

Long-Term Macroeconomic Effects of Climate Change: An Introduction to the Theory and Application of Dynamic Panel Models

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The assessment of climate change's influence on global economic production has been facilitated by panel models. However, the commonly employed fixed effects estimator for estimating dynamic panel models has been found to yield biased and inconsistent estimates, known as the Nickell bias (Nickell, 1981, *Econometrica*). The first part of this lecture aims to provide a comprehensive review of the theory behind the fixed effects estimator, the Nickell bias, and the Generalized Method of Moments (GMM) estimator. Specifically, we will delve into the application of GMM estimators for dynamic panel models as introduced by Anderson and Hsiao (1982, *Journal of Econometrics*), Arellano and Bond (1991, *Review of Economic Studies*), and Blundell and Bond (1998, *Journal of Econometrics*). Furthermore, the Half-Panel Jackknife Fixed Effects (HPJFE) Estimator, introduced by Chudik, Pesaran, and Yang (2018, *Journal of Applied Econometrics*), will also be explored as a solution to the limitations of the traditional fixed effects estimator. In the latter part of the lecture, attention will be directed toward the anticipated economic impacts of climate change. Drawing on research by Dell et al. (2012, *American Economic Journal: Macroeconomics*), Burke et al. (2015, *Nature*), and Kahn et al. (2021, *Energy Economics*), we will discuss the predicted outcomes and their implications for global economic production.