Post-Covid-19 Gender Inequality in Global Employment: A Difference-In-Difference Analysis

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Abstract. The fifth Sustainable Development Goal of the United Nations targets achieving gender equality by 2030, but recent progress has been sluggish. Gender inequalities in the labor markets may have been exacerbated by the Covid-19 recession. This paper aims to investigate the effects of the Covid-19 pandemic on gender inequalities in the labor markets by analyzing unemployment rate data of different genders of 187 countries and regions from 2018 to 2023, estimated by the International Labour Organisation. Applying a difference-in-difference model, this paper finds that the pandemic has significantly widened the gender gap in unemployment, with female unemployment heightened more than that of males. However, even though the World Health Organization considers the pandemic period to span from 2020 to 2023, the Covid dummy variable becomes insignificant when the years of 2022 and 2023 are incorporated. This is evidence that the employment of most countries recovered before the pandemic completely died down. However, learning from the Covid-19 lesson, policymakers and business managers, especially those of developing countries, should invest in infrastructure that aids working mothers, such as work-from-home and flexible work hours. As many women contribute to increasing participation in the labor force, such support to female workers will cushion the adverse effects of economic shocks in the future.

Keywords: Gender Inequality, Difference-In-Difference, Female Labor Force, Sustainable Development Goals, SDG.

1 Introduction

According to the fifth Sustainable Development Goal (SDG) set out by the United Nations (2024) [1], gender inequality is seen as one of the most profound injustices and significant human rights challenges of our time. Achieving gender equality means ensuring that everyone, regardless of gender, enjoys equal civil rights and human rights conditions (United Nations, 2024) [1]. This includes equal treatment and benefits in politics, the economy, society, law, culture, education, and family life, as well as combating gender discrimination and inequalities (United Nations, 2024) [1]. Since the first International Labour Conference in 1919, notable progress in gender equality in the labor market has been achieved (International Labour Organisation [ILO], 2024) [2].

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In. In many developed countries, women have become a significant part of the workforce. However, such progress has stagnated in recent decades.

When the Covid-19 pandemic hit the global economy in 2020, numerous countries implemented strict measures such as lockdowns to prevent the virus's spread. Consequently, industries such as commercial shipping and tourism were heavily impacted. Since women predominantly worked in the service sector, they were disproportionately affected (United Nations, 2020) [3]. The International Monetary Fund (IMF, 2021) [4] highlighted the risks to women's livelihoods and their increased vulnerability to the pandemic's economic effects. For instance, women with young children faced additional challenges due to economic lockdowns because school closures and remote learning increased caregiving responsibilities (IMF, 2021). Many mothers who were primary caregivers and homemakers before the pandemic had to leave their jobs or reduce their working hours (IMF, 2021).

The observations of widened gender inequality in the labor markets across the globe motivated this study to investigate the degree of disparity across genders, assess the impacts of Covid-19, and identify if the impacts have been gradually mitigated as the world recovered from the health crisis.

2 Related Literature

While no single indicator captures the full picture of the labor market conditions, the unemployment rate is one of the most analyzed and interpreted by economists. Standard economics textbooks define the labor force as the population of people who are willing to work and able to do so. The unemployment rate is then the percentage of the unemployed labor force who do not have a job but have been actively seeking one in the past month. Hence, gender differences in the unemployment rate can reflect unequal labor force participation and uneven job opportunities for men and women.

Previous studies collected unemployment data of different frequencies of different selections of countries to estimate the impacts of Covid-19 on the gender gap. Dang and Nguyen (2021) [5] focused on China, Japan, South Korea, Italy, the United Kingdom, and the United States and showed that women were 24% more likely than men to become permanently unemployed due to the pandemic. Reichelt et al. (2021) [6] discovered that in the United States, Germany, and Singapore, women were more prone to transitioning to unemployment compared to men. Cook and Grimshaw (2021) [7] noted that women's unemployment rates were higher than men's in Germany, Italy, Norway, and the United Kingdom because the short-time work programs were normatively designed in favor of male workers. Möhring et al. (2021) [8] confirmed the same results in German female unemployment. Fabrizio et al. (2021) [9] estimated that unemployment among American women with young children accounted for 45% of the total unemployed during the initial nine months of the pandemic. Abraham et al. (2021) [10] found that Indian women were seven times more likely to be unemployed than men during national lockdowns, and women were 11 times more likely than men to not return to work. Deshpande's (2020) [11] results were in line with Abraham et al. (2021) [10].

Other studies analyzed the employment rate, which is 100% minus the unemployment rate. Bluedorn et al. (2021) [12] examined quarterly data from 38 advanced and emerging economies, discovering that the pandemic caused women's employment rates to decline more than men's in over half of these countries. However, Bluedorn et al. (2021) [12] noted that these gender disparities were short-lived, typically lasting only one to two quarters. Hossain (2021) [13] found that men were more likely to experience job and income losses in India, but the female-dominant informal workers in Ethiopia were hit harder by the pandemic. Hossain (2021) [13] found no significant gender differences in Peru and Vietnam. Fukai et al. (2021) [14] estimated that in Japan, the employment rate of married women with children dropped by 4% due to the pandemic, compared to only 1% for married women without children and insignificant change among married men with children. There were lasting effects as mothers who left or lost their jobs remained out of the workforce months after schools reopened (Fukai et al., 2021) [14].

Other studies explored gender inequalities specific to industries or sectors. Zamarro et al. (2020) [15] noted that previous U.S. recessions primarily affected traditionally male-dominated sectors such as manufacturing, construction, and trade, but the Covid-19 crisis disproportionately impacted female-dominated industries. Peck (2020) [16] and Verick et al. (2022) [17] examined how widespread lockdowns made it impossible for people to access services, such as those provided by hairdressers, restaurant workers, hotel housekeepers, and retail clerks. Many of the service providers were laid off during the pandemic and the roles had been mostly held by women (Peck, 2020; Verick et al., 2022) [16] [17]. Ham (2021) [18] investigated the significant impact of the pandemic on industries predominantly employing women in South Korea, which resulted in a higher unemployment rate for women compared to men. Chitiga et al. (2022) [19] discovered that the South African female workforce was heavily concentrated in unskilled sectors that were most affected by the Covid-19 pandemic, leading to a greater increase in unemployment among women compared to men.

Previous studies were conducted amidst the pandemic. While most studies found women workers to be the disadvantaged group in their selected countries and regions, they did not have a consensus on whether the impacts would be long-lasting. The present study collects the latest data from a much broader selection of countries and performs empirical analysis in order to shed light on the global phenomenon.

3 Analysis

This analysis collects annual unemployment rates of males and females estimated by the ILO, real PPP GDP growth rate, and rate of inflation in GDP deflator between 2018 and 2023 from the World Bank's (2024) Databank [20]. As of July 2024, the data are not available for all countries and regions, and some lack the latest data for 2022 and 2023. As a result, a total of 185 to 187 data points were collected for the time periods. Table 1 shows the descriptive statistics of the male and female unemployment rates. The means and standard errors indicate that female unemployment rates have been higher than those of males over the years, and the former fluctuates more than the latter.

Table 1. Descriptive statistics.

Year	2018	2019	2020	2021	2022	2023
Male unemployment rates:						
Mean	6.868	6.699	7.771	7.456	6.655	6.438
Std. Dev.	5.188	5.087	5.502	5.497	5.351	5.122
Minimum	0.051	0.045	0.068	0.080	0.078	0.077
Maximum	25.48	27.59	32.92	34.44	27.38	36.10
n (countries or regions)	187	187	187	187	186	185
Female unemployment rates:						
Mean	8.794	8.711	9.744	9.443	8.739	8.342
Std. Dev.	7.581	7.568	7.817	7.794	7.728	7.283
Minimum	0.164	0.153	0.211	0.416	0.274	0.266
Maximum	41.62	40.89	39.82	42.55	40.04	39.35
n (countries or regions)	187	187	187	187	186	185

In order to estimate the impacts of the Covid-19 pandemic on the unemployment rates of the genders, this study employs the following difference-in-difference regression model:

$$u_{it} = b_0 + b_1 FEMALE_i + b_2 COVID_t + b_3 FEMALE_i \times COVID_t + \beta_4 \omega_t + \epsilon_{it} (1)$$

where the coefficient b_0 is a constant, b_1 captures the impact of the "treatment" (i.e., female or not), b_2 measures the impact of the Covid-19 pandemic, and b_3 indicates whether $FEMALE$ and $COVID$ have interactive impacts on the unemployment rate, u_{it}, controlled for ω_t, a vector of macroeconomic control variables. While the World Health Organisation defines the outbreak to be a public health emergency from January 30th, 2020 to May 5th, 2023, previous studies indicated that the economies and the labor markets might have started to recover much earlier than mid-2023. To test for the length of the impacts, this study runs separate regressions using different time periods as $COVID$. As shown in Table 2, they are 2020, 2020-2021, 2020-2022, and 2020-2023, resulting in four regressions.

The regression results show that the constant term has a significant coefficient across the regressions; hence, when both $FEMALE$ and $COVID$ equal zeros, the unemployment rate equals the significantly positive constant on average, which is the male unemployment rate during non-Covid periods. The $FEMALE$ coefficients are significantly positive across regressions, indicating that female unemployment rates are significantly higher than those of males across the countries and regions. The $COVID$ coefficients are positive but are statistically significant only when defining the Covid years as 2020 to 2021. This is evidence that the impact of the pandemic on gender inequalities in unemployment has started to fade away in 2022 among the 185 to 187 countries and regions in the dataset.

Table 2. Regression results.

Variable	#1	#2	#3	#4
constant	6.821596***	6.65964***	6.69921***	6.84925***
	(0.239963)	(0.259619)	(0.294949)	(0.354883)
FEMALE	1.968566***	1.95502***	1.92665***	1.99480***
	(0.314405)	(0.351604)	(0.406302)	(0.494277)

2020	0.66705 (0.573382)			
2020 + 2021		0.850583** (0.432234)		
2020 + 2021 + 2022			0.528748 (0.406357)	
2020 + 2021 + 2022 + 2023				0.183614 (0.43019)
FEMALE × 2020	0.049519 (0.766111)			
FEMALE × (2020 + 2021)		0.06497 (0.605815)		
FEMALE × (2020 + 2021 + 2022)			0.100038 (0.573228)	
FEMALE × (2020 + 2021 +2022 + 2023)				-0.02699 (0.606962)
GDP GROWTH RATE	-3.50345* (2.094135)	-3.97446** (1.911742)	-4.63739** (1.888466)	-4.9312*** (1.885371)
INFLATION RATE	0.007517** (0.003737)	0.007354** (0.003726)	0.006969* (0.003731)	0.007016* (0.003742)
R^2	0.028753	0.031343	0.02942	0.027671
F	12.33884***	13.4865***	12.6337***	11.8617***

Note: *$p < 0.1$ **$p < 0.05$, and ***$p < 0.01$.

4 Concluding Remarks

Gender inequality in the labor market is a long-standing issue. The fifth SDG of the United Nations aims to achieve gender equality by 2030, but gender differences in labor markets might have been widened due to the Covid-19 pandemic. To evaluate the degree and the length of the impact, this study analyzes unemployment rates of the genders in 187 countries and regions from 2018 to 2023. Estimating a difference-in-difference regression model, the study finds that the pandemic significantly widened the gender gap in unemployment, such that female unemployment was hit harder than male unemployment. The regression results also show that the Covid, when measured as the period from 2020 to 2021, has significant impacts, indicating that the labor force has started to recover since 2022.

While it is good news that the global economy is already in its recovery phase, the Covid-19 pandemic was a painful lesson for the female workforce in many countries around the world. To avoid history repeating itself, policymakers and business managers should learn from the experiences of the Covid years. Developing countries can follow the examples of advanced countries to invest in infrastructure that supports working mothers, such as remote work and flexible hours. Since the women's labor force participation rate is relatively low in developing countries, it should be envisioned that the women's labor force has the potential to make significant contributions to the economic growth of their countries.

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