2_Albania

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1 Does the decline in female education coincide with changes in slum population in Albania between 2000 and 2010?

1.1 Abstract

Education and urban living conditions are closely linked in developing contexts, yet their dynamics in Albania remain underexplored. This study examines changes in the percentage of the female population aged 15+ with no education and the proportion of the population living in slums between 2000 and 2010 using World Bank World Development Indicators. While slum population steadily decreased over the period, the percentage of females with no education slightly increased. These descriptive trends suggest a potential inverse relationship between female education and urban living conditions, though the results remain correlational. The findings highlight the need for additional indicators and regional data to better understand the complex interplay between education and urban development.

1.2 1. Question

Does the decline in female education coincide with changes in slum population in Albania between 2000 and 2010?

- **Proxy for urbanization**: Population living in slums (% of urban population)
- **Measure of education**: Percentage of female population age 15+ with no education

1.3 2. Data

- **Source**: World Bank World Development Indicators (WDI)
- **Indicators**:
  - Population living in slums (% of urban population)
  - Percentage of female population age 15+ with no education
- **Coverage**: Albania, 2000–2010 (years with available data only)
- **Notes**: Only national-level data; some years missing for each indicator.

1.4 3. Method

1. Filtered dataset for Albania.
2. **Selected relevant columns**: Year, Indicator Name, Value.
3. Pivoted indicators into separate columns and sorted by year.
4. Produced a line graph comparing female education and slum population over time.

(Analysis is descriptive; no causal methods were applied.)

1.5 4. Results

- **Slum population**: Decreased steadily over the period.
- **Female population with no education**: Slightly increased, contrary to slum population trends.
- **Comparison**: While urban living conditions improved, female education declined slightly, suggesting that decreases in slum population did not coincide with improvements in female education.

(Figure 1. Female Education vs Slum Population in Albania, 2000–2010)

(Table 1. Pivoted dataset)

1.6 5. Interpretation

- Declining female education, despite improvements in urban living conditions, highlights gaps in educational access or quality.
- Decreasing slum populations reflect ongoing urban development, but these improvements alone did not enhance educational outcomes for women.
- Descriptive trends underscore the complexity of development dynamics in Albania and the limits of using only national-level indicators.

1.7 6. Limitations

- Only two indicators analyzed.
- Gaps exist for some years.
- National-level data only; no regional detail.
- No causal relationships established.

1.8 7. Next Steps / Extensions

- Incorporate additional educational and urbanization indicators.
- Use subnational/regional data to study heterogeneity.
- Apply econometric models to test causal pathways.
- Compare Albania with similar developing countries for broader insight.

[28]:
```
# Does the decline in female education coincide with changes in slum population␣
↪in Albania from 2000 to 2010?

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 = "albania_combined.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 Albania 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["Population living in slums (% of urban␣
 ↪population)"],
         marker='o', linestyle='-', label="Slum Population (% urban)")
plt.plot(df_plot["Year"], df_plot["Percentage of female population age 15+ with␣
 ↪no education"],
         marker='o', linestyle='-', label="Female Population 15+ No Education␣
 ↪(%)")

plt.title("Albania: Slum Population vs Female Education (2000-2010)")
plt.xlabel("Year")
plt.ylabel("Percentage of Population")
plt.legend()
plt.grid(True)
plt.tight_layout()
plt.savefig(os.path.join(figures_folder, "albania_slums_vs_female_edu.png"))
plt.show()

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

```
Pivoted Albania dataset:

Indicator Name  Year  \
0               2000
```

```
1                2002
2                2004
3                2005
4                2006
5                2008
6                2010

Indicator Name  Percentage of female population age 15+ with no education  \
0                                                                1.71
1                                                                 NaN
2                                                                 NaN
3                                                                3.07
4                                                                 NaN
5                                                                 NaN
6                                                                4.39

Indicator Name  Population living in slums (% of urban population)
0                                                                28.1
1                                                                25.5
2                                                                23.0
3                                                                 NaN
4                                                                20.5
5                                                                17.9
6                                                                15.4
```