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FURCA End of Summer Report

This summer, I have been studying the multifaceted impact of seasonal air pollution on public health and economic productivity in Ulaanbaatar, Mongolia. The city's severe winter air pollution, primarily due to coal stoves in residential ger districts, has become a pressing issue over the past decade. As someone who grew up in Mongolia, I've noticed that winters become particularly challenging when the air becomes polluted making it difficult to see the road and causing traffic congestion. This in turn leads to delays for individuals who struggle to reach work on time, especially small businesses, and stakeholders feel the impact. My goal was to understand the intricate connections between seasonal air pollution, health, productivity, and production, and to quantify the economic costs associated with these factors.

The primary focus of this project was to investigate productivity during the winter season to understand the direct and indirect effects of air pollution on the workforce. I started collecting and analyzing data on air pollution levels and public health statistics from the National Institute of Meteorology and Environmental Monitoring of Ulaanbaatar, Mongolia to compare concentrations of PM2.5 and PM10 particles during cold and warm seasons by correlating these levels with health outcomes and economic indicators. After collecting data of particulate matter I got an understanding of air pollution effects on public health and related impacts on the workforce. The data showed a clear correlation between poor air quality and a rise in respiratory and cardiovascular conditions, leading to substantial economic costs in terms of healthcare expenses and lost productivity. To find the air pollution effects on productivity I started conducting data on GDP (Gross Domestic Product) and Labor Force of Ulaanbaatar from the National Statistics Office of Mongolia (NSO) to calculate the productivity of the winter season and compare the result with the warm season to find the difference between the highest mean concentration and lowest mean concentration of air pollution seasons. To find labor productivity I divided quarterly GDP by quarterly Labor Force of Ulaanbaatar.

Figure1. Annual Gross Domestic Product of Ulaanbaatar (NSO)

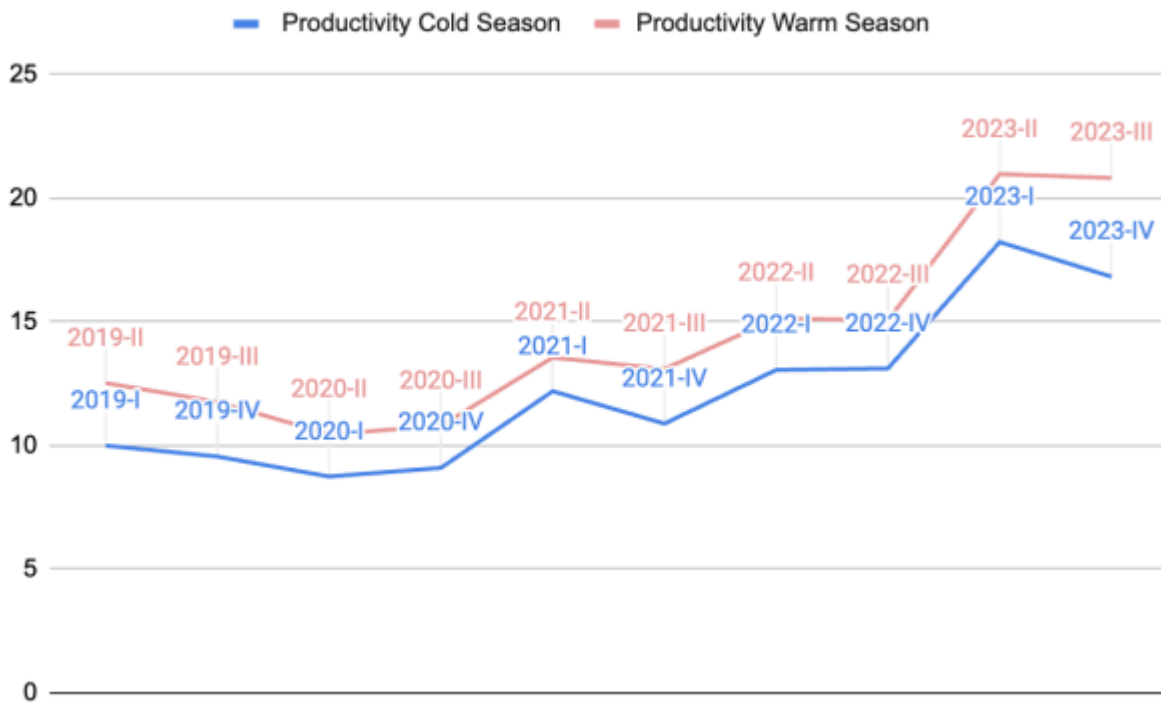| Aimag	2018	2019	2020	2021	2022	2023
Total	32,582,629.1	37,839,225.4	37,453,275.3	43,555,484.4	53,851,544.5	68,871,741.6
Ulaanbaatar	21,765,833.5	25,217,038.0	24,187,785.7	27,444,280.7	33,851,090.6	45,047,930.2

Figure 2. Resulted productivity comparison of the cold season and the warm season

With adjusted labor force and GDP, my analysis showed that productivity during cold seasons is lower than during warm seasons, and it supports the hypothesis of the research that air pollution negatively impacts productivity.

I plan to keep studying this project to investigate vulnerable economic sectors that are mostly affected by air pollution in Ulaanbaatar, Mongolia. By addressing air pollution in Ulaanbaatar is imperative not only for improving public health but also for enhancing overall quality of life and economic productivity and it can ensure a healthier, more productive, and sustainable urban environment future for all Mongolians.