4_Andorra

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1 Does the share of the population living in urban areas coincide with changes in domestic government health expenditure in Andorra between 2000 and 2020?

1.1 Abstract

Urbanization and public health investment are both central to development, yet their relationship in Andorra has not been systematically analyzed. This study uses World Bank World Development Indicators to examine trends in the share of the population living in urban areas and domestic government health expenditure (% of total government expenditure) from 2000 to 2020. The data reveal that urban population slightly decreased over the period, while government health expenditure fluctuated dramatically from year to year but generally declined by about half. These descriptive patterns suggest that shifts in urbanization were largely independent of public health spending trends. The analysis highlights the importance of understanding how demographic and policy variables interact, even in small, high-income contexts.

1.2 1. Question

Does the share of the population living in urban areas coincide with changes in domestic government health expenditure in Andorra between 2000 and 2020?

- **Proxy for urbanization**: Urban population (% of total population)
- **Measure of public investment**: Domestic general government health expenditure (% of total government expenditure)

1.3 2. Data

- **Source**: World Bank World Development Indicators (WDI)
- **Indicators**:
  - Urban population (% of total population)
  - Domestic general government health expenditure (% of total government expenditure)
- **Coverage**: Andorra, 2000–2020
- **Notes**: Only national-level data

1.4 3. Method

1. Filtered dataset for Andorra.
2. **Selected relevant columns**: Year, Indicator Name, Value.
3. Pivoted indicators into separate columns and sorted by year.

4. Produced a line graph comparing urban population and government health expenditure over time.

(Analysis is descriptive; no causal inference applied.)

1.5 4. Results

- **Urban population (% of total population)**: Slightly decreased over the period, showing a modest decline in the share of residents living in urban areas.
- **Government health expenditure (% of total government expenditure)**: Highly variable from year to year, but generally declined by approximately 50% over the two decades.
- **Comparison**: Trends in urbanization and health spending did not move together, suggesting largely independent dynamics.

(Figure 1. Urban Population vs Government Health Expenditure in Andorra, 2000–2020)

(Table 1. Pivoted dataset)

1.6 5. Interpretation

- Urbanization in Andorra slightly decreased, indicating that demographic shifts toward urban living were modest.
- Public health spending exhibited significant volatility, pointing to policy, budgetary, or economic influences rather than demographic drivers.
- These findings suggest that, in Andorra, government investment in health was not closely aligned with urban population trends, highlighting the complex interaction of policy priorities and demographic structure even in small, high-income countries.

1.7 6. Limitations

- Only two indicators analyzed.
- National-level data only; no regional breakdowns.
- No causal relationships tested.

1.8 7. Next Steps / Extensions

- Examine additional health and demographic indicators (e.g., life expectancy, healthcare access).
- Incorporate subnational or municipal data to study heterogeneity.
- Apply econometric methods to explore potential causal relationships.
- Compare Andorra's patterns with other small, high-income countries to identify common dynamics and policy implications.

[1]:
```
# Does the share of the population living in urban areas coincide with changes␣
↪in domestic government health expenditure in Andorra between 2000 and 2020?

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 = "andorra_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 Andorra 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["Domestic general government health␣
 ↪expenditure (% of general government expenditure)"],
        marker='o', linestyle='-', label="Domestic general government health␣
 ↪expenditure (% of general government expenditure)")
plt.plot(df_plot["Year"], df_plot["Urban population (% of total population)"],
        marker='o', linestyle='-', label="Urban population (% of total␣
 ↪population)")

plt.title("Andorra: Domestic General Government Health Expenditure vs Urban␣
 ↪Population (2000-2020)")
plt.xlabel("Year")
plt.ylabel("Percentage")
plt.legend()
plt.grid(True)
plt.tight_layout()
plt.savefig(os.path.join(figures_folder,␣
 ↪"andorra_dom_gen_gov_health_exp_vs_urban_pop.png"))
```

```
plt.show()

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

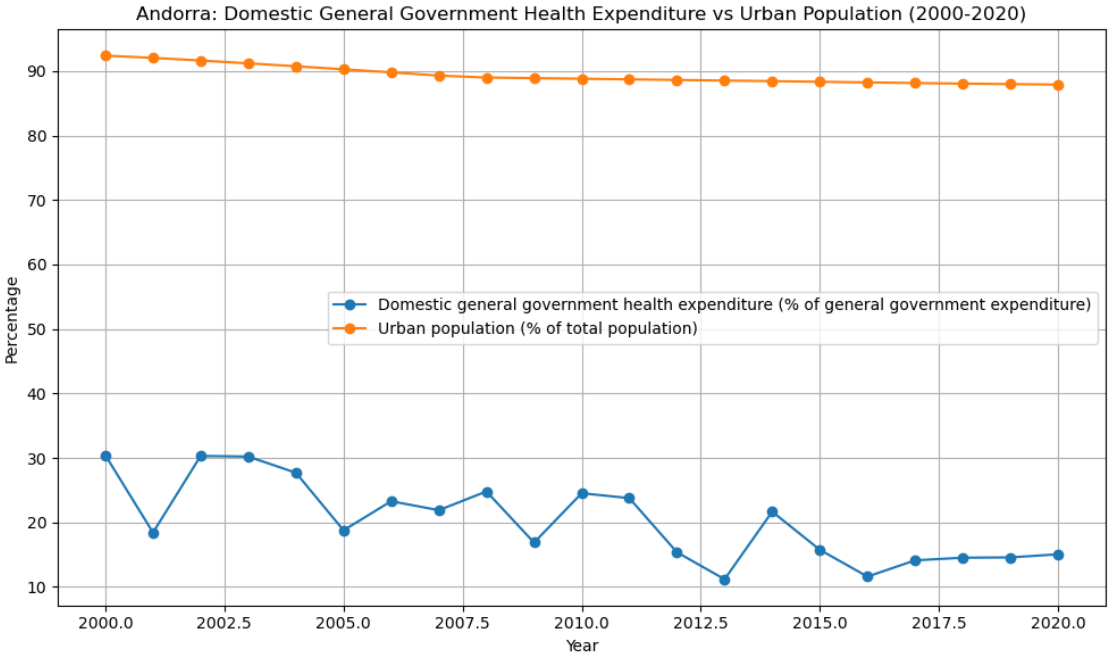
```
Pivoted Andorra dataset:
```

Indicator Name	Year
0	2000
1	2001
2	2002
3	2003
4	2004
5	2005
6	2006
7	2007
8	2008
9	2009
10	2010
11	2011
12	2012
13	2013
14	2014
15	2015
16	2016
17	2017
18	2018
19	2019
20	2020

Indicator Name	Domestic general government health expenditure (% of general government expenditure)
0	30.418488
1	18.425966
2	30.313049
3	30.215126
4	27.705290
5	18.778881
6	23.288269
7	21.894827
8	24.805691
9	16.870777
10	24.528812
11	23.766270
12	15.370749
13	11.189083
14	21.671690

15	15.752106
16	11.595967
17	14.120295
18	14.528497
19	14.574258
20	15.055970

Indicator Name	Urban population (% of total population)
0	92.395
1	92.056
2	91.641
3	91.207
4	90.751
5	90.285
6	89.807
7	89.308
8	89.004
9	88.912
10	88.819
11	88.726
12	88.631
13	88.537
14	88.441
15	88.345
16	88.248
17	88.150
18	88.062
19	87.984
20	87.916


Andorra: Domestic General Government Health Expenditure vs Urban Population (2000-2020)
Percentage
Year
Domestic general government health expenditure (% of general government expenditure)
Urban population (% of total population)
90
80
70
60
50
40
30
20
10
2000.0
2002.5
2005.0
2007.5
2010.0
2012.5
2015.0
2017.5
2020.0

[ ]: