 3. Seasonal Factors, by quarters, for Tertiary Sector

Period	Seasonal Factor (%)
1	99.7
2	100.0
3	99.9
4	100.5

Source: Federal Statistical Office, own work

The index numbers are very close to each other and the lowest employment is observed in the first quarter; therefore, the highest unemployment is represented in the later winter period from January.

3.3.4. Summary

Based on the observations, it can be assumed that typically the highest unemployment happens in the first quarter, when the lowest falls into the third and fourth quarters.

3.4. Demographics

3.4.1. Local vs Foreigners

One of the aspects that requires to be investigated is the ratio of unemployed among Swiss and foreign citizens. The data taken for the analysis covers the years from 1991 to 2019. The pandemic years have been examined in the separate graph, as it is an exception being an irregular fluctuation.

In most of the cases the rate of unemployment is more than twice higher for foreign citizens than for Swiss ones. One potential reason for the higher presence of foreigners in industries sensitive to economic cycles, like construction, could be attributed to their overrepresentation. Additionally, individuals from other countries may encounter increased challenges in the labor market due to their restricted proficiency in the local language. Some jobs may require understanding of culture as well, which can also lead to challenges for foreign citizens. To show the difference visually, Graph 9 has been created.

In the graph it is visible that the pattern of the curve is the same for all citizens – the increase and decrease happens at the same time for locals and foreigners. However, foreign individuals experience unemployment in more drastic and bigger changes. All the events that affected Swiss economy, thus unemployment rate as well, are more visible of the foreigners' curve. Beginning of the 1990's – double – dip recession, early 2000's – dotcom bubble burst and 2008 – 2009 – the global financial crisis.

Graph 9. Unemployment rate, % in Switzerland among Swiss and foreign citizens from 1991 to 2019 (ILO definition, values second quarter)
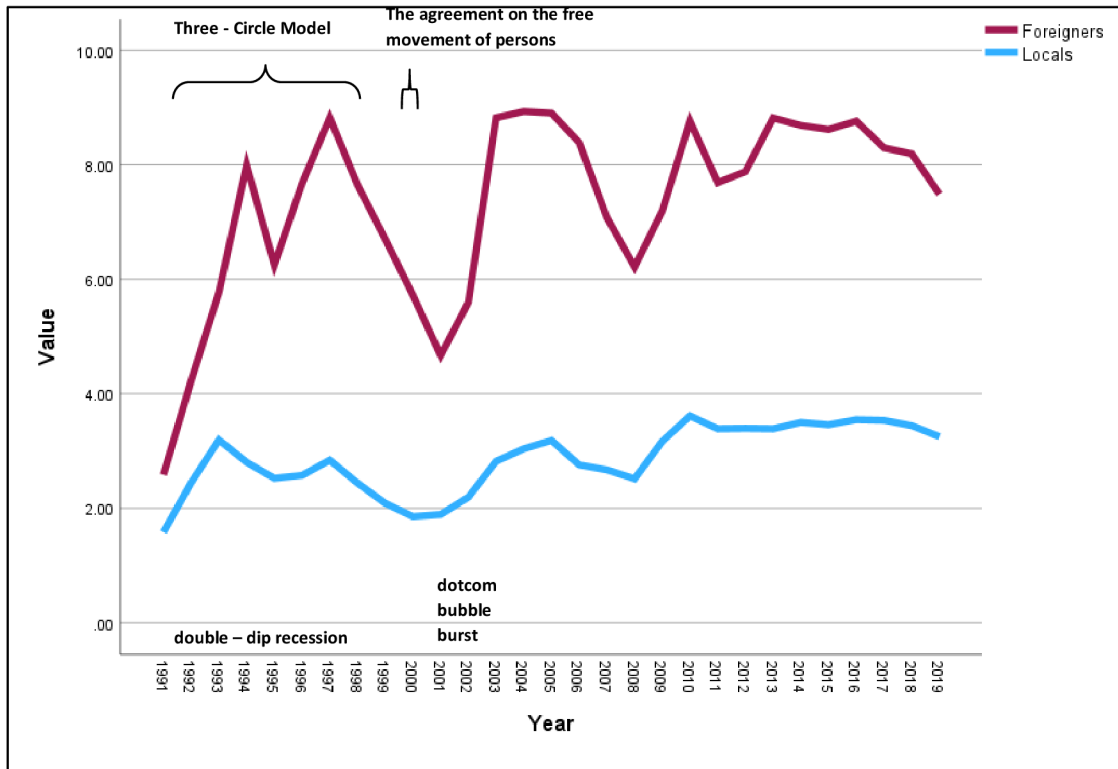
Source: Federal Statistical Office, own work

Moreover, such drastic changes in unemployment of foreigners can be explained by historic changes of Swiss migration policies mentioned in the literature part of the thesis.

The very rapid increase of foreign unemployment from 1991 up to 1997 can be explained by "Three – Circle Model".

The agreement on the free movement of people could have caused an increase in foreign citizens coming into the country and, thus, could potentially increase unemployment due to higher competition.

- **2020 - 2021**

Graph 10 represents unemployment rate changes in the years 2019 – 2021. During COVID – 19 both Swiss and foreign citizens faced increase in unemployment. However, unemployment among foreigners experienced more drastic changes. Foreigners' unemployment grew by 0.37% between 2019 and 2020, and by almost 1% between 2020 and 2021 because of implemented restrictions due to COVID – 19. In contrast, Swiss citizens experienced only a slight increase in unemployment being equal to 0.48% in these two years.

Graph 10. Unemployment rate, % in Switzerland among Swiss and foreign citizens from 2019 to 2021 (ILO definition, values second quarter)
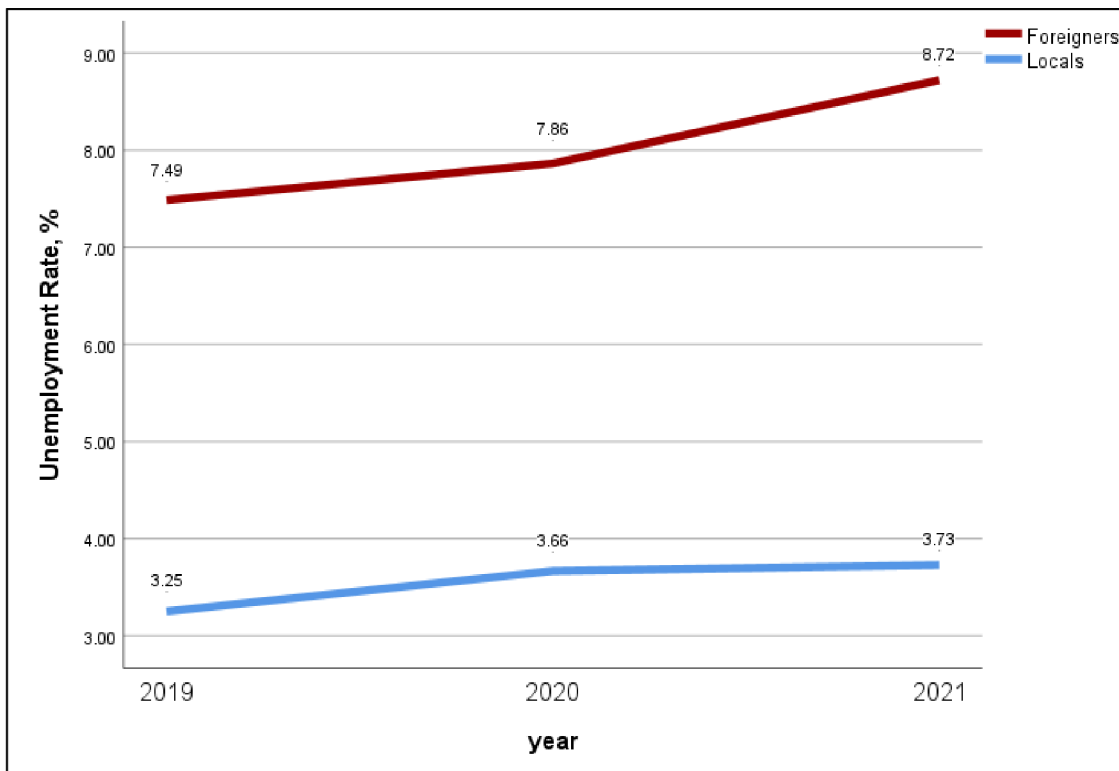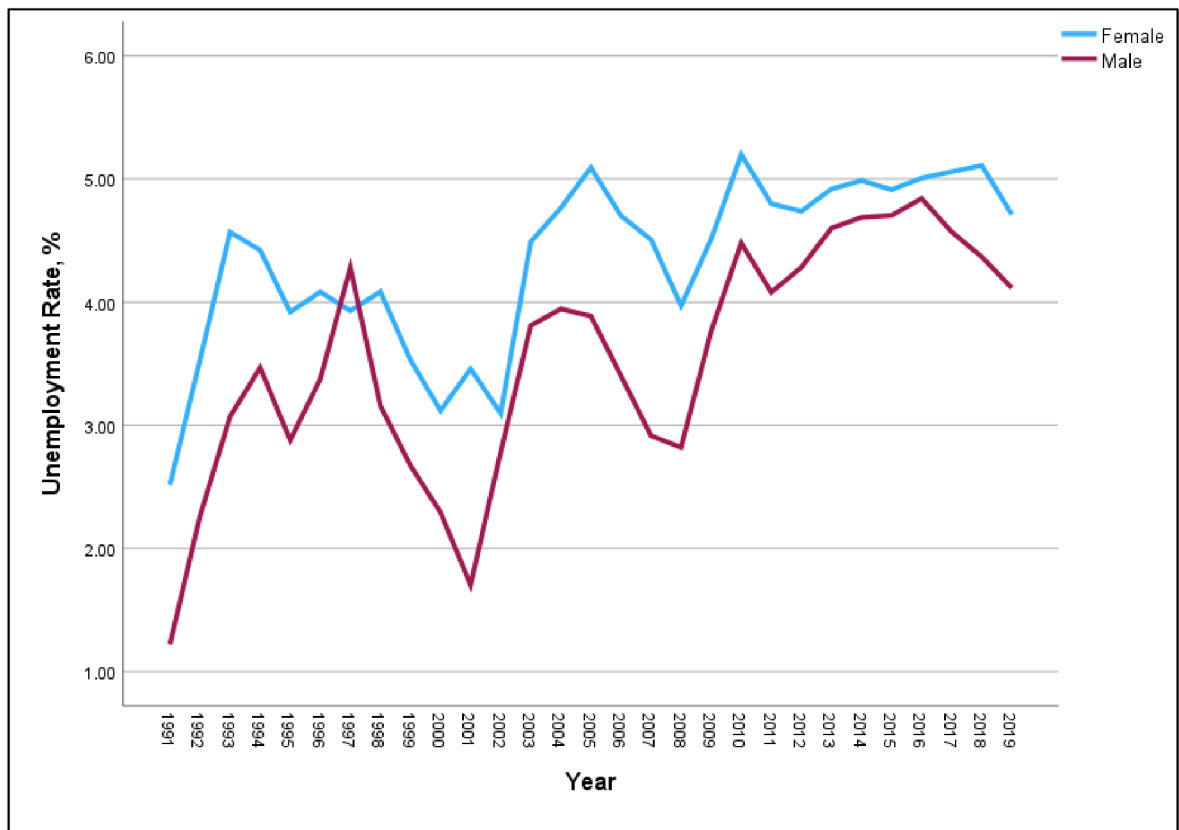

Source: Federal Statistical Office, own work

3.4.2. Gender

Another important factor to research is a difference in unemployment rate between male and female individuals. The data being analyzed was collected from 1991 to 2019. The pandemic years have been examined in the separate graph, as it is an exception being an irregular fluctuation.

Almost throughout all years the unemployment rate among women is higher than among men. The only exception is 1997 when men's unemployment rate was higher by 0.35%. Graph 11 shows visual representation of unemployment by genders through years. It is noticeable that the difference used to be more significant between 2003 to 2008, but closer to the present the difference is decreasing, yet still visible.

Graph 11. Unemployment rate, % in Switzerland among male and female citizens from 1991 to 2019 (ILO definition values second quarter)
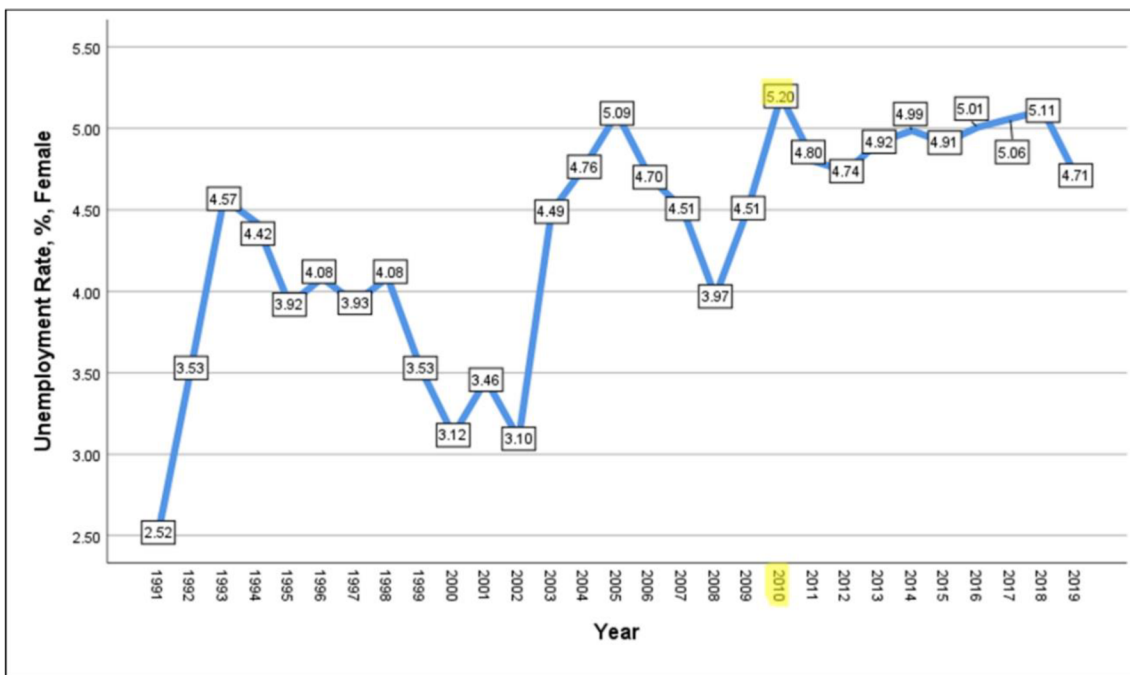

Source: Federal Statistical Office, own work

- **Female unemployment**

Graph 12 represents only female unemployment from 1991 to 2019. Overall, unemployment among women was growing throughout the years.

Graph 12. Unemployment rate, % in Switzerland among female citizens from 1991 to 2019 (ILO definition values second quarter)

Source: Federal Statistical Office, own work

In the beginning of the 1990's there was an annual increase of around 1%. The pattern is similar to the curve of the overall unemployment rate in Switzerland. From 1993 to 2000 there was mostly a decrease in unemployment, from 4.57% to 3.12%. In 2001 women experienced increase in unemployment by 0.34%, followed by almost the same decrease. In the 2000's there was a drastic increase due to the events mentioned above – dotcom bubble burst and the global financial crisis. In 2010 the highest rate has been observed – 5.20%. After that, the rate stabilized and stayed around 4.9%, with fluctuations around 0.1%. In 2019 there was a decrease of 0.4%.

- **Male unemployment**

Graph 13 represents only male unemployment from 1991 to 2019. Overall, unemployment among men was growing throughout the years as well. As from 2001, the pattern of the curve is similar to female unemployment curve only with the difference in numbers.

Graph 13. Unemployment rate, % in Switzerland among male citizens from 1991 to 2019 (ILO definition values second quarter)
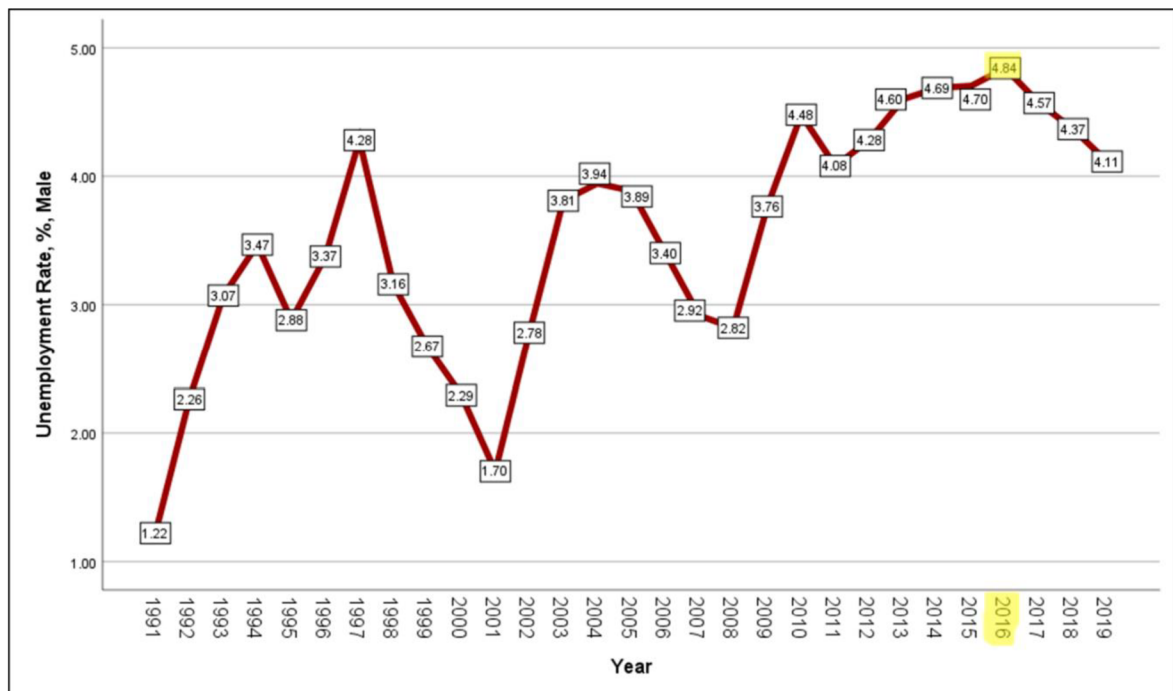

Source: Federal Statistical Office, own work

From 1991 to 2001 graph pattern is identical to the graph of general unemployment in Switzerland. Among male the double-dip recession is more visible. In 1997 is the only year when male unemployment (4.28%) exceeded female (3.93). Potential causes can be a slight decrease in labor force participation and increase in part-time workers among men which will be analyzed further. From 1997 there was an extreme decrease in unemployment from 4.28% to 1.7% in 2001. In the further years, unemployment rate was affected by dotcom bubble burst and the global financial crisis as well. From 2011 to 2016 the rate was stable and stayed around 4.5%. However, in 2016 the highest unemployment rate among men has

been observed – 4.84%. Again, the potential cause might be a noticeable increase in part-time workers among men, which also will be covered further in the thesis. As from 2016, men experienced quite regular annual decrease in unemployment by average 0.24%. In 2019 the rate became almost the same as in 2011 (4.08%), being equal to 4.11%.

- **Unemployment among men and women during COVID – 19**

Graph 14 represents unemployment rate changes in the years 2019 – 2021. During pandemic both male and female citizens experienced an obvious increase in unemployment.

Graph 14. Unemployment rate, % in Switzerland among male and female citizens from 2019 to 2021 (ILO definition, values second quarter)
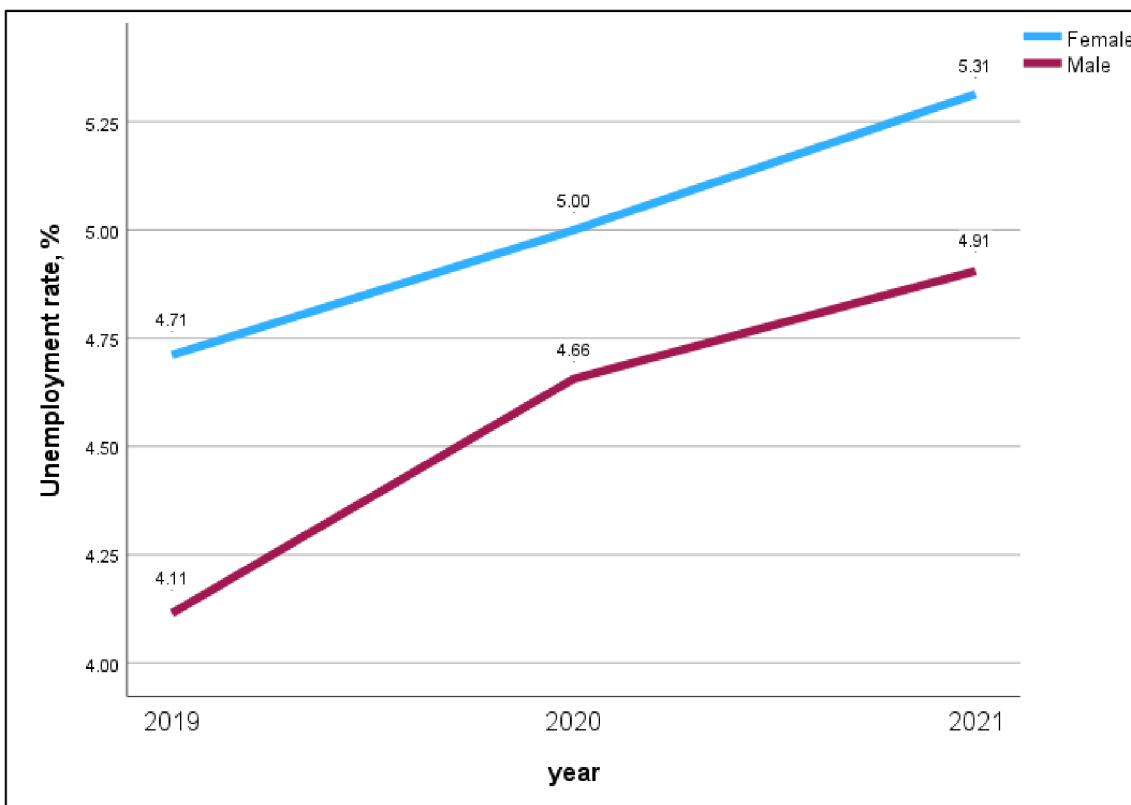

Source: Federal Statistical Office, own work

Female citizens experienced less drastic changes than male citizens. From 2019 to 2020 there was an increase of 0.29%, from 4.71% to 5%. From 2020 to 2021 the increase continued; the unemployment rate became 5.31%.

There was a faster growth in unemployment among male citizens. From 2019 to 2020, there was an increase of more than a half percent. In 2021, the rate was already equal to 4.91%. Among men the growth in unemployment in 2 years reached almost 1%.

The more rapid increase for men can be again caused by the increasing number of men taking part – time jobs, unlike women.

- **Labor Force Participation**

It is also important to consider the labor force involvement and type of job being performed – full-time or part-time among men and women. Graph 15 shows labor force involvement among men and women in Switzerland from 1991 to 2021.

Graph 15. Labor force participation rate, %, by gender, (population ages 15+) from 1991 to 2021 (ILO definition, values second quarter)
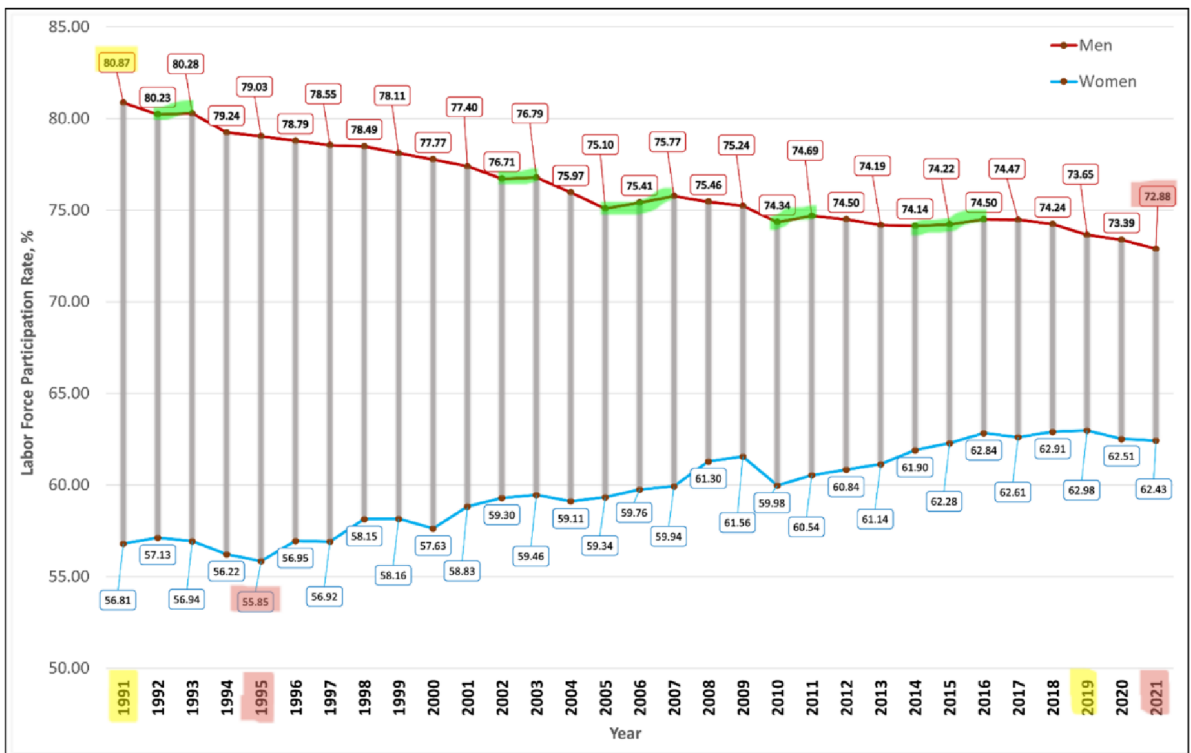
Source: Federal Statistical Office, own work

In general, in the period from 1991 to 2021 labor force participation among men decreased and increased among women. For male workers in 1991 the rate was equal to 80.87%, begin the highest number (marked in yellow on graph) observed in the current time span. The rate for female workers at the same year was equal to 56.81%, making a 24% difference from men. The highest rate (marked in yellow) for women was recorded in 2019, being equal to 62.98%. The lowest rate (marked in red on graph) for men was in 2021, equal to 72.88%, making a difference of almost 8% from the highest index. For women, the lowest number (marked in red) was in 1995, equal to 55.85%, by 7.1% less than the highest fixated rate. From this analysis, it is possible to state that male workers experienced bigger changes in labor force participation than women.

For men, labor force participation had a couple of very slight increases (marked in green on graph) in 1993 (by 0.05%), in 2003 (by 0.08%), in the period from 2005 to 2007 (in total by 0.67%), in 2011 (by 0.35%) and in the period from 2014 to 2016 (in total by 0.36%).

Women experience more drastic and faster changes in both increases and decreases. There was a slight decrease in the beginning from 1992, which resulted in the lowest recorded rate (55.85%), observed in the years 1991 - 2021, in 1995.After that, the rate began to rapidly increase and in 2009 was equal to 61.56%. In the next year there was a noticeable decrease of 1.6%, however, in the next years the labor force rate was mainly increasing. In 2021 the rate was equal to 62.43%.

In the covid years, male workers experienced bigger changes than female ones. From 2019 to 2021, the difference in the labor force participation rate among men was equal to 0.77%, when for women the number was 0.55%.

- **Part – time Workers**

When analyzing data of percentage of employed persons by gender who work in Switzerland part-time, it is possible to identify a relationship between unemployment rate and type of job employment. Graph 16 shows the share of part – time workers from total number of employed people in the years 1991 – 2021.

Graph 16. Share of employed persons part-time, %, by gender, in Switzerland from 1991 to 2021 (ILO definition, values second quarter)
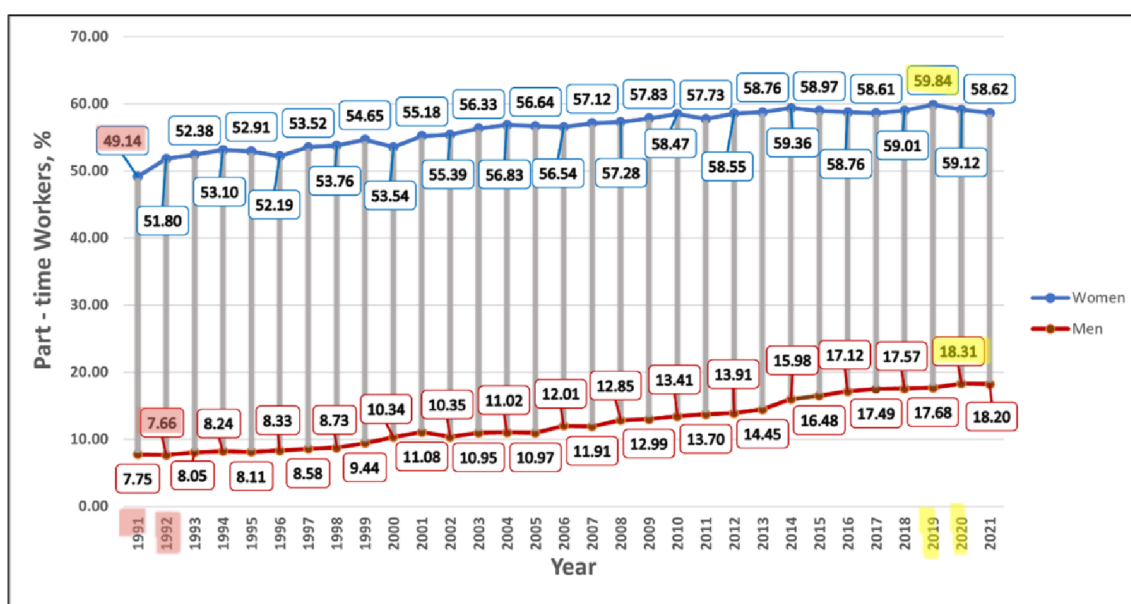
Source: Federal Statistical Office, own work

The gap between male and female workers is huge, more than 40% throughout all years, and very stable - in 30 years there was a decrease in differences but very small, around 4 %. The lowest share for both men and women was in the start of the observed period. For men, in 1992 share of part – time workers was equal to 7.66% and for women, 49.14%, in 1991. The difference of the lowest index among men and women is 41.5%. The highest numbers were recorded in 2020 for men – 18.31%, and in 2019 for women – 59.84%., making a difference of 41.53%. Thus, it is possible to state that throughout the years the difference among men and women as part – time workers decreased. To analyze which gender experienced more drastic changes, next calculations have been made. The difference between highest and lowest index of rate both for men and women is around 10.7%, which indicates the similarity in the size of overall fluctuations. To better analyze shifts in the share through the years, separate graphs for male and female part - time workers have been created.

- **Female Part – time Workers**

Graph 17 represents share of only female part – time workers from 1991 to 2021. Overall, the number of part - time workers among women was growing throughout the years.

Graph 17. Share of employed persons part-time, %, female, in Switzerland from 1991 to 2021 (ILO definition, values second quarter)

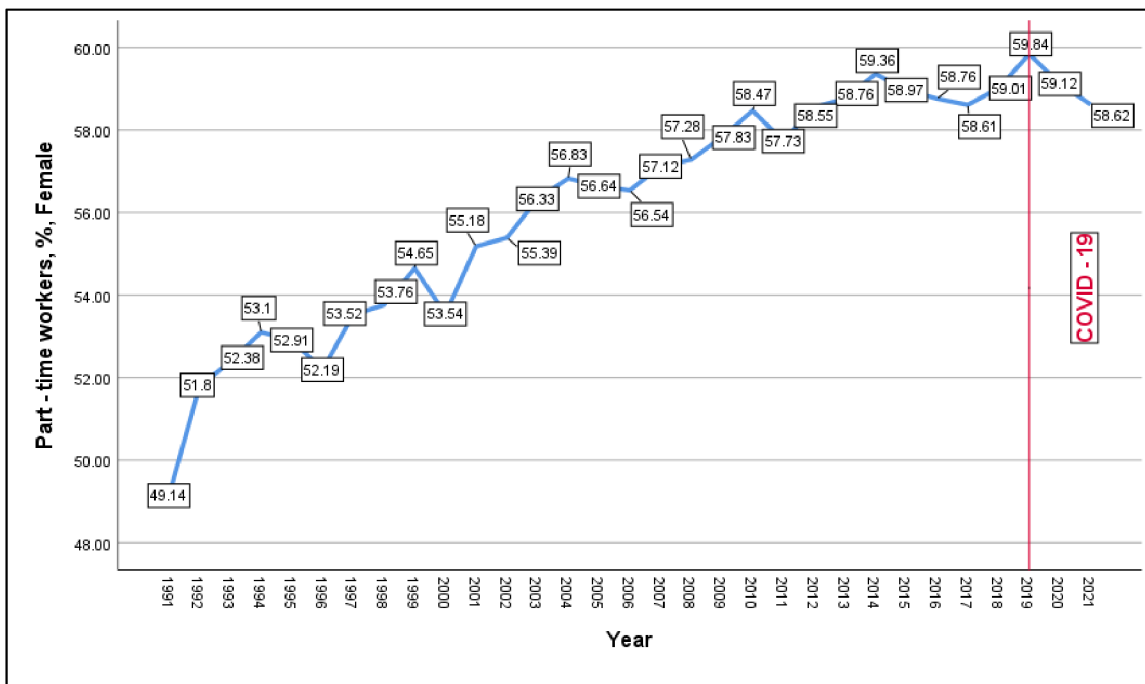***Source: Federal Statistical Office, own work***

In the larger scale, it is noticeable that women experienced rapid and sharp fluctuations. From 1991 to 1994 there was an increase of around 4%. The subsequent slight decrease of 1% lasted till 1997 and was followed by a stable, almost constant increase till 2019. The other visible decreases were noted in 2000 - around 1%, in the years 2004 - 2006 – very small decrease of 0,3%, in 2001 – around 0,7% and in the years 2014 – 2017 – also 0,7%. In the pandemic years there was an obvious decrease of 1,2%.

- **Male Part – time Workers**

Graph 18 represents share of only male part – time workers from 1991 to 2021. Overall, the number of part - time workers among men was also growing throughout the years.

Graph 18. Share of employed persons part-time, %, male, in Switzerland from 1991 to 2021 (ILO definition, values second quarter)
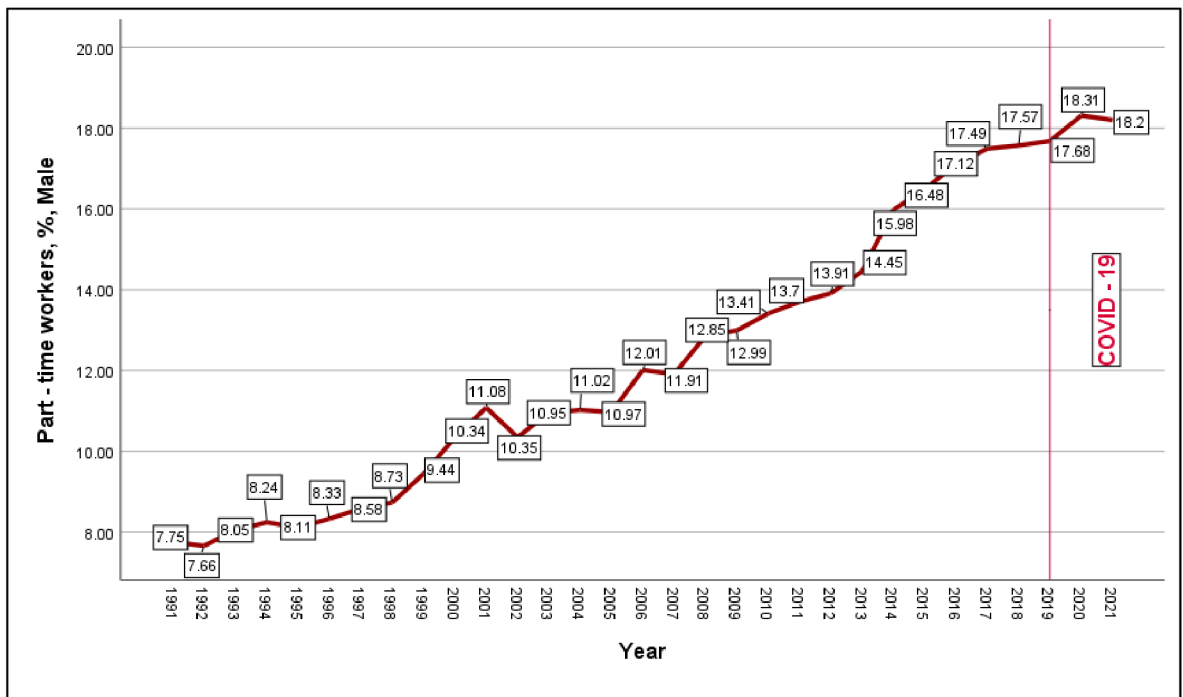

Source: Federal Statistical Office, own work

Compared to female graph in the 1990's male workers had a slower and more stable increase. From 1991 to 2001 there was an almost constant increase of 3.3% in total. The decrease of 0.73% in 2001 was practically the only noticeable and big decrease in the scale of men's graph. In the years 2007 – 2019 there was a sharp increase of 5.7%. For men, the pandemic years differ from women. From 2019 to 2020 the increase in part – time workers continued, making a difference of 0.3%, and after was followed by a very slight decrease of 0.1%.

- **Summary**

The observed results indicate one of the reasons of a higher unemployment rate among women in Switzerland than men.

Lower labor-force participation has historically been associated with increased labor-force turnover and, as a result, a higher rate of frictional unemployment. In the case of women, higher labor force turnover is a primary contributor to their higher unemployment rate (Niemi, 1974).

Part-time workers are considered to experience unemployment more often compared to full-time workers for several reasons:

- Lack of job security - employers may be more inclined to lay off or reduce hours for part-time workers during economic downturns or when facing financial constraints.

- Seasonal or temporary nature of job - many part-time jobs, such as those in retail or hospitality are seasonal or temporary in nature. Workers in such positions may be hired during peak periods and laid off during off-seasons, contributing to higher unemployment rates.

- Limited advancement opportunities - part-time positions may have fewer opportunities for career advancement or wage growth, which can lead to frustration and job searching, increasing the likelihood of experiencing unemployment (Indeed, 2023).

3.4.3. Age

Age is another factor that plays important role in unemployment picture of Switzerland.

Collected data covers the unemployment rate of 4 age groups – 15 – 24y.o., 25 – 39y.o., 40 – 54y.o. and 55 – 64y.o. in the period from 1991 to 2019. The pandemic years have been

examined in the separate graph, to compare how unemployment rate was changing for each group in such an unpredictable environment.

Graph 19. Unemployment rate, %, by age groups, in Switzerland from 1991 to 2019 (ILO definition, values second quarter)
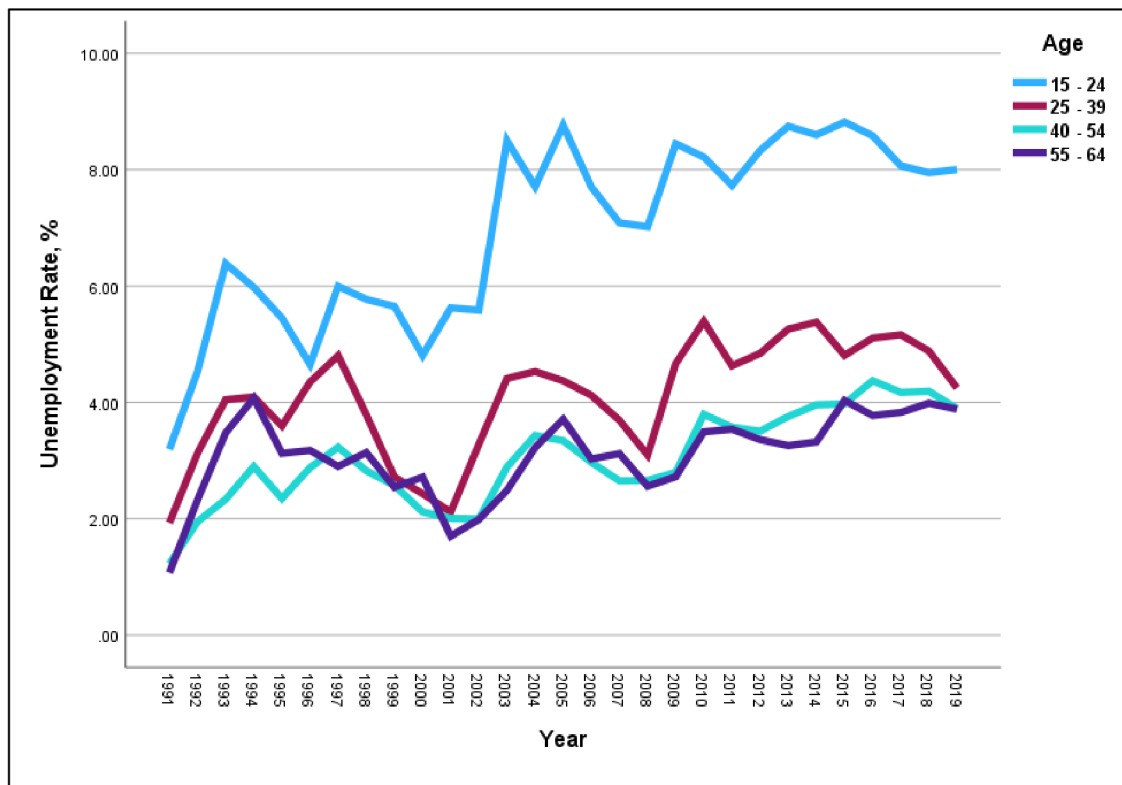
Source: Federal Statistical Office, own work

Since 1991 the unemployment rate of young adults (15 – 24 y.o.) has been significantly greater than in other age groups. In the years 2001 – 2009 there was the biggest difference in unemployment rate between young adults and other groups. In 2001 the unemployment rate of young adults was almost half of the total rate in Switzerland. Graph 19 clearly shows the pattern of the curve for each age group. It is noticeable that younger people were affected more than older generations. Age groups 15 - 24 and 25 – 39 have similar curve patterns but differ in numbers.

- **15 – 24 years old**

Graph 20 represents unemployment rate changes among ages 15 – 24 y.o. in the years 1991 - 2019. Mainly, throughout the years the rate was increasing, however, as from 2015 it started to decrease. The average unemployment rate is 7%.

Graph 20. Unemployment rate, %, 15 – 24 y.o., in Switzerland from 1991 to 2019 (ILO definition, values second quarter)
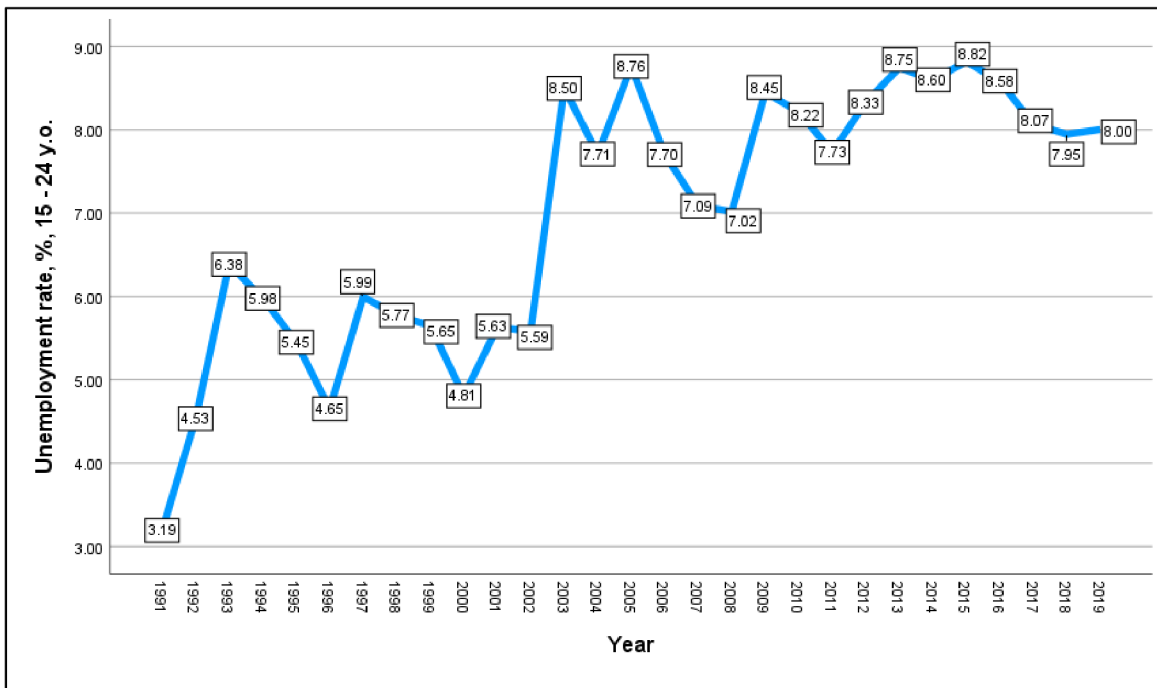
Source: Federal Statistical Office, own work

In the observed time span, the lowest unemployment rate was equal to 3.19% in 1991. In the 1990's the curve resembles the pattern of an overall unemployment rate in Switzerland due to double-dip recession. Between 2002 and 2003 there was a fast increase of 2.9%. It continued in 2005, when the unemployment rate became 8.76%. The subsequent decrease of 1.7% lasted till 2008, and after another increase, the rate fluctuated around the same numbers, on average equal to 8.4%. In 2015 the highest number has been recorded – 8.82%. In the next years the rate began to decrease and was equal to 8% in 2019.

Based on this analysis, it can be stated that young adults of age 15 – 24 y.o. are less resilient to economic situations on the labor market.

- **25 - 39 years old**

Graph 21 depicts unemployment rate changes among ages 25 - 39 y.o. in the years 1991 - 2019. The rate fluctuated a lot, being affected by changes in the economy. The average unemployment rate is 4.2%.

Graph 21. Unemployment rate, %, 24 - 39 y.o., in Switzerland from 1991 to 2019 (ILO definition, values second quarter)

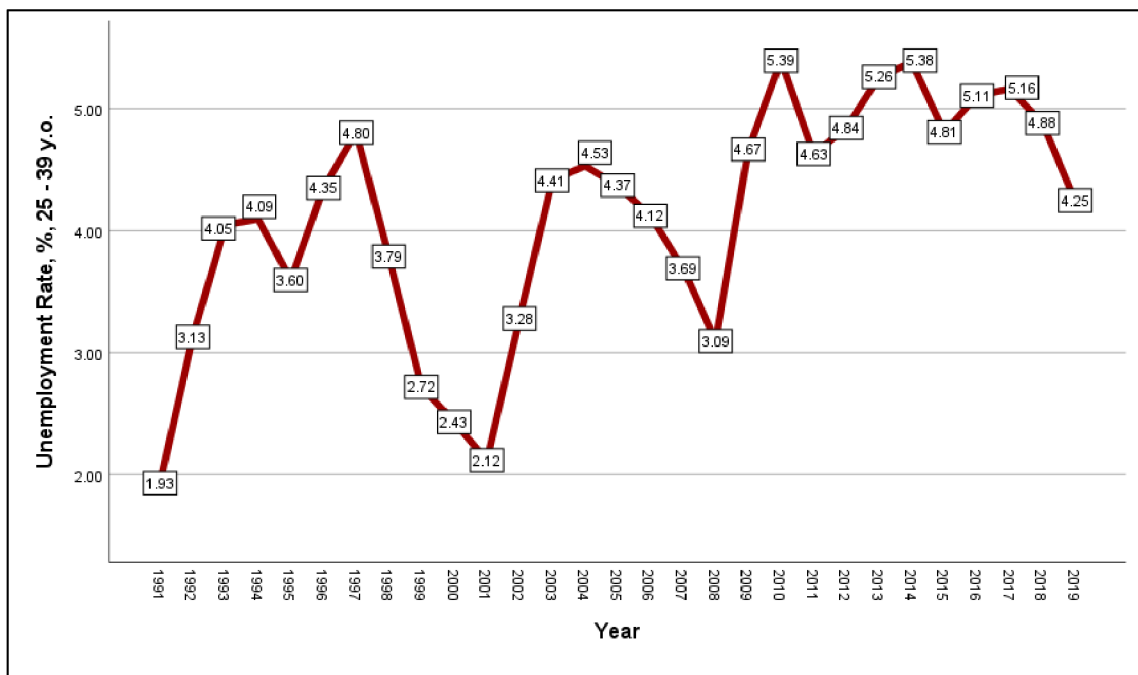**Source: Federal Statistical Office, own work**

Compared to the previous age group (15 – 24 y.o.), adults between 25 – 39 y.o. experienced more drastic decreases. From 1991 to 1997 the rate has been mainly increasing, resulting in a total difference of 2.9%. From 1997 numbers began to decline and in 2001 the rate of 2.12% was almost the same as the lowest index of unemployment, 1.93%, in 1991. For comparison, unemployment rate of young adults in 2001 was higher by 3.5%. Between 2011 to 2004 there was an increase of 2.4% followed by a decrease of 1.4%. In the next two years the rate drastically increased again by 2.3%, resulting in the highest unemployment index for adults of 25 – 39 y.o. – 5.39%. In the next years the rate fluctuated around the same numbers, on average being equal to 5%. From 2017 the rate began to decrease and in 2019 became 4.25%. Pattern of unemployment of this age group is the most like the pattern of overall unemployment in Switzerland.

- **40 – 54 years old**

Graph 2 represents unemployment rate changes among ages 40 - 54 y.o. in the years 1991 - 2019. The overall rate increased but this age group experienced very small fluctuations. The difference between the smallest and the biggest numbers is only 3.2%. The average unemployment rate is 3.1% - the smallest among all groups.

Graph 22. Unemployment rate, %, 40 - 54 y.o., in Switzerland from 1991 to 2019 (ILO definition, values second quarter)

Source: Federal Statistical Office, own work

The beginning of the graph shows the smallest unemployment rate for this group – 1.22%, which was recorded in 1991. Adults of 40 – 54 y.o. have not been affected by economic fluctuations as much as the previous groups. During the double–dip recession there was an increase of 2%, which was followed by a decrease of 1.2% till 2001. This is the only age group for whom the rate (2%) did not change between 2001 and 2002. From 2002 to 2010 there were small fluctuations which resulted in the unemployment rate being equal to 3.79%. The increase of the years 2012 – 2016, resulted in the highest recorded index of

unemployment of 4.37% in 2016. In the following years the rate decreased and became equal to 3.89%.

- **55 – 64 years old**

Graph 23 shows unemployment rate changes among ages 55 - 64 y.o. in the years 1991 - 2019. The rate of this group fluctuated the most often among others. The average unemployment rate is 3.2%.

Graph 23. Unemployment rate, %, 55 - 64 y.o., in Switzerland from 1991 to 2019 (ILO definition, values second quarter)
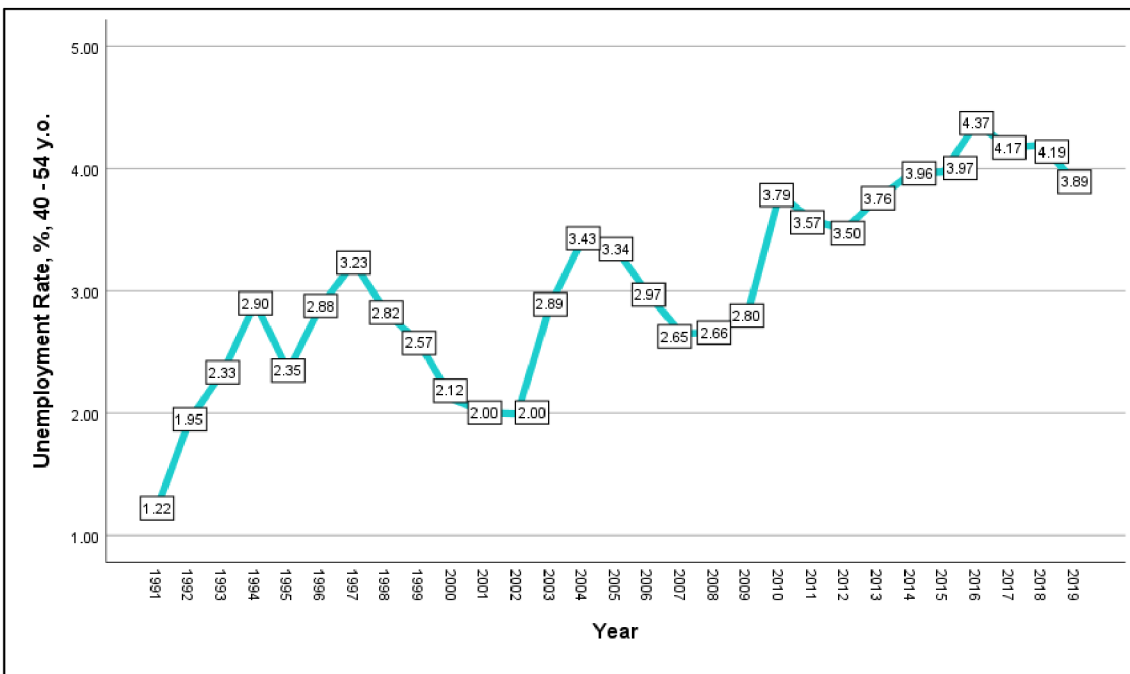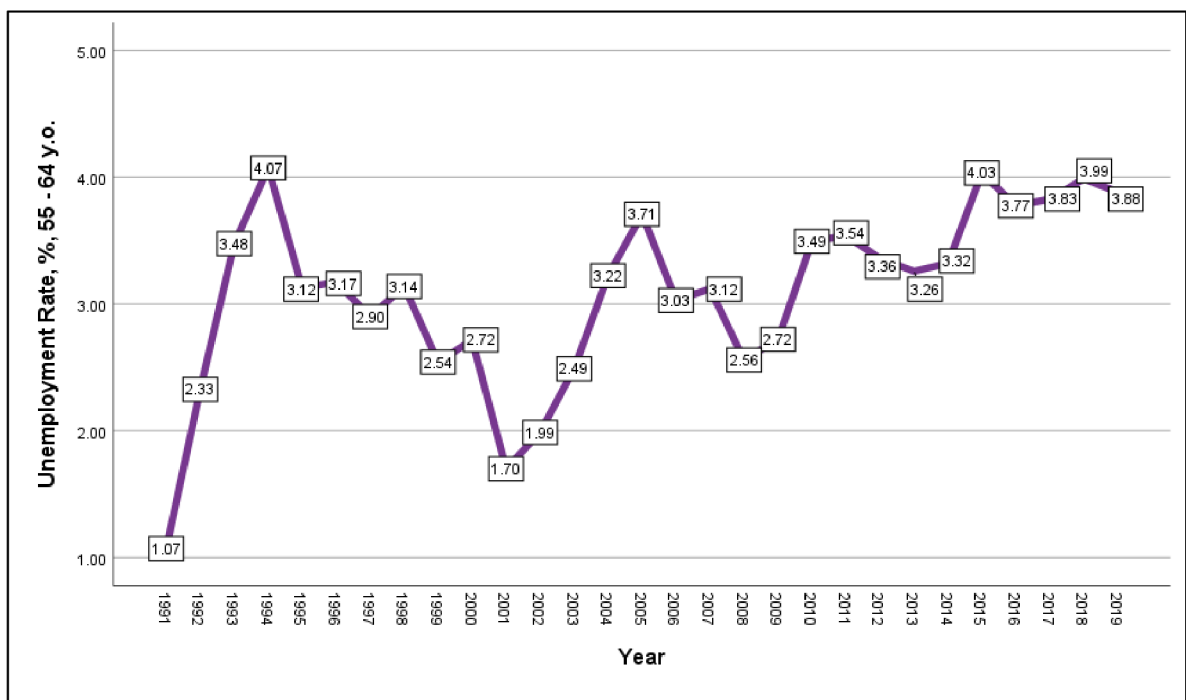

Source: Federal Statistical Office, own work

From 1991 to 1994 adults of 55 – 64 y.o. experienced the change of 3%, which is almost as big as difference of unemployment among young adults (15 – 24 y.o.) – 3.2% in the years 1991 - 1993, despite the drastic differences in numbers and pattern behavior. The period from 1994 to 2001 is totally different from other groups. Unemployment was decreasing without returning increases unlike in the other groups. The double – dip recession is not

reflected on the graph, and in 2001 the rate was 1.7%, only 0.63% greater than the lowest index in 1991. From 2001 the graph was changing in a very similar wave pattern: increasing and decreasing, reducing the length of the waves over time. First wave: in the years 2001 – 2008, an increase of 2%, followed by a decrease of 1.2%, starting from 2005. Second wave: in the years 2008 – 2013, an increase of 1% and from 2011 the subsequent decrease of 0.3%. Third wave: from 2013 to 2016, with an increase of 0.7% which stopped in 2015 and the next year the rate decreased by 0.3%. In the third wave the highest unemployment rate for this age group was recorded, being equal to 4.03%. The last wave, from 2016 to 2019 included very small changes, the 3.77% rate became 3.99% in 2018 and decreased by 0.1% in 2019.

- **Unemployment among different age groups during COVID – 19**

Graph 24 shows unemployment rate changes among all four age groups in the years 2019 - 2021. From the graph 20, it is possible to note that the smallest changes during pandemic experienced '40 – 54 y.o.' age group and the biggest group '25 – 39 y.o.'

Graph 24. Unemployment rate, % in Switzerland among different age groups from 2019 to 2021 (ILO definition, values second quarter)
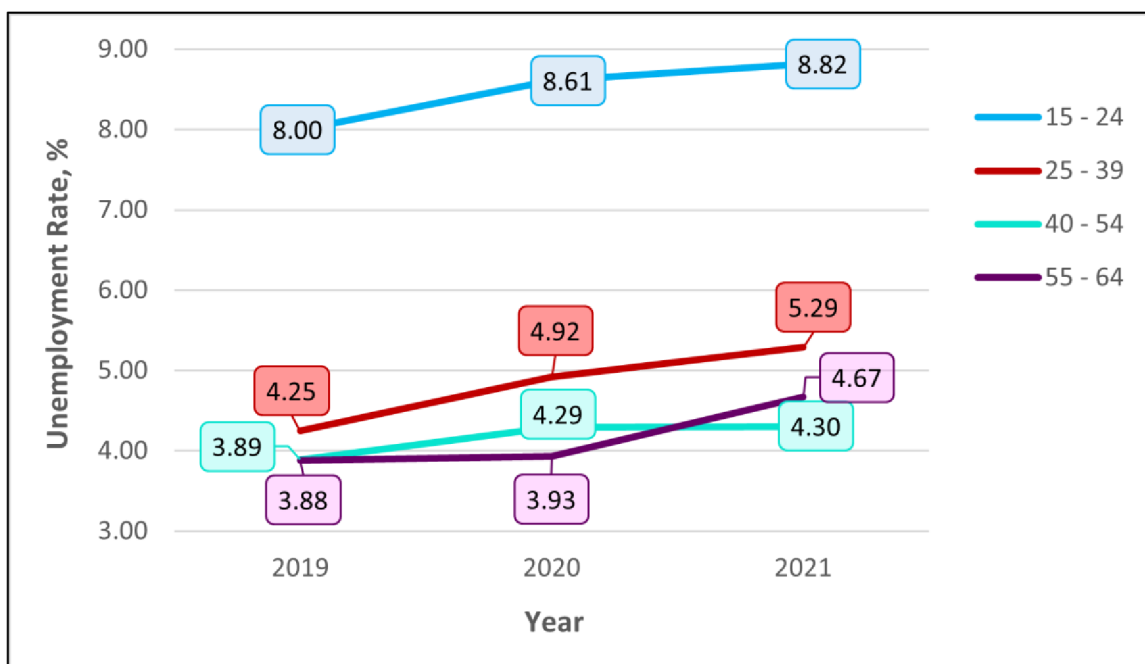
Source: Federal Statistical Office, own work

In the beginning of the pandemic, between the years 2019 and 2020, adults of 25 − 39 y.o. had the fastest growth of unemployment − 0.67%. Increase of young adults was around the same speed − 0.61%. An increase of 0.4% was recorded for adults of 40 − 54 y.o. The '55 − 64 y.o.' group almost was not affected in the beginning of covid, having an extremely small increase of 0.05%.

Between 2020 and 2021 the situation changed. The fastest and most drastic growth of 0.74% was among the older people, age group '55 − 64 y.o.). It can be caused due to older people being more affected by Covid − 19 in comparison to other groups. Group '25 − 39 y.o.' experienced an increase of 0.37%, followed by the group of young adults, whose difference was 0.21%. Adults of 40 − 54 y.o. experienced practically no change in unemployment, the increase was only 0.01%.

- **Summary**

Young adults suffer from high unemployment the most. They are the most affected by economic fluctuations.

Young adults might be more prone to be unemployed due to several reasons:

- Frictional unemployment − graduates might need time to decide which career they want to pursue.

- Lack of skills − young adults can be lacking necessary skills because of lack of experience, or poor school/university performance.

- Entry-level positions - young adults often target entry-level positions that may be more affected by economic fluctuations, making them susceptible to job loss during economic downturns (Pettinger, 2019).

However, if analyze only pandemic years 2019 - 2021, then the most vulnerable group is adults of 25 − 39 y.o.

3.5. Prediction Model

In assessing the economic landscape, the accuracy of predictive models becomes paramount in understanding and responding to dynamic changes. This part compares two models built based on the general unemployment data in Switzerland. Graph 25 shows observed and predicted values. Observed data covers the period from 1998, Q1 to 2019, Q4 and is shown on the graph in blue line. After it, follows data forecasted for the periods from 2020, Q1 till 2022, Q4, shown on the graph in red line. For the forecasting calculations 'ARIMA' model has been considered with the non-seasonal parameters (3,2,3) and seasonal (4,1,3) [4]. The parameters have been identified with the sequence and auto-regression charts.

 To check how well the model fits the data several metrics have been considered which are shown in Figures 3 and 4. R - squared is 0.878 which is a great indicator, because it is close to 1. MAPE (Mean Absolute Percentage Error) also shows a favorable index of 4.638, which is less than 5.

It is important to check it index of the p – value as well. In the case of this prediction model p – value shows a good index of 0.337, which is more than 0.05.

Figure 3. Fit Statistics of the predicted model

Fit Statistic	Mean
Stationary R-squared	.694
R-squared	.878
RMSE	.302
MAPE	4.638
MaxAPE	24.260
MAE	.196
MaxAE	1.021
Normalized BIC	-1.641

Source: MacroTrends.net, own work

Figure 4. Model Statistics

	Ljung-Box Q(18)			Number of Outliers
Statistics	DF	Sig.		
5.696	5	.337		<.001

Source: MacroTrends.net, own work

Based on the forecasting, it is noticeable that without pandemic years the unemployment rate in Switzerland would continue its gradual decrease of 0.4. It was forecasted that by the fourth quarter of 2022 the rate would be equal to 3.06 which is around the same numbers as unemployment in 2003, assuming the decreasing trend continues.

Graph 25. Prediction model of quarterly unemployment rate, % in Switzerland, observed values (1998, Q1 – 2019, Q4), forecasted values (2020, Q1 - 2022, Q4)

Source: MacroTrends.net, own work

65
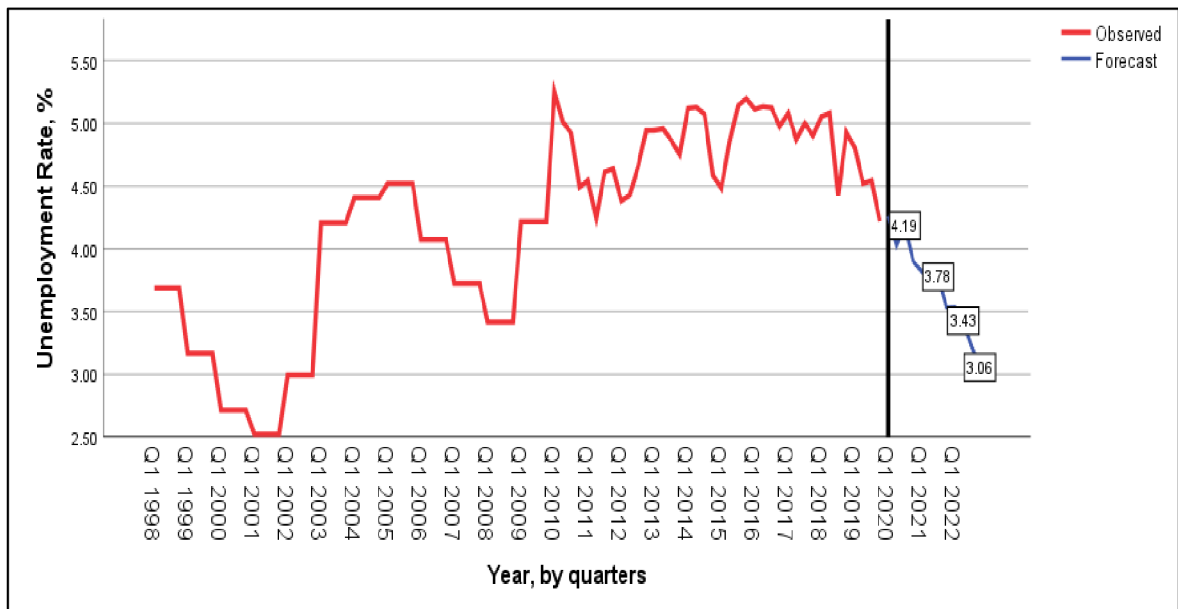
Graph 26 shows two models of unemployment rate, observed and predicted, based on observed data from 1998, Q1 to 2021, Q4.

Graph 26. Quarterly unemployment rate, %, in Switzerland for years 1998 – 2021, observed and predicted

Source: MacroTrends.net, own work

With both graphs, observed and predicted, presented, the obvious difference starting from 2020's is visible. In 2020 the ra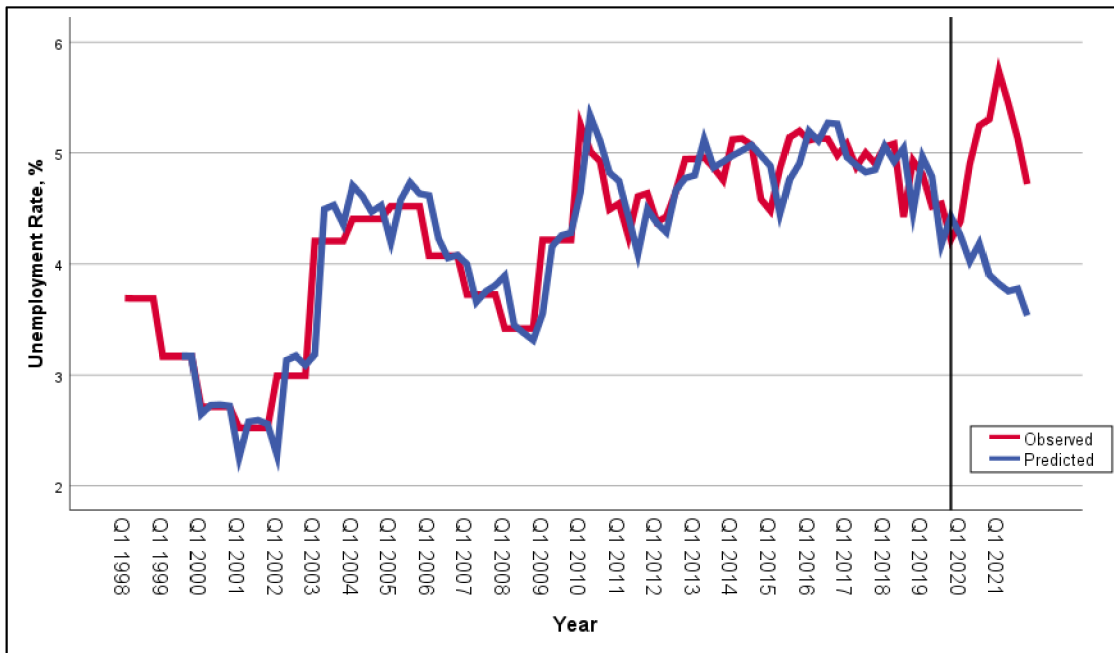te increased by 2.5% due to all challenges the world faced during the pandemic - economic shutdowns and restrictions, disruptions in global supply chains, challenges in adapting to remote work, changes in consumer behavior leading to reduced demand, and the overall economic downturn. However, in the beginning of 2021 the rate continued to increase but closer to the years end, a noticeable decrease of 1% had happened. It can be assumed that in the next years Switzerland will continue its recovery in labor market and unemployment rate might reach the forecasted values, just further in time than predicted due to the pandemic.

4. Results and Discussion

The analysis of the unemployment rate in Switzerland from 1991 to 2021 revealed several key findings. Over the three-decade period, the unemployment rate exhibited certain trends and fluctuations, which were closely tied to various economic and societal factors.

The study has identified the differences in unemployment rate between various groups by gender, age and nationality. During the analysis it was noticed that foreign citizens of Switzerland are more prone to unemployment due to implemented migration policies, lack of specific skills, language barrier and prevalence in industries that are more affected by economic changes. Women experience higher unemployment due to higher index of part – time workers among them and their labor force participation. Young adults of age from 15 to 24 years old face a lot higher rate of unemployment and are affected more by economic changes and changes in the labor market.

This analysis can be supported with additional information from the Swiss Labor Force Survey and Labor Market Indicators, published by the Federal Statistical Office in 2019. According to the documents, the increasing unemployment among foreign citizens is due to very high competition. As from 2013, the increase in the number of foreigners in the labor force was more than three times higher than the increase among local ones.

If compare publications with labor market statistics filtered by gender, then reports show that employment among women had a bigger increase than among men from 2013 to 2018. However, higher unemployment represented among women as well. Also, it states that women are more likely to be employed in the service sector than men, which also might explain their higher rate of unemployment due to seasonality and high competition of this sector.

Based on the reports, young adults change jobs more often, which also explains the higher unemployment rate among them. "Approximately a fifth of 15 to 24-year-olds and 25 to 39 year-olds changed job in 2018 (23.0% and 17.8%), only 5.0% of 55- to 64-year-olds did so" (Federal Statistical Office, 2019).

The prediction model has shown how the unemployment rate could have developed without COVID – 19 happening. The rate would have continued to decrease resulting in the index becoming 3%.

Federal Statistical Office predicted the favorable development of the labor market in Switzerland in their forecast publication from December 2019. It says that the development of unemployment rate in the last months of 2019 was more favorable than expected and in 2020 the unemployment rate is predicted to stay the same, around 2.4% (based on SECO definition). Also, a solid growth in employment is anticipated in the coming year. In 2021, it is predicted that unemployment rate might experience a growth of 0.2% due to the economic slowdown in the previous years. The International Labor Organization estimated the unemployment rate to be equal to 4.5% in 2020 (Federal Statistical Office, 2019).

The built model in the Graph 25 shows the same fluctuations, however the decreasing trend, unlike the predictions from Swiss authorities.

5. Conclusion

In conclusion, this bachelor thesis has provided a comprehensive analysis of the unemployment rate in Switzerland from 1991 to 2021.

The analysis has revealed that Switzerland has generally maintained a relatively low and stable unemployment rate compared to other European countries. The main reasons which result in such a low rate are constant tourist flow, high level of education, good system of social security – unemployment benefits and diversified economy.

The study delved into variations in the unemployment rate among different groups based on gender, age, and nationality. Additionally, the analysis covered the employment situations of the primary, secondary, and tertiary sectors in Switzerland, detailing the industries encompassed within each.

The prediction model shows the difference in the trend affected by the irregular fluctuation and not. In case of no pandemic, the unemployment rate would continue to decrease. However, covid negatively affected employment situation causing drastic increase in unemployment caused by several reasons: business closures, particularly in hospitality, travel, and entertainment; supply chain disruptions which reduced consumer spending; challenges in transitioning to remote work which further contributed to job losses. The pandemic triggered a global economic recession, causing contractions in various sectors and a ripple effect of unemployment across the economy.

Overall, this thesis contributes to the existing body of knowledge on unemployment dynamics in Switzerland and provides a foundation for future research in this area. It captures the overarching trends, identifies vulnerable groups, and explores the impact of unforeseen events, offering valuable insights into the multifaceted nature of unemployment in the country. By understanding the underlying factors and trends, policymakers can make informed decisions and implement targeted policies to reduce unemployment and foster a resilient and inclusive labor market in Switzerland.

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