ORIGINAL ARTICLE

Katarina Kramarova
University of Zilina, Slovakia
 orcid.org/0000-0001-6883-3541

Lucia Svabova
University of Zilina, Slovakia
 orcid.org/0000-0002-4722-4103

Barbora Gabrikova
University of Zilina, Slovakia
 orcid.org/0000-0002-9014-7932

Impacts of the Covid-19 crisis on unemployment in Slovakia: a statistically created counterfactual approach using the time series analysis

Abstract

Research background: The current health crisis, which began to take shape in mid-March 2020 due to the massive spread of the coronavirus SARS-CoV-2, has shaped the face of the Slovak labour market the most. Slovakia, similarly, to other countries in the world, has operated with several non-pharmaceutical anti-pandemic measures taken by the government to reduce the spread of the virus or reverse adverse developments. On the other hand, these measures have frozen production, and business activities of companies annulled not only the number of physical meetings with business collaborators but also business contracts themselves. Consequently, the demand for new labour has decreased, and in many cases, redundancies have occurred.
Purpose of the article: The study aims to develop a comprehensive and detailed analysis of unemployment and its development in Slovakia, during the 1st and 2nd wave of the Covid-19

pandemic, determine the extent to which the anti-pandemic measures have affected the Slovak labour market, and identify the most affected groups of unemployed.
Methods: To analyze the impact of the anti-pandemic measures on the unemployment situation in Slovakia, we applied the approach where the statistically created hypothetical state of the absence of the pandemic was compared with the real state as the consequence of the pandemic. The hypothetical state was modelled by the autoregressive 1st order or one-dimensional time series model with a linear trend and seasonability.
Findings & value added: The results of the analysis identify the groups of the population, mostly affected by the Covid-19 pandemic together with the quantification of the impact on unemployment. The findings of quantification of the impact of the Covid-19 crisis on the Slovak labour market can be further used in creating targeted measures aimed at supporting unemployed individuals or at the sustainability of already existing jobs and in other governmental economic and social decisions.

Introduction

The health crisis caused by the SARS-CoV-S2 virus has been haunting the world since about March 2020. According to WHO, the virus firstly appeared in the People's Democratic Republic of China in Wu-chan in the province of Hubei. From there, it has subsequently spread at a dizzying rate to the whole world. At present, countries are exposed not only to the attack of the original virus, but also to its mutated forms, with a significant negative impact on the health of citizens, national economies and economic activity of their subjects, and the quality of social life of citizens. The current economic crisis generated by the public policy measures occasioned by the Covid-19 pandemic is truly novel compared to any other types of crisis that the global and local economies have experienced until now (Landmesser, 2021; Liu *et al*., 2021; Shayb & Musetescu, 2020). In terms of economic impact, it is compared with the great economic crisis of the 1930s or with the recent global financial crisis. At the same time, but from a health point of view, it is a state that, according to several, individual countries last faced in connection with the Spanish influenza pandemic in 1918–1920.

Almost all countries in the world have taken actions in the form of different levels of lockdown due to the lack of any successfully proven remedy that could be able to prevent a major rise in the number of infection cases, however with the negative impact on the national economies and the level of economic activity of their citizens (Kuc-Czarnecka, 2020; Zinecker *et al*., 2021). National labour markets worldwide were disrupted to a historically unprecedented extent (International Labour Organization, 2021).

Considering the existence of the Covid-19 crisis, in the article, we focus on the analysis of the development of unemployment in Slovakia, while the focus is primarily on the development of unemployment in the period from

April 2020 to June 2021, which corresponds to the 1st and 2nd wave of the Covid-19 pandemic in Slovakia.

To credibly assess the impact of the anti-pandemic actions on the Slovak labour market and its development, we used an approach based on the statistically created hypothetical situation of non-pandemic. This approach allows us to quantify the impact of the pandemic with sufficient accuracy, comparing the hypothetical developments, modelled, and predicted by econometrical models, with the real state as the consequence of the pandemic. Given the methodology used, we consider the article to be relatively innovative, as this type of evaluation of the impact of the Covid-19 crisis on the labour market has not yet been carried out in Slovakia. Therefore, the main contribution of this article is an accurate assessment of the impacts of the health crisis on the Slovak labour market and within it also on the selected segments of unemployed according to their different classification criteria.

Given the objective of our study, the rest of the article is organised as follows. The literature review highlights the current state of the issue from different points of view, however in close connection with the labour market. This section also contains a subchapter that we dedicate to the basis analytical view of the Slovak economy, social policy, and provided interventions to support employment in Slovakia with the emphasis on the period of the 1st and 2nd Covid-19 pandemic wave. This partial analysis is a necessary background for obtaining a picture of the functioning of the labour market and the Slovak economy as a whole because of the Covid-19 crisis in the analysed period. At the same time, it provides important information for understanding the core results of the impact analysis on the development of unemployment because of the crisis in a broader context. In the methodology and data section, we describe the methodology used and characterise the data we worked with in the study. The results, broken down in detail based on the selected factors, we present right behind that. The discussion section compares the results of our study with the results of similar studies carried out so far in Slovakia or in other countries. In the conclusion part of the study, we mainly sum up the obtained results, discuss possible further developments of the health crisis, and list the weaknesses and possible further direction of the study.

Literature review

International analytical framework

The economies of European countries have had to deal not only with the spread of the pandemic, but also with the impact that the pandemic has had on various macroeconomic variables including unemployment as one of the most reflective indicators (Su *et al*., 2021). The lack of jobs and income security in employment (mainly due to unexpected short-term shutdowns of companies and longer-term layoffs) is a major factor in the economic, health and psychological impact of the pandemic on different employees or self-employed persons (Webb *et al*., 2020). Su *et al*. (2021) even talk about a drastic increase in unemployment due to the Covid-19 pandemic. In the labour market, it was observed that some employers laid off their employees in an effort to avoid bankruptcy (Galea & Abdalla, 2020). According to International Labour Office (2020) and Verick *et al.* (2022), the labour market disruption in 2020 far exceeded the impact of the global financial crisis in 2009. The International Labour Office estimates that in early January 2021, 93% of workers in the world resided in countries with some of the Covid-19 related workplace restrictions, while the trends in workplace closures vary considerably across the main regions of the world. Working-hour losses in 2020 were approx. four times greater than during the global financial crisis in 2009, and the global labour income (abstracting from income support measures taken in individual countries) declined by approx. 8.3%, that is 4.4% of the global GDP compared to 2019. In the fourth quarter of 2020 (due to the ongoing 2nd wave of the pandemic), the decrease in global working hours was equal to 130 million full-time jobs (International Labour Office, 2020; International Labour Organization, 2021). In connection with the existence of objective effects of the health crisis on the labour market, the OECD reports that the OECD area unemployment rate was 7.1% in October 2020, i.e.,1.7 percentage points above the level observed in February 2020, before the pandemic hit the labour market. In absolute terms, the OECD estimates that around 45.5 million unemployed (by 10.7 million more than in February 2020) were registered in the OECD countries. At the same time, the data show that women were the most vulnerable group in terms of job loss (OECD, 2021). The EU statistics on unemployment lead to the same conclusions. The unemployment rate in the EU-27 countries reached 7.5 % in December 2020 (by 1.0 percentage points above the rate in February 2020), and in the Euro area, even 8.3% (by 1.1 percentage points above the rate in February 2020) (Eurostat, 2021a, 2021b). Recent data show an improvement in the situation — the EU–27 unem-

ployment rate was at 6.7% in October 2021 and 7.3% in the Euro area (Eurostat, 2021a), but the recovery of the labour market is only very slow, and further complications can be expected depending on the development of the pandemic situation and the process of "convalescence" of national economies.

The results of several analyses of the impacts of the Covid-19 pandemic on the largest economy in the world — the USA show that mitigation efforts to reduce the incidence of infections have led to massive growth in unemployment, and social disruption, and appear to be leading to severe economic depression (von Wachter, 2020; Wormser, 2020). As for the specification of those concerned unemployed, the youngest groups and the lowest-earning occupations were hit the hardest during the Covid-19 related recession. If we consider the sectorial orientation of the U. S. industry, the leisure and hospitality sector lost the most jobs in the early months of the pandemic (Gould & Kassa, 2020). Bartik *et al.* (2020) point to the fact that during the first months of the pandemic, the low-wage and retail sectors in the US were hardest hit. In the low-wage sectors, the least disadvantaged workers were hit the most.

As for Europe, for example, the results presented in the study by Su *et al.* (2021) prove that the pandemic increased the unemployment rate robustly in the European economies. Following that, they then emphasize that it is active labour market measures which will play an important role in the labour market and economic recovery. Engemann (2020) and Papoutsaki and Wilson (2020) point to the same facts in the UK and emphasise that, e.g., the economic sectors most affected by the pandemic in its early stages were low-wage sectors that tend to disproportionately employ youth, women, and those from ethnic and minority groups. As for the largest European economy, the German one, according to the Statistical Federal Office, the number of people in employment dropped dramatically compared to 2019, for instance, in the 4th quarter of 2021 by 1.6% (Destatis–Statistisches Bundesamt, 2021). The unemployment rate was at the level of 4.6% in December 2020 (Destatis–Statistisches Bundesamt, 2021) and overall increased by 1.5 percentage points compared to the annual unemployment rate of the previous year. E. g. Bauer and Weber (2021) estimate that the shutdown measures adopted against the 1st wave of the pandemic increased unemployment in Germany in the short run by approx. 117,000 persons. By assessing the treatment effect on unemployment via difference-in-difference estimation, they found that 60% of the considerably increased inflows from employment into unemployment in April 2020 were due to the shutdown measures. In all three countries mentioned above, the USA, Germany, and the UK, according to a study by Adams-Prassl *et al.* (2020) based on the

survey, the differential impact of the pandemic on the labour markets of individual countries was found.

The Covid-19 pandemic has also affected the labour market in Czechia, which is historically, politically, and commercially closest to the Slovak economy. The interconnectedness is also evident in terms of free labour movement since a significant part of Slovaks find employment in Czechia. Since 2020, significant changes have been observed in the labour market related to the Covid-19 pandemic. The changes were reflected in various sectors, both on the part of employees and employers (Hedvicakova & Kozubikova, 2021). In the 4th quarter of 2020, the unemployment rate in Czechia was at the level of 3.1% (which in comparison with other countries of the world can be considered a very low rate), but compared to the previous year, it increased by more than one percentage point. As a result, employment in this period dropped year-on-year by more than 87,500 persons. In terms of gender, the employment rate was lower in the case of women than men, and at the same time, in a year-on-year comparison, its rate of decline was higher (1.2 percentage points for women, 0.8 percentage points for men) (Czech Statistical Office, 2020). In September 2021, the unemployment rate reached 3.5%, whereas the "Covid unemployment peak" was reached so far in January and February 2021, namely 4.3% (Czech Statistical Office, 2021). However, Zubikova and Smolak (2022), who analysed not only the first months of the Covid-19 crisis, surprisingly found that the Czech labour market was not significantly affected by the pandemic.

The study by Atkins *et al*. (2020), for instance, revealed that the pandemic restrictions applied at the beginning of the pandemic in Australia (April 2020) mostly affected youth (aged 14–25 years). These authors and e.g., Churchill (2021) then also point to the fact that young women, in particular, were exposed to the economic fallout, since more likely they were employed in the industries that were most severely impacted by the pandemic. Churchill (2021) also concluded that young people are more vulnerable to the pandemic in the Australian labour market. Atkins *et al.* (2020) estimate that the overall youth employment-to-population ratio dropped from 60.5% in March 2020 to 54% in April 2020. The authors assume that the drop in youth employment would have been greater if it had not been for the JobKeeper payment (one of the Australian financial help schemes). On the other hand, they notice the disproportionate adverse impact experienced by young people that JobKeeper arrangements failed to protect many young people, but had a stronger effect on workers over the age of 25. The authors further state that young people making the transition from education to work will find it more difficult to find employment at entry-level positions due to increased competition for jobs and a declining availability

of jobs precisely because of the continuing negative impacts of the health crisis on the labour market. The importance of targeted support for existing Covid-19-exposed jobs during the onset of a pandemic, but this time in Poland is also sustained by Czapski and Janczuk (2020). They estimate that thanks to these actions taken by the Polish government, three quarters of the employees who took up the support instrument were protected from job loss and before registration as unemployed.

The adopted anti-pandemic actions have logically affected the labour market not only in terms of employment and job creation but also in the form of work itself. To prevent the spread of the virus, several companies have accepted work from home. Working from home has become a more acceptable employment model even for companies that have so far insisted that all employees attend the office or other workplace in person. Retraining and digitisation have taken place, too (Bajgar *et al.*, 2021; Chong *et al.*, 2020; de Lucas Ancillo *et al.*, 2021; Shayb & Musetescu, 2020). Digitalisation and the use of information technology have deepened considerably, not only in large but also in small companies and schools (Dvorak *et al.*, 2020). The introduced measures in the form of lockdown or mandatory quarantine or border closures have had and continue to have an obvious impact on the free movement of labour, especially the low-skilled (Ibn-Mohammed *et al.*, 2021).

The Covid-19 epidemic "positively" affects also the spread of the underground economy, considering both the incidence and its intensity (in terms of afflictions) (Berdiev *et al.*, 2020), including also informal employment since it is expected that the underground economy provides refuge for individuals who lose formal sector employment. Individual workers (including self-employed persons) and companies can undertake such activities, and incomes are derived from them. E. g. Berdiev *et al.* (2020) suppose that an increase in the intensity of epidemics by 10% leads to an increase in the prevalence of the shadow economy approx. by 2%. The rise in home working and remote-based operations due to the pandemic is likely to accelerate trends over the coming years, potentially altering the balance between formal and informal employment. Often delivered informally, social, and childcare demands may also rise in response to greater home working. Increased online purchasing trends, accelerated by the pandemic, may increase informal subcontracting of work (Webb *et al.*, 2020). Particularly in times of long-term crisis, it is possible that formalised employment may become more casualised and no longer a provider of significantly better work conditions than informal jobs (Shapland & Heyes, 2017). This is also compounded by the fact that the size of the underground economy was extensive before the Covid-19 crisis. At the same time, e.g., Webb *et al.*

(2020) state that while the short-term effects of the pandemic are complex and rather unclear, on the other hand, long-term effects on informal and formal employment and different groups in society will be considerable, potentially affecting economic polarisation. For example, in the context of Slovakia, the prevailing view is that a large part of the activities of self-employed persons have moved to the shadow economy because the state aid does not have an effective umbrella concept and many employers, and therefore employees and self-employed persons fall through the sieve of currently financial assistance from the side of the state. The long-term problem is that Slovakia is one of the countries whose citizens do not have much confidence in state institutions, which is one of the general and basic preconditions for a shadow economy to exist. This situation is only exacerbated by the presence of the health crisis and anti-pandemic measures in Slovakia, and therefore, the shadow economy is considered to offer better benefits than the formal one to selected economic subjects.

The general economic and social overview of the situation due to the Covid-19 pandemic in Slovakia

Starting with December 2021, Slovakia has faced the 3rd wave of the Covid-19 pandemic. The life and activities of businesses and citizens have been in the social and economic lockdowns since 12 March 2020 (the start of the 1st wave) with the same breaks depending on the pandemic situation, which is primarily driven by pressures of the pandemic on the system of white medicine functionality and the scope of performing black medicine activities. As of 31 December 2021, Slovakia registered 1,343,393 people who are or were infected with the SARS-COV-2 virus (passed on PCR and antigen tests) and 16,665 deaths (Ministry of Investment, Regional Development and Informatization of the Slovak Republic., 2022).

Economic activity in unchanged conditions in its performance is only allowed to critical infrastructure companies. The activities of other companies are in the lockdown system or are restricted in other ways due to the pandemic. The economic (financial) severity of the impact of lockdowns on their activity is different in terms of their industry classification, the way of selling products and goods, and providing services. Retail and wholesale operations were closed during the 1st and 2nd wave (which corresponds to the analysed period); currently are operating in the shortened opening hours regime due to curfew and only for fully vaccinated or convalescent customers apart from grocery stores, drugstores, pharmacies, shoe repair service, dry cleaners, retail premises serving as dispensaries, gardening, and clothing repair shops (they all are opened without any restrictions). Restaurants,

as well as hotel services, are fully closed. Since the Slovak economy is an open one, measures against the pandemic that have been applied in other countries also have causal effects on the business and economic activities of many Slovak companies and entrepreneurs. Public sector services also operate on a limited basis, except for public health care. However, its priority is given to the care of Covid-19 patients.

The economic impact of the Covid-19 pandemic in aggregate terms is also fully reflected in the Slovak GDP. While before the spread of the pandemic, the medium-term forecast of the National Bank of Slovakia spoke of 2.2% growth of the national economy for 2020 (National Bank of Slovakia, 2019), in real terms, according to current information, it fell by 4.4 % (Statistical Office of the Slovak Republic, 2021b) and 4.8% respectively (National Bank of Slovakia, 2021). The Slovak economic climate thus recorded collapse in 2020 during the 1st wave of the pandemic. In general, the Slovak economic situation had been deteriorating since the beginning of 2018, but due to the pandemic, the situation escalated faster. E.g., according to data from the Statistical Office of the Slovak Republic (2021a), the economic sentiment indicator literally fell in April 2020 to a new historical low (57.0), well below its previous historic low in April and May 2009 (70.6). The creation of Slovak GDP in 2020 is thus comparable to its level in 2017. The forecast of the development of the GDP for 2021 is largely influenced by the expected development of the pandemic and varies from 2.8% (Statistical Office of the Slovak Republic, 2021b) to 4.7% (European Commission, Directorate General for Economic and Financial Affairs, 2020) and up to 5.6% depending on the predictor.

The Covid-19 pandemic has also influenced the current form and scope of education of children and youths – distance learning and home-schooling have come to the fore. The first partial closure of schools took place on 9 March 2020; the general closure of all levels of education (including nurseries and universities) took place on 16 March 2020, while the full-time was not resumed until the last week of the school year 2019/2020. Schools and universities were closed in the following school year since the middle of October 2020. Only kindergartens, school clubs, and primary education of children attending the 1st to 4th class had exceptions — until 8 February 2021, these educational institutions were opened only, however for children of parents who worked in critical infrastructure and children of parents whose nature and content of work did not allow them to work from home. Since the current school year (2021/2022), the method of "letting" children into schools (primary and secondary schools) has been changed several times currently, it is governed by the Covid-19 school routine. Educational processes at the universities in Slovakia are governed by the own rules of

the universities, which, however, must take full account of the constraints defined by the national and regional Covid-19 automats, respectively. According to the OECD, Slovakia belongs among the countries with the highest number of instruction days when the primary and secondary schools were fully closed due to the pandemic. Almost 52,000 primary and secondary pupils (7.5% of the student population) lost access to education in 2020. As many as 8.2% of primary school pupils and 5% of secondary school students did not participate in distance learning. The numbers are even more alarming for pupils and students in special schools and disadvantaged social groups. As many as a quarter of children attending primary schools with a high proportion of socially disadvantaged pupils were not involved in distance learning. In the case of secondary schools with a similar representation of students, it was a dropout of almost 14% of children from the teaching process (Ostertagova & Cokyna, 2020). In this context, however, the potential effects of insufficient access to distance education are already being analysed, especially for socially disadvantaged families and marginalised groups. Another problem is the impossibility of practical learning over distance and the associated threat of unpreparedness of this generation of pupils and students in terms of practical skills and practice for entering the labour market. At the same time, there is an objective concern that, even after the recovery of the labour market, the disparities between labour market requirements and labour supply in terms of practical skills and experience, and thus the very applicability of the generation studying in this way, may widen largely. The same is also true for university graduates.

The Government of Slovakia measures against the spread of the SARS-CoV-2 virus in the form of lockdown currently combines with the vaccination and comprehensive population testing, while negative inhabitants have precisely defined exceptions, especially from the social and working life. Employers also approach testing on a large scale, especially for those employees whose nature and content of work activities do not allow them to work from home. Testing of employees is economically costly, but is currently recognised as a tax expense, and the state partially offsets expenditures. According to the Slovak Employers' Association, a significant number of employers were forced to make an operational redistribution of financial resources to financially cover testing their employees, in many cases at the expense of resources for development, innovation, and wages. They have also largely suspended job creation and filling existing but vacant jobs. In December 2020, the unemployment rate reached 7.57%, the total annual unemployment rate was 6.78% and compared to 2019, it increased by 1.76 percentage points. Actually (one year later), the unemployment rate for December 2021 was "only" 6.76%, which is a significant

year-on-year improvement. However, for the first time since April 2021, we have seen again an increase in the number of unemployed and the unemployment rate (COLSAF SR, 2021).

In connection with the ongoing health crisis, we consider the indicator of the number of vacancies offered online (regardless of whether they are already existing but vacant job positions or newly created job positions) to be a timely indicator characterising the development of the Slovak labour market. If companies — employees filled vacancies in the analysed pandemic period, in many cases, these were already established and existing jobs where employees were replaced due to normal fluctuations. For example, in 2019, newly created jobs (real additional needs of the labour market) represented about 37% of the total number of vacancies; currently, their number is expected to be at the level of 13% (Ministry of Labours, Social Affairs and Family, Slovak Republic, 2019). At zero level, newly created jobs occur within the sectors most affected by the pandemic, such as gastronomy, tourism, and the hotel industry (Profesia Analytics, 2021). While, e.g., the average weekly number of advertised vacancies in January 2020 was 5,108 and 5,023 in February 2020 (approximately one month before the adoption of anti-pandemic measures in the 1st wave of the Covid-19 pandemic), in March 2020, it decreased to 3,364. In January 2021, the average weekly number of vacancies was 3,419, representing a year-on-year decrease of 33.07%. The pandemic also impacts the form of work required by employers. While in the first quarter of 2019, the average number of advertised demand for jobs from home was approx. 197, i.e., 0.3% of the overall job vacancies, in 2020 there was a jump increase on the level of 362 (1.2% of the overall job vacancies). For the 1st quarter of 2021, the number of online advertised job vacancies for this type of work was 1.156 (2.2% of overall job vacancies) (Profesia Analytics, 2021).

The adopted anti-pandemic measures also affected the development of the average nominal wage in Slovakia. In the 1st to 3rd quarter of 2020, the average nominal monthly wage of an employee in the Slovak economy was EUR 1,096, which is a year-on-year increase of 3%. As a result, the average real wage increased by 0,9 %. However, compared to the corresponding period of 2019 (3rd quarter), the average nominal wage growth slowed down by 5.1% and the average real wage by 4.5% (Statistical Office of the Slovak Republic, 2022).

The health crisis has also worsened the degree of the financial health of many businesses and has significantly contributed to the growing number of bankrupt companies (which is logically reflected in the growing number of job losses and increase in unemployment). According to the data offered by the Insolvency Register, 237 businesses got into the status of judicial

bankruptcy in 2020. For the first six months in 2021 it was 155 businesses (the period of our analysis), which is half of the number from the year 2020. By 2021, the register registers 355 companies in bankruptcy totally (Ministry of Justice of the SR & Informatics and Project Management Section, 2021).

Measures for working support assisting workers and employers in dealing with redundancies due to the Covid-19 pandemic are part of the Slovak labour market policy implemented beyond the scope of already existing (ordinary) measures. The Slovak government operates with a toolbox of passive labour market measures "First Aid" (FA), strictly addressing suffered individuals, self-employed, and companies, including special Covid-19 short-time working support. The FA is of a grant nature and is non-refundable if the conditions are met. The assistance is financed from 6 different measures co-financed by the European Social Fund. The first financial support was paid for March 2020.

During the 1st and 2nd waves of the pandemic, there were also the measures outside the FA in Slovakia that included a pandemic contribution to parents providing full-time childcare due to the closure of pre-school and school facilities and the introduction of home-schooling (children up to and including 12 years), and contribution to Covid-19 pandemic sickness. An extension of the period of payment of unemployment allowance to already registered unemployed and an extension of parental allowance for one parent who took care of a child up to the age of three years up to 3 months due to adverse development in the labour market belong there, too. In addition, the amendment to Act No. 461/2003 on Social Insurance waived or postponed the payment of statutory social insurance contributions to some employers and self-employed persons. In the case of all these measures, the conditions and system of their provision are being created hand in hand with the development of the health crisis and its effects on the Slovak labour market.

According to Baliak *et al*. (2021), the Ministry of Labour, Social Affairs and Family of the Slovak Republic, through the Offices of Labour, Social Affairs and Family, paid approx. 2,100 mil. EUR to maintain employment based on 204,000 FA agreements until September 2021. Until January 2021, the financial sources from the FA supported 2,686,101 monthly incomes of employees (person-months), including self-employed persons. Until September 2021, it was 1.5 times more, i.e., 4,95 mil. monthly incomes of employees, including self-employed persons. For the period of providing the FA (03/2020–09/2021), the average monthly number of supported employees and self-employed persons was more than 275,000; an estimated one-third of jobs in the Slovak economy was supported so far.

The drawing of the sources during the 1st wave of the pandemic culminated in April 2020, and the value of allocated finance gradually decreased in the following months. During the 2nd wave, the highest value of financial support was paid in February 2021.

Selected quantitative data characterised by the FA are presented in Figure 1. The data represent preliminary data that can be retrospectively corrected, for example, by reassigning the supported entities within the measures (if we consider the FA structure), especially for the last three months.

The largest share in the drawn amount of the FA as well in the number of supported workers (on a monthly cumulative basis) during the period of the Covid-19 pandemic analysed in the study (04/2020–06/2021) and according to the NACE classification had industrial production (NACE C, 27.5% during the period; 26.2% until October 2020; approx.1,690 mil. workers) followed by wholesale and retail trade (NACE G, 18.5% during the period; 17.2% until October 2020; approx. 861,000 workers), construction (NACE F, 10.8% during the period; 11.1% until October 2021; approx. 403,000 workers), and accommodation and food services (NACE I, 10.2% during the period, 15.6% until October 2020; approx. 409,000 workers). The construction sector and accommodation and food services sector were the most supported in terms of the monthly contribution per one job (EUR 549 respectively EUR 512 per job).

Research method

The primary objective of the study aims to develop a comprehensive and detailed analysis of unemployment and its development in Slovakia during the 1st and 2nd waves of the Covid-19 pandemic and determine the extent to which the anti-pandemic measures have affected the Slovak labour market and identify the most affected groups of unemployed. On the one hand, we focused on the analysis of the overall situation, characterised mainly by the unemployment rate, inflows of new registrations into the database of jobseekers, and an available number of jobseekers. However, we also paid attention to individual segments of the unemployed population (e.g., according to the age, achieved level of education, gender etc.) in more details. For the sake of scale, we do not present figures for the time development of all components of the population, we have selected the most interesting indicators.

In the study, we worked with the secondary data — the raw data collected and published monthly by the Centre for Labour, Social Affairs and

Family of the Slovak Republic (COLSAF SR) on its institutional website and applied a counterfactual approach by the creation of the hypothetical situation without the pandemic. However, in this study, we did not apply counterfactual evaluation methods.

COLSAF SR publishes various data that characterises the Slovak labour market, including data on unemployment and its changes for the previous month(s). We collected the data from 01/2013 to 06/2021 and prepared our own database, which we worked with. In terms of time, the database contains data for two basic periods — the period from 01/2013 to 03/2020 is a period without the pandemic (pre-pandemic period) and the period from 04/2020 to 06/2021 we refer to as a pandemic period, namely the period of the 1st and 2nd wave of the Covid-19 pandemic in Slovakia. The database compiled in this way contains various monitored variables; the variables preferred and used in this study, including their basic statistical characteristics, we present in Table 1.

On the left side of this table, we present the outcome variables, which we used to analyse the impact of the pandemic on unemployment. There are two values for each outcome variable — the average value of a given variable during the pre-pandemic period and the average value of the same variable during the pandemic period. The right part of the same table contains the population variables that we used to model hypothetical non-pandemic situations, i.e., to create regression models of the development of the outcome variables provided that the pandemic situation did not occur at all. We also present their mean values during both monitored periods.

We analysed all the variables that characterise unemployment and its development (within the outcome variables) in Slovakia as the time series. The unemployment and its development we modelled using a regression model for each of these time series. In doing so, we considered the nature of the time series for each variable. Some variables have the character of time series with a seasonal component (inflows of jobseekers, all the variables for education, age categories, NACE classification, inflows of jobseekers for men/women including the individual age categories, and inflows of disadvantaged jobseekers). We modelled these variables using a regression model, where we used as explanatory variables the corresponding population variable (as well listed in Table 1) and months of the year as dummy variables. According to the development of time series, it is obvious that unemployment fluctuates during the year. Therefore, we modelled these variables using a one-dimensional time series model with a linear trend and seasonality represented by the mentioned dummy variables. Then, the second group of outcome variables has the character of stationary time series. We assumed autoregressive dependence without the trend

component for these variables (number of jobseekers totally including separately for men/women, and unemployment rates totally including separately for men/women). We verified autocorrelation in these time series using the Durbin-Watson test, with the result (Durbin-Watson statistic DW) in the interval $\langle 0; 4 \rangle$. The values from $\langle 0; 2 \rangle$ indicate a positive autocorrelation, the values outside this interval indicate a negative autocorrelation. A value of $DW = 2$ indicates no autocorrelation (Durbin-Watson Significance Tables, n.d.). The degree of autocorrelation was determined using the autocorrelation function (ACF) and the partial autocorrelation function (PACF). As a result, it was sufficient to use the 1st order autoregressive model for modelling all these variables. These findings were further used in the process of the creation of regression models of these outcome variables (hypothetical non-pandemic states). In the prediction, we assumed that the created regression model could estimate the further development of a given variable. Then, we carry out a quantitative evaluation of the Covid-19 pandemic on the Slovak labour market by comparing the real state that has occurred (i.e., real empirical data on unemployment during the pandemic) with the hypothetical situation of "what would have happened if the pandemic had not occurred". I.e., we did ex-post verification of our forecasts by comparing them with the empirical realisations of the outcome variables. The differences found are expected to be the results of the pandemic. To prove its statistical significance, we did the test of the statistical significance of the impact. Subsequently, those outcome variables for which the impact of the pandemic proved to be the strongest were identified. In the case of variables describing the unemployment situation in the NACE sectors, in the levels of education, the age categories, and gender, we identified those groups where the pandemic had the strongest impact. Since the values of most variables are measured as numbers of persons, it was suitable to express the impact of the pandemic as a percentage. In some groups, the numbers of unemployed were naturally lower than in other groups. Therefore, if we wanted to compare them, using a relative expression of frequency was more appropriate.

Results

The high level of unemployment among economically active people is, in general, an undesirable phenomenon (Jaskova & Haviernikova, 2020; Svabova & Kramarova, 2021), while the impact of the Covid-19 pandemic on the labour market worldwide was unexpected. This applies to Slovakia too. As more data on unemployment, presented in Figure 2, confirmed the

beginning of the health crisis in Slovakia and the gradual adoption of the measures to prevent its spread, also in the form of economic lockdown, sharply increased the unemployment rate, logically the number of jobseekers as well (an increase of 1.3 percentage points in April 2020 compared to February 2020 in case of the registered unemployment rate and of 1.52 percentage points in case of the calculated unemployment rate), and the upward trend were continuing with temporary declines throughout. The unemployment rate (based on both considered kinds) during the period analysed peaked in the 2nd wave of the pandemic in April 2021, i.e., approx. one year since the crisis started (an increase of 2.42 percentage points in April 2021 compared to February 2020 in case of the registered unemployment rate and of 2.95 percentage points in case of the calculated unemployment rate). At the same time, we estimate that almost 10% of this increase was represented by people who worked abroad in the first three months of the crisis.

Since the beginning of the pandemic, the values of the observed indicators have never returned to their pre-pandemic levels. The more intensive increase in unemployment was partially "hampered" by the targeted actions of the FA. At the same time, it is necessary to accept that the complete elimination of the decline in employment through the FA was not and still is not possible. In the longer term depending on the further course and duration of the pandemic, the measures of the FA will give priority mainly to maintaining a stable core of employees and to continuing self-employed activities so that it is not interrupted from a legislative point of view. The decline in the employment of agency staff, ancillary labour, and temporary labour is therefore logical and expected.

If we consider the development of inflow of newly registered jobseekers according to the age groups, the impact of the health crisis and anti-pandemic measures applied, the most visible changes are in the age group of 25–55 and in the age group over 55. For both groups, there was a significant increase in the number of new jobseekers in April 2020. The number of newly registered jobseekers remained above the long-term trend also in the next consecutive months that we closely relate to the established anti-pandemic measures in Slovakia. In the group of young people under the age of 25, there are regular fluctuations in the development of the indicator of newly registered jobseekers each year in September, when school graduates are registered in the database of jobseekers. In the past, this was in October each year, as graduates were considered students until the end of September. The change is related to the change in the law and the definition of the graduate. In this group of young people, it can be said that there were no significant fluctuations during the pandemic compared to the long-term

development trends in the number of new jobseekers. The development of the indicator of newly registered jobseekers according to the age groups is depicted in Figure 3.

In Figure 4, the data on the development of inflows of newly registered jobseekers according to NACE economic classification are presented. We selected those sectors where the analysis showed that the pandemic increased inflows of new jobseekers on average by more than 30%, namely A (agriculture, forestry, fishing), D (agriculture, forestry, fishing), F (construction), I (accommodation and catering services), L (real estate activities), and R (art, entertainment, and recreation). An interesting finding is that this group also includes two sectors, which used the most the support for existing jobs through the FA (F and I). This confirms our opinion that, in the absence of the FA, especially in the case of these two sectors, the situation would be dramatically worse.

Considering the economic sectors, which we identified as the most affected in terms of the inflow of newly registered jobseekers, in April 2020, there was a strong increase in the number of newly registered jobseekers, and the increased numbers persisted, with small exceptions, throughout the whole observed pandemic period. Even with a small number of jobseekers, some sectors indicate a significant change, which is logical because the share of the economically active population employed in these sectors is relatively low compared to others.

Next, we present the results of the impact assessment of the health crisis that we quantified by comparison of the modelled hypothetical situation of the development of the outcome variables based on the data characteristics for the pre-pandemic period with the real (pandemic) data. The mean values of all predicted outcome variables are presented in Table 2. In the same table, we also present the summary results of the impact analysis in absolute and relative terms. The penultimate column of the same table lists the R-square values we used to verify the statistical quality of the regression models used to model the hypothetical situation without the existence of the Covid-19 pandemic. The last column lists the p-values of the t-tests of equality of means under the null hypothesis "the pandemic has no impact on the selected outcome variable".

As shown in Table 2, the inflows of the newly unemployed people increased by an average of 2,242 persons monthly, representing an increase of 13.7% over the modelled hypothetical non-pandemic situation. The number of disponible jobseekers thus increased on average by 6,540 persons monthly compared to the prediction, which is a 2.97% increase. Based on our findings, both analysed unemployment rates are by 0.24 and 0.27 percentage points higher under the "normal" conditions. The development

of the selected basic indicators of the Slovak labour market — the real state as well as the hypothetical non-pandemic situation is depicted in Figures 5A–5D. Our findings are therefore in line with the statistics of international organizations or with the empirical studies that also prove that the first waves of the Covid-19 pandemic hit national labour markets most notable and in an unpredictable manner (e.g., Bauer & Weber, 2021; Beland *et al*., 2020; Churchill, 2021; Czapski & Janczuk, 2020; Powel *et al*., 2022; Roychowdhury *et al.,* 2022 etc.).

According to our findings of the impact analysis, men seem to have been a more vulnerable group during the pandemic. For example, although the calculated male unemployment rate (real) is lower than for women due to the pandemic (8.8% to 9.5%), the absolute, as well as relative change compared to the predicted non-pandemic state, is higher for them, confirming that the impact of the crisis was greater for men (0.26 to 0.28 percentual points, 2.85% to 3.20% respectively).

For the age groups, according to the analysis results and the relative numbers, the pandemic worsened the situation in the age group 55+ the most (an increase of 19.22% in the case of women, 23.43% in the case of men; overall 21.04%). The predicted hypothetical and real development of monthly inflows of new jobseekers according to the age categorisation is graphically depicted in Figures 6A–6F.

As regards the results of the impact analysis in terms of the educational structure of inflows of jobseekers, the highest impact of the health crisis in relative numbers was revealed in the case of jobseekers with higher vocational education (an increase of 37.53% in comparison with our prediction) and in absolute terms in case of jobseekers with upper secondary vocational (in the absence of the health crisis, the increase of inflows of newly registered jobseekers would be by 828 lower) followed by secondary vocational (an increase by 596). Surprisingly, some results indicate the improvement in unemployment of certain educational groups, i.e., the health crisis had a positive impact on these educational groups. In other circumstances, the statistical model indicates a higher increase in the inflow of jobseekers. We identified this condition in the case of jobseekers with the unfinished and basic level of achieved education followed by the 2nd -degree university education and 1st-degree university education (the rank based on relative numbers). We consider jobseekers with unfinished education problematic from a statistical point of view because the regression model of the hypothetical predicted situation for this group has lower quality than the others (R-square = 0.56). Overall, we can say that the most vulnerable group during the 1st and 2nd waves of the Covid-19 crisis in Slovakia were people

who had completed secondary education level. The results are depicted in Figures 7A–7C.

The important findings follow the impact analysis according to the economic classification of the last employer of newly registered jobseekers too. As can be seen, the real data indicate that the statistically significant average monthly increase occurred in the field of construction (NACE F; +96.21 % increase in the number of jobseekers) followed by accommodation and food service activities (NACE I; +74.46 % increase in the number of new jobseekers), electricity, gas, steam and air conditioning supply (NACE D; +60.56%), real estate activities (NACE L; +33.68%), transportation and storage (NACE H; + 22.79 %), and information and communication (NACE J; +12.13 %). Some of these sectors were the most important recipients of the FA in terms of the number of jobs supported (as we have stated before), so it is logical to expect that the real data on the increase in the number of newly unemployed would show even higher values. As for the results of the impact analysis considering the numbers in absolute terms, in the absence of the pandemic, the average monthly inflows of newly registered jobseekers would most frequently be related to accommodation and food services (NACE I; by 278), manufacturing (NACE C; by 258), and construction (NACE F; by 242). Because the employment varies across the sectors of the Slovak economy, relative results indicate that the pandemic mostly impacted construction (NACE F; 96.1%) followed by accommodation and food services (NACE I; 74.5%), electricity, gas, steam supply services (NACE D; in their case, however, the absolute amount of the increase is eligible; 60,6%), and arts and entertainment services (NACE R; 54,8%). For example, in such an industry as manufacturing (NACE C), the impact of the pandemic in relative terms was not so severe, reaching a level of "only" 13.9%. However, when we realise that one-third of Slovaks work in this sector according to estimates, even a small relative change in the increase of newly registered jobseekers from this sector represents a significant contribution to the increase in total unemployment in Slovakia. Thus, the support of jobs during the pandemic in this sector had a significant justification, and from the point of view of Slovakia, it was/is crucial. In contrast to the previously mentioned sectors, some results of the analysis indicate a certain level of in the case of public administration and compulsory defence services (NACE O; by 30.8%), health and social assistance (NACE Q; by 7.7%), and education (NACE P; by 4.1%) which has a logical justification, as in these sectors there was an increased demand for employees who worked in social facilities (for example for the elderly), health workers, but also teachers during the analysed pandemic period.

Discussion

If we consider the research question we defined and the resulting hypothesis which we worked with, as well the results of the impact analysis, most of the p-values for the selected outcome variables (Table 2) are "close to zero" (grey colour) which indicates that the null hypothesis — "the pandemic has no impact on the selected outcome variable(s)" — has very little support in the observed data on the Slovak labour market. Therefore, based on the universal and most preferred labour market indicators — the unemployment rate, inflows of newly registered jobseekers, and the number of jobseekers, we dare to say that the Covid-19 pandemic during its 1st and 2nd waves affected the Slovak labour market rather negatively since almost all selected indicators could be hypothetically lower. Furthermore, it is logical to assume that the changes in the observed outcome variables may be triggered by other factors as well, but a general analysis of the development of unemployment in Slovakia as well as other foreign studies confirm that the Covid-19 pandemic has hit national labour markets in a shock and unpredictable manner, which also applies in the case of Slovakia. This study extends the results of the study by (Svabova *et al*., 2021), in which the authors analysed the impact of the Covid-19 pandemic on the development of unemployment in Slovakia in general. In the current study, the time frame is longer, so we can see the quantification of the pandemic impact on the situation in Slovakia during several waves of the pandemic. Specifically, the study by Svabova *et al*., (2021) is targeted at the pandemic period up to December 2020, and the impact of the pandemic during that period has proved to be strong. The number of newly registered jobseekers increased by 16.19% compared to the prediction, the unemployment rate by 2.12% and the registered unemployment rate by 2.84% by December 2020. In the current study, we focused on the period of the pandemic until June 2021. In this period, the inflow of new jobseekers was 13.71% higher than predicted. The unemployment rate rose by 3.02% and the registered unemployment rate by 3.66%. The current quantification of impacts can be considered more accurate also due to the inclusion of variables characterizing the population in the regression model, predicting a hypothetical development of unemployment in a situation without a pandemic.

Other indicators also confirmed the deterioration of the situation on the labour market in Slovakia. Our findings, like those by other scholars, point to the difference generated by the crisis refers to the inequities in employment influenced by gender, race or ethnicity, economic sector, level of education achieved, or other factors.

E.g., the evaluation of the pandemic impact shows that during the analysed pandemic period, the situation of disadvantaged jobseekers (the status defined by Act No. 5/2004 Coll. on Employment Services, section 8) was even worse. The inflows of newly registered disadvantaged jobseekers increased due to the health crisis by 1,806 persons monthly on average (17.83% in relative numbers) compared to the prediction. The increase in inflows of disadvantaged jobseekers represents more than 60% of the overall monthly increase of inflows of jobseekers in Slovakia. If we consider that one of the most vulnerable groups of unemployed is the long-term unemployed then the results of our study are in the line with the findings of the International Labour Organization (2020), International Labour Organization (2021), McGinnis and Gitis (2021), Sharone (2021), von Wachter (2020), etc.

Many studies also state that the Covid-19 pandemic has negatively affected the employment of women rather than men. The findings of Dang and Viet Nguyen (2021) state that women are up to 24% more likely to lose their jobs than men as a result of a pandemic. The rate of unemployment of women in Slovakia has always been higher than that of men, but according to our findings of the impact analysis, men seem to have been a more vulnerable group in this case, which contradicts the conclusions of previous studies.

For both genders, the most vulnerable group in terms of inflows of jobseekers were people aged 25–55. However, according to the analysis results and the relative numbers, the pandemic worsened the situation in the age group 55+ the most. Similar results were observed in a study by Svabova and Gabrikova (2021), where, according to relative numbers, the greatest impact of the pandemic was on the age group over 55 years. According to the Slovak legislation, this age group belongs to the population of disadvantaged jobseekers. In terms of the employability of this age group, the situation is even more serious because they are "on edge" of retirement age and employers in many cases (if there are vacancies) prefer younger candidates with established work habits and experience or offer them short-term jobs or part-time jobs. Similar findings regarding this age group were made, e.g., by Gray *et al*. (2022). However, the opposite situation could be observed in the labour market in Australia, where Churchill (2021) compared the impact of a pandemic on youth employment with the impact on employment of the older generation. The author found that during the period under review, the pandemic had a greater impact on the unemployment of the younger generation. The same conclusions were reached by Atkins *et al.* (2020) or Gould and Kassa (2020), who also came

to the same conclusion that the youngest groups are most affected by Covid-19 in labour market in the USA.

From the global point of view of the evaluation of the results, even in the case of the Slovak economy, it has been confirmed that the applied anti-pandemic measures did not have the same impact on all economic sectors. In a study by (Svabova *et al*., 2022) the authors also focused on the analysis of the pandemic impact on unemployment in individual sectors. This study focused on the period up to April 2021 and identified the most affected sectors as F — construction (on average almost 89% increase in unemployment compared to the prediction), I — accommodation and food service activities (on average 88% increase in unemployment) and R — arts, entertainment and recreation (on average 65% increase). In the current study, we identified the first two sectors as the most affected until June 2021, with an impact of over 96% in the F — construction sector and over 74% in the I — accommodation and food service activities sector. It can be said that in the first mentioned sector the situation worsened during the continuation of the pandemic, in the second the impact eased a bit. The third most affected sector, identified in the previous study, R — arts, entertainment and recreation, has in current study an almost 55% increase in unemployment over the prediction. The pandemic impact in this sector have been mitigated, due to the relaxation of measures and state aid. Again, however, we can say that the current study provides more accurate results due to the inclusion of population characterization variables in the regression models used to predict values in a hypothetical no-pandemic situation. The sectors that were most exposed to lockdown risks, generally classified as non-essential, proved to be the most vulnerable, also in other foreign countries (e.g., Dube *et al*., 2021; Gemelas *et al*., 2022; Gould & Kassa, 2020 etc.).

Conclusions

This study analysed the possible impact of the Covid-19 pandemic and taken anti-pandemic measures in the Slovak labour market that was represented by the selected indicators. We quantified the impact of the pandemic by comparing the real state with the hypothetical situation without the existence of the pandemic that we got through the regression modelling. Depending on the character of the variables observed, we applied either autoregressive modelling of the 1st order or one-dimensional time series model with a linear trend and seasonability.

Using high-quality data directly from the COLSAF, this study explored that the pandemic deleteriously impacted the Slovak labor market during its 1st and 2nd waves and, assuming its inexistence, the situation would be more favorable. We also concluded that, in the absence of the measures that supported pandemic-affected firms and entrepreneurs in Slovakia, the impact of the pandemic on the labor market and the number of unemployed individuals would be much worse. In the line with it, we logically assumed that the changes in the observed variables may be triggered by other factors as well, but a general analysis of the development of unemployment in Slovakia as well as other foreign studies confirmed that the Covid-19 pandemic has hit national labor markets in a shocking and unpredictable manner, which also applies in the case of our country.

We consider the study and resulting findings to be beneficial regarding the continuing health crisis (in the time of preparing the study we are awaiting the arrival of the 4th wave of the Covid-19 pandemic) as it provides important information about the state and structure of the labour market, and about its reactions to the pandemic crisis in Slovakia.

The results of our study could be seen as valuable information based on which both private and public stakeholders should understand better the relationship between the observed variables and their dynamics due to the crisis. The findings are applicable to the government not only to already existing measures, but also for newly profiled ones. At the same time, our findings indirectly evaluate the effectiveness of FA in the analysed pandemic period (without their existence, the labour market situation would be worse during the period analysed; quantitative impact analysis of the FA is currently the subject of our robust examination in close cooperation with the public authorities).

We dare say that the study provides a comprehensive list of future events to examine further implications of the Covid-19 crisis for the economy as well unemployed individuals. A possible complement to the study and thus its further direction (which we work on) is the extension of the analysis to the impact of the 3rd and 4th waves and the analysis of the impacts of the crisis on individual geographical areas of Slovakia, as long-term geographical imbalances characterise the Slovak economy in terms of unemployment. This situation logically affects the economic wealth/poverty in the regions concerned. It will also be interesting to observe the development of the labour market in the post-covid period and whether the "Covid unemployed" remained unemployed, even with the currently developing crisis of rising inflation, which negatively affects, among other things, the price of inputs, including labour cost. The findings from our study in connection with new information except other will also

be able to contribute to the assessment of the effectiveness of the funds spent on saving existing jobs or programs to support jobseekers, with emphasis on the fact that a large part of this support came from and comes from the EU funds. The findings of the study are, of course, also useful in the international comparison of the effects of the crisis on national labour markets.

References

Adams-Prassl, A., Boneva, T., Golin, M., & Rauh, C. (2020). Inequality in the impact of the coronavirus shock: evidence from real time surveys. *Journal of Public Economics*, *189*, 104245. doi: 10.1016/j.jpubeco.2020.104245.

Atkins, M., Callis, Z., Flatau, P., & Kaleveld, L. (2020). *COVID-19 and youth unemployment—CSI Response*. Centre for Social Impact. Retrieved from https://www.csi.edu.au/media/uploads/csi_fact_sheet_social_covid-19_youth_unemployment.pdf.

Bajgar, M., Jansky, P., & Sedivy, M. (2021). How many of us can work from home? Evidence for the Czech Republic. *Politická Ekonomie*, *69*(5), 555–570. doi: 10.18267/j.polek.1329.

Baliak, M., Domonkos, S., Fasungova, L., Habel, B., Chujac, T., Komadel, J., Veselkova, M., & Vojtechova, B. (2021). *Interim report on social assistance to workers and families*. Bratislava: Institute of Social Policy, Ministry of Labor, Social Affairs and Family of the Slovak Republic.

Bartik, A. W., Bertrand, M., Lin, F., Rothstein, J., & Unrath, M. (2020). Measuring the labor market at the onset of the COVID-19 crisis. *Brookings Papers on Economic Activity*, (Special Edition), 239–268. doi: 10.3386/w27613.

Bauer, A., & Weber, E. (2021). COVID-19: how much unemployment was caused by the shutdown in Germany? *Applied Economics Letters*, *28*(12), 1053–1058. doi: 10.1080/13504851.2020.1789544.

Beland, L.-P., Brodeur, A., & Wright, T. (2020). The short-term economic consequences of Covid-19: exposure to disease, remote work and government response. *IZA Discussion Paper Series*, *13159*, 1–92. doi: 10.2139/ssrn.3584922.

Berdiev, A., Goel, R. K., & Saunoris, J. W. (2020). International disease epidemics and the shadow economy. *CESifo Working Paper, 8425*.

Chong, S., Huang, Y., & Chang, C.-H. D. (2020). Supporting interdependent telework employees: a moderated-mediation model linking daily COVID-19 task setbacks to next-day work withdrawal. *Journal of Applied Psychology*, *105*(12), 1408–1422. doi: 10.1037/apl0000843.

Churchill, B. (2021). COVID-19 and the immediate impact on young people and employment in Australia: a gendered analysis. *Gender, Work & Organization*, *28*(2), 783–794. doi: https://doi.org/10.1111/gwao.12563.

COLSAF SR. (2021). Monthly statistics on the number and structure of jobseekers in Slovakia. Retrieved from https://www.upsvr.gov.sk/statistiky/nezamestnanost-mesacne-statistiky/kopia-2020.html?page_id=1060197.

Czapski, G., & Janczuk, M. (2020). The impact of coronavirus on the current situation on the labour market in Poland. *Postmodern Openings*, *11*(2), 43–50. doi: 10.18662/po/11.2/156.

Czech Statistical Office (2020). Zaměstnanost a nezaměstnanost podle výsledků VŠPS - 4. Čtvrtletí 2020. Retrieved 17 September 2021, from Zaměstnanost a nezaměstnanost podle výsledků VŠPS - 4. Čtvrtletí 2020. Retrieved from https://www.czso.cz/csu/czso/cri/zamestnanost-a-nezamestnanost-podle-vysledku-vsps-4-ctvrtleti-2020.

Czech Statistical Office (2021). Zaměstnanost a nezaměstnanost podle výsledků VŠPS - 3. Čtvrtletí 2021. Retrieved 10 March 2022, from Zaměstnanost a nezaměstnanost podle výsledků VŠPS - 3. Čtvrtletí 2021. Retrieved from https://www.czso.cz/csu/czso/cri/zamestnanost-a-nezamestnanost-podle-vysledku-vsps-3-ctvrtleti-2021.

Dang, H.-A. H., & Viet Nguyen, C. (2021). Gender inequality during the COVID-19 pandemic: income, expenditure, savings, and job loss. *World Development*, *140*, 105296. doi: 10.1016/j.worlddev.2020.105296.

de Lucas Ancillo, A., del Val Nunez, M. T., & Gavrila, S. G. (2021). Workplace change within the COVID-19 context: a grounded theory approach. *Economic Research-Ekonomska Istraživanja*, *34*(1), 2297–2316. doi: 10.1080/1331677X.2020.1862689.

Destatis - Statistisches Bundesamt (2021). Economic impacts—Statistics related to COVID-19. Retrieved 17 September 2021, Federal Statistical Office. Retrieved from https://www.destatis.de/EN/Themes/Cross-Section/Corona/Economy/context-economy.html.

Dube, K., Nhamo, G., & Chikodzi, D. (2021). COVID-19 cripples global restaurant and hospitality industry. *Current Issues in Tourism*, *24*(11), 1487–1490. doi: 10.1080/13683500.2020.1773416.

Durbin-Watson Significance Tables (n.d.). Retrieved from https://www3.nd.edu/~wevans1/econ30331/Durbin_Watson_tables.pdf.

Dvorak, M., Rovny, P., Grebennikova, V., & Faminskaya, M. (2020). Economic impacts of Covid-19 on the labor market and human capital. *Terra Economicus*, *18*(4), 78–96. doi: 10.18522/2073-6606-2020-18-4-78-96.

Engemann, K. (2020). How the COVID-19 pandemic has affected the U.S. labor market | St. Louis Fed. Open Vault Blog, Everyday Economics Explained. Retrieved from https://www.stlouisfed.org/open-vault/2020/october/how-covid19-pandemic-ha s-affected-labor-market.

European Commission, Directorate General for Economic and Financial Affairs. (2020). *European economic forecast: Autumn 2020.* Luxembourg: Publications Office of the European Union.

Eurostat (2021a). *Euro area unemployment at 8.3%*. Eurostat Press Office. Retrieved from https://ec.europa.eu/eurostat/documents/portlet_file_entry/2995 521/3-08012021-AP-EN.pdf/fc360f72-ff0d-ecc0-df77-2bd9c7549825.

Eurostat (2021b). Unemployment statistics. Retrieved 17 September 2021 Retrieved from: https://ec.europa.eu/eurostat/statistics-explained/index.php?title= Unemployment_statistics.

Galea, S., & Abdalla, S. M. (2020). COVID-19 pandemic, unemployment, and civil unrest: underlying deep racial and socioeconomic divides. *JAMA*, *324*(3), 227–228. doi: 10.1001/jama.2020.11132.

Gemelas, J., Davison, J., Keltner, C., & Ing, S. (2022). Inequities in employment by race, ethnicity, and sector during COVID-19. *Journal of Racial and Ethnic Health Disparities*, *9*(1), 350–355. doi: 10.1007/s40615-021-00963-3.

Gould, E., & Kassa, M. (2020). *Young workers hit hard by the COVID-19 economy: workers ages 16–24 face high unemployment and an uncertain future (No. 203139)*. Washington: Economic Policy Institute.

Gray, B. J., Kyle, R. G., Song, J., & Davies, A. R. (2022). Characteristics of those most vulnerable to employment changes during the COVID-19 pandemic: a nationally representative cross-sectional study in Wales. *Journal of Epidemiology and Community Health*, *76*(1), 8–15. doi: 10.1136/jech-2020-216030.

Hedvicakova, M., & Kozubikova, Z. (2021). Impacts of COVID-19 on the labour market—evidence from the Czech Republic. In *Proceedings of the international scientific conference Hradec Economic Days 2021*, *11*. Hradec Kralove: University of Hradec Kralove, Faculty of Informatics and Management, 232–241. doi: 10.36689/uhk/hed/2021-01-023.

Ibn-Mohammed, T., Mustapha, K. B., Godsell, J., Adamu, Z., Babatunde, K. A., Akintade, D. D., Acquayeg, A., Fujiih, H., Ndiayei, M. M., Yamoahj, F. A., & Koh, S. C. L. (2021). A critical analysis of the impacts of COVID-19 on the global economy and ecosystems and opportunities for circular economy strategies. *Resources, Conservation and Recycling*, *164*, 105169. doi: 10.1016/j. resconrec.2020.105169.

International Labour Office (2020). *ILO Monitor: COVID-19 and the world of work. Fourth edition. Updated estimates and analysis*. Retrieved from https://www.ilo.org/wcmsp5/groups/public/---dgreports/-- dcomm/documents/b riefingnote/wcms_745963.pdf.

International Labour Organization (2021). *ILO Monitor: COVID-19 and the world of work. Seventh edition. Updated estimates and analysis*. Retrieved from https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/documents/b riefingnote/wcms_767028.pdf.

Jaskova, D., & Haviernikova, K. (2020). The human resources as an important factor of regional development. *International Journal of Business and Society*, *21*(3), 1464–1478. Doi: 10.33736/ijbs.3364.2020.

Kuc-Czarnecka, M. (2020). COVID-19 and digital deprivation in Poland. *Oeconomia Copernicana*, *11*(3), 415–431. doi: 10.24136/oc.2020.017.

Landmesser, J. (2021). The use of the dynamic time warping (DTW) method to describe the COVID-19 dynamics in Poland. *Oeconomia Copernicana*, *12*(3), 539–556. doi: 10.24136/oc.2021.018.

Liu, N., Xu, Z., & Skare, M. (2021). The research on COVID-19 and economy from 2019 to 2020: Analysis from the perspective of bibliometrics. *Oeconomia Copernicana*, *12*(2), 217–268. doi: 10.24136/oc.2021.009.

McGinnis, K., & Gitis, B. (2021). *Understanding the COVID-19 rise in long-term unemployment*. Bipartisan Policy Center. Retrieved from https://bipartisanpolicy.org/blog/understanding-covid-19-unemployment/.

Ministry of Investment, Regional Development and Informatization of the Slovak Republic (2022). Coronavirus and Slovakia. Retrieved from https://korona.gov.sk/.

Ministry of Justice of the SR & Informatics and Project Management Section (2020). Register of bankrupts, public part. Retrieved from https://ru.justice.sk/ru-verejnost-web/pages/home.xhtml.

Ministry of Labours, Social Affairs and Family, Slovak Republic (2019). Labor market trends—Survey. Retrieved from https://www.trendyprace.sk/sk/prieskum.

National Bank of Slovakia (2019). Strednodobá predikica—4. Štvrťrok 2019. Národná banka Slovenska. Retrieved from http://www.nbs.sk/_img/Documents/_Publikacie/PREDIK/2019/protected/P4Q-2019.pdf.

National Bank of Slovakia (2021). Selected economic and monetary indicators of the Slovak Republic. Retrieved from https://www.nbs.sk/_img/Documents/_Publikacie/OstatnePublik/ukazovatele.pdf.

OECD (2021). Unemployment rates. Retrieved from https://www.oecd.org/sdd/labour-stats/unemployment-rates-oecd-update-january-2021.htm.

Ostertagova, A., & Cokyna, J. (2020). *The main findings of the questionnaire survey in the basic and secondary schools on the course of distance learning in the school year 2019/2020*. Bratislava: Institute of Educational Policy, Ministry of Education, Science, Research and Sports of the Slovak Republic. Retrieved from https://digitalnakoalicia.sk/wp-content/uploads/2020/09/Prieskum-IVP-o-priebehu-distancnej-vyucby-2020.pdf.

Papoutsaki, D., & Wilson, T. (2020). *Covid-19 and the low paid: early analysis of labour force survey*. Brighton: Institute for Employment Studies.

Powel, A., Francis-Devine, B., & Clark, H. (2022). *Coronavirus: impact on the labour market*. House of Commons Library. Retrieved from https://researchbriefings.files.parliament.uk/documents/CBP-8898/CBP-8898.pdf.

Profesia Analytics (2021). ProfesiaReport—COVID 19 recruitment report. Retrieved https://public.tableau.com/views/ProfesiaReport/Covid?%3Adisplaystatic_image=y&%3AbootstrapWhenNotified=true&%3Aembed=true&%3Alanguage=en-US&:embed=y&:showVizHome=n&:apiID=host0#navType=0&navSrc=Parse.

Roychowdhury, A., Bose, M., & De Roy, S. (2022). The great Indian lockdown 1.0: exploring the labour market dynamics. *Canadian Journal of Development Studies / Revue Canadienne d'études Du Développement*. Advance online publication. doi: 10.1080/02255189.2022.2038093.

Shapland, J., & Heyes, J. (2017). How close are formal and informal work? *International Journal of Sociology and Social Policy*, *37*(7/8), 374–386. doi: 10.1108/IJSSP-06-2016-0071.

Sharone, O. (2021). Networking while long-term unemployed: why long-term unemployment will likely persist long after the COVID-19 pandemic recedes. *American Behavioral Scientist*. Advance online publication. doi: 10.1177/000 27642211066032.

Shayb, H., & Musetescu, R. (2020). Business strategy during crisis. *Proceedings of the International Conference on Business Excellence*, *14*(1), 263–272. doi: 10.2478/picbe-2020-0025.

Statistical office of the Slovak Republic (2021a). Economic sentiment indicator. Retrieved from http://statdat.statistics.sk/cognosext/cgi-bin/cognos.cgi?b_acti on=cognosViewer&ui.action=run&ui.object=storeID%28"i9C8FE18003BF43E EB340E5EBF334FF81"%29&ui.name=Indikátor%20ekonomického%20sentim entu%20%5bkp0001ms%5d&run.outputFormat=&run.prompt=true&cv.header =false&ui.backURL=%2fcognosext%2fcps4%2fportlets%2fcommon%2fclose. html&run.outputLocale=sk#.

Statistical Office of the Slovak Republic (2021b). The decline in GDP in 2020 was reduced to 4.4%, the revision showed a higher performance of the Slovak economy. Retrieved from https://slovak.statistics.sk/wps/portal/ext/products/ informationmessages/inf_sprava_detail/aeb89a86-b3a3-465f-9985-35b38c9d9e c2/!ut/p/z1.

Statistical Office of the Slovak Republic (2022). Average monthly wage in the Slovak economy. Retrieved 10 March 2022, from http://statdat.statistics. sk/cognosext/cgi-bin/cognos.cgi?b_action=cognosViewer&ui.action=run&ui.o bject=storeID(%22i94C7052B240A492FB3BE8C7A487D337B%22)&ui.name =Priemern%C3%A1%20mesa%C4%8Dn%C3%A1%20mzda%20v%20hospod %C3%A1rstve%20SR%20%5bpr0204qs%5d&run.outputFormat=&run.prompt =true&cv.header=false&ui.backURL=%2fcognosext%2fcps4%2fportlets%2fco mmon%2fclose.html&run.outputLocale=sk.

Su, C.-W., Dai, K., Ullah, S., & Andlib, Z. (2021). COVID-19 pandemic and un-employment dynamics in European economies. *Economic Research-Ekonomska Istraživanja*. Advance online publication. doi: 10.1080/1331677X.2 021.1912627.

Svabova, L, & Gabrikova, B. (2021). The rise in youth employment? Impact eval-uation of COVID-19 consequences. *Journal of Eastern European and Central Asian Research (JEECAR)*, *8*(4), 511–526. doi: 10.15549/jeecar.v8i4.757.

Svabova, L., & Kramarova, K. (2021). An analysis of participation factors and effects of the active labour market measure Graduate practice in Slovakia – counterfactual approach. *Evaluation and Program Planning*, *86*, 101917. doi: 10.1016/j.evalprogplan.2021.101917.

Svabova, L., Nahalkova Tesarova, E., Durica, M., & Strakova, L. (2021). Evaluation of the impacts of the COVID-19 pandemic on the development of the unemployment rate in Slovakia: counterfactual before-after comparison. *Equilibrium. Quarterly Journal of Economics and Economic Policy*, *16*(2), 261–284. doi: 10.24136/eq.2021.010.

Svabova, L., Nahalkova Tesarova, E., Strakova, L., & Durica, M. (2022). No escape from COVID-19 consequences: cross-sectoral evaluation of impact on unemployment in Slovakia. *Central European Journal of Public Policy*, ahead of print. doi: 10.2478/cejpp-2022-0004.

Verick, S., Schmidt-Klau, D., & Lee, S. (2022). Is this time really different? How the impact of the COVID-19 crisis on labour markets contrasts with that of the global financial crisis of 2008–09. *International Labour Review*, *161*(1), 125–148. doi: 10.1111/ilr.12230.

von Wachter, T. (2020). Lost generations: long-term effects of the COVID-19 crisis on job losers and labour market entrants, and options for policy. *Fiscal Studies*, *41*(3), 549–590. doi: 10.1111/1475-5890.12247.

Webb, A., McQuaid, R., & Rand, S. (2020). Employment in the informal economy: implications of the COVID-19 pandemic. *International Journal of Sociology and Social Policy*, *40*(9/10), 1005–1019. doi: 10.1108/IJSSP-08-2020-0371

Wormser, G. P. (2020). COVID-19 versus seasonal influenza 2019–2020: USA. *Wiener Klinische Wochenschrift*, *132*(13), 387–389. doi: 10.1007/s00508-020-01685-y.

Zinecker, M., Doubravský, K., Balcerzak, A. P., Pietrzak, M. B., & Dohnal, M. (2021). The Covid-19 disease and policy response to mitigate the economic impact in the EU. *Technological and Economic Development of Economy*, *27*(3), 742–762. doi: 10.3846/tede.2021.14585.

Zubikova, A., & Smolak, P. (2022). Macroeconomic impacts of the COVID-19 pandemic in the Czech Republic in the period of 2020-2021. *International Journal of Economic Sciences*, *11*(1), 117–145. doi: 10.52950/ES.2022.11.1.008.

Annex

Table 1. Variables, characteristics of variables

Group of variables	Outcome variable			Population variable		
	Name	**Mean period pre- pandemic**	**Mean pandemic period**	**Name**	**Mean period pre-pandemic**	**Mean pandemic period**
Basic indicators	inflow of jobseekers (newly registered jobseekers)	19 601 (4022.83)	18 603 (4459.83)	economically active persons	2 738 510 (17.69)	2 704 240 (19.90)
	number of jobseekers	249 362 (94 985.71)	207 527 (7 939.08)			
	unemployment rate calculated [%]	10.55 (3.57)	8.28 (0.30)			
	unemployment rate [%]	9.19 (3.44)	7.57 (0.37)			
	inflow disadvantages	12 928 (3 716.69)	11 934 (2 637.92)			
Education	unfinished	422 (102.86)	349 (49.79)	population unfinished basic	333 (0.20)	200 (0.00)
	basic	2 875 (596.27)	2 605 (373.33)	population basic	157 448 (6.82)	109 220 (16.39)
	lower secondary	299 (249.32)	131 (53.36)	population lower secondary vocational	732 424 (59.87)	602 580 (12.79)
	secondary vocational	5 017 (932.28)	4 945 (1 361.43)	population secondary vocational	166 862 (27.14)	168 720 (2.44)
	upper secondary vocational	6 242 (1 668.06)	6 217 (2 020.99)	population upper secondary vocational	903 786 (15.99)	928 000 (16.99)
	upper secondary general	931 (267.74)	873 (262.06)	population upper secondary general	112 928 (5.51)	111 320 (0.83)
	higher vocational	126 (58.58)	101 (28.64)	population higher vocational	23 786 (2.67)	20 740 (1.43)
	university 1st	599 (246.84)	611 (208.70)	population university 1st	79 017 (7.69)	87 840 (2.37)
	university 2nd	2 553 (1 085.23)	2 636 (1 236.63)	population university 2nd	527 210 (60.37)	651 580 (15.95)
	university 3rd	79 (30.98)	90 (30.85)	population university 3rd	19 141 (5.63)	24 120 (2.58)
Age	inflow_ age under 25	4 924 (2 932.69)	3 596 (1 802.10)	population under 25	199 186 (17.67)	150 200 (7.08)
	inflow_ age 25-55	12 875 (1 947.91)	12 702 (3 037.08)	population 25-55	2 118 338 (15.00)	2 074 520 (9.32)
	inflow_ age 55 and older	1 802 (353.90)	2 305 (496.67)	population 55 and older	421 003 (35.68)	479 500 (6.61)
Women	inflow of jobseekers (newly registered jobseekers)	9 411 (2 028.07)	9 234 (2 371.92)	economically active persons women	1 233 290 (16.31)	1 241 900 (17.17)
	number of jobseekers	125 833 (40 025.31)	108 568 (5 470.11)			

Table 1. Continued

Group of variables	Outcome variable			Population variable		
	Name	Mean period pre- pandemic	Mean pandemic period	Name	Mean period pre-pandemic	Mean pandemic period
Women	unemployment rate calculated [%]	11.93 (3.51)	9.51 (0.34)			
	unemployment rate [%]	10.28 (3.42)	8.64 (0.44)			
	inflow_ age under 25	2 206 (1 369.89)	1 691 (868.21)	population women under 25	74 800 (7.70)	55 180 (2.71)
	inflow_ age 25-55	6 405 (985.72)	6 404 (1 589.14)	population women 25-55	961 197 (11.55)	952 480 (18.23)
	inflow_ age 55 and older	800 (174.30)	1 139 269.39)	population women 55 and older	197 331 (26.02)	234 220 (3.38)
Men	inflow of jobseekers	10 190 (2 241.38)	9 369 (2 155.36)			
	number of jobseekers	140 198 (54 238.67)	107 444 (3 957.51)	economically active persons men	1 505 221 (7.13)	1 462 340 (24.65)
	unemployment rate calculated [%]	11.59 (4.48)	8.88 (0.33)			
	inflow_ age under 25	2 718 (1 601.07)	1 906 (982.05)	population men under 25	124 386 (10.31)	95 020 (5.11)
	inflow_ age 25-55	6 470.14 (1 197.18)	6 297.87 (1 535.69)	population men 25-55	1 157 141 (5.01)	1 122 040 (16.74)
	inflow_ age 55 and older	1 001.70 (235.33)	1 165.67 (244.11)	population men 55 and older	223 672 (10.13)	245 280 (3.34)
NACE classification	A – agriculture, forestry, fishing	242 (127.96)	206 (69.88)			
	B – mining, quarrying	26 (10.26)	17 (5.85)			
	C – industrial production	1 835 (283.91)	2 110 (608.5)			
	D – supply of electricity, gas, steam, and cold air	31 (16.74)	30 (9.83)			
	E – water supply, wastewater treatment and waste disposal, waste management and waste disposal services	64 (20.71)	67 (15.37)	economically active persons	2 738 510 (17.69)	2 704 240 (19.90)
	F – construction	590 (320.78)	493 (131.13)			
	G – wholesale and retail trade, trade repair of motor vehicles and motorcycles	1 508 (225.17)	1 545 (430.67)			
	H – transport and storage	345 (57.94)	423 (127.73)			

Table 1. Continued

Group of variables	Outcome variable			Population variable		
	Name	Mean period pre- pandemic	Mean pandemic period	Name	Mean period pre-pandemic	Mean pandemic period
NACE classificat ion	I – accommodation and catering services	335 (67.01)	652 (511.36)			
	J – information and communication	161 (31.68)	195 (48.34)			
	K – financial and insurance services	147 (29.73)	147 (42.20)			
	L – real estate activities	102 (24.23)	135 (58.31)			
	M – professional, scientific, and technical activities	385 (63.93)	429 (126.81)			
	N – administrative and support services	642 (98.25)	684 (207.54)			
	O – public administration and defence compulsory services	665 (621.37)	478 (179.00)			
	P – education	353 (378.39)	316 (309.48)			
	Q – health and social assistance	281 (72.65)	302 (49.40)			
	R – art, entertainment, and recreation	112 (30.24)	172 (168.06)			
	S – other activities	156 (84.56)	159 (73.40)			

Table 2. Results of pandemic impact evaluation

group of variables	outcome variable	pandemic (mean)	predicted (mean)	absolute impact	relative impact %	R-square	p-value
basic indicators	inflow of jobseekers (newly registered jobseekers)	18 603	16 361	2 242	13.71%	0.932	0.041
	number of jobseekers (total)	227 019	220 479	6 540	2.97%	0.999	0.003

Table 2. Continued

group of variables	outcome variable	pandemic (mean)	predicted (mean)	absolute impact	relative impact %	R-square	p-value
basic indicators	unemployment rate calculated [%]	8.28	8.03	0.24	3.02%	0.999	0.002
	unemployment rate [%]	7.57	7.30	0.27	3.66%	0.999	0.004
	inflow disadvantages	11 934	10 129	1 806	17.83%	0.878	0.006
education	unfinished	349	420	-71	-16.86%	0.56	0.005
	basic	2 605	2 822	-217	-7.70%	0.769	0.140
	secondary vocational	4 945	4 349	596	13.71%	0.826	0.191
	upper secondary vocational	6 217	5 388	828	15.38%	0.852	0.020
	upper secondary general	873	849	24	2.82%	0.942	0.865
	higher vocational	101	74	28	37.53%	0.934	0.008
	university 1st	611	632	-21	-3.38%	0.781	0.650
	university 2nd	2 636	2 829	-193	-6.81%	0.958	0.460
	university 3rd	90	90	0	-0.01%	0.966	0.691
age	age under 25	3 596	3 427	170	4.95%	0.96	0.173
	age 25-55	12 702	10 985	1 717	15.63%	0.84	0.036
	age 55 and older	2 305	1 904	401	21.04%	0.829	0.001
women	inflow of jobseekers	9 234	8 891	342	3.85%	0.937	0.776
	number of jobseekers	119 575	116 377	3 198	2.75%	0.999	0.005
	unemployment rate calculated [%]	9.51	9.25	0.26	2.85%	0.999	0.005
	unemployment rate [%]	8.64	8.34	0.30	3.57%	0.999	0.001
	age under 25	1 691	1 695	-5	-0.27%	0.966	0.733
	age 25-55	6 404	6 297	107	1.70%	0.881	0.001
	age 55 and older	1 139	955	184	19.22%	0.891	0.002
men	inflow of jobseekers	9 369	8 012	1 357	16.94%	0.893	0.031
	number of jobseekers	107 444	104 112	3 332	3.20%	0.99	0.004
	unemployment rate calculated [%]	8.88	8.60	0.28	3.20%	0.999	0.004

Table 2. Continued

group of variables	outcome variable	pandemic (mean)	predicted (mean)	absolute impact	relative impact %	R-square	p-value
	age under 25	1 906	1 720	186	10.82%	0.955	0.017
men	age 25-55	6 298	5 434	864	15.91%	0.831	0.036
	age 55 and older	1 166	944	221	23.43%	0.826	0.001
	A - Agriculture, Forestry and Fishing	206	176	31	17.52%	0.952	0.100
	B - Mining and Quarrying	17	16	1	5.21%	0.516	0.650
	C – Manufacturing	2 110	1 851	258	13.94%	0.713	0.307
	D - Electricity, Gas, Steam and Air Conditioning Supply	30	19	11	60.56%	0.757	0.006
	E - Water Supply; Sewerage, Waste Management and Remediation Activities	67	63	4	6.20%	0.673	0.394
	F – Construction	493	251	242	96.21%	0.865	0.001
NACE	G - Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles	1 545	1 509	36	2.39%	0.814	0.650
	H - Transportation and Storage	423	345	79	22.79%	0.632	0.015
	I - Accommodation and Food Service Activities	652	374	278	74.46%	0.777	0.012
	J - Information and Communication	195	174	21	12.13%	0.746	0.031
	K - Financial and Insurance Activities	147	148	-1	-0.53%	0.714	0.427
	L - Real Estate Activities	135	101	34	33.68%	0.612	0.017

Table 2. Continued

group of variables	outcome variable	pandemic (mean)	predicted (mean)	absolute impact	relative impact %	R-square	p-value
NACE	M - Professional, Scientific and Technical Activities	429	382	47	12.26%	0.772	0.173
	N - Administrative and Support Service Activities	684	600	84	13.92%	0.653	0.069
	O - Public Administration and Defence; Compulsory Social Security	478	685	-207	-30.17%	0.654	0.001
	P – Education	316	329	-14	-4.11%	0.906	0.281
	Q - Human Health and Social Work Activities	302	327	-25	-7.72%	0.692	0.023
	R - Arts, Entertainment and Recreation	172	111	61	54.82%	0.719	0.173
	S - Other Service Activities	159	152	8	5.02%	0.452	0.280

Figure 1. Basic quantitative information on the anti-pandemic measure "First Aid"
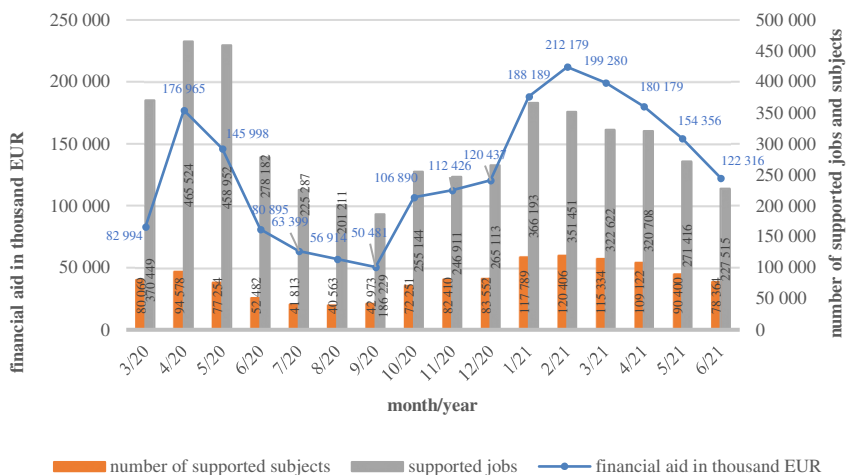
Source: own elaboration based on data provided by the database of *First Aid to Slovakia - Interim Report on Social Assistance to Workers and Families - UPDATE 18.* Retrieved from https://www.employment.gov.sk/sk/ministerstvo/vyskum-oblasti-prace-socialnych-veci-institut-socialnej-politiky/analyticke-komentare/prva-pomoc-slovensku.html.

Figure 2. Unemployment in Slovakia in the period 01/13–06/21
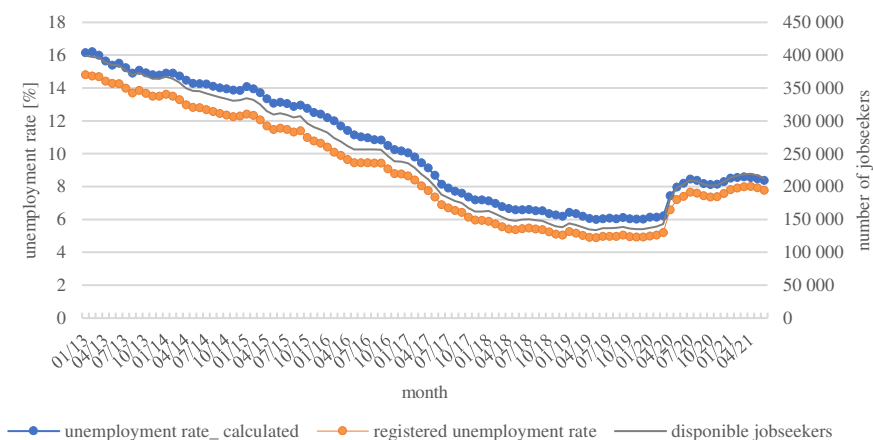
Source: own elaboration based on data provided by the Centre of Labour, Social Affairs and Family SR. Retrieved from https://www.upsvr.gov.sk/statistiky/nezamestnanost-mesacne-statistiky.html?page_id=1254.

Figure 3. Unemployment in age groups in Slovakia in the period 01/13–06/21
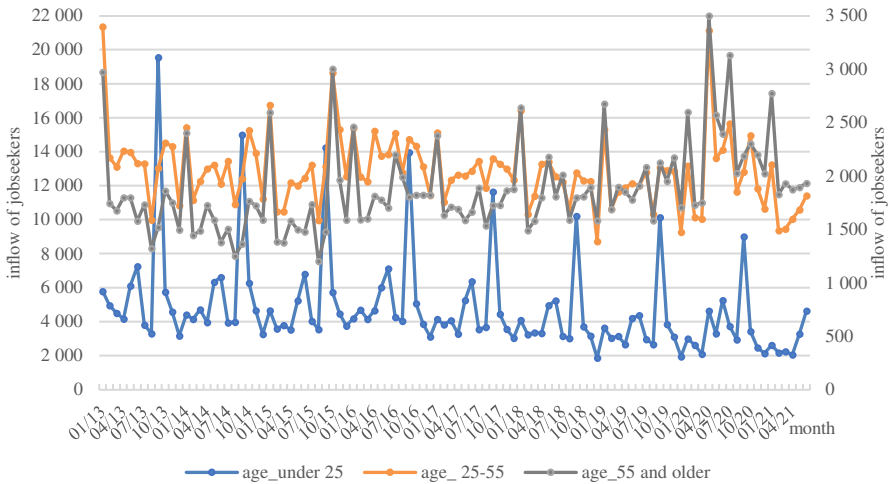
Source: own elaboration based on data provided by the Centre of Labour, Social Affairs and Family SR. Retrieved from https://www.upsvr.gov.sk/statistiky/nezamestnanost-mesacne-statistiky.html?page_id=1254.

Figure 4. Unemployment in NACE categories in Slovakia
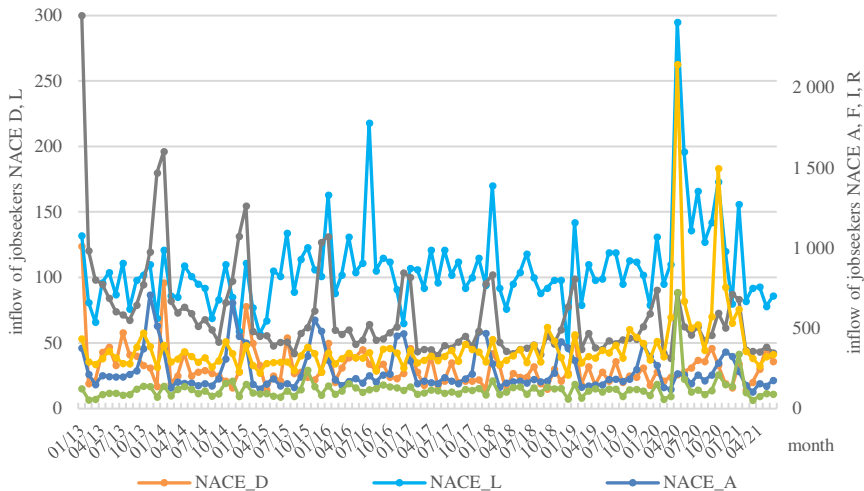
Source: own elaboration based on data provided by the Centre of Labour, Social Affairs and Family SR. Retrieved from https://www.upsvr.gov.sk/statistiky/nezamestnanost-mesacne-statistiky.html?page_id=1254.

Figure 5A. Predicted and real development of unemployment in Slovakia: inflow of jobseekers
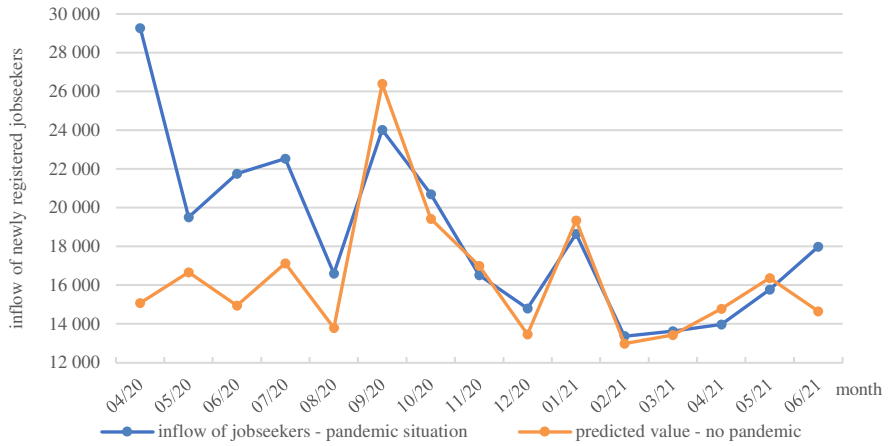
Figure 5B. Predicted and real development of unemployment in Slovakia: number of jobseekers
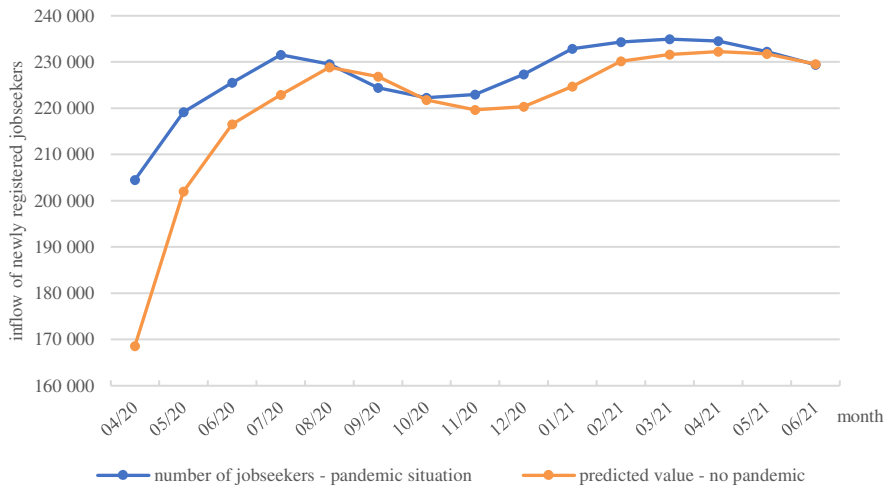
Figure 5C. Predicted and real development of unemployment in Slovakia: unemployment rate calculated from the number of jobseekers
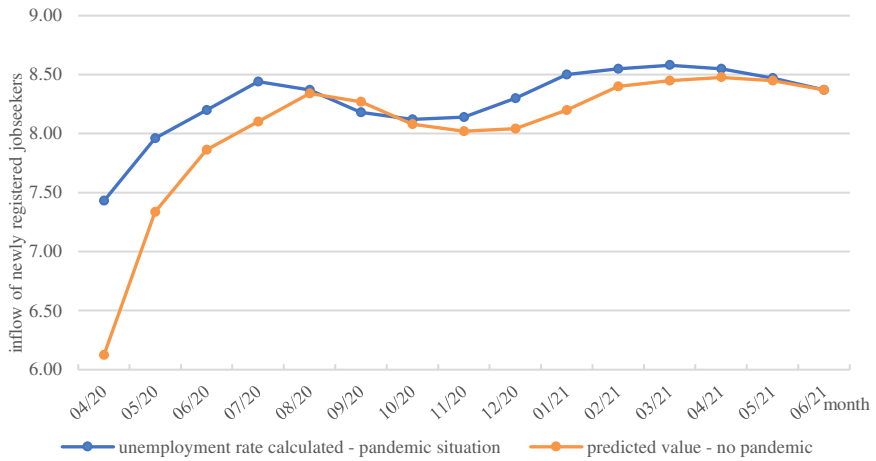
Figure 5D. Predicted and real development of unemployment in Slovakia: registered unemployment rate
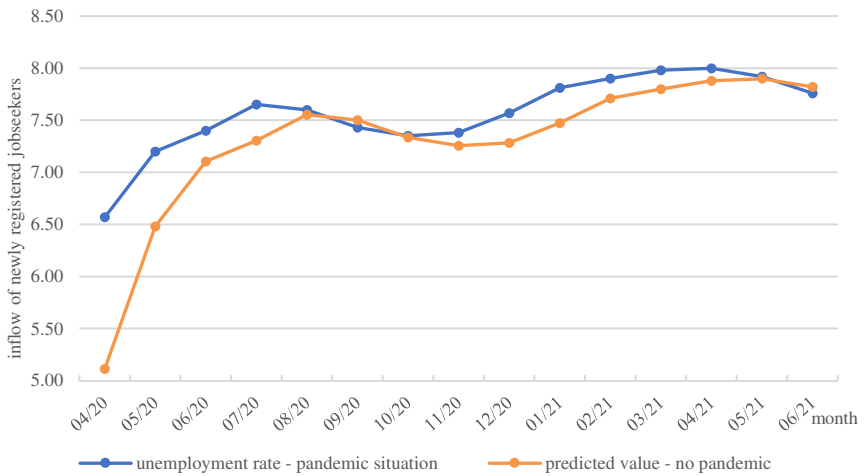
Figure 6A. Predicted and real development of unemployment in Slovakia for age groups: age 25–55
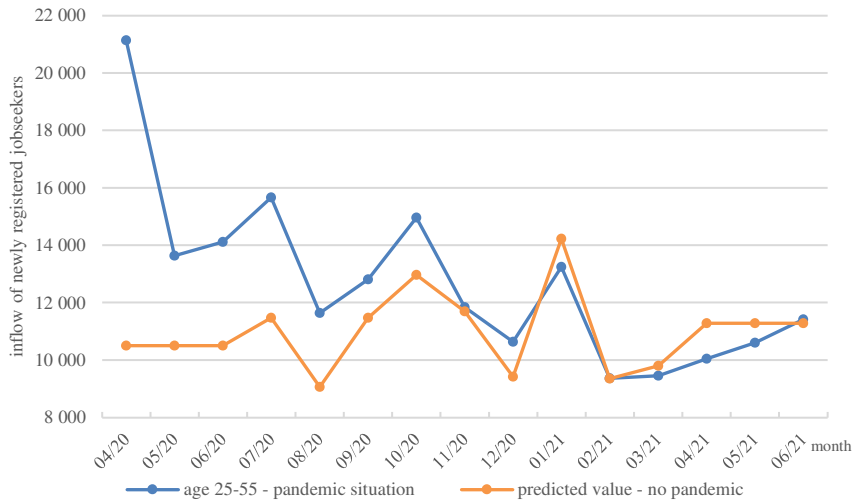
Figure 6B. Predicted and real development of unemployment in Slovakia for age groups: age 55 and older
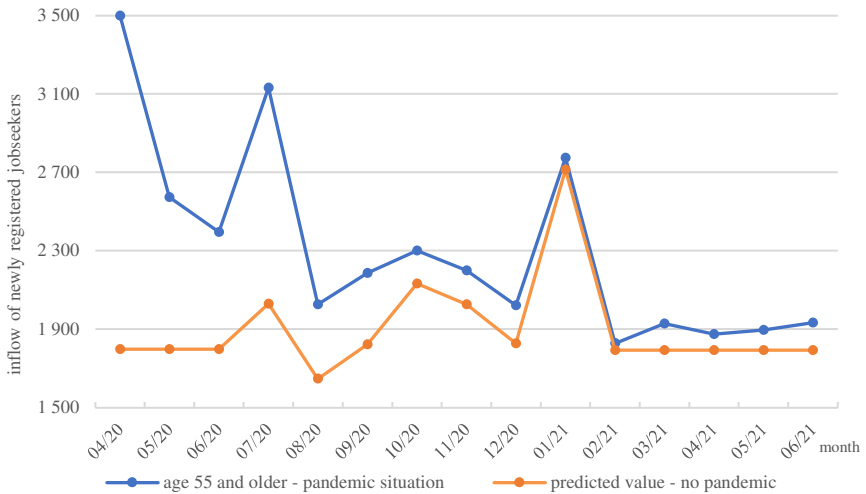
Figure 6C. Predicted and real development of unemployment in Slovakia for age groups: women 25–55
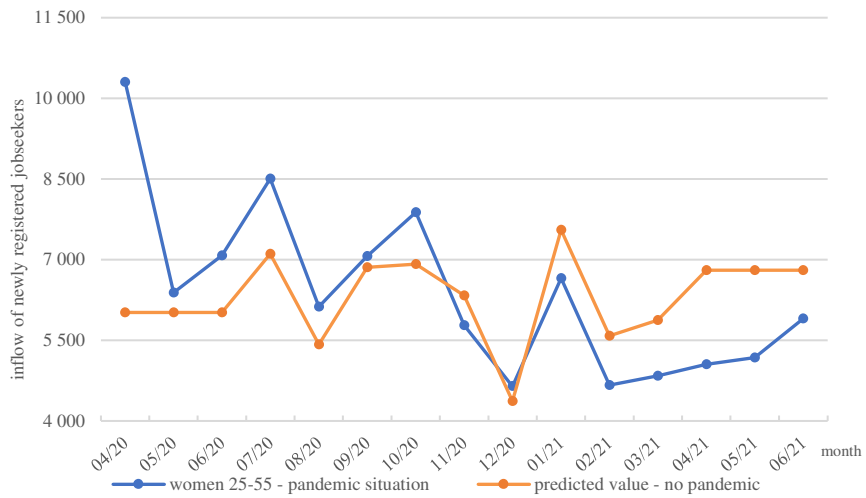
Figure 6D. Predicted and real development of unemployment in Slovakia for age groups: women 55 and older
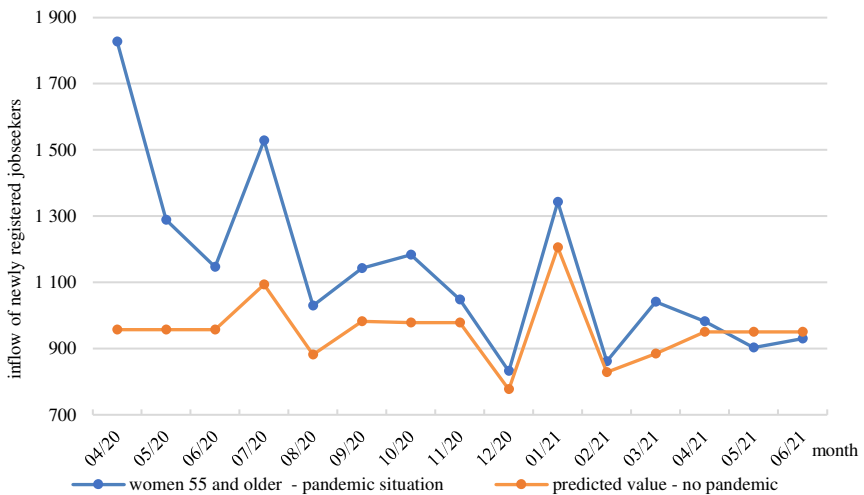
Figure 6E. Predicted and real development of unemployment in Slovakia for age groups: men 25–55
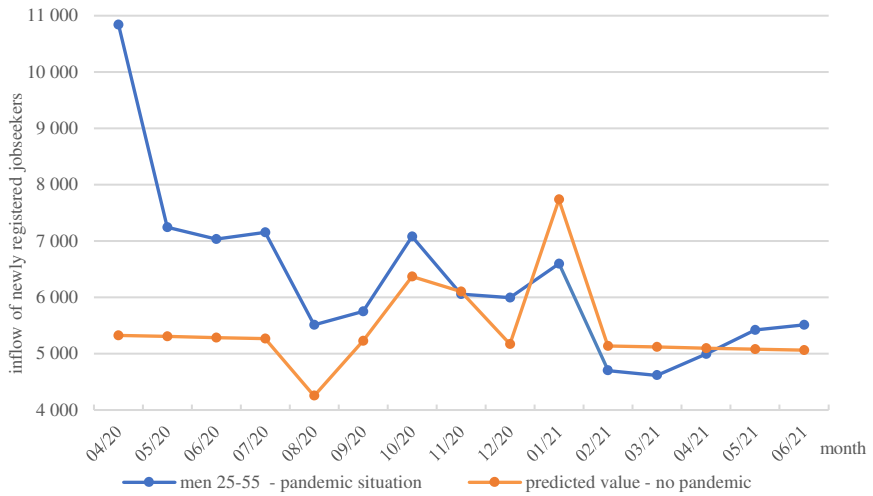
Figure 6F. Predicted and real development of unemployment in Slovakia for age groups: men 55 and older
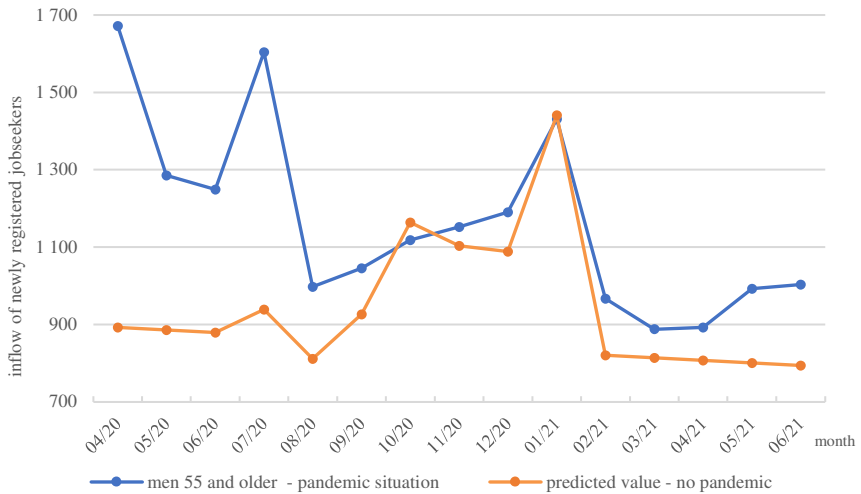
Figure 7A. Predicted and real development of unemployment in Slovakia for level of education: higher vocational
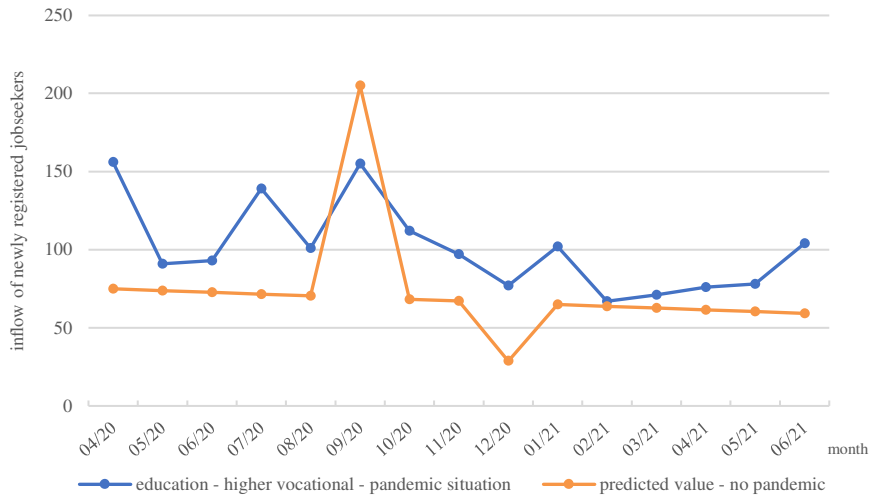
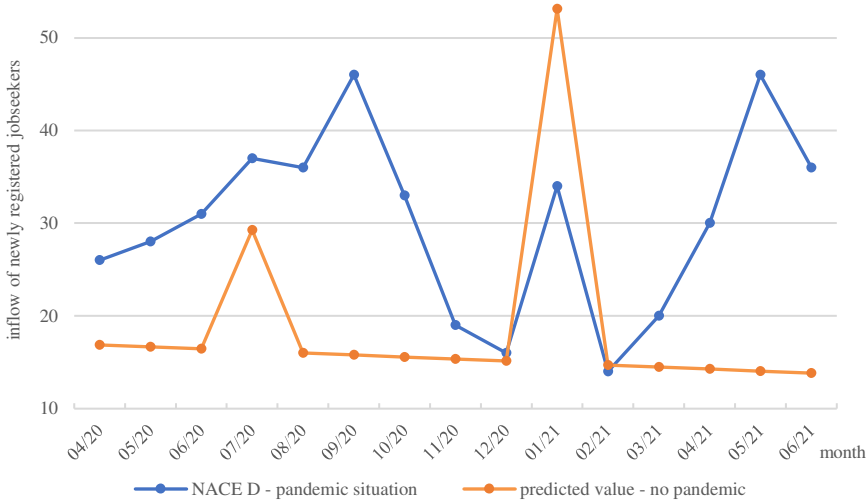**Figure 7B.** Predicted and real development of unemployment in Slovakia for level of education: upper secondary vocational
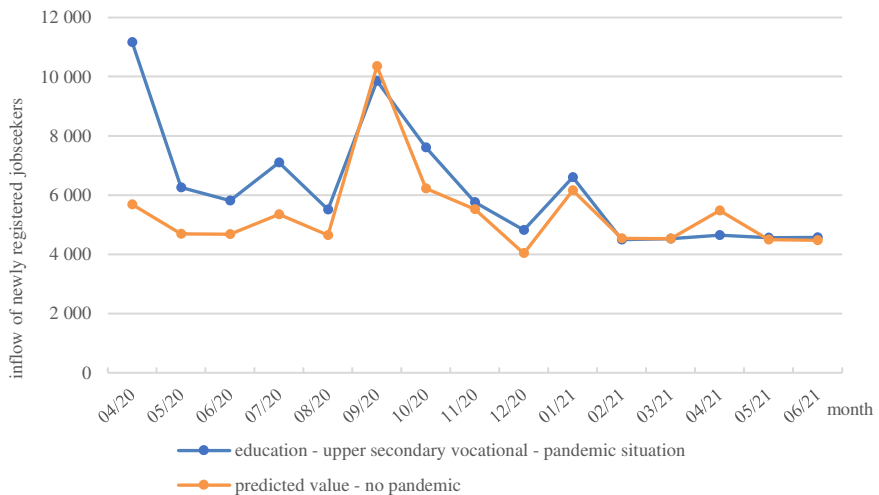
Figure 7C. Predicted and real development of unemployment in Slovakia for level of education: secondary vocational
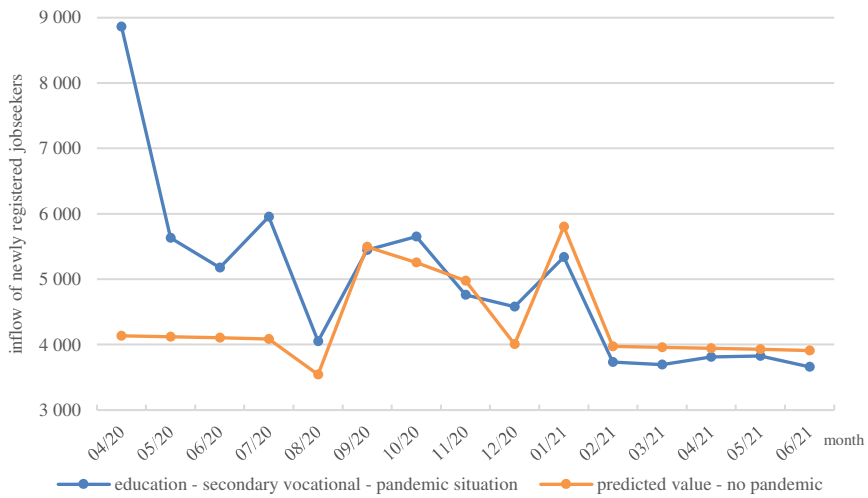
Figure 8A. Predicted and real development of unemployment in Slovakia for NACE D

Figure 8B. Predicted and real development of unemployment in Slovakia for NACE F
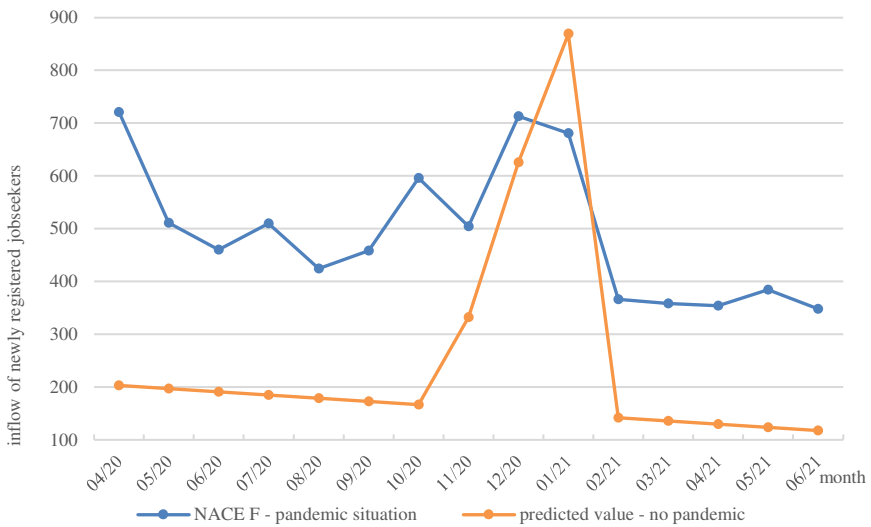
Figure 8C. Predicted and real development of unemployment in Slovakia for NACE H
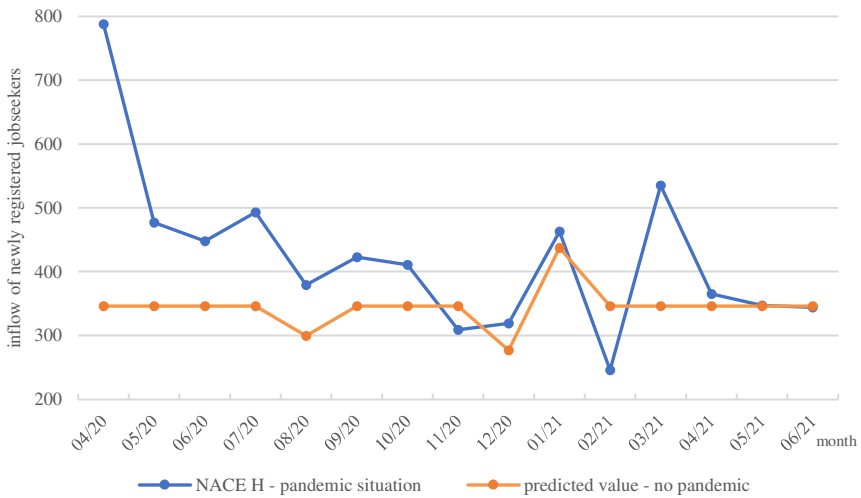
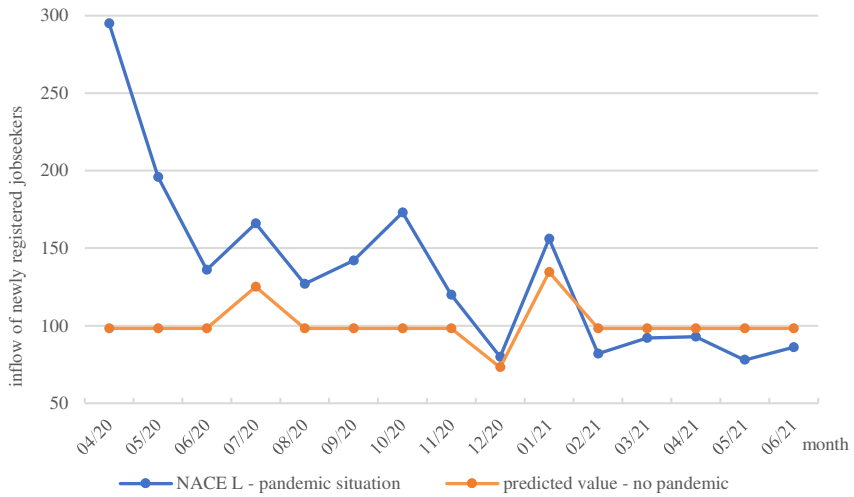**Figure 8D.** Predicted and real development of unemployment in Slovakia for NACE L

Figure 8E. Predicted and real development of unemployment in Slovakia for NACE R
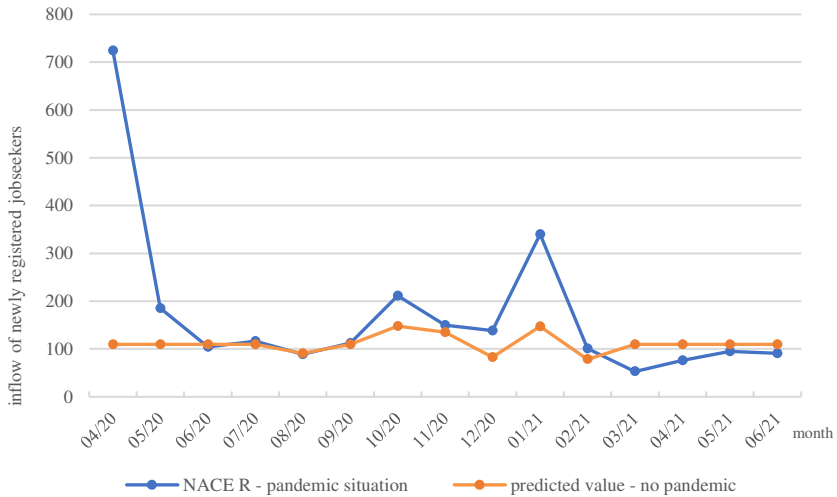
Figure 8F. Predicted and real development of unemployment in Slovakia for NACE: three sectors with negative impact O, P, Q