22_Bosnia_and_Herzegovina

October 8, 2025

1 How has the share of women in vulnerable employment evolved relative to that of men in Bosnia and Herzegovina between 1991 and 2023?

1.1 Abstract

Using World Bank World Development Indicators (WDI), this study examines the evolution of vulnerable employment among men and women in Bosnia and Herzegovina from 1991 to 2023. Over this thirty-two-year period, both male and female vulnerable employment shares declined overall, reflecting gradual improvements in labor market stability. Female vulnerable employment began at a significantly higher level - about ten percentage points above the male rate — but the two converged around 2015, suggesting narrowing gender disparities. However, following this convergence, the female share began to rise again while the male rate continued to decline moderately, leading to a renewed divergence. These trends highlight both progress and persistent challenges in achieving equitable and secure employment across genders, emphasizing the need for sustained labor policy attention to gender-specific vulnerabilities.

1.2 1. Question

How has the share of women in vulnerable employment evolved relative to that of men in Bosnia and Herzegovina between 1991 and 2023?

- **Female employment proxy**: Vulnerable employment, female (% of female employment)
- **Male employment proxy**: Vulnerable employment, male (% of male employment)

1.3 2. Data

- **Source**: World Bank World Development Indicators (WDI)
- **Indicators**:
    - Vulnerable employment, female (% of female employment)
    - Vulnerable employment, male (% of male employment)
- **Coverage**: Bosnia and Herzegovina, 1991–2023
- **Notes**: National-level data only

1.4 3. Method

1. Filtered dataset for Bosnia and Herzegovina.
2. Selected relevant columns: Year, Indicator Name, Value.

3. Pivoted male and female vulnerable employment indicators into separate columns and sorted by year.
4. Produced a dual-axis line graph comparing gender-specific trends in vulnerable employment.

(Analysis is descriptive; no causal inference applied.)

1.5   4. Results

- **Female vulnerable employment (% of female employment)**: Declined sharply over time, from significantly higher levels in the early 1990s to convergence with male rates around 2015.
- **Male vulnerable employment (% of male employment)**: Declined more gradually but consistently across the same period.
- **Comparison**: The two indicators converged around 2015 before diverging again, as the female rate began to increase slightly while the male rate continued to decline.

(Figure 1. Vulnerable Employment by Gender, Bosnia and Herzegovina 1991–2023)

(Table 1. Pivoted dataset)

1.6   5. Interpretation

- Bosnia and Herzegovina's experience demonstrates the complex dynamics of labor market transformation during post-socialist transition and European integration.
- The initial gender gap—where women were far more likely to be in vulnerable forms of work—reflected structural barriers such as occupational segregation, informal sector concentration, and limited access to stable employment.
- The convergence around 2015 suggests progress toward gender equality in labor market conditions, potentially linked to formalization efforts, educational expansion, and targeted employment policies.
- The subsequent re-divergence, however, indicates persistent vulnerabilities among women, possibly tied to care responsibilities, part-time or informal work, and uneven recovery from economic shocks.
- These findings underscore that reducing gendered labor insecurity requires not just economic growth but also inclusive labor market reforms, access to social protection, and gender-sensitive employment programs.

1.7   6. Limitations

- Modeled ILO estimates may not fully capture informal or unpaid work, particularly in rural and household contexts.
- National-level data mask regional and sectoral variations in employment vulnerability.
- Descriptive analysis limits causal interpretation; further econometric analysis could isolate policy or structural effects.

1.8   7. Next Steps / Extensions

- Conduct sectoral analysis to identify which industries drive the gender gap in vulnerable employment.
- Examine the relationship between vulnerable employment, education levels, and informality.

- Compare Bosnia and Herzegovina's trends with other Western Balkan countries to assess regional labor market convergence.
- Explore the impact of EU integration processes, migration, and post-conflict economic restructuring on gendered employment outcomes.

[2]:
```python
# How has the share of women in vulnerable employment evolved relative to that
 ↪of men in Bosnia and Herzegovina between 1991 and 2023?

import pandas as pd
import matplotlib.pyplot as plt
import os

# Folders
data_raw_folder = "data_raw/"
data_clean_folder = "data_clean/"
figures_folder = "figures/"

# Load CSV
filename = "social-development_bih_filtered.csv"  # Filtered dataset with only
 ↪relevant rows
df = pd.read_csv(os.path.join(data_raw_folder, filename))

# Keep only needed columns
df = df[["Year", "Indicator Name", "Value"]]

# Convert Year and Value to numeric, drop invalid rows
df["Year"] = pd.to_numeric(df["Year"], errors="coerce")
df["Value"] = pd.to_numeric(df["Value"], errors="coerce")
df = df.dropna(subset=["Year", "Value"])

# Pivot indicators into separate columns
df_pivot = df.pivot(index="Year", columns="Indicator Name", values="Value").
 ↪reset_index()
df_pivot = df_pivot.sort_values("Year")

print("Pivoted Bosnia and Herzegovina dataset:")
display(df_pivot)

# Interpolate missing values for smooth plotting (optional)
df_plot = df_pivot.interpolate(method='linear')

# Plot the two indicators
plt.figure(figsize=(10,6))
plt.plot(df_plot["Year"], df_plot["Vulnerable employment, female (% of female
 ↪employment) (modeled ILO estimate)"],
         marker='o', linestyle='-', label="Vulnerable employment, female (% of
 ↪female employment)")
```

3

```
plt.plot(df_plot["Year"], df_plot["Vulnerable employment, male (% of male␣
 ↪employment) (modeled ILO estimate)"],
          marker='o', linestyle='-', label="Vulnerable employment, male (% of␣
 ↪male employment)")

plt.title("Bosnia and Herzegovina: Female vs Male vulnerable employment (%)␣
 ↪(1991-2023)")
plt.xlabel("Year")
plt.ylabel("Percentage")
plt.legend()
plt.grid(True)
plt.tight_layout()
plt.savefig(os.path.join(figures_folder,␣
 ↪"bosnia_and_herzegovina_female_vs_male_vulnerable_employment.png"))
plt.show()

# Save cleaned CSV
df_pivot.to_csv(os.path.join(data_clean_folder,␣
 ↪"bosnia_and_herzegovina_female_vs_male_vulnerable_employment"), index=False)
```

Pivoted Bosnia and Herzegovina dataset:

```
Indicator Name  Year  \
0                1991
1                1992
2                1993
3                1994
4                1995
5                1996
6                1997
7                1998
8                1999
9                2000
10               2001
11               2002
12               2003
13               2004
14               2005
15               2006
16               2007
17               2008
18               2009
19               2010
20               2011
21               2012
22               2013
23               2014
24               2015
```

```
25              2016
26              2017
27              2018
28              2019
29              2020
30              2021
31              2022
32              2023

Indicator Name  Vulnerable employment, female (% of female employment) (modeled␣
 ↪ILO estimate)  \
0                                                   34.558335
1                                                   34.194248
2                                                   33.606646
3                                                   32.932774
4                                                   32.094033
5                                                   30.782078
6                                                   29.769229
7                                                   28.379303
8                                                   27.579441
9                                                   27.342847
10                                                  26.023908
11                                                  25.372455
12                                                  24.798383
13                                                  24.188786
14                                                  23.723287
15                                                  23.182274
16                                                  23.002288
17                                                  23.601446
18                                                  26.388424
19                                                  24.165494
20                                                  21.916003
21                                                  24.051637
22                                                  20.659795
23                                                  18.755098
24                                                  19.253069
25                                                  19.518425
26                                                  20.947923
27                                                  17.476484
28                                                  21.773283
29                                                  22.124359
30                                                  22.518624
31                                                  22.957538
32                                                  24.164985

Indicator Name   Vulnerable employment, male (% of male employment) (modeled ILO␣
 ↪estimate)
```
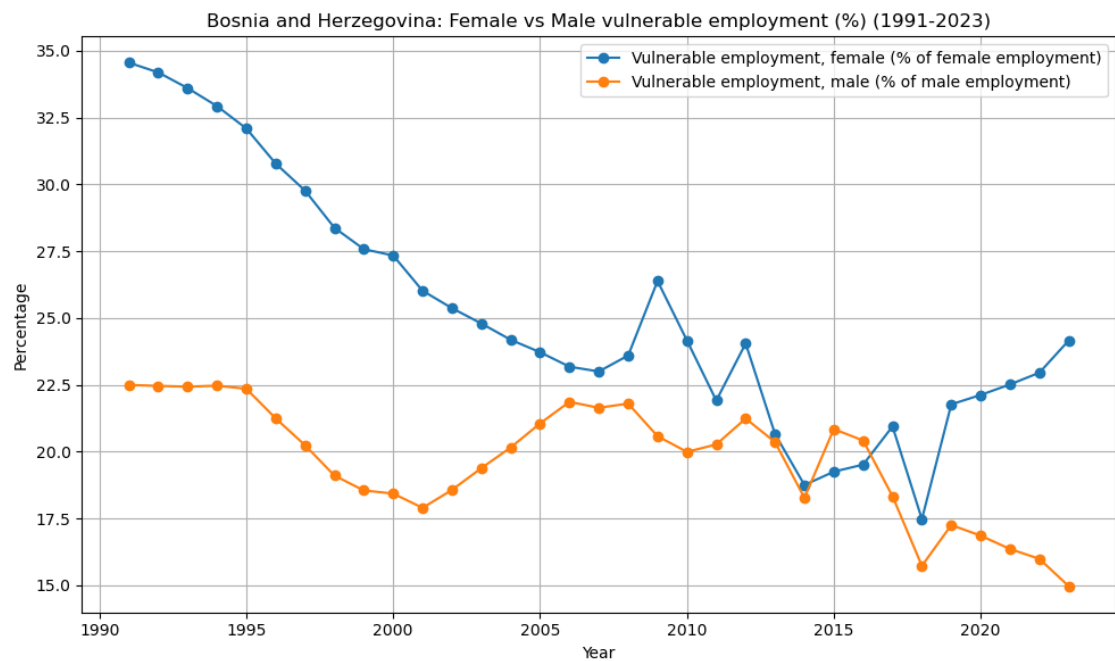
0	22.498741
1	22.463306
2	22.433347
3	22.470916
4	22.354403
5	21.247986
6	20.241527
7	19.107066
8	18.551217
9	18.434283
10	17.899939
11	18.570205
12	19.385663
13	20.158833
14	21.059640
15	21.865715
16	21.644473
17	21.801596
18	20.580883
19	19.994724
20	20.272229
21	21.243324
22	20.359814
23	18.275506
24	20.848301
25	20.419174
26	18.331565
27	15.730193
28	17.255666
29	16.860909
30	16.359713
31	15.991559
32	14.967204

Bosnia and Herzegovina: Female vs Male vulnerable employment (%) (1991-2023)