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THE IMPACT OF THE COVID-19 PANDEMIC ON LABOUR PRODUCTIVITY IN EUROPEAN UNION

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Abstract. The purpose of this article is to determine the impact of Covid-19 on aggregate labour productivity and labour productivity in different economic activity fields in European Union and to investigate the reasons of changes in labour productivity per employee in the macroeconomic level. In the article, firstly labour productivity per employee (GDP divided by the number of employed persons) in EU for the years 2013–2021 has been provided, then the results of the pandemic period have been compared with the results of the previous years. Both GDP and the number of employed persons have been decreased in 2020 compared to 2019. However, the decrease in GDP was higher than the decrease in number of employees which also means a drop in labour productivity per employee. Regarding the impact of the pandemic on labour productivity in various economic activity fields in EU, percentage changes of real labour productivity per employee in different industries in 2020 compared to 2019 show that there are substantial differences in changes which could mainly (but not only) explained by government restrictions causing business closures or working from home in some industries. For this reason, the relationship between real labour productivity per person and working from home in selected economic activity fields fitting best to the purpose and method of our analysis has been investigated and correlation coefficient has been calculated. The results confirm that working from home affected labour productivity in different economic activity fields during the pandemic.

Keywords: labour productivity, Covid-19 pandemic, European Union, working from home, economic activity fields.

JEL Classification: J0, J4, E24.

Introduction

The Covid-19 pandemic has negatively affected the labour markets in many countries including the EU member countries. Regarding the impact of the pandemic on employment level, there was a fall in unemployment rate in European Union every year until 2020, but EU has observed 6% increase in unemployment rate in 2020 (Gubatova, 2021). Also, labor market transition from unemployment to inactivity has been increased from 26.2% to 34.5% in the 2nd quarter of 2020 (Eurostat, 2023c), and the number of persons available to work but not seeking has been increased by 26% in 2020 in comparision with the previous year (Eurostat, 2023g). Moreover, substantial and uneven potential wage losses across the distribution all around Europe have been revealed, and it is determined that both poverty and wage inequality increased in all European countries as a result of lockdown and social distance measures (Palomino et al., 2020).

The pandemic also had an impact on labour productivity in macroeconomic / microeconomic level: it is clear that the decrease in GDP and number of employed persons would lead to a drop in labour productivity per employee, and people explain the reduction in their labour productivity during the pandemic in different ways. Taking into account everything mentioned above, the purpose of this research is to determine the effects of Covid-19 on real labour productivity per employee in general and in different economic activity fields in European Union and to investigate the reason of changes in labour productivity during the pandemic.

1. Literature review

The impacts of the Covid-19 pandemic on labour productivity in the macroeconomic level in some countries have been studied by some researchers. For instance, De Vries et al. (2021) mentioned that France, UK and

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US indicated positive growth rates of aggregate output per hour in 2020 over 2019. However, after removing the effects from the reallocation of hours between low and high productivity industries, only the US still performed positively in terms of within-industry productivity growth.

Regarding the reason of change in aggregate labour productivity during the Covid-19 pandemic, only Blit et al. (2020) provided a macroeconomic analysis of the change in labour productivity based on output and working hours in Canada. He indicated that Canadian labour productivity rose by about 15% during the first two quarters of 2020, reflecting a decline in total hours worked that exceeded an exceptional decline in output. Then it has been mentioned that while productivity measured by output per hour worked has increased, output per capita has fallen, and improvements in that indicator are likely only attainable with continued increases in hours of employment. There is not such a research analyzing the reason of changes in labour productivity in the macroeconomic level in EU and EU member countries.

There are some papers mentioning a specific factor (especially working from home) that could affect employees' labour productivity during the Covid-19 pandemic. For instance, Morikawa (2021) revealed that the mean working-from-home productivity relative to working at the usual workplace was about 60–70%, and it was lower for employees and firms that started working-from-home practice only after the spread of the Covid-19 pandemic. The findings also show that highly educated and high-wage employees tended to exhibit a small reduction in working-from-home productivity.

Moreover, some researchers determined the impact of working from home on labour productivity of employees in a specific field. For example, Xiao et al. (2021) determined that there is a significant negative effect of workplace-home commuting distance on inventor productivity in the light of recent trends around telecommuting and remote work in the US: every 10 km increase in distance is associated with 5% decrease in patents per inventor-firm pair per year and 7% decrease in patent quality. Regarding the impact of different factors on labour productivity in various economic activity fields, only Blit et al. (2020) analyzed the changes in labour productivity by industry, estimating indices for the feasibility of working from home, the degree of worker health (Covid) risk, and the extent workers in the industry are customer-facing. According to the results, industries with high work from home index values tended to have smaller reductions in output and hours. To analyze this paper, there are some other factors such as possibility of having a good rest, wage changes etc. that could affect employees' labour productivity during the pandemic. Because taking into account anti-pandemic measures including internal (in some countries) and external movement restrictions and tourism and hospitality sector being the most affected sector in many countries (Forsythe et al., 2020; Škare et al., 2021), most of the people couldn't have a holiday like before the pandemic which caused them to feel exhausted and to observe a decrease in their productivity. Wage is also motivational factor in terms of productivity and a lot of employees observed wage decreases during the pandemic (Palomino et al., 2020; Larrimore et al., 2022; Miller, 2020; Gambau et al., 2021). To the best of my knowledge, there is not a research scrutinizing the impacts of different factors on employees' labour productivity and determining the most important reason of changes in labour productivity in the microeconomic level in various economic activity fields in European Union.

2. The impact of the Covid-19 pandemic on aggregate labour productivity in EU

2.1. The effect of the pandemic on real labour productivity per person in European Union

As employment level and working conditions of employees, labour productivity was also affected negatively during the Covid-19 pandemic. The Figure 1 illustrates the real labour productivity per person in European Union (27 countries) in 2013–2021.

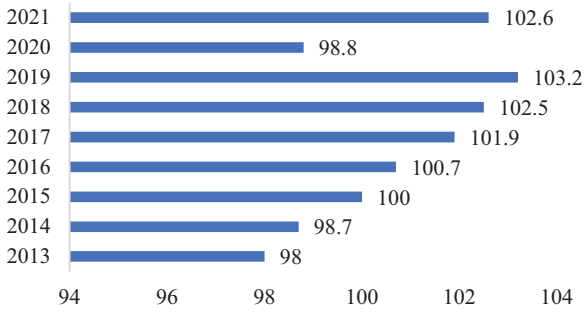

Figure 1. Real labour productivity per person by year in EU (source: Eurostat, 2023e)

There was an increase in real labour productivity per person every year until 2020, but EU has observed 4% decrease in labour productivity in 2020 when the pandemic just started to spread in European countries. After the unexpected shock and decline in economies in the beginning of the pandemic, the EU labour market gradually returned to its normal trend following more optimal measures to combat with the disease. As a result, the real labour productivity per person in EU increased by 4% in 2021 compared to the previous year.

2.2. The reason of changes in labour productivity in the macroeconomic level during the pandemic

It is possible to explain, for instance, the reason of decrease in labour productivity in the macroeconomic level in different ways such as a constant or lower GDP and higher number of employed persons, lower GDP and constant employment, or depending on the level of changes in both GDP and the number of employees. The

Table 1 helps us understand the exact reason of changes in labour productivity in the macroeconomic level during the pandemic

Table 1. Changes in GDP, the number of employed persons and real labour productivity per employee in 2020 and 2021 compared to the previous year (source: author's own calculations based on Eurostat, 2023a, 2023b, 2023f)

Year	Change in GDP	Change in employment	Labour productivity per employee
2020	–4%	–1%	↓
2021	8%	1%	↑

Both GDP and the number of employed persons in European Union have been fallen in 2020 compared to the previous year, but the decrease in GDP (4%) was higher than the decrease in number of employees (1%) which also means a drop in labour productivity per employee. Similarly, both GDP and the level of employment in EU were risen in 2021 in comparison with 2020, but the increase in GDP (8%) was higher than the rise in number of employed persons (1%) that explains the reason of improvement in real labour productivity per person in the macroeconomic level in 2021.

3. The effects of the Covid-19 pandemic on labour productivity in different economic activity fields

3.1. The impact of the pandemic on real labour productivity per person in various economic activity fields in EU

As we can see from the Figure 2, the impact of the Covid-19 pandemic on labour productivity varied in different industries. While real labour productivity per person in some economic activity fields such as professional, scientific and technical activities (–2%), wholesale and retail trade, repair of motor vehicles (–2%), water supply, sewerage, waste management (–1%), electricity, gas, steam and air conditioning supply (–2%) was slightly affected, accommodation and food service activities (–35%), arts, entertainment and recreation (–25%), transportation and storage (–17%) experienced the highest decrease in labour productivity in 2020 compared to 2019. Moreover, 6% fall has been observed in administrative and support service activities, as well as in construction, and 5% decrease in manufacturing. Regarding information and communication, labour productivity in this industry almost didn't change. Agriculture, forestry and fishing (2%) and financial and insurance activities (1%) even recorded an increase in real labour productivity per person, albeit with very low levels.

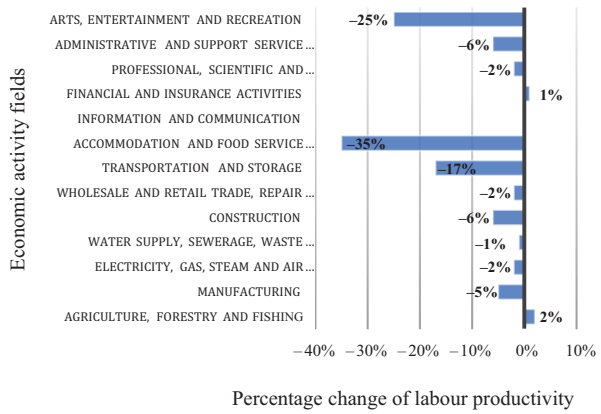

Figure 2. Percentage changes of real labour productivity per employee in different economic activity fields in 2020 compared to 2019 (source: author's own calculations based on Eurostat, 2023d)

3.2. The relationship between working from home and real labour productivity per person in EU

As discussed above, economic activity fields have been differently affected in terms of labour productivity after the pandemic started. There are many factors that could impact labour productivity and explain the reason of change in various industries in the macroeconomic and microeconomic levels. Generally speaking, the effects of the Covid-19 pandemic on labour productivity depend on industry and worker characteristics. Some industries have not been subjected to serious government restrictions and thus, didn't experience business closures thanks to their importance for people's survival which is an industry characteristic, while many others unable to start working from home had to follow the rules for temporarily closing businesses that was the main reason of change in aggregate labour productivity during the pandemic. Other examples of industry characteristics can be health risk and consumer demand, as in some economic activity fields the level of exposure of individuals to disease / infection in their workplace is very high or consumer demand which directly affects the number of goods produced was significantly decreased during the pandemic. Regarding worker characteristics, not being able to have a good rest, worse working conditions such as lower wages and learning / training opportunities could affect employees' labour productivity. It is again possible to mention as well as remote work, because some employees found it difficult to work from home.

In this article, I investigated the relationship between real labour productivity per person and working from home using data from various economic activity fields with similar levels of labour productivity in EU. Labour productivity per person is a continuous variable based on data obtained from Eurostat, and working from home is a dummy variable – the economic activity fields in which businesses started to work from home are coded as 1, the others that didn't experience remote work in 2020 either because they continued their activities at workplace or because they were temporarily closed due to not being able to work from home are coded as 0. Since one of the variables is binary, I used line chart instead of scatter plot for better visualization.

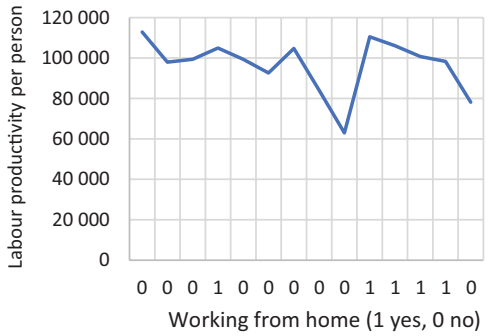

Figure 3. Relationship between real labour productivity per person and working from home in some economic activity fields in EU (source: author's own contribution based on Eurostat, 2023d and industry classification of remote work – Adams-Prassl et al., 2022)

The Figure 3 illustrates that apart from some exceptions that will be clarified after the Table 2, the economic activity fields in which remote work was experienced in 2020 had a higher level of labour productivity per employee.

I also calculated correlation between real labour productivity per person and working from home in European Union using data of some industries in 2020.

Table 2. Correlation between real labour productivity per person and working from home (source: author's own calculations based on data obtained from Eurostat, 2023d)

Coefficient R	0.5854
N	14
P value	0.0455

As we can see from the Table 2, the correlation coefficient is positive that means industries in which it was possible to work from home usually recorded high levels of real labour productivity per person in EU. More specifically, the economic activity fields which have not been subjected to serious government restrictions and thus, didn't experience business closures thanks to their importance for people's survival (e.g. agriculture) experienced higher levels of labour productivity than some of the industries in which businesses started to work from home, but the level of labour productivity in remote work activities was greater than labour productivity in the industries that were temporarily closed due to not being able to work from home. As the number of industries that experienced remote work is higher than the number of other economic activity fields, the relationship between labour productivity per person and working from home is positive, but it is moderate / not strong (0.585) also because of other factors that had an impact on labour productivity during the pandemic and caused the industries which experienced working from home to be affected by different levels in terms of labour productivity.

Since the P value (0.045) is less than 0.05, the correlation is statistically significant. The number of observations is relatively small, because I excluded some of the main industries in EU in which despite a significant decrease in labour productivity, it was still higher than labour productivity in other economic activity fields in order to get more accurate results.

Conclusions

In the article, it has been defined that there was an increase in real labour productivity per person every year until 2020 in European Union, but EU observed 4% decrease in labour productivity in 2020. After the EU labour market gradually returned to its normal trend following more optimal measures to combat with the disease, the real labour productivity per person in EU increased by 4% in 2021 compared to the previous year.

Regarding the reason of changes in labour productivity in the macroeconomic level, both GDP and the number of employed persons in European Union have been fallen in 2020 compared to the previous year, but the decrease in GDP (4%) was higher than the decrease in number of employees (1%) which also means a drop in labour productivity per employee. Similarly, both GDP and the level of employment in EU were risen in 2021 in comparison with 2020, but the increase in GDP (8%) was higher than the rise in number of employed persons (1%) that explains the reason of improvement in real labour productivity per person in the macroeconomic level in 2021.

Percentage changes of real labour productivity per employee in various industries in 2020 compared to 2019 demonstrate that economic activity fields have been differently affected in terms of labour productivity. The most negatively affected fields are accommodation and food service activities with 35% decrease and arts, entertainment & recreation with 25% fall, while some industries recorded a rise in labour productivity – agriculture, forestry and fishing by 2%, financial and insurance activities by 1%. In order to confirm that remote work is one of the reasons of differences in changes of labour productivity in various economic activity fields, the relationship between real labour productivity per person and working from home has been determined. The results show that the economic activity fields which have not been subjected to serious government restrictions and thus, didn't experience business closures thanks to their importance for people's survival experienced higher levels of labour productivity than some of the industries in which businesses started to work from home, but the level of labour productivity in remote work activities was certainly greater than labour productivity in the industries that were temporarily closed due to not being able to work from home. Since the number of industries that experienced remote work is higher than the number of other economic activity fields, the correlation coefficient between labour productivity per person and working from home is positive, but it is moderate / not strong also because of other industry characteristics and worker characteristics that had an impact on labour productivity

during the pandemic and caused the industries which experienced working from home to be affected by different levels in terms of labour productivity.

As a development of this research, I will estimate, in the same model, the impacts of those factors on labour productivity per person in order to determine the particular reasons of the impact of Covid-19 pandemic on labour productivity in the microeconomic level.

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