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How Has The Pandemic Affected The Labor Market And Gender Unemployment Gap?

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ABSTRACT: The COVID-19 pandemic has profoundly impacted global economies, reshaping labor markets and exacerbating gender inequality. Although the pandemic had a negative impact on the whole labor market, it affected female and male workers differently in countries. While in some countries women faced an unprecedented rise in unemployment, in others this change was more common for men. Additionally, while the pandemic decreased the gender unemployment gap in the early stages of COVID-19, the gender unemployment gap was exacerbated in the second wave of COVID and during the economic recovery. The study employs a mixed-methods approach, combining quantitative analysis of labor market data and qualitative insights from industry reports and previous research to provide evidence of impact on the world labor market.

KEYWORDS: Behavioral and Social Sciences, Other, COVID-19, Labor Market, Inequality.

Introduction

The COVID-19 pandemic had an unprecedented impact on the global economy. According to the International Labour Organization report for G20 leaders,[1] the projected working hours loss in G20 economies constituted 14% in the 2nd Quarter of 2020. Such an impact underscores the need to understand how economic disruptions affect different groups within the labor market. The impact on unemployment rates differed: some countries - such as the United States - experienced substantial growth in unemployment, while some, particularly the European Union, did not. These differences highlight the need to examine country-specific factors, such as social policy measures, GDP per capita, or other factors that contributed to such differences. However, all countries experienced a slowdown of economic growth, with a greater slowdown for advanced economies (World Bank).[2] The labor market is a crucial component of the economy, influencing both economic growth and social stability. During the pandemic, containment measures such as lockdowns were implemented to control the spread of the virus. These measures were one of the reasons for the decline in economic activity and increase in unemployment rates, as the International Monetary Fund emphasizes.[3]

Although the pandemic had a negative impact on the whole industry, women underwent a larger burden of COVID-19 in general. Specifically, more women than men are employed in economic sectors that were hurt during the pandemic, so the female labor market experienced disruption due to the shutdowns, job losses, and female overrepresentation in frontline jobs.[4] Specifically, according to the McKinsey & Company report,[5] women had 54 percent of global jobs in accommodations and food service, 43 percent of jobs in retail, and 46 percent in other services. Additionally, women often own microenterprises in developing countries that were also strongly affected by the pandemic. While being a majority in the health sector of the economy, accounting for more than 80% in the health sector of such countries as Russia, Canada, and South Korea (International Labour Organization report for G20 leaders),[1] women also experienced a greater loss in working hours due to an increase in time spent on childcare and home responsibilities.[6] According to the OECD (2020), employed women are more likely than employed men to have care responsibilities.[7] Thus, the COVID-19 also exacerbated the gender gap in unpaid work.[7] This dual burden is critical to understanding the overall gender gap in employment outcomes during the pandemic.

This study aims to analyze the changes in unemployment rates among men and women during the pandemic and in the gender unemployment gap, examining the factors that have contributed to such changes. By utilizing data from various countries, the paper provides a comprehensive analysis of the world labor market. Specifically, it compares unemployment rate changes for females and males between 2019 and 2020 to assess the immediate impact of the COVID-19 pandemic. Additionally, it examines trends in the gender unemployment gap from 2013 to 2023, providing a broader context for understanding how economic disruptions may differentially impact male and female labor market outcomes.

Unlike previous studies, this research aims to analyze labour trends across different countries rather than focusing on a single country or considering the global market. This study offers few potential explanations for the existing differences, such as economic measures enacted by the governments and GDP per capita.

The rest of the paper is organized as follows: the Methods section elaborates on data processing methods, mathematical models, and statistical analysis. The Results and Discussion section presents the findings, offering potential interpretations of the observed results as well as limitations. The Conclusion section provides a summary of the research. The Appendix section provides the list of the countries used in the study.

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Methods

To standardize the methodology, I decided to use the International Labour Organization estimate for unemployment rates across countries.[8]

I collected data from the International Labour Organization database, from 187 countries in total.[8] The dataset included unemployment rates for men and women in percent for different years: in this paper, data from 2013 to 2023 is considered.

To assess if women or men were more vulnerable to unemployment due to COVID, I calculated the 2020 percent change in unemployment (relative to 2019) for males and females for each country as follows:

$$100\% \times (female\ unemployment\ rate\ in\ 2020/female\ unemployment\ rate\ in\ 2019 - 1)$$

$$100\% \times (male\ unemployment\ rate\ in\ 2020/male\ unemployment\ rate\ in\ 2019 - 1)$$

The positive value indicates that the unemployment rate increased, compared to 2019, while the negative value refers to a relative decrease in the unemployment rate.

Then, the difference in change in unemployment was calculated for each country:

$$\%\ change\ in\ female\ unemployment\ in\ 2020 - \%\ change\ in\ male\ unemployment\ in\ 2020$$

This difference is the gap in unemployment rate change between females and males. Thus, a positive value indicates that women are more vulnerable to unemployment; on the contrary, a negative value refers to increased vulnerability for men.

To find out patterns of the gap in unemployment rate change in different countries, I divided them into 3 groups:

1. Positive group: positive value for 2020 percent change in unemployment (relative to 2019) for males and females. In other words, woman unemployment was more vulnerable to COVID.

2. Normal group. I consider that there is no significant change in unemployment

3. Negative group. Male unemployment was more vulnerable to COVID.

To come up with criteria for group selection, I constructed a 95% confidence interval so that the interval included a zero value. In other words, it is reasonable to assume there is no significant difference in the gap in unemployment change for females and males in the Normal group. Consequently, the Normal group includes countries where the difference in unemployment rate change for females and males is within (-1.45, 1.45) % range. In turn, the Positive group includes differences in unemployment rate change greater than or equal to 1.45%, and the Negative group includes values less than or equal to - 1.45%.

Table 1: Unemployment rate change and gap of the change for females and males in 2020 (total of 170 countries after removing outliers).

Economy	2020 % change in unemployment, females	2020 % change in unemployment, males	Difference in change in unemployment,%female-%male, 2020	group
Afghanistan	8.853	5.317	3.536	positive
Albania	10.703	12.785	-2.082	negative
Algeria	10.862	16.265	-5.403	negative
Angola	0.308	2.103	-1.795	negative
Argentina	15.665	17.143	-1.478	negative
Armenia	-7.650	6.448	-14.099	negative
Australia	24.417	25.869	-1.452	negative
Austria	13.523	14.481	-0.958	normal
Azerbaijan	46.161	43.055	3.106	positive
Bahamas, The	23.457	29.227	-5.770	negative
Bahrain	31.044	80.579	-49.534	negative
Bangladesh	16.306	26.384	-10.079	negative
Barbados	13.616	17.472	-3.856	negative
Belarus	3.369	-6.445	9.814	positive
Belgium	8.360	-0.105	8.465	positive
Belize	15.325	20.166	-4.841	negative
Benin	12.607	23.789	-11.182	negative
Bhutan	83.781	85.037	-1.257	normal
Bolivia	145.925	87.813	58.112	positive
Bosnia and Herzegovina	-1.072	3.661	-4.733	negative

To determine whether COVID-19 had a statistically significant impact on the gender unemployment gap change within each group, I employed a paired t-test.

Before running a statistical test, I removed outliers from each of the groups, subtracting the 1.5 interquartile range from the Q1 of the boxplot and adding the 1.5 interquartile range to the Q3 of the boxplot. As a result, the Negative group included 115 countries, the Positive group included 41 countries, and the Normal group was not affected and included 14 countries. You can find the list of the countries in the appendix section.

I ran a paired t-test for the difference in female and male unemployment change. Positive group had statistically significant results, with test statistics of approximately 7.78 and a p-value of 1.57x10^-9. The negative group, subsequently, also revealed statistically significant results with test statistics of approximately -14.85 and a p-value of 2.09x10^-28. Using the Bonferroni correction for multiple comparisons, the results are still significant. Thus, there are indeed groups of countries in which women and men experienced a different impact on unemployment due to the COVID.

Table 2: Paired t-test output for the Positive and Negative groups.

Group	df	t-value	p-value
Positive	40	7.78	1.57x10^-9
Negative	114	-14.85	2.09x10^-28

One of the reasons for these differences can be labor market interventions that aimed to mitigate the effects of partial closure of workplaces. For example, while in some countries service and public sector workers received compensation from the government, in others these workers were laid off. There is evidence that GDP per capita and adoption of economic measures are associated (C. Elgin *et al.*).[9] To determine whether GDP per capita and change in unemployment gap are associated, I ran the linear regression model for the Difference in change in unemployment in 2020 compared to 2019 and GDP per capita. I collected the GDP per capita data from the World Bank DataBank (World Development Indicators Database).[10] I used the GDP per capita that countries had in 2019 to offset the effect of the pandemic and assess the resources countries had before the pandemic. Each point on the graph refers to the country from Table 1 (total of 170 countries).

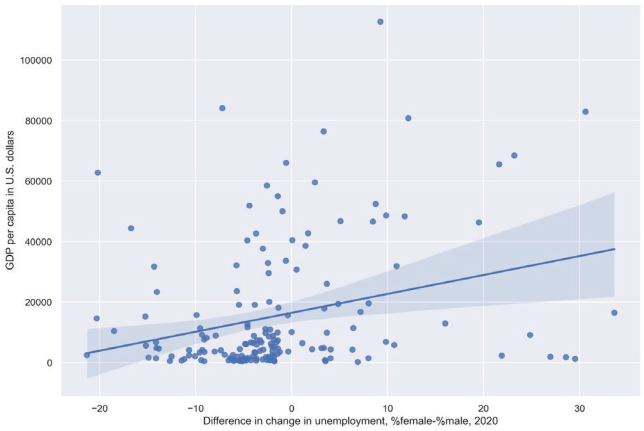

Figure 1: Linear regression model for GDP per capita in U.S. dollars and Difference in change in unemployment for females and males.

I calculated a correlation coefficient of 0.285, indicating a weak positive linear relationship. This result aligns with previous research findings, which have reported a positive but variable correlation between economic support measures and GDP per capita. Similarly, in this study, the correlation between the change in the gender unemployment gap and GDP per capita is positive but weak. Thus, the GDP per capita cannot alone explain the differences in change in unemployment between countries. From Figure 1 we can see that the higher differences in change in unemployment between males and females are worse predicted by the model.

To assess how the gender unemployment gap changed over the years, I calculated the gap for each of the 187 countries. To calculate the gap for each country across 2013-2023, I subtracted female and male unemployment rates for the corresponding years. Using the 1.5 IQR, I removed outliers from the data set. To calculate the World unemployment gap for each year, I took a mean of unemployment gaps across the countries.

Result and Discussion

I created a graph for the gender unemployment gap for 2013-2023 to analyze the gender unemployment gap across the years. The points on the line refer to the gender unemployment gap calculated for the selected year.

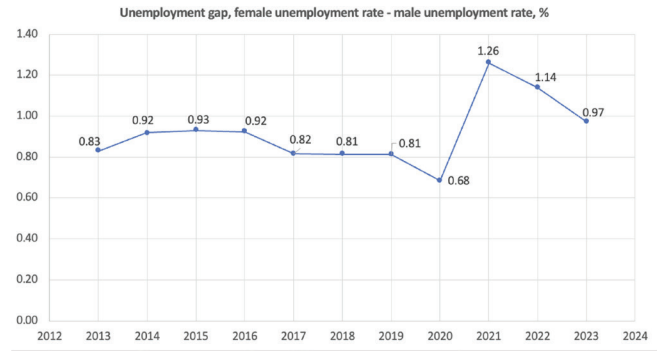

Figure 2: Gender unemployment gap (female unemployment rate - male unemployment rate) across years 2013-2023, %.

After a small increase after 2013, the unemployment gap basically did not change in 2014-2016. Similarly, the unemployment gap stayed approximately the same in 2017-2019, following a small decline after 2016. However, in 2020 the gender unemployment gap sharply decreased and then surpassed the previous trend in 2021. This result may reveal that women were more vulnerable during the second wave of COVID-19. However, the sharp rise in the unemployment rate gap was also followed by a sharp decline in 2022.

To find out if the decline in 2020 was either due to the relative increase in male unemployment, relative decrease in female unemployment, or both, I implemented the Contribution to Change assessment.

UG = Unemployment Gap (Female unemployment rate - Male unemployment rate)

UM = Male Unemployment Rate which was calculated as mean for male unemployment for all the countries after removing outliers.

UF = Female Unemployment Rate which was calculated as mean for female unemployment for all the countries after removing outliers.

The change in the gap from 2019 to 2020 would be:

$$\Delta UG = UG2020 - UG2019$$

$$Contribution\ of\ male\ unemployment\ change = -(UM2020 - UM2019) / \Delta UG \times 100\%$$

$$Contribution\ of\ female\ unemployment\ change = (UF2020 - UF2019) / \Delta UG \times 100\%$$

After performing calculations, I found that the Contribution of male unemployment change was approximately 806.7% and the Contribution of female unemployment change was approximately -816%. This result suggests that both genders had significant impacts on the gap change but in opposite directions. The positive male contribution indicates that male unemployment increased more than the overall gap changed. The negative female contribution suggests that female unemployment increased less than that of males. The percentages exceed 100%, indicating that the changes were working against each other. Thus, the change was associated with both a relative increase in male unemployment and less increase in female unemployment.

Performing the same calculations for 2021 I received 43.4% for male unemployment and -41% for female unemployment. These results indicate that the gap widened due to the decrease in male unemployment. The 2020 decline in the gender unemployment gap may be explained by remote working opportunities and increased demand for medical personnel which is mostly represented by women in many countries.[1] However, it is not reasonable to assume that COVID had a positive effect on gender inequality: although remote working opportunities may indeed be beneficial for some women, others experienced a decline in working hours due to the increased domestic work.[4]

Considering the positive, normal, and negative groups that were used to characterize countries by the pandemic burden (with the positive group referring to a larger burden undertaken by women and the negative group referring to a larger burden undertaken by men), their differences may be to some degree explained by the GDP per capita and implemented social policy packages. However, there are likely other factors that contributed to the differences. One such factor can be the organization of the government and the historical level of

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governmental intervention in the economy. Specifically, the countries with a larger share of service and educational sectors controlled by private companies may have a larger pandemic burden undertaken by women. For example, the US is a top-5 country by the Economic Freedom Rating (Index of Economic Freedom by Fraser Institute[11]) in 2022 and into the positive group with a larger burden undertaken by women.

Limitations:

The first quarter of 2020 was included in the study due to the data set availability. However, since COVID-19 restrictions began in the second quarter of 2020, the study may underrepresent the full impact of these restrictions on unemployment rates.

Additionally, unemployment rates for countries are based on the International Labor Organization estimate and may differ from the national estimate.

Conclusion

The results suggest that there are differences in unemployment for females and males due to COVID-19: in some countries, male workers were more affected than female workers, while in others the situation was the opposite with more female workers affected by the pandemic. These differences can be explained by social packages and GDP per capita to some degree. However, the correlation coefficient of 0.285 between GDP per capita in U.S. dollars and the Difference in change in unemployment for females and males is still small to fully explain the differences between the countries.

Notably, while COVID-19 initially narrowed the gender unemployment gap in 2020, this effect was temporary. By 2021, the gap had not only rebounded but also exceeded pre-pandemic levels, highlighting that the crisis may have exacerbated underlying gender inequalities. However, the gender unemployment gap also gradually decreased after 2021. Overall impact of the COVID-19 on unemployment differed from country to country. While in some countries (for example, in Albania) male unemployment was more vulnerable during pandemic, in others (for example, in Belgium) female unemployment became more vulnerable due to the pandemic. The reason for this difference is a subject for another research. This study makes a contribution to the field of labor economics by providing a comparative analysis of COVID-19's impact on the gender unemployment gap across multiple countries and regions. Unlike previous research, which often focused on single countries or global trends, this study highlights the importance of examining regional-specific patterns, revealing differences in impact of the COVID-19 among countries. Specifically, by dividing the countries by 3 groups depending on the pandemic effect on unemployment rate changes. This approach highlights the need for policy responses that address specific regional and economic contexts when mitigating crises.

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Appendix

The list of the countries used in the paper (after removing outliers): Albania, Algeria, Angola, Argentina, Armenia, Australia, Bahamas, The, Bangladesh, Barbados, Belize, Benin, Bosnia and Herzegovina, Botswana, Brazil, Burkina Faso, Cabo Verde, Cambodia, Cameroon, Central African Republic, Channel Islands, Chile, Comoros, Congo, Dem. Rep., Congo, Rep., Costa Rica, Cote d'Ivoire, Croatia, Czechia, Djibouti, Dominican Republic, Ecuador, Eswatini, Ethiopia, Fiji, French Polynesia, Gabon, Gambia, The, Ghana, Greece, Guam, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, India, Indonesia, Iran, Islamic Rep., Iraq, Israel, Japan, Jordan, Kazakhstan, Korea, Dem. People's Rep., Lao PDR, Leba-

non, Lesotho, Liberia, Libya, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Mauritania, Mexico, Montenegro, Morocco, Mozambique, Namibia, Nepal, Nicaragua, Niger, North Macedonia, Pakistan, Papua New Guinea, Philippines, Poland, Portugal, Puerto Rico, Qatar, Samoa, Sao Tome and Principe, Senegal, Serbia, Sierra Leone, Solomon Islands, Somalia, South Africa, South Sudan, Spain, Sri Lanka, St. Lucia, St. Vincent and the Grenadines, Sudan, Suriname, Sweden, Switzerland, Syrian Arab Republic, Tajikistan, Tanzania, Thailand, Timor-Leste, Togo, Tunisia, Turkiye, Turkmenistan, Uganda, United Kingdom, Venezuela, RB, West Bank and Gaza, Yemen, Rep., Afghanistan, Azerbaijan, Belarus, Belgium, Bulgaria, Burundi, Canada, Cuba, Denmark, El Salvador, Finland, Germany, Hong Kong SAR, China, Hungary, Iceland, Ireland, Kenya, Korea, Rep., Kyrgyz Republic, Latvia, Lithuania, Luxembourg, Macao SAR, China, Moldova, Mongolia, Netherlands, New Zealand, Nigeria, Norway, Panama, Paraguay, Romania, Russian Federation, Rwanda, Slovak Republic, Slovenia, Tonga, United States, Uzbekistan,Zambia, Zimbabwe, Austria, Bhutan, Brunei Darussalam, China, Colombia, Equatorial Guinea, France, Georgia, Italy, Singapore, Trinidad and Tobago, Ukraine, Uruguay, Virgin Islands (U.S.).

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