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## From Micro-level Weather Shocks to Macroeconomic Impacts

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Weather matters at the *local* level. Microeconomic climate econometric analyses find evidence that weather has localized effects on labor supply, agricultural yields, mortality rates, and other socio-economic measures. However, macroeconomic analyses at the national level find no evidence that weather affects macroeconomic aggregates, such as GDP or aggregate productivity in the US and other developed economies. These results present a seeming contradiction. In this paper, I develop a general equilibrium theoretical model of an economy with localized weather shocks to bridge the gap between microeconomic and macroeconomic studies. The theoretical model provides a simple, modular framework for aggregating weather shock impacts. I apply the findings to an empirical setting in the US, a prime example of the contradictory findings. I first estimate the microeconomic impacts of weather on labor productivity growth across county-industry pairs in the US from 2002 to 2017. I then apply these to construct annual estimates of the impact of weather shocks across the economy on US GDP according to the theoretical framework. I construct confidence intervals using the estimated microeconomic impact uncertainty. Across the sample years, I find no evidence that the annual impacts are distinct from \$0. I then deconstruct the aggregate impacts, again following the theoretical framework, to examine what generates this no-effect result. I find consistent evidence of statistically significant but heterogeneous effects across a majority of counties and industries. For example, within a given year, over two-thirds of counties are consistently and significantly impacted by their local weather. This effect is positive for some counties and negative for others. I show that it is the aggregation of these heterogeneous impacts across the spatial distribution and industrial composition of the economy that masks the impact of weather. This finding highlights the importance of understanding micro-level economic impacts and changes in the composition of economic activity for projections of future macroeconomic climate change impacts.