Cross-country cross-technology digitalisation a Bayesian hierarchical model perspective

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AbstractIn this article, we present a new perspective on forecasting technology adoption, focused on the extensive margin of adoption of multiple digital technologies in multiple countries. We do this by applying a Bayesian hierarchical structure to the seminal model of technology diffusion. After motivating the new perspective and the choices of priors, we apply the resulting framework to a cross-continental data set for EU and OECD countries and different digital technologies adopted by either households/individuals or by businesses. The results illustrate that the Bayesian hierarchical structure may be used to assess and predict both the adoption process and the uncertainty surrounding the data, and is robust to the use of alternative priors. They point to heterogeneity across countries and across technologies, mostly in the timing of adoption and, although to a lesser extent, the steady-state adoption rate once technologies are fully diffused. This suggests that characteristics of countries and technologies matter for technology diffusion.JEL CodeC11 : Mathematical and Quantitative Methods→Econometric and Statistical Methods and Methodology: General→Bayesian Analysis: GeneralC52 : Mathematical and Quantitative Methods→Econometric Modeling→Model Evaluation, Validation, and SelectionC53 : Mathematical and Quantitative Methods→Econometric Modeling→Forecasting and Prediction Methods, Simulation MethodsO33 : Economic Development, Technological Change, and Growth→Technological Change, Research and Development, Intellectual Property Rights→Technological Change: Choices and Consequences, Diffusion ProcessesO57 : Economic Development, Technological Change, and Growth→Economywide Country Studies→Comparative Studies of Countries