Regional Population Dynamics after the COVID-19 Pandemic in Japan: An Examination of the Monthly Time Series of Births, Deaths, and Migration in the Three Major Metropolitan Areas after the 2000s

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This study rigorously analyzes the latest evolution of population dynamics in Japan by focusing on monthly vital statistics series, including the number of births, deaths, and inter-prefectural in-migration and out-migration. To address the seasonality embedded in these series, we apply the well-established X-13ARIMA-SEATS method developed by the U.S. Census Bureau. We decompose the seasonal components for each prefecture, and summarize the key results by aggregating them for the nation as a whole and the three major metropolitan areas. In particular, we investigate whether population trends shifted around April–May 2020, when the COVID-19 pandemic began and the Japanese government declared the state of emergency for the first time.

The analysis revealed that births and deaths were subject to nationwide shocks observed across a wide range of regions. Notably, the regARIMA model identified a level shift indicating a sustained increase in deaths beginning in February 2022. In contrast, population mobility exhibited substantial regional variation. Although the "COVID-19 shock" in May 2020 reduced both in-migration and out-migration across all regions, the Tokyo metropolitan area experienced a greater decline in in-migration than in out-migration, resulting in a reduction in net in-migration. Conversely, in non-metropolitan areas, the decline in in-migration was smaller than that in out-migration, leading to a reduction in net out-migration.

Keywards: Monthly births, deaths, and inter-prefectural migration, COVID-19, Seasonal adjustment

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