

Population Density and Fertility

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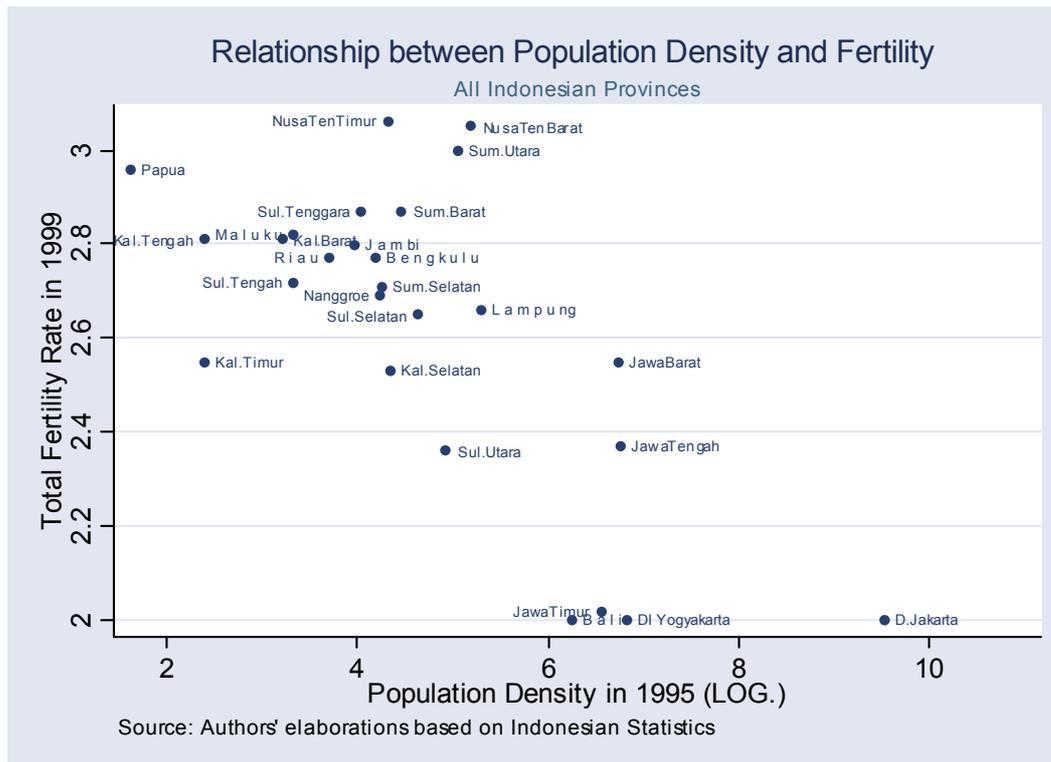
Ecological factors, such as population density, which are prominent in animal ecology, have played only a marginal role in the demographic analysis of human fertility. This is because human reproduction is primarily seen as socially determined, especially under the condition of conscious family planning during the late phases of the demographic transition. However, population density may be an important psychological determinant of fertility, if it is considered as perceived living space and not as a factor operating only through direct biological mechanisms.

A recent analysis on determinants of human population growth has shown that population density -- beyond the well-studied social and economic determinants -- may be a significant factor for the levels and trends of human birth rates (Lutz and Qiang, 2002). The authors found out a significant negative relationship between population density and fertility on a world scale. The negative correlation does hold even after controlling for several background variables, which may play a confounding effect, such as female labor force participation rate, female literacy, urban population, GDP per capita, and food production index. The results are interpreted with the hypothesis of possible psychological reactions of people to perceived increasing population density.

In our paper we study the association between population density and fertility on national scale, by looking at one developing country, Indonesia, and one developed country, Italy. In each of these two countries we implement a territorial analysis by using data disaggregated at provincial level.

The aim is to better understand the effects of population density on human fertility, and particularly, the possible mechanisms of causation.

In Indonesia population density is found to be significantly and inversely correlated with fertility levels, the Pearson correlation coefficient is equal to $- .69$ (see graph below). Such a relationship appears even stronger once is controlled for other variables, such as infant mortality, sex ratio, immigration level, population growth and size. Indeed, the partial correlation of Total Fertility Rate with population density, holding all the variables mentioned above constant, is $- .73$. The regression analysis implemented confirms the population density as an important determinant of fertility rates in Indonesia. This analysis will be repeated with the inclusion of other key socioeconomic indicators, such as urban population and female literacy, which might influence simultaneously fertility and population density playing a role of possible confounding.



In Italy the correlation between population density and fertility is weak and no longer significant, but before we jump to any conclusion we need to repeat the same analysis controlling for some background variables, which may affect the results.

If the interpretation of psychological reactions to the perceived living space is corrected, we should expect to observe an impact of population density not only on actual childbearing, but also on ideal fertility. Therefore, the relationship between population density and desired fertility is investigated by looking at the regions of the European Union Countries and using Eurobarometer and EUROSTAT data. A significant negative correlation is found between population density and ideal fertility in the regions of the European Union: the higher the density, the lower the mean ideal family size (see graph in the next page). The Pearson correlation coefficient is equal to $-.43$ and is highly significant. The relationship is still significant also when the average fertility ideals of women in the main reproductive ages are considered, instead of the mean fertility ideals of all people aged 15 or more. We will look more in-depth at this relation in a multivariate analysis, in order to verify whether population density is one of the most important factors associated with differences and trends in fertility ideals.

