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Title: What happens in the womb under the dome: the impact of air pollution on birth outcomes

Can womb protect fetus well from ambient air pollution? This paper studies the causal impact of ambient air pollution on birth outcomes in a high polluting country. Although a lot of work has been done to explore the associations between ambient air pollution and birth outcomes (birth weight and the risk of preterm delivery), causality is yet to be determined, especially in high polluting context, such as China. We exploit the exogenous variation in air quality during the 2010 Guangzhou Asian Games and Paralympic Games in China, during which strict regulations were mandated to assure good air quality. Specifically, we study the adverse impact on birth outcomes of three "criteria" pollutants using daily monitored air quality data and birth certificates data during 2009-2011 from Guangzhou city in Guangdong province and 2 control cities in Hainan province. We undertake a difference-in-difference estimation strategy using whether the gestational period overlapped with the period of the Asian Games and Paralympic Games as an instrument for level of prenatal exposure to pollution. We find all three pollutants cause adverse birth outcomes, with the results especially robust for the preterm delivery outcome. We test the robustness of the results to many many changes in specification, and examine the heterogeneity of the impacts across gender, mother's age and educational group. This is one of the few studies that identify the causal impacts of air pollution on adverse birth outcomes in China.