

Irrigation and Agricultural Productivity [☆]

Charles Gottlieb^{2,3,4}, Jan Grobovšek¹

March 8, 2018

Abstract

Irrigation is a key feature of modern agricultural technology. By securing water provision and reducing the exposure to weather risks, irrigation enhances crop yields. While its benefits are widely acknowledged, the observed share of irrigated land varies substantially across countries. Are these differences in irrigation shares due to general agricultural technology, irrigation specific productivity, or geo-climatic factors? To answer this question, we develop a spatial equilibrium accounting model to measure the role of irrigation in the cross-country agricultural productivity gap. In particular, the model incorporates geo-climatic conditions that govern the benefit of irrigation (higher average yields and lower output variability) as well as its cost (water availability). The model is calibrated to Indian districts and then applied to a cross-section of countries to infer cross-country differences in the productivity of irrigation technologies. The subsequent counterfactual experiments allow to disentangle the relative contribution of irrigation productivity on the one hand and general agricultural technology and land endowment on the other, in explaining levels of irrigation and differences in agricultural productivity across the world.

[☆]The financial support from DFID/ESRC (ES/L012499/1) is gratefully acknowledged.

Email addresses: charles.gottlieb@unisg.ch (Charles Gottlieb), jan.grobovsek@ed.ac.uk (Jan Grobovšek)

¹University of Edinburgh, School of Economics

²University of St. Gallen, School of Economics and Political Science

³Centre for Macroeconomics (CFM), University of Cambridge

⁴Nuffield College