Exploring the Correlation Between Net Migration Rates and Fertility Rates Overtime: A Cross-National Study*

Omar Diakhate †
University of Oregon, Data Science
omard@uoregon.edu

Abstract. This study investigates the relationship between net migration rates and total fertility rates (TFR) across 217 countries over a 60-year period using data from the World Bank. By estimating linear, quadratic, and log-quadratic regression models, the analysis finds evidence of both negative and non-linear associations between migration and fertility, with socioeconomic factors such as urbanization and female employment playing significant mediating roles. These findings suggest that migration's impact on fertility is very complex and context-dependent, emphasizing the need for nuanced, multi-dimensional approaches in demographic research.

Keywords. migration; fertility; socioeconomic development; regression analysis; demographic change

Introduction

In today's society, both the demographic and economic implications of migration have become an extremely critical issue in regards to global development. Throughout this project, my goal is to investigate the relationship between net migration rates and total fertility rates (TFR) within host countries overtime, where I ask the question: How do changes in net migration rates correlate with subsequent changes in total fertility rates (TFR) within host countries over time, and what socioeconomic factors might mediate this relationship? When it comes to prior research, the relationship between fertility and socioeconomic development has been widely studied, but net migration in particular, especially at the national level, has not been given as much attention. Most of the existing literature focuses on the fertility behaviors of the migrants themselves, such as how they adapt to host-country culture and norms or how they maintain their own cultural practices. However, there are ample studies that have investigated how net migration flows impact the overall fertility rates of host countries over time. By utilizing a comprehensive data set taken from the World Bank's World Development Indicators, spanning over 60 years and including 217 countries, this project aims to provide a longitudinal, cross-national perspective on a topic that has been very country-specific in past research. Also, by incorporating socioeconomic controls such

*Thanks to everyone for checking this out.
†Corresponding author.

as GDP per capita, urbanization, and female employment rates, the project will offer better understanding of the factors that could possible mediate the relationship between migration and fertility rate. This will not only help with understanding transitions regarding demographics, but could also aid discussions on policy as well.

Data and Methods

The data used for this project were sourced from the World Bank's World Development Indicators (WDI), a publicly accessible database that consists of globally comparable statistics on different developmental metrics throughout different countries. The primary indicators that were chosen for the project are:

- Net Migration (SM.POP.NETM): the difference between number of immigrants and emigrants in a given year
- Total Fertility Rate (SP.DYN.TFRT.IN): the average number of children a woman would bear in her lifetime based on current age-specific rates
- GDP (constant 2015 US$) (NY.GDP.MKTP.KD): a country's inflation-adjusted economic output
- Urban Population (% of total) (SP.URB.TOTL.IN.ZS): the share of a countries population residing in urban areas
- Employment to Population Ratio, 15+, Female (%) (modeled ILO estimate) (SL.EMP.TOTL.SP.FE.ZS): the percentage of working-age females (15 and older) who are employed

The primary outcome variable (dependent variable) is the Total Fertility Rate (TFR), while the explanatory variable (independent variable) is the Net Migration Rate. To better understand the context and possible confounding factors, socioeconomic indicators including GDP, urban population percentage, and female employment percentages were also included.

This data was both collected and aggregated by the World Bank from international organizations and national statistical agencies, spanning from the years 1960 to 2024 (64 years). The raw data set contains data from 217 countries thus yielding thousands of individual data points. This data set is broadly generalizable as it spans across a wide range of national contexts and has an internationally standardized collection methodology.

Results

In order to investigate how standardized net migration relates to fertility rates, I estimated three regression models to further asses the relationship: linear, quadratic, and log-quadratic. In the linear model, there appears to be a significant negative relationship between net migration and fertility (-0.028, $p < .05$). This relationship then remained consistent with the quadratic model with a negative relationship (-0.028, $p < .05$), and the squared term for net migration was not significant, indicating that the addition of a quadratic component

did not improve the model. Although, in the log-quadratic model which now includes a log-transformed net migration term, the relationship between net migration and fertility becomes significantly positive (0.205, $p < 0.5$), suggesting a non-linear dynamic when logarithmic changes are taken into consideration. Among all of the control variables, urbanization was significantly and negatively associated with fertility (-0.043 to -0.045, $p < .001$), while female employment showed a positive relationship in the linear and quadratic models (0.005 and 0.004 respectively, $p < .001$) though it loses significance in the log-quadratic model. The addition of a quadratic term for net migration did not improve the models fit and also was not statistically significant while on the other hand, the inclusion of the logarithmic dimension improved the model's R^2 value significantly from 0.400 in the first two models, to 0.416, indicating a better fit. These results highlight the complex and potentially non-linear role that migration plays when it comes to fertility, and they show the importance of taken socioeconomic factors into account as well in cross-national fertility research.

Conclusions

The analysis in this project aimed to explore how changes in net migration rates correlate with total fertility rates (TFR) in host countries over time, while also accounting for key socioeconomic factors. The results from the linear and quadratic models showed a significant negative relationship between net migration and fertility, which suggested that higher migration is generally associated with lower fertility. However, the log-quadratic model showed a significant positive relationship, which indicates a possible non-linear effect where the impact of migration varies depending on its scale. Taking the socioeconomic factors into consideration, urbanization consistently showed a strong negative effect on fertility, while female employment was positively associated in the more simple models. These findings drive home the importance of including socioeconomic context when researching fertility patterns cross-nationally. Some limitations of the research included the assumption of immediate effects and overtime data quality. Future research could benefit from including aspects like time-lagged variables or by exploring regional differences Overall, this study contributes to the understanding of the relationship between migration and national fertility rates, thus highlighting the importance of socioeconomic context and non-linearity in shaping demographic trends. These findings could help inform both on an academic level and in regards to policy discussions on the topic of migration, fertility, and overall national development.