21_Bolivia

October 5, 2025

1 How has the concentration of Bolivia's population in large urban agglomerations (over 1 million inhabitants) evolved relative to overall urbanization between 1960 and 2024?

1.1 Abstract

Using World Bank World Development Indicators (WDI), this study examines the evolution of Bolivia's urban population and the share living in large urban agglomerations from 1960 to 2024. Over this sixty-four-year period, both total urban population and population in agglomerations of over 1 million increased steadily by roughly 25%, reflecting significant urban growth. Population in large agglomerations consistently accounted for about half of the total urban population, highlighting the concentration of urbanization in Bolivia's largest cities. These parallel but proportionally offset trends reveal that urban growth has been both widespread and concentrated, underscoring the dual pressures of urban expansion and metropolitan centralization. The findings emphasize the importance of balanced urban planning, infrastructure investment, and governance to manage growth sustainably while supporting both large cities and smaller urban centers.

1.2 1. Question

How has the concentration of Bolivia's population in large urban agglomerations (over 1 million inhabitants) evolved relative to overall urbanization between 1960 and 2024?

- **Urban agglomeration proxy**: Population in urban agglomerations of more than 1 million (% of total population)
- **Urban population proxy**: Urban population (% of total population)

1.3 2. Data

- **Source**: World Bank World Development Indicators (WDI)
- **Indicators**:
    - Population in urban agglomerations of more than 1 million (% of total population)
    - Urban population (% of total population)
- **Coverage**: Bolivia, 1960–2024
- **Notes**: National-level data only

1.4 3. Method

1. Filtered dataset for Bolivia.
2. **Selected relevant columns**: Year, Indicator Name, Value.

3. Pivoted urban population and large agglomeration indicators into separate columns and sorted by year.
4. Produced a dual-axis line graph comparing overall urbanization versus concentration in large agglomerations.

(Analysis is descriptive; no causal inference applied.)

1.5 4. Results

- **Urban population (% of total)**: Increased steadily by roughly 25% from 1960 to 2024, reflecting sustained urban growth.
- **Population in large agglomerations (% of total population)**: Also rose by about 25%, consistently representing roughly half of total urban inhabitants.
- **Comparison**: Both indicators exhibit significant upward trends, but large agglomerations maintained a stable share of total urban population, showing that Bolivia's urbanization has been both concentrated and relatively balanced.

(Figure 1. Urban Population vs Population in Large Agglomerations, Bolivia 1960–2024)

(Table 1. Pivoted dataset)

1.6 5. Interpretation

- Bolivia's experience highlights the dual dynamics of urban expansion: rapid growth in overall urban population combined with sustained concentration in major metropolitan centers.
- The stable proportion of population in large agglomerations suggests structural factors such as economic opportunities, internal migration patterns, and urban policy have consistently favored large cities.
- These trends underscore the need for integrated urban planning, infrastructure investment, and equitable service delivery to balance growth across both large and smaller urban areas.
- Policymakers can use these insights to anticipate pressures on housing, transportation, and public services in major agglomerations while supporting regional urban development.
- The findings illustrate that understanding both the scale and spatial distribution of urbanization is essential for sustainable, resilient, and inclusive urban policy.

1.7 6. Limitations

- The analysis does not capture the quality of urban infrastructure, housing conditions, or service access.
- National-level data may mask regional, departmental, or informal settlement disparities.
- Descriptive analysis does not explore causal factors such as migration, economic shocks, or policy interventions.

1.8 7. Next Steps / Extensions

- Examine regional and city-level population trends to assess localized urbanization pressures.
- Investigate the relationship between urban concentration, economic productivity, and social outcomes.
- Compare Bolivia's urbanization patterns with neighboring South American countries to identify shared dynamics and divergences.

- Explore the role of migration, housing policy, and infrastructure investment in shaping both large agglomerations and smaller urban centers.

```
[1]:  # How has the concentration of Bolivia's population in large urban␣
      ↪agglomerations (over 1 million inhabitants) evolved relative to overall␣
      ↪urbanization between 1960 and 2024?

      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 = "urban-development_bol_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 Bolivia 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 in urban agglomerations of more␣
       ↪than 1 million (% of total population)"],
               marker='o', linestyle='-', label="Population in urban agglomerations␣
       ↪of more than 1 million (% of total population)")
      plt.plot(df_plot["Year"], df_plot["Urban population (% of total population)"],
```

3

```
            marker='o', linestyle='-', label="Urban population (% of total␣
 ↪population)")

plt.title("Bolivia: Population in urban agglomerations of more than 1 million␣
 ↪(% of total population) vs Urban population (% of total population)␣
 ↪(1960-2024)")
plt.xlabel("Year")
plt.ylabel("Percentage")
plt.legend()
plt.grid(True)
plt.tight_layout()
plt.savefig(os.path.join(figures_folder,␣
 ↪"bolivia_pop_in_urban_agglomerations_vs_total_urban_pop.png"))
plt.show()

# Save cleaned CSV
df_pivot.to_csv(os.path.join(data_clean_folder,␣
 ↪"bolivia_pop_in_urban_agglomerations_vs_total_urban_pop"), index=False)
```
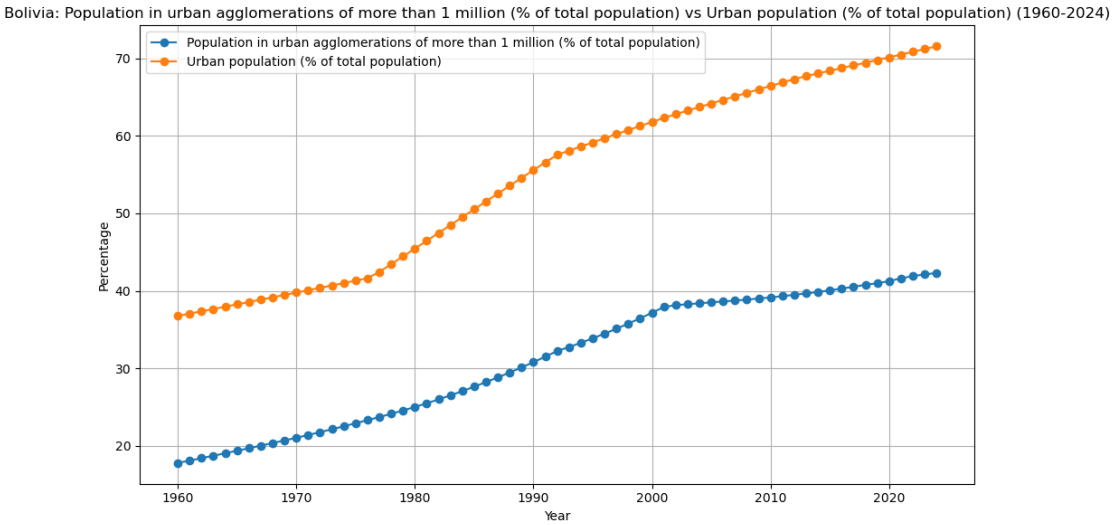
Pivoted Bolivia dataset:

Indicator Name Year \
0   1960
1   1961
2   1962
3   1963
4   1964
..   …
60   2020
61   2021
62   2022
63   2023
64   2024

Indicator Name Population in urban agglomerations of more than 1 million (% of␣
 ↪total population) \
0   17.796935
1   18.103617
2   18.415562
3   18.730853
4   19.050976
..   …
60   41.251427
61   41.609602
62   41.905386
63   42.109736
64   42.309327

```
Indicator Name  Urban population (% of total population)
0                                                 36.762
1                                                 37.059
2                                                 37.357
3                                                 37.656
4                                                 37.957
..                                                   ...
60                                                70.123
61                                                70.475
62                                                70.830
63                                                71.186
64                                                71.545

[65 rows x 3 columns]
```


Bolivia: Population in urban agglomerations of more than 1 million (% of total population) vs Urban population (% of total population) (1960-2024)

[ ]: