

COVID-19 and Unemployment Dynamics in Bangladesh: Evidence from A Structural Break Analysis

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ABSTRACT: The labor market experienced significant disruptions due to the COVID-19 pandemic, particularly in highly informal developing economies like Bangladesh. This study examines how the pandemic impacted unemployment dynamics in Bangladesh through an analysis of structural breaks in unemployment trends and sectoral unemployment patterns. The analysis, based on secondary data spanning 2000 to 2023, applies dummy variable regression, along with Wald and Chow breakpoint tests to detect pandemic-related disruptions. Results reveal a statistically significant structural break in unemployment during 2020–2021, reflecting a sharp rise in joblessness, followed by partial recovery by 2022. Sectoral results show that the industrial sector experienced the greatest disruption, while agriculture-maintained stability, and the service sector showed adaptive resilience. The study further underscores the persistence of gender inequality and informal employment in the post-pandemic labor market. The findings call for targeted labor market recovery policies and stronger social protection to enhance post-pandemic employment resilience in Bangladesh.

KEYWORDS: COVID-19, Unemployment, Structural Break, Labor Market, Bangladesh

1.0 INTRODUCTION

The COVID-19 pandemic acted as an external shock that destabilized labor markets worldwide and posed significant challenge to workforce stability in developing economies. The crisis in Bangladesh highlighted issues related to unemployment dynamics and sectoral labor distribution within an economy defined by informal employment and minimal social safeguards. This research focuses to explore how the pandemic altered unemployment structures and sectoral employment patterns to provide insights for post-crisis labor market policy whether temporarily or structurally.

1.1 Background of the Study

The labor market in Bangladesh is characterized as widespread informality in employment, weak social protection systems, and enduring inequalities across gender, age, and sectoral lines. A substantial portion of total employment remains vulnerable in nature, particularly in agriculture, construction, transport, and small-scale services, thereby indicating labor outcomes to economic instability and external shocks (ILO, 2020). Although official unemployment rates were relatively low prior to COVID-19, underemployment and vulnerable employment remained intensive, notably among youth and women (BBS, 2019).

Prior to the pandemic, the share of employment in agriculture continued to fall slowly. Although, the service sector expanded, industrial employment increased only marginally. However, most service sector growth took place in low-productivity activities, offering little improvements in job quality and wages (World Bank, 2017). Women's labor force participation in labor market remained low compared to regional levels, indicating structural barriers such as limited occupational access and unpaid household and care duties (UNDP, 2020).

These labor market features shaped the pre-covid-19 baseline conditions. This factor helps interpret changes in unemployment and employment patterns after the pandemic, and assess if they result from cyclical fluctuations or structural shifts.

The study adds to the literature in three major ways. First, it offers a rigorous time series evaluation. Second, it examines heterogeneous sectoral response to the pandemic across agriculture, industry, and services, emphasizing differences in

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vulnerability and resilience. Third, the findings provide actionable policy implications for post-pandemic labor market recovery, expanding social protection coverage, and improving readiness for future economic shocks in Bangladesh.

1.2 Statement of the Problem

Although many studies show that COVID-19 hit women, low-income families, and informal workers the hardest, most of this research just describes the problem rather than measuring it with quantitative data. There is a lack of deep statistical analysis that compares unemployment trends before and after the pandemic using a single, unified framework. Furthermore, few studies have used formal mathematical tests to pinpoint exactly where and how different job sectors were damaged. This study addresses these gaps by using economic data to determine if the pandemic caused a permanent shift in Bangladesh's unemployment patterns and which specific industries suffered the most.

1.3 Rationale of the Study

Assessing the pandemic's structural impact on the labor market is vital for designing policy intervention for effective recovery in Bangladesh. Using formal econometric techniques like Wald and Chow tests, this study offers empirical insights on the extent and persistence of COVID 19-induced breaks in unemployment. The sector wise analysis provides guidance to identify the industries require prioritized intervention. Moreover, the study contributes to enhance literature on resilience of labor market in developing economies respond to external shocks. These results are aimed to support policymakers, scholars, and development actors to promote evidence-based strategies for labor market recovery and structural reforms.

1.4 Research Questions

- i. How did the labor market conditions of Bangladesh differ between the pre-COVID and post-COVID periods in terms of employment, unemployment, gender participation, and sectoral distribution?
- ii. Did the COVID-19 pandemic create a statistically significant structural break in Bangladesh's unemployment trend?
- iii. Which sector of the economy—agriculture, industry, or services—was most adversely affected by the COVID-19 shock?

1.5 Objectives

In line with the formulated questions, this study seeks to achieve the following research objectives:

- i. To descriptively examine the employment scenario of Bangladesh before and after the COVID-19 pandemic.
- ii. To investigate whether the COVID-19 pandemic caused a structural break in the unemployment trend of Bangladesh.
- iii. To identify the most vulnerable employment sector during the COVID-19 pandemic.

1.6 Hypotheses

H₁: The COVID-19 pandemic did not cause any structural break in the unemployment trend of Bangladesh.

H₂: The COVID-19 pandemic did not cause any structural break in sectoral employment across agriculture, industry, and services.

2.0 LITERATURE REVIEW

2.1 Theoretical Background:

The study is rooted in theories of structural shift and labor market division. The dual-sector model (Lewis, 1954) clarifies workforce mobility from agriculture to non-agricultural sectors without essentially raising open unemployment, especially in the existence of surplus labor. The Harris–Todaro (1970) model points out how inadequate formal job creation can result in persistent unemployment and increase dependency on informal work despite the mobility of labor force.

Recent literature indicates that the employment outcomes of sectoral transitions are influenced by differences in productivity as movement towards low-productivity sectors may constraint both job opportunities and employment quality gains (McMillan, Rodrik, & Verduzco-Gallo, 2014; Fields, 2011). According to the structural break theory (Perron, 1989), major exogenous shocks can trigger lasting changes in employment patterns.

2.2 Review of Literature

A study by Siddiqui and sharif (2023) on impact of covid-19 on the rights of informal workers in Bangladesh found that informal workers such as taxi drivers, domestic workers, vendors and hotel staff faced several hardships during pandemic. The hardship was so severe that they even could not meet their basic needs, children dropout of school, and they did not receive proper healthcare and so on. This study was basically based on qualitative method. The study also argued that the weakly formulated policies failed to reach the informal workers to provide the existing relief and safety-related support. This study concluded that the informal workers were largely unprotected during the pandemic crisis.

Rahman et al., (2023) explored how covid pandemic affected fish and shellfish processing women worker's in Bangladesh using survey and focus-group data. this study found the impact sharply declined working hours in both domestic and external sectors,

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which led lower household income and reduced food consumption. Children did not get access to online study, and gender-based violence increased. Lastly, the authors concluded that the women workers lacked social protection during this crisis period, indicates they were the highly affected group in this sector.

Tara et al., (2023) interviewed 348 respondents across 20 districts of marginal-income households in Bangladesh to examine how covid-19 affected their livelihoods. The result revealed that the pandemic substantially undermines the livelihood, income, food security, and child health of those who rely on daily informal earnings, as about 50% OF RESPONDENTS LOST THEIR JOBS AND around 90% reported a decline in their income. finally, the authors argued state support was insufficient to overcome this vulnerability.

Research by Hossain et al., surveyed 342 respondents through online and examined how covid 19 how covid 19 affect travel and work behavior of office workers in Bangladesh. The study observed a transition from regular in-office work to remote work, along with shorter and less frequent travel decline in public transportation usage, rather increased using walking, cycling, rickshaws and company provided vehicles. The study finally concluded that the pandemic notably reshaped the commuting and work habit, influencing future office and transport strategies.

On March 31, 2022, a paper was published by Nahrin Rahman Swarna et.al. that delves into the understanding of how COVID-19 has impacted the informal sector workers in Bangladesh. The paper specifically examines the effects of the pandemic on the income and food expenses of these workers during the lockdown period. It was found that 90% of informal workers in Bangladesh experienced a decline in both income and food expenditure during the lockdown. Furthermore, the author suggests that policy support is necessary to help these informal workers navigate such crises.

A scholarly article titled "The Impact of Covid-19 on the Economy of Bangladesh" authored by Yasir Mahmud in 2021. In this publication, the author elucidated on the extensive repercussions of the covid pandemic on the prominent economic sectors of Bangladesh, namely Textiles, Trade and commerce, Banking and Insurance, Export-Import, and the Stock market. The thesis put forth by the author posits that the influential Remittance sector will soon find itself in a similar dire state if the current circumstances persist. Lastly, he suggested some policy recommendations to get out of this economic crisis.

The publication titled "Covid-19 Impact on Bangladesh Economy," (2020) sheds light on the significant concentration of economic activities, particularly in the manufacturing and service sectors, in the top two cities of Dhaka and Chittagong. This concentration poses a substantial risk of COVID-19 transmission for the country. The country's public sector projects are expected to be put on hold due to the impact of the global and local demand for manufactured goods, especially in the garment industry, on private sector growth. Furthermore, the Covid-19 pandemic has severely disrupted the growth trajectory of the textile industry.

Research by Islam (2020) aims to evaluate the repercussions of the crisis on the employment and livelihoods of the working population while also delineating how the policy and regulatory framework can be aligned to foster an employment-friendly, inclusive, and sustainable economic recovery. The key findings of the study indicate that the economic upheaval triggered by the COVID pandemic has resulted in a substantial decline in economic growth and the loss of numerous job opportunities, with the manufacturing, construction, and service sectors being particularly severely affected. The urban informal economy has suffered immensely, both during the period of shutdown and subsequently.

Shahariar et al., (2021) have disseminated a scholarly article on the Influence of COVID-19 on the Economy of Bangladesh: An Emphasis on the Employability of University Graduates" in the month of February in the year 2021. This study endeavored to examine the predicament of graduate unemployment in Bangladesh and assess the ramifications of the COVID-19 pandemic on the employability of graduates. Furthermore, it aimed to propose certain policies for the government to surmount this issue.

A survey conducted by the United Nations Industrial Development Organization (UNIDO) has substantiated the fact that the COVID-19 pandemic has inflicted a profound and detrimental influence upon indigenous commercial enterprises. It is noteworthy to mention that the financial implications emerging from this unprecedented circumstance are deemed to be the most formidable peril encountered by the private sector, particularly the micro businesses. It is, therefore, imperative to underscore that the amelioration of this dire situation necessitates the provision of supplementary policy reinforcement.

A scholarly article titled on the Labor Market Implications of the COVID-19 Pandemic in Bangladesh, authored by Maria et. al. has effectively documented initial observations regarding the impact of the COVID-19 pandemic on the labor market in Bangladesh. This study placed particular emphasis on three susceptible regions within the country: impoverished areas in Dhaka, Chittagong City Corporations, and Cox's Bazar district. The analysis conducted revealed a considerable degree of uncertainty surrounding employment opportunities, as evidenced by the substantial rates of worker absenteeism and a pessimistic outlook among active laborers.

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2.3 Research Gap

Existing studies document significant impact of COVID-19 on labor market of Bangladesh, specifically, on informal workers, women, low-income groups, and selected sectors. Most of the literature relies on qualitative surveys and descriptive analysis focusing primarily on income loss, layoffs, food insecurity, and sector-specific instability. However, these studies generally fall short of offering a rigorous quantitative assessment of labor market dynamics evolve over time.

The literature provides little empirical evidence whether the pandemic resulted in stability or significant structural breaks in unemployment trends using long-term data. Moreover, changes in sectoral unemployment before and after the pandemic remain largely unexplored using a unified econometric approach. Addressing the existing gaps, this research utilizes the structural framework with Wald and Chow test to analyze the sectoral labor market data for Bangladesh over a long time.

3.0 METHODOLOGY

This research applied a mixed-method approach, combining descriptive as well as econometric models to investigate the unemployment trend of Bangladesh considering the pandemic shock of COVID-19 period. Systematically the methodology is designed to achieve three specified resource objectives.

3.1 Data Sources

This study is basically based on secondary data covering the time period 2000 to 2023. Data were collected from several sources including Bangladesh Bureau of Statistics (BBS)-Labor Force Surveys (2013, 2015-2016, 2016-2017); International Labor Organization (ILOSTATE)-Global Estimates (2019-2023), World Development Indicators (WDI), World Bank for the dependent and independent variables used in the model from 2000 to 2023. This research also reviewed different scholarly articles, policy reports and institutional publications to frame and interpret its findings.

3.2 Variables

The first objective has been discussed descriptively with the following determinants to show the pre and post covid situation of unemployment pattern of Bangladesh:

- **Labor Force Size:** Total labor force (in millions), disaggregated by sex (male/female) and locality (rural/urban).
- **Labor Force Participation Rate (LFPR):** Percentage of the working-age population engaged in the labor market, by sex and locality.
- **Employment by Sector:** Distribution of employment across: Formal Sector (% of employed population), Informal Sector (% of employed population)
- **Unemployment Rate:** Percentage of the labor force that is unemployed, disaggregated by sex and locality.
- **Employment-Population Ratio:** Ratio of employed persons to the working-age population.

To analyze second and third objectives this research applied four models and includes several variables as dependent and independent (control). They are listed as follows

Dependent Variables

- Unemployment Rate (UNEMP): Unemployment, total (% of total labor force)
- Agriculture Sector (AGR): Employment in agriculture (% of total employment)
- Industry Sector (IND): Employment in industry (% of total employment)
- Service Sector (SER): Employment in services (% of total employment) (modeled ILO estimate).

Independent Variables

Gross Domestic Product (GDP): GDP per capita (constant 2015 US\$) (WDI)

National Inflation (INF): Inflation, GDP deflator (annual %) (WDI)

Exchange Rate (ER): Official exchange rate (LCU per US\$, period average) (WDI)

Dummy Variables: Reflecting COVID period

Immediate Shock: D2020; (1 for year 2020, else 0)

Recovery Stage 1: D2021, (1 for year 2021, else 0)

Recovery Stage 2: D2022, (1 for year 2022, else 0)

3.3 Model specification

To fulfill research objectives of examining structural breaks in unemployment trend and estimating the impact of covid 19 on sectoral employment of Bangladesh four econometric models were developed.

Model 01: Structural Break analysis on Unemployment

$$UNEMP_t = \theta_0 + \theta_1 D2020_t + \theta_2 D2021_t + \theta_3 D2022_t + \epsilon_t$$

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For unemployment trend analysis, a multi-year dummy model was formulated without including any control variables to clearly isolate the pure time-based structural break occurred due to the pandemic during 2020 to 2022. This method avoids mixing from pandemic affected economic variables, consistent with studies that emphasize focusing structural break rather causality. On the other hand, the following sectoral models include control variables such as Per capita Gross Domestic Product, Inflation Rate and Exchange Rate to isolate the COVID-19 impact from broader macroeconomic fluctuations. This confirms the dummy variable D2020 only the pandemic specific shock.

Model 02: Agriculture Employment Model:

$$AGR_t = \alpha_0 + \alpha_1 GDP_t + \alpha_2 INF_t + \alpha_3 ER_t + \varepsilon_t$$

Model 03: Industry Employment Model:

$$IND_t = \gamma_0 + \gamma_1 GDP_t + \gamma_2 INF_t + \gamma_3 ER_t + \varepsilon_t$$

Model 04: Service Employment Model:

$$SER_t = \delta_0 + \delta_1 GDP_t + \delta_2 INF_t + \delta_3 ER_t + \varepsilon_t$$

3.4 Econometric Analysis

To estimate the second objective structural break model was performed which fulfill the first objective. For diagnostic purpose Wald test have been done. Furthermore, Chow Breakpoint Test have been employed for the rest of the sector based models separately.

Wald Test Hypothesis:

$H_0 : \beta^*_4 = 0$ (No Structural Break)

$H_1 : \beta^*_4 \neq 0$ (Structural Break exist)

The formula of Wald Test is,

$$W = (R\beta^* - r)' [R(\alpha^2 (X'X)^{-1}) R']^{-1} (R\beta^* - r)$$

Where,

β^* = estimated coefficient vector

r = vector of restrictions

R = restriction matrix

A statistically significant Wald statistic rejects H_0 , confirming the presence of a structural break in 2020.

Chow Breakpoint Test:

Model 2, 3 and 4 have been estimated through Chow Breakpoint Test to investigate which sector affected the most due to COVID.

Chow Test Formula:

$$F = \frac{(RSS_p - RSS_1 - RSS_2)/k}{(RSS_1 + RSS_2)/(n_1 + n_2 - 2k)}$$

Where,

RSS_p = unrestricted RSS (pooled model)

RSS_1, RSS_2 = restricted RSS from sub-sample regressions

k = number of parameters

n_1, n_2 = sample size of the two sub periods

Hypothesis of Chow Test

H_0 : No Structural Break at 2020

H_1 : Structural Break exists at 2020

A significant f-statistic rejects H_0

4.0 Result and Discussion:

4.1 Objective 1: Overviewing the Employment Scenario Pre and Post period of COVID-Pandemic

Overview of the Employment Scenario Before the Pandemic

Employment is a key macroeconomic indicator to measure a country's economic condition. From a macroeconomics perspective, a low employment rate and high unemployment rate reduce the productivity of labor force. According to the *Britannica Encyclopedia*, "the labor force comprises all those who work for gain, whether as employees, employers, or as self-employed, and it includes the unemployed who are seeking work". To overview the employment scenario of Bangladesh it is essential to understand the labor force participation rate of the country.

4.1.1 Size of the labor force:

The size of the labor force of any country includes the employed people as well as the unemployed people who are looking for work. Table: 1 showing the labor force of Bangladesh of 15+ aged by sex and locality of some selected years.

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Table 1: Labor Force aged (15+) by Sex and Locality 2013-14, 2015-16 & 2016-2017

Period	Rural (Million)		Urban (Million)		Total (Million)	
	Women	Men	Women	Men	Women	Men
2013-2014	13.1	30.5	5.1	12.0	18.2	42.5
2015-2016	14.3	30.6	5.8	12.5	19.1	43.1
2016-2017	15.0	30.7	5.0	12.9	20.0	43.5

Source: Labor Force Survey Bangladesh 2013, 2015-2016 & 2016-17, BBS

It is followed that in 2013 the women labor force was 13.1 million which increased to 15.0 million in 2016-17 in rural area. On the contrary, no significant change followed in case of men labor force in this period. In urban area female labor force remained relatively stable (5.1 million to 5.0 million), while men labor force increased 12.0 million to 12.9 million. Overall, the total change of women labor force is 18.2 to 20.0 million and total male labor force increased from 42.5 to 43.5 million.

4.1.2 Labor Force Participation Rate:

The LFPR measures the proportion of the working age population that is actively engaged in the labor market. The following table is showing the labor force participation rate by sex and locality according to some specific years.

Table 2: Labor Force Participation Rate by Sex and Locality, 2013-14, 2015-16 & 2016-2017

Locality	2013-2014		2015-2016		2016-2017	
	Women (%)	Men (%)	Women (%)	Men (%)	Women (%)	Men (%)
Rural	33.7	81.6	37.6	81.9	38.6	80.3
Urban	32.9	81.7	30.8	81.7	31.0	81.0
Total	33.5	81.7	35.6	81.9	36.3	80.5

Source: Labor Force Survey Bangladesh 2013-14, 2015-2016 & 2016-17, BBS

In Table-02, in rural area the labor force participation rate or the refined activity rate for women has increased from 33.7% (2013), to 38.6% (2016-17). On the other hand, for men the percentage has been decreased in 2016-17 compared to in 2013 and 2015-16, which is 80.3%, 18.6% and 18.9% respectively.

In urban area, for women the labor force participation rate dipped in 2015-16 (30.8%) before a minor recovery (31.0%), on the contrary, for men the percentage remained stable above 81%. Nationally, female participation increased, while male participation saw a marginal decreased by 2016-17.

4.1.3 The employment-population ratio:

The employment-population ratio is calculated as employed divided by civilian noninstitutionalized population multiplied by 100. The employed population according to the formal and informal sector for women and men in rural and urban area has been shown in the following table.

Table 3: Employed Population (15+) By Sectors of Employment, Sex and Locality, 2013-14, 2015-16 & 2016-2017.

Sectors	Rural (%)		Urban (%)		Total (%)	
	Women	Men	Women	Men	Women	Men
2013						
Formal Sector	5.2	8.9	21.8	26.2	9.7	13.7
Informal Sector	94.8	91.1	78.2	73.8	90.3	86.3
Total	100	100	100	100	100	100
2015-2016						
Formal Sector	3.0	14.1	9.4	26.4	4.6	17.7
Informal Sector	97.0	85.9	90.6	73.6	95.4	82.3
Total	100	100	100	100	100	100
2016-2017						
Formal Sector	6.7	14.4	12.7	26.4	8.2	17.9
Informal Sector	93.3	85.6	87.3	73.6	91.8	82.1
Total	100	100	100	100	100	100

Source: Labor Force Survey Bangladesh 2013, 2015-2016 & 2016-17, BBS

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In 2013, only 5.2% women in rural area were engaged in formal sector, while the vast majority with 94.8% were in the informal sector. Men in rural areas showed a marginally higher formal engagement at 8.9%, with 91.1% in the informal sector.

Women stayed far more clustered in informal work than men, and this gap extended over time. In 2015-16, rural women had remarkably low formal employment only 3%, whereas rural men confirm 14.1%. Urban areas performed comparatively better, though women's participation in formal employment reduced to 9.4%, it remained at 26.4% for men. Taken together, data from both rural and urban displays continued and increasing gender disparity, with women predominantly employed in the formal sector.

4.1.4 Unemployment Rate

The unemployment rate represents the proportion of the labor force without work, signals economic hardship.

Table 4: Unemployment Rate of Population aged (15+) By Sex and Locality, 2013-14, 2015-2016 & 2016-2017

Year/ Area	Women		Men		Total	
	No. of Unemployed Population (in 000)	Unemployment Rate (%)	No. of Unemployed Population (in 000)	Unemployment Rate (%)	No. of Unemployed Population (in 000)	Unemployment Rate (%)
2013						
Rural	754	5.8	840	2.8	1594	3.7
Urban	555	10.9	437	3.6	993	5.8
Total	1309	7.2	1277	3.0	2587	4.3
2015-2016						
Rural	923	6.5	896	2.9	1819	4.1
Urban	372	7.7	395	3.2	768	4.4
Total	1295	6.8	1292	3.0	2587	4.2
2016-2017						
Rural	882	5.9	929	3.0	1811	4.0
Urban	448	8.9	417	3.3	866	4.9
Total	1330	6.7	1347	3.1	2677	4.2

Source: Labor Force Survey Bangladesh 2013, 2015-2016 & 2016-17, BBS

Based on the unemployment data from 2013 to 2016–2017, several key trends emerge. Overall, the total unemployment rate remained relatively stable at approximately 4.2–4.3%, with a slight increase in the total number of unemployed individuals over this period. A persistent and pronounced gender gap is evident, as women experienced unemployment rates more than double those of men across all years and areas. This disparity was most acute in urban settings, where female unemployment peaked at 10.9% in 2013 before declining to 8.9% by 2016–2017. In contrast, male unemployment remained consistently low, hovering between 3.0% and 3.6%. Geographically, rural areas reported lower unemployment rates for both genders compared to urban areas. Notably, while the total unemployment situation showed little change, the data suggests a modest improvement in urban female unemployment rates over time, even as the absolute number of unemployed urban women fluctuated. The findings underscore a structural imbalance, with women—particularly in urban locales—facing significantly higher joblessness despite broader labor market stability.

4.1.5 Overview of Post-COVID Employment Scenario:

Globally, the COVID-19 pandemic caused substantial shocks that disrupted labor markets. Bangladesh experienced similar challenges, with employment sharply declined after 2019 and recovering slowly through 2023. Despite this recovery, notable gender inequality persisted; an ongoing structural transition in the economy is also visible.

4.1.6 Size of the Labor Force:

Table 5: Labor Force by age (15+) and Sex from 202019-2023

Year	Women	Men	Total
2019	22486.1	47762.3	70248.4
2020	22727.9	48212	70940

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2021	23520.2	49028.7	72548.8
2022	24327.3	50131.6	74458.9
2023	24744.9	50853.9	75598.8

Source: ILOSTAT (International Labor Organization) 2023 Global Estimate

Bangladesh labor force grew steadily from 70.2 million in 2019 to 75.6 million in 2023. The workforce expanded annually despite the pandemic, with women entering the labor market rapidly. Female employment rose by about 2.3 million, while male participation increased by 3.1 million. Despite rising female participation, men represented approximately two third of the total labor force. This highlights continuous growth in labor force confirming higher women participation, yet having gender disparity.

4.1.7 Labor Force Participation Rate:

The Labor Force Participation Rate (LFPR) reflects the working-age population that is economically active. The following table represents the LFPR by age and sex from year 2019 to 2023 in percentage.

Table 6: Labor Force Participation Rate by Age (15+) and Sex from 2019-2023 (%)

Year	Women	Men	Total
2019	36.9	81	58.6
2020	36.5	80.3	58
2021	37.1	80.2	58.2
2022	37.7	80.6	58.8
2023	37.7	80.5	58.7

Source: ILOSTAT (International Labor Organization) 2023 Global Estimate

2020 shows the immediate pandemic impact, in 2020 both the participation of both men and women declines. Participation of men declined from 81.0% to 80.3% and participation of women dipped from 36.9% to 36.5%. this pattern implies a temporary withdrawal of workers from labor market, specially, male workers during the pandemic.

From 2021, participation rates began to improve. By 2023, the participation rate of women reached 37.7%, exceeding its pre-pandemic rate which indicates a positive long-term shift of female labor force in economic activities. In contrast, in 2023, the participation of men reached 80.5%, still less than 2019 peak, which indicates the impact of pandemic on men's labor force attachment has been more persistent.

4.1.8 Number of Unemployed workers:

The absolute number of unemployed people reflects the true scale of the pandemic's impacts on labor market.

Table 7: Unemployment by Age (15+) and Sex from 2019-2023 (Thousand)

Year	Women	Men	Total
2019	1490.4	1587.8	3078.2
2020	1712	1983	3695
2021	1774	1923.8	3697.9
2022	1722.2	1776.4	3498.6
2023	1753.4	1781.3	3543.7

Source: ILOSTAT (International Labor Organization) 2023 Global Estimate

From 2019 to 2020, total unemployment rose sharply by about 6.17 lakh. In 2023, unemployment women numbered 1.75 million which is still higher than 2019 level, and male unemployment likewise remained above pre-pandemic levels. Although unemployment decreased after 2021, total unemployment in 2023 stood at 3.54 million, which is 4,65,000 more than in 2019, reflecting a persistent employment shortfall.

4.1.9 Unemployment Rate:

The unemployment rate represents the proportion of the labor force without work, signals economic hardship.

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Table 8: Unemployment Rate by Age (15+) and Sex from 2019-2023 (%)

Year	Women	Men	Total
2019	6.6	3.3	4.4
2020	7.5	4.1	5.2
2021	7.5	3.9	5.1
2022	7.1	3.5	4.7
2023	7.1	3.5	4.7

Source: ILOSTAT (International Labor Organization) 2023 Global Estimate

The unemployment rate jumped from 4.4% in 2019 to 5.2% in 2020. Across the entire period, women faced an unemployment rate nearly double that of their male counterpart. As of 2023, overall unemployment level remained at 4.7%, with women's unemployment rate at 7.1%, indicating that the labor market had not fully recovered from the pandemic shock.

Overall, the post-covid labor market in Bangladesh characterized by a growing work force with rising female participation, yet facing challenges from insufficient job creation, higher unemployment rate than pre-pandemic level and persistent gender inequality. Creation of new job opportunities must be given the first priority to keep align with the growing participatory labor force.

4.1.10 Summary of Objective 01

In the post-covid era the economy showed modest progress, including increased female labor participation, and a gradual structural transition, but deep-rooted issues such as extensive informality and gender inequalities remained. In the post-covid era this pattern intensified. Participation of women grew more rapidly, yet unemployment worsened and the gap between job seekers and job opportunities grew larger. Even though the pandemic did not change the basic pattern of Bangladesh's labor market, it amplifies its structural fragilities, emphasizing the urgency of faster and better employment generation.

4.2 Objective 2: Examining the unemployment trend in Bangladesh during COVID through structural break model:

The structural break in unemployment during the covid-19 period was tested by estimating a multi-year dummy variable regression model. Furthermore, to evaluate whether the dummy terms, influenced by covid pandemic jointly exerted a significant effect on unemployment, Wald test was conducted. Accordingly, the structural break analysis is modeled as follows:

4.2.1 Model 01: Structural Break in unemployment:

$$UNEMP_t = \beta_0 + \beta_1 D2020t + \beta_2 D2021t + \beta_3 D2022t + \varepsilon_t$$

Where,

UNEMP: Unemployment Rate

GDP: Per Capita Gross Domestic Product

INF: Annual Inflation Rate

ER: Exchange Rate

D202, D2021 and D2022: dummy variables for the respective pandemic and post-pandemic years.

B's are the coefficients and ε_t is the omitted variable (Error term).

The estimated Unemployment Regression model is:

$$UNEMP_t = 0.041775 + 0.012625 D2020t + 0.011525 D2021t + 0.004125 D2022t +$$

Table 9: Regression Results for Structural Break in Unemployment (Model 1)

Variable	Coefficient	Std. Error	t-Statistic	p-value	Interpretation
Constant	0.041775	0.000954	43.782	0.0000	Baseline unemployment $\approx$ 4.18%
D2020	0.012625	0.004372	2.887	0.0094	Significant increase in 2020
D2021	0.011525	0.004372	2.636	0.0163	Significant increase in 2021
D2022	0.004125	0.004372	0.943	0.3573	Insignificant change in 2022

Source: Author's estimation using EViews based on data from World Bank (2000 to 2023)

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4.2.2 Interpretation on Annual Coefficient:

Starting from year 2020, since this is the outbreak year of COVID-19, this clearly highlights a sharp unemployment shock induced by COVID with positive and statistically significant coefficient $D_{2020} = 0.012625$ and p value $p=0.0094$ at 1% level of significance. It indicates the unemployment increased by 1.26 percentage in 2020 relative to the baseline trend.

However, in the year of 2021, the value of coefficient of dummy ($D_{2021}=0.011525$, $p=0.0163$) is also positive and significant at the 5% level, implies unemployment remained 1.15 percentage higher than trend in 2021. The result suggests a persistent post pandemic impact, consistent with slow labor market adjustment.

Lastly, in 2022, the coefficient value of dummy ($D_{2022}=0.004125$, $p=0.3573$) showing positive but insignificant effect, suggesting partial normalization of the labor market by 2022. Since the effect lacks statistical significance this indicates the structural break fades after 2021.

4.2.3 Model Fit

The R^2 value of 0.442 reveals approximately 44% of the variation in the unemployment is explained by the model and the F-statistic, with a p-value of 0.0098, confirms strong overall model significance.

4.2.4 Wald Test for Joint Significance:

To investigate whether these three dummies (D_{2020} , D_{2021} and D_{2022}) jointly equal zero or there is any structural break at all Wald Test have been employed.

$H_0 : \beta^*_4 = 0$ (No Structural Break)

$H_1 : \beta^*_4 \neq 0$ (Structural Break exist)

A statistically significant Wald statistic rejects H_0 , confirming the presence of a structural break in 2020.

Table 10: Wald Test for Joint Significance of COVID Dummies

Test Statistic	Value	p-value	Conclusion
F-statistic	5.024672	0.0099	Reject H_0
Chi-square	15.07402	0.0018	Reject H_0

Source: Author's estimation using EViews based on data from World Bank (2000 to 2023)

4.2.5 Interpretation

The result shows both F-statistic with p-value 0.0099 and Chi-square with p-value 0.0018 are highly coefficient at 1% level of significant that leads a rejection of null hypothesis. This confirms the COVID period from 2020 to 2022 collectively represents statistically significant structural break in unemployment trend in Bangladesh.

4.2.6 Summary of objective 2

Overall, the regression estimate provides strong evidence of a structural break in unemployment during the COVID-19 period. The 2020 dummy carries a high and positive significant coefficient reflects an immediate increase in unemployment. This sharp rise corresponds to overall strict lockdown, temporary and permanent business closure, extensive job losses, particularly in the informal and industrial sectors. The continued significant effect in 2021 indicates a slow recovery as labor market took time to absorb the disruptions caused by pandemic. However, by 2022, the insignificant dummy value suggests that the labor market was gradually stabilizing and returning to its long run pattern. Moreover, the Wald test rejects the null hypothesis and ensures the presence of a joint structural break during 2020 to 2022. Taken together, the findings offer a strong temporary but statistically significant break in the Bangladesh's unemployment pattern.

4.3 Objective 3: Identifying the most vulnerable sector during COVID-19-Sectoral Impact

In order to evaluate sector specific vulnerability during the pandemic, the analysis employed two complementary econometric methods: 1. Regression analysis with dummy variables for COVID-19 and 2. Chow Structural break tests. The result shows the impact of the pandemic across the agriculture, industry and services was asymmetric.

The regression models including control variables such as GDP, Inflation and Exchange Rate, along with the findings of Chow Structural Breakpoint (taking D_{2020} as dummy) that provides additional evidence of structural instability are as follows:

Model 2: Agriculture Employment Model

$$AGR_t = \alpha_0 + \alpha_1 GDP_t + \alpha_2 INF_t + \alpha_3 ER_t + \epsilon_t$$

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Estimated Employment Agriculture Model

$$AGR_t = 67.959 - 0.00508GDP_t - 0.7077INF_t + 0.1610ER_t + \varepsilon_t$$

Table 11: Regression Results – Agriculture (AGR)

Variable	Coefficient	Std. Error	t-Statistic	p-value
C	67.95918	4.711453	14.42425	0.0000
GDP	-0.005076	0.001540	-3.295760	0.0036
INF	-0.707687	0.331343	-2.135815	0.0452
ER	-0.161012	0.105735	-1.522780	0.1435
R²	0.922662	Adj. R²	0.911062	
DW	0.855590	F-stat	79.53532	0.000000

Source: Author's estimation using EViews (2000–2023).

4.3.1 Chow Test for Agriculture

F-statistic = 0.233 and p-value = 0.9156; Showing No structural break in 2020.

The result shows that, GDP exerts a negative and significant impact on agriculture ($p = 0.0036$), which indicates that as the economy grow, the contribution of this sector declines. Result also reveals that, agriculture ($p = 0.0452$) is negatively and significantly affected by inflation, suggesting the adverse effect of rising input costs, whereas the effect of exchange rate remains insignificant ($p = .8556$), highlighting minimal impact of currency fluctuations.

The value of R^2 (0.9227) reflects the model's fitness, though the low Durbin-Watson value indicates a moderate autocorrelation. Perhaps, the Chow test result (F-statistic = 0.233 and p-value = 0.9156) ensures there is no structural break in agriculture sector in 2020. This highlights this sector was stable during covid pandemic.

Model 3: Industry Employment Model

$$IND_t = Y_0 + Y_1GDP_t + Y_2INF_t + Y_3ER_t + \varepsilon_t$$

Estimated Industry Employment Model

$$IND_t = 1.212 + 0.000632GDP_t + 0.1860INF_t + 0.1947ER_t$$

Table 12: Regression Results – Industry (IND)

Variable	Coefficient	Std. Error	t-Statistic	p-value
C	1.211768	4.071799	0.297600	0.7691
GDP	0.000632	0.001331	0.475121	0.6398
INF	0.185961	0.286358	0.649399	0.5235
ER	0.194653	0.091380	2.130142	0.0458
R²	0.792689	Adj. R²	0.761592	
DW	0.450528	F-stat	25.49114	0.000000

Source: Author's estimation using EViews (2000–2023).

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4.3.2 Chow Test for Industry:

F-Statistics = 12.239 and p-value = 0.0001; shows strong structural break in 2020

In case of Industrial sector, both GDP and inflation are statistically insignificant with $p = 0.6398$ and $p = 0.5235$ respectively, showing limited responsiveness to short term economic changes. The positive and significant impact of exchange rate with $p = 0.0458$ suggests currency movement supports industry sector, particularly in exports.

On the other hand, the result of Chow test (F-Statistics = 12.239 and p-value = 0.0001) confirms a significant structural break in 2020. This is clearly evidence that the industrial sector suffered significant disruption due to the pandemic.

Model 4: Service Industry Model:

$$SER_t = \delta_0 + \delta_1 GDP_t + \delta_2 INF_t + \delta_3 ER_t + \varepsilon_t$$

Estimated Service Industry Model:

$$SER_t = 30.829 + 0.00444GDP_t + 0.5217INF_t + 0.03364ER_t + \varepsilon_t$$

Table 13: Regression Results – Services (SER)

Variable	Coefficient	Std. Error	t-Statistic	p-value
C	30.82906	4.247947	7.257402	0.0000
GDP	0.004443	0.001389	3.199950	0.0045
INF	0.521726	0.298746	1.746389	0.0961
ER	-0.033641	0.095333	-0.352877	0.7279
R ²	0.801922	Adj. R ²	0.772210	
DW	0.506349	F-stat	26.99008	0.000000

Source: Author's estimation using EViews (2000–2023).

4.3.3 Chow Test for Service

F-Statistic = 2.524 and p-value = 0.0818; shows marginal structural break. Lastly, in service sector, the GDP has a positive and highly significant impact with $p = 0.0045$, presenting economic growth strongly boosts the service sector. Inflation also displays slightly positive and marginally significant ($p = 0.0961$) impact, implying limited connection. Exchange rate however showing statistically insignificant result ($p = 0.7279$) explain movements in the service sector. The Chow test result (F-Statistic = 2.524 and p-value = 0.0818) implies marginal structural break in the model, suggesting that the connection between the variables may have shifted over the estimated time period.

Table 14: Summary of Sectoral Impact and Structural Breaks

Sector	GDP Impact	INF Impact	ER Impact	COVID-19 Dummy (D2020)	Chow Test (2020)	Vulnerability
Agriculture	Negative** ($p=0.003$)	Negative** ($p=0.045$)	Insignificant	Not significant	No break ($p=0.9156$)	Low
Industry	Insignificant	Insignificant	Positive** ($p=0.0458$)	Significant negative	Strong break ($p=0.0001$)	High
Services	Positive*** ($p=0.0045$)	Marginal ($p=0.0961$)	Insignificant	Significant positive	Marginal break ($p=0.0818$)	Adaptive

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

Source: Author's compilation from regression and Chow test results.

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4.3.4 Summary of objective 3

Based on the rigorous econometric analyses done to meet this objective, industry appears as the hardest-hit sector during covid-19, experienced several negative shocks such as strong structural break and high vulnerability to external factors. In contrary, agriculture remain stable, no structural break, while service remain resilient with limited structural change. Overall, the effect of pandemic found to be uneven across the sectors and highlights the need for policies for the recovery of industrial sector.

4.4 Summary of all Diagnostic Tests for checking Robustness:

Prior to interpreting the coefficients, each model underwent diagnosis tests for autocorrelation, heteroskedasticity, multicollinearity and specification errors. The agriculture regression test passed all the classical assumptions, enabling reliable OLS-based inference. However, the industry and service models suffered from significant autocorrelation and heteroscedasticity, therefore they were re-estimated with White-HAC robust standard errors to guarantee accurate hypothesis tests. The industry regression further revealed strong multicollinearity ($VIF > 10$ for ER and GDP) and failed the RESET diagnostic, pointing to some specification ambiguity, which is highlighted as study limitation. Nonetheless, CUSUM and CUSUM-of squares tests confirmed parameter stability across all models.

5.0 POLICY IMPLICATIONS:

- **Support for the Industrial Sector:** Introduce fiscal incentives, credit access, and retraining programs for displaced industrial workers, particularly in export-oriented manufacturing.
- **Expand Social Protection for Informal Workers:** Broaden coverage of safety nets such as cash transfers, health insurance, and unemployment benefits to shield vulnerable workers during future shocks.
- **Promote Female Labor Participation:** Implement gender-sensitive measures, including childcare support, flexible work arrangements, and targeted skills training.
- **Enhance Labor Market Monitoring:** Establish a real-time labor market information system to track employment trends and enable timely policy interventions.
- **Encourage Sectoral Diversification:** Invest in resilient sectors like ICT, agro-processing, and renewable energy to reduce reliance on vulnerable industries and create sustainable jobs.
- **Improve Data Collection:** Conduct regular, disaggregated labor surveys capturing informal employment, gender gaps, and rural–urban differences to support evidence-based policymaking.

5.1 CONCLUSIONS

The analysis indicates that the COVID-19 pandemic caused a notable structural break in Bangladesh's unemployment trend, with the most pronounced increase occurring in 2020 and effects persisting into 2021. Although signs of labor market recovery emerged in 2022, unemployment remained above pre-pandemic levels. Sectoral impacts were uneven: the industrial sector experienced the greatest disruption, agriculture remained largely stable, and services demonstrated relative resilience. Overall, the pandemic exposed pre-existing structural vulnerabilities in Bangladesh's labor market, particularly related to informality and gender disparities.

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