QTM 350 Final Project - Population Dynamics in Latin America

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Table of contents

Introduction

In this project, we explore population dynamics across several Latin American countries, focusing on Mexico, Colombia, Argentina, and Brazil. These nations were selected for their

diverse social, economic, and demographic profiles, offering distinct perspectives on life in Latin America. Through this analysis, we examine how urbanization influences population trends, compare birth and death rates, and investigate other key factors shaping demographic change in the region.

Data Description

This project uses data from the World Bank's World Development Indicators (WDI) database, which includes over 1,600 indicators for more than 200 countries from 1960 to 2023.

For this analysis, we selected a focused set of population-related indicators to explore key aspects of demographic change, including:

- total population
- population growth
- urban and rural population percentages
- fertility rate
- birth and death rates
- infant and under-five mortality rates
- adolescent fertility
- net migration
- population density
- life expectancy

The countries analyzed [Brazil (BRA), Mexico (MEX), Argentina (ARG), and Colombia (COL)] were chosen to reflect a diversity of social and economic conditions within Latin America.

Urbanization vs. Population Growth

Do more urbanized countries experience higher population growth?

This section explores the relationship between the urbanization rate and population growth rate in four Latin American countries: Colombia, Brazil, Argentina, and Mexico. It compares how different levels of urban development may lead to differences in population growth.

Data Analysis

	Country	Urban Pop. %	Rural Pop %	Pop. Growth
0	Colombia	82.1	18.0	1.068
1	Argentina	92.3	7.7	0.211
2	Mexico	81.3	18.7	0.753
3	Brazil	87.6	12.4	0.36

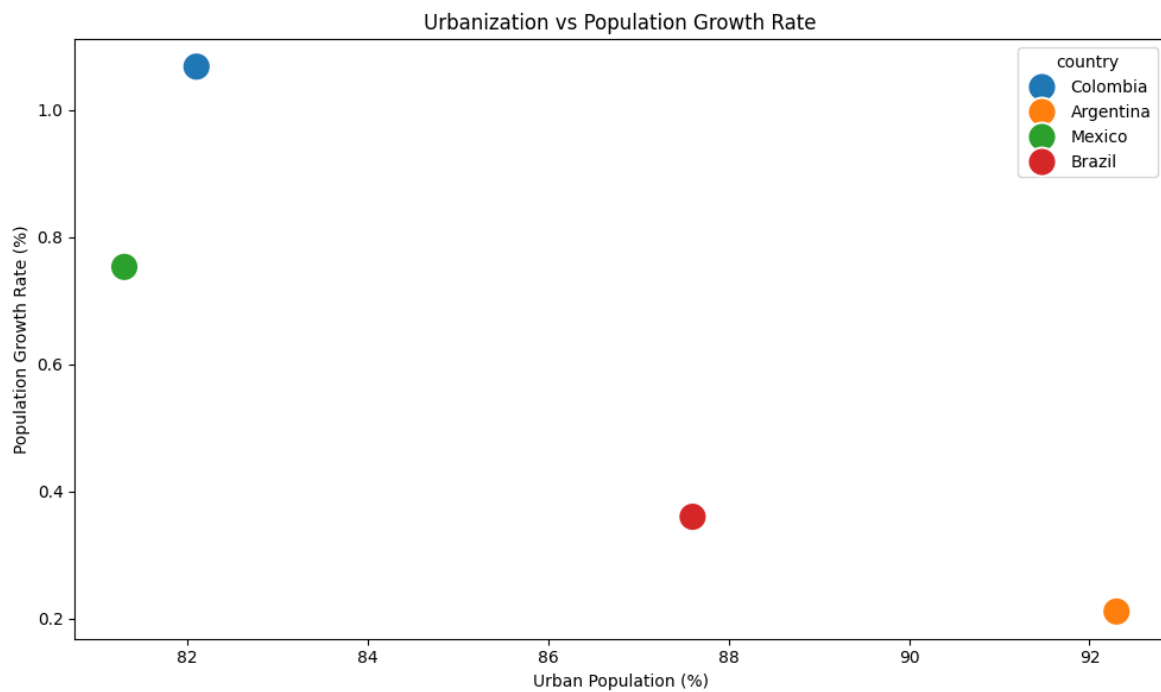Figure 1: Population growth (table format)

Figure 2: Population growth rates across Latin American countries

Results & Discussion

As shown by the graph, countries with a higher urban population tend to have lower population growth rates, while those with a lower urban population have higher growth rates. Specifically, Mexico and Colombia, which have urban populations below 83%, both exhibit population growth rates above 70%. In contrast, Brazil and Argentina, with urban populations exceeding 85%, have population growth rates below 50%. This suggests an inverse relationship between urbanization and population growth among these countries.

Death Rate vs. Birth Rate

Which countries have death rates higher than birth rates?

This section explores the relationship between the birth rate and death rate in four Latin American countries: Colombia, Brazil, Argentina, and Mexico.

Data Analysis

	Country	Birth Rate	Death Rate	Sum of Rates
0	Argentina	10.926	8.797	2.129
1	Brazil	12.555	7.539	5.016
2	Colombia	13.731	5.881	7.85
3	Mexico	16.041	6.521	9.52

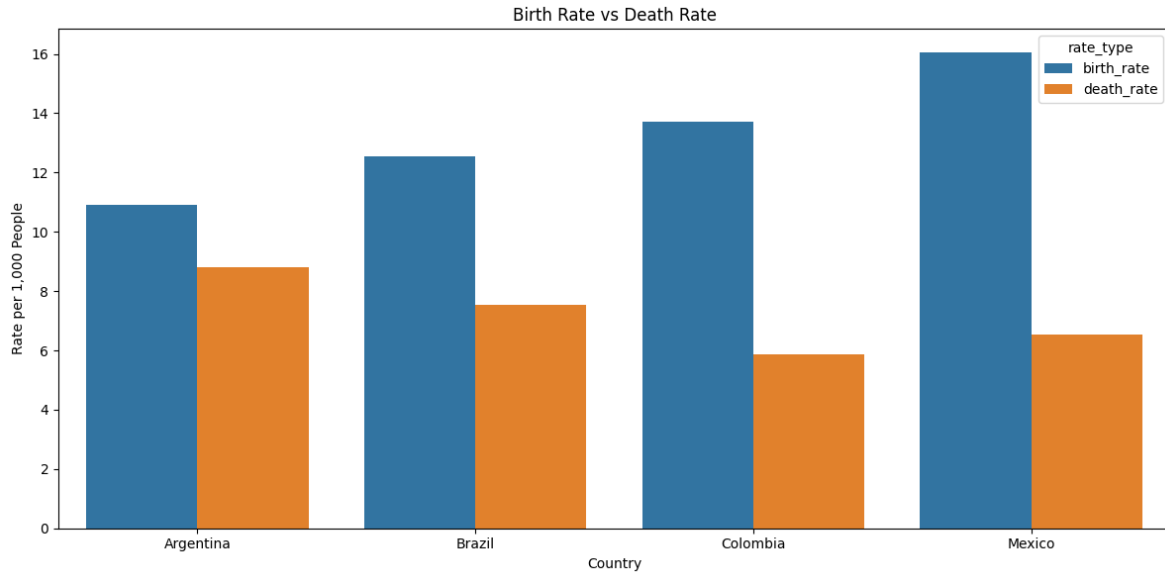Figure 3: Death rates and birth rates (table format)

Figure 4: Death rates and birth rates across Latin American countries

Results & Discussion

As shown in the graph, none of these countries currently have a death rate that surpasses their birth rate. Colombia and Brazil show comparable differences between birth and death rates, while Argentina's gap is slightly narrower. Among all 4 countries compared, Mexico exhibits the highest natural population growth, whereas Argentina's growth is smaller.

Fertility rate among adolescents

Which countries have a disproportionately high adolescent fertility rate?

This section explores the patterns of fertility rate (overall, and just among adolescents) in four Latin American countries: Colombia, Brazil, Argentina, and Mexico.

Data Analysis

	Country	Fertility Rate	Adolescent Fertility Rate
0	Mexico	1.94	0.0611
1	Colombia	1.663	0.0602
2	Brazil	1.629	0.0429
3	Argentina	1.482	0.0258

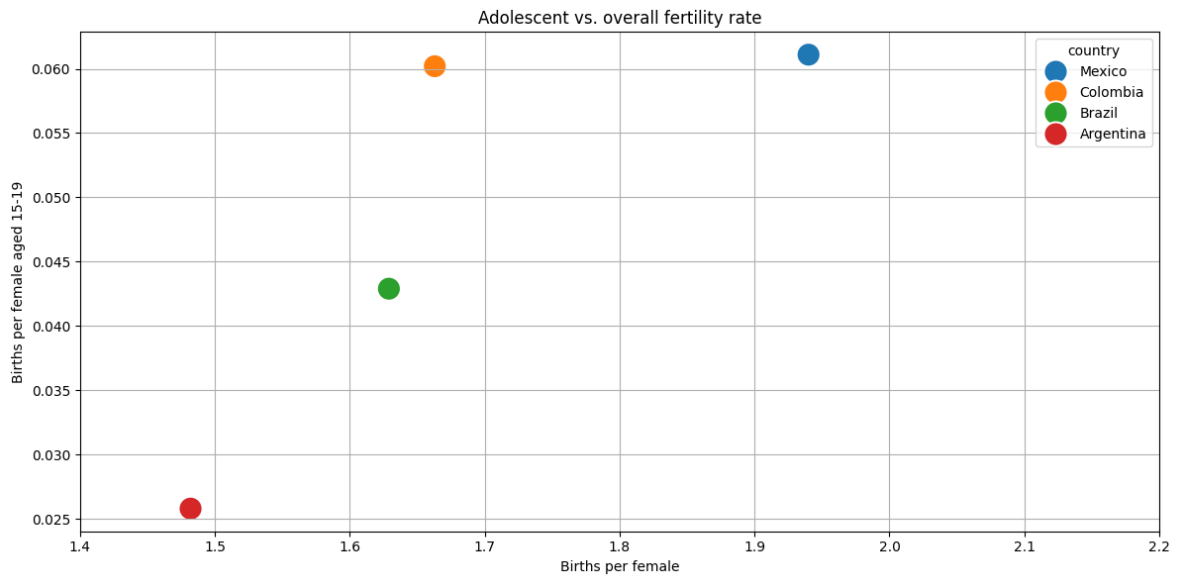Figure 5: Fertility rates (table format)

Figure 6: Fertility rates (adolescent and overall) across Latin American countries

Results & Discussion

Though it's hard to tell with only four points of comparison, we can see Colombia is somewhat of an outlier in this analysis. Its adolescent fertility rate is disproportionately high compared to its *overall* fertility rate, indicating that Colombians aged 15-19 give birth more than would be expected compared to the rest of the Colombian population.

This trend is confirmed in other studies, which attributes the high adolescent fertility, in part, to Colombia's "illegality of abortion"(Daniels 2015).

Child mortality rates

Which countries have an outlying child mortality rate?

This section explores the patterns of child mortality rate in four Latin American countries: Colombia, Brazil, Argentina, and Mexico.

Data Analysis

	Country	Population Density	Child Mortality Rate
0	Argentina	16.6	9.8
1	Colombia	46.6	12.4
2	Mexico	66.2	12.9
3	Brazil	25.2	14.6

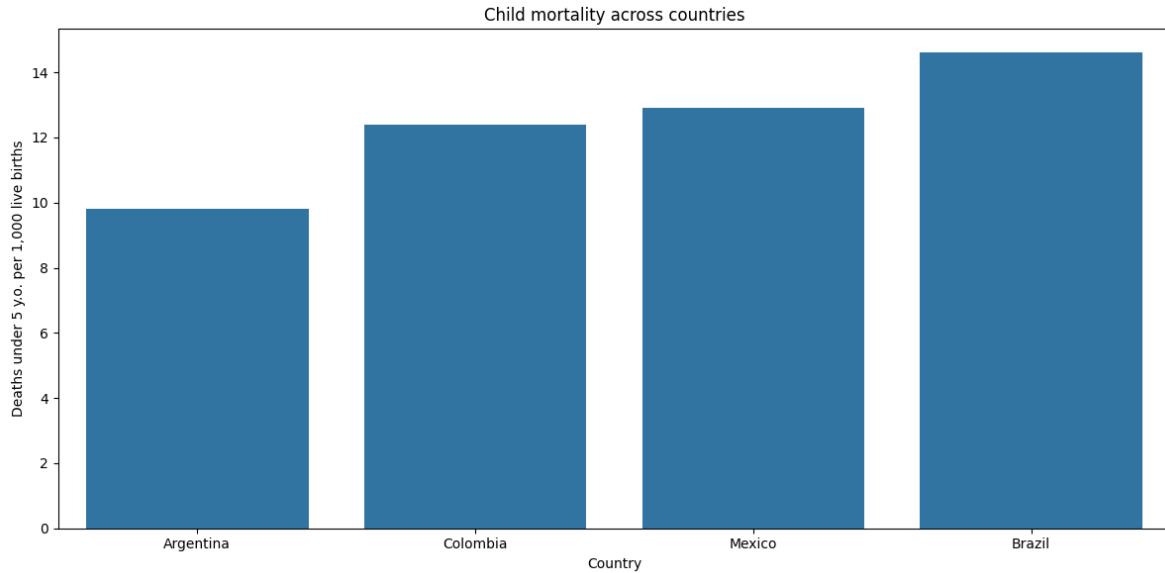Figure 7: Child mortality rates (table format)

Figure 8: Child mortality rates across Latin American countries

Results & Discussion

We can see from this plot that Brazil's child mortality rate is particularly high compared to the other three Latin American countries.

Brazil's high child mortality rate is observed in other studies, which attribute it to insufficient prenatal care in the country (França et al. 2017).

Conclusion

In Conclusion,

Across all four countries analyzed, birth rates exceed death rates, with Mexico showing the highest natural population growth and Argentina the lowest. Urbanization appears inversely related to growth—Mexico and Colombia, with lower urban populations, have higher growth rates, while Brazil and Argentina show the opposite.

Colombia stands out with a notably high adolescent fertility rate relative to its overall fertility rate, suggesting early-age childbirth is more common. Additionally, Brazil shows a higher child mortality rate than the others, signaling potential health or socioeconomic concerns.

Overall, despite the limited sample size, distinct demographic patterns emerge, highlighting significant regional disparities in growth, urbanization, and health outcomes.

References

Daniels, Joe Parkin. 2015. "Tackling Teenage Pregnancy in Colombia." *The Lancet* 385 (9977): 1495–96.

França, Elisabeth Barboza, Sônia Lansky, Maria Albertina Santiago Rego, Deborah Carvalho Malta, Julia Santiago França, Renato Teixeira, Denise Porto, et al. 2017. "Leading Causes of Child Mortality in Brazil, in 1990 and 2015: Estimates from the Global Burden of Disease Study." *Revista Brasileira de Epidemiologia* 20: 46–60.