51_Ecuador

October 24, 2025

1 How has the share of young women aged 15–19 who completed primary education evolved relative to that of the overall youth population in Ecuador between 1960 and 2010?

1.1 Abstract

Using World Bank World Development Indicators (WDI) data, this study examines the evolution of primary education completion among youth aged 15–19 in Ecuador between 1960 and 2010. The analysis compares the percentage of young women who completed primary education with that of the overall youth population, capturing long-term patterns in educational attainment, gender disparities, and development progress. Over the period, both indicators experienced substantial increases, though the total population maintained a slight overall lead. However, the trends were non-linear — both series followed an inverted U-shape between 1960 and 1985, with significant growth up to 1970 followed by a decline through the mid-1980s, after which levels stabilized until a strong upward surge began around 2000. Notably, female completion briefly surpassed total completion in 1995. Overall, the long-term trajectory reveals substantial educational advancement and gradual narrowing of gender gaps in Ecuador's primary education system.

1.2 1. Question

How has the share of young women aged 15–19 who completed primary education evolved relative to that of the overall youth population in Ecuador between 1960 and 2010?

- **Female education proxy**: Percentage of female population age 15–19 with completed primary education
- **Total education proxy**: Percentage of total population age 15–19 with completed primary education

1.3 2. Data

- **Source**: World Bank World Development Indicators (WDI)
- **Indicators**:
  - Percentage of female population age 15–19 with completed primary education
  - Percentage of total population age 15–19 with completed primary education
- **Coverage**: Ecuador, 1960–2010
- **Notes**: National-level data only

1.4 3. Method

1. Filtered dataset for Ecuador and selected indicators for female and total youth primary education completion.
2. **Extracted relevant columns**: Year, Indicator Name, and Value.
3. Pivoted the dataset to create a side-by-side chronological comparison of female versus total youth completion rates.
4. Produced a dual-line time series plot to visualize long-term trends, gender gaps, and convergence in educational attainment.

(Analysis is descriptive; no causal inference applied.)

1.5 4. Results

- **Female youth primary completion (% of female population ages 15–19)**: Followed an inverted U-shape between 1960 and 1985, with strong growth from 1960 to 1970 followed by a decline of roughly half that gain by 1985. Rates then stabilized until 2000, after which they rose sharply and consistently through 2010.
- **Total youth primary completion (% of total population ages 15–19)**: Mirrored the female pattern closely—steady increase until 1970, decline until 1985, then stability through 2000 followed by significant growth through 2010. Total completion remained slightly higher than female completion throughout the period, except in 1995, when female completion briefly surpassed it.
- **Comparison**: Over the long term, both indicators exhibited substantial overall growth, indicating marked progress in educational attainment and near-convergence between female and total youth completion by 2010.

(Figure 1. Ecuador: Female vs. Total Youth Primary Education Completion, 1960–2010)

(Table 1. Pivoted dataset summary)

1.6 5. Interpretation

- The inverted U-shape from 1960 to 1985 likely reflects early expansion in education access followed by setbacks from economic or institutional challenges.
- The convergence of female and total completion rates suggests Ecuador achieved significant gender equality in basic education by the early 21st century.
- The sharp post-2000 rise indicates the success of education reforms, increased public investment, and social inclusion policies targeting both access and retention.
- The brief 1995 crossover, when female completion surpassed total, highlights periods of accelerated progress for young women relative to their male counterparts.

1.7 6. Limitations

- National averages may mask disparities across rural–urban areas, income groups, or regions.
- Earlier data points may be modeled estimates, introducing uncertainty in long-term trend interpretation.
- The analysis remains descriptive, not identifying the causal mechanisms behind fluctuations or surges in completion rates.

1.8 7. Next Steps / Extensions

- Examine how public education reforms and economic growth after 2000 influenced the surge in completion rates.
- Explore correlations between female education progress and labor market participation or fertility trends.
- Compare Ecuador's trends with those of neighboring Andean countries to evaluate regional convergence in youth education.
- Extend the analysis to post-2010 data to determine whether gains continued or plateaued in the following decade.

[1]:
```
# How has the share of young women aged 15-19 who completed primary education␣
 ↪evolved relative to that of the overall youth population in Ecuador between␣
 ↪1960 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 = "education_ecu_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 Ecuador dataset:")
display(df_pivot)

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

```
# Plot the indicators
plt.figure(figsize=(10,6))
plt.plot(df_plot["Year"], df_plot["Barro-Lee: Percentage of female population␣
 ↪age 15-19 with primary schooling. Completed Primary"],
         marker='o', linestyle='-', label="Percentage of female population age␣
 ↪15-19 with primary schooling")
plt.plot(df_plot["Year"], df_plot["Barro-Lee: Percentage of population age␣
 ↪15-19 with primary schooling. Completed Primary"],
         marker='o', linestyle='-', label="Percentage of total population age␣
 ↪15-19 with primary schooling")

plt.title("Ecuador: Female vs Total population age 15-19 with primary schooling␣
 ↪(%) (1960-2010)")
plt.xlabel("Year")
plt.ylabel("Percentage")
plt.legend()
plt.grid(True)
plt.tight_layout()
plt.savefig(os.path.join(figures_folder,␣
 ↪"ecuador_female_vs_total_pop_age_15-19_with_primary_schooling.png"))
plt.show()

# Save cleaned CSV
df_pivot.to_csv(os.path.join(data_clean_folder,␣
 ↪"ecuador_female_vs_total_pop_age_15-19_with_primary_schooling"), index=False)
```

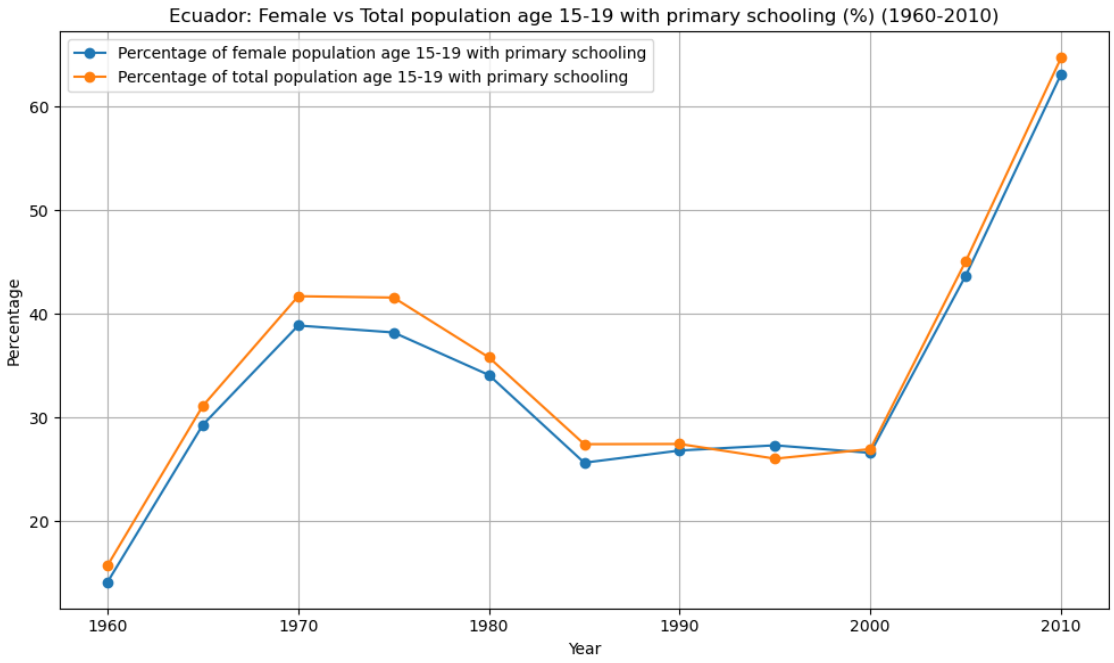
```
Pivoted Ecuador dataset:

Indicator Name  Year  \
0               1960
1               1965
2               1970
3               1975
4               1980
5               1985
6               1990
7               1995
8               2000
9               2005
10              2010

Indicator Name  Barro-Lee: Percentage of female population age 15-19 with␣
 ↪primary schooling. Completed Primary  \
0                                                                   14.10
1                                                                   29.29
2                                                                   38.88
3                                                                   38.21
4                                                                   34.10
```

```
5                                                   25.63
6                                                   26.81
7                                                   27.31
8                                                   26.58
9                                                   43.70
10                                                  63.15

Indicator Name  Barro-Lee: Percentage of population age 15-19 with primary␣
 ↪schooling. Completed Primary
0                                                   15.70
1                                                   31.12
2                                                   41.71
3                                                   41.58
4                                                   35.80
5                                                   27.42
6                                                   27.44
7                                                   26.02
8                                                   26.95
9                                                   45.09
10                                                  64.74
```



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