3_Algeria

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1 Does the prevalence of adults without formal education coincide with urban population growth in Algeria between 1965 and 2010?

1.1 Abstract

Education and urbanization are two key pillars of development, yet their interaction in Algeria has not been directly compared over the long run. This study uses World Bank World Development Indicators to examine trends in the percentage of adults aged 15+ without formal education and the annual rate of urban population growth from 1965 to 2010. Findings show a dramatic decline in the share of adults without education, while urban population growth remained comparatively stable. These descriptive results suggest that Algeria's educational improvements unfolded largely independently of urbanization pressures. The analysis highlights the importance of considering both demographic change and policy reforms when assessing development progress.

1.2 1. Question

Does the prevalence of adults without formal education coincide with urban population growth in Algeria between 1965 and 2010?

- **Proxy for urbanization**: Urban population growth (annual %)
- **Measure of education**: Population ages 15+ with no formal education (%)

1.3 2. Data

- **Source**: World Bank World Development Indicators (WDI)
- **Indicators**:
  - Urban population growth (annual %)
  - Population ages 15+ with no formal education (%)
- **Coverage**: Algeria, 1965–2010 (years with available data only)
- **Notes**: Only national-level data; some years missing.

1.4 3. Method

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

(Analysis is descriptive; no causal inference applied.)

1.5 4. Results

- **Adults without formal education**: Declined substantially across the period, especially after the 1970s.
- **Urban population growth**: Remained relatively steady, showing limited variation across decades.
- **Comparison**: Educational gains did not move in tandem with urban growth, suggesting independent drivers.

(Figure 1. Adult Education vs Urban Population Growth in Algeria, 1965–2010)

(Table 1. Pivoted dataset)

1.6 5. Interpretation

- Algeria achieved major improvements in education, reducing the share of adults without schooling.
- Urban growth rates were steady, meaning demographic expansion was not the main driver of rising education levels.
- These findings imply that policy efforts and institutional reforms, rather than urbanization alone, played a central role in advancing education.

1.7 6. Limitations

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

1.8 7. Next Steps / Extensions

- Add complementary indicators (e.g., literacy rates, school enrollment).
- Incorporate subnational/regional data to capture heterogeneity.
- Test causal pathways with econometric models.
- Situate Algeria's trajectory within a comparative North African context.

[3]:
```
# Does the prevalence of adults without formal education coincide with urban␣
↪population growth in Algeria between 1965 and 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 = "algeria_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 Algeria 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["Urban population growth (annual %)"],
         marker='o', linestyle='-', label="Urban Population Growth (%)")
plt.plot(df_plot["Year"], df_plot["Barro-Lee: Percentage of population age 15+␣
 ↪with no education"],
         marker='o', linestyle='-', label="Population 15+ No Education (%)")

plt.title("Algeria: Urban Population Growth vs Population Education␣
 ↪(1965-2010)")
plt.xlabel("Year")
plt.ylabel("Percentage of Population")
plt.legend()
plt.grid(True)
plt.tight_layout()
plt.savefig(os.path.join(figures_folder, "algeria_urban_pop_growth_vs_pop_edu.
 ↪png"))
plt.show()

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

```
Pivoted Algeria dataset:
```

Indicator Name	Year	\
0	1965	

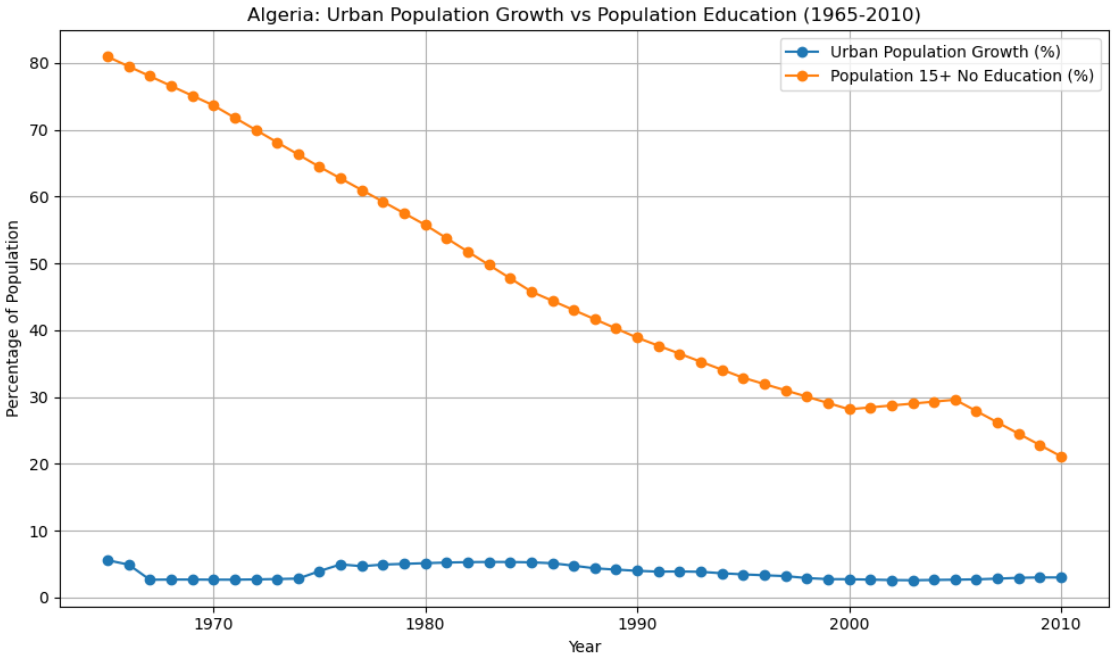
```
1                1966
2                1967
3                1968
4                1969
5                1970
6                1971
7                1972
8                1973
9                1974
10               1975
11               1976
12               1977
13               1978
14               1979
15               1980
16               1981
17               1982
18               1983
19               1984
20               1985
21               1986
22               1987
23               1988
24               1989
25               1990
26               1991
27               1992
28               1993
29               1994
30               1995
31               1996
32               1997
33               1998
34               1999
35               2000
36               2001
37               2002
38               2003
39               2004
40               2005
41               2006
42               2007
43               2008
44               2009
45               2010

Indicator Name  Barro-Lee: Percentage of population age 15+ with no education  \
0                                                               80.93
```

1	NaN
2	NaN
3	NaN
4	NaN
5	73.64
6	NaN
7	NaN
8	NaN
9	NaN
10	64.45
11	NaN
12	NaN
13	NaN
14	NaN
15	55.76
16	NaN
17	NaN
18	NaN
19	NaN
20	45.78
21	NaN
22	NaN
23	NaN
24	NaN
25	38.88
26	NaN
27	NaN
28	NaN
29	NaN
30	32.89
31	NaN
32	NaN
33	NaN
34	NaN
35	28.17
36	NaN
37	NaN
38	NaN
39	NaN
40	29.60
41	NaN
42	NaN
43	NaN
44	NaN
45	21.12

Indicator Name	Urban population growth (annual %)
0	5.588796

1	4.926324
2	2.667946
3	2.698709
4	2.697106
5	2.679216
6	2.677974
7	2.718341
8	2.772832
9	2.837681
10	3.953505
11	4.967617
12	4.689986
13	4.938400
14	5.043286
15	5.148822
16	5.240465
17	5.302461
18	5.329496
19	5.321975
20	5.274762
21	5.136154
22	4.771971
23	4.375253
24	4.185987
25	4.001491
26	3.881369
27	3.910950
28	3.852983
29	3.635134
30	3.467798
31	3.335734
32	3.211162
33	2.920057
34	2.759568
35	2.745489
36	2.688062
37	2.621600
38	2.594727
39	2.636235
40	2.675391
41	2.729546
42	2.831154
43	2.958505
44	3.012772
45	3.009838


Algeria: Urban Population Growth vs Population Education (1965-2010)
Urban Population Growth (%)
Population 15+ No Education (%)
Percentage of Population
Year
0
10
20
30
40
50
60
70
80
1970
1980
1990
2000
2010