

Authors

Michael Carter
University of California, Davis

Rachid Laajaj
Paris School of Economics

Dean Yang
University of Michigan

Savings, Subsidies, and Technology Adoption: Field Experimental Evidence from Mozambique

Michael R. Carter

University of California, Davis, NBER, BREAD and the Gannett Foundation

Rachid Laajaj

Université de la Sorbonne

Dean Yang

University of Michigan, NBER and BREAD

January 28, 2016

Abstract

We investigate the impacts of subsidies for technology adoption, and how savings constraints affect subsidy impacts. In a theoretical model in which risk-averse households face liquidity constraints as well as incomplete insurance, alleviating savings constraints could promote persistence of technology adoption over time (dynamic enhancement), or could instead reduce technology investment by encouraging savings accumulation (dynamic substitution). We implemented a field experiment in rural Mozambique, randomly assigning households one-time subsidies for adopting modern agricultural technology (chiefly fertilizer). Entire localities were later randomly assigned programs facilitating formal savings. In localities with no savings program, subsidy recipients raise their fertilizer use in the subsidized season and for two subsequent unsubsidized seasons. By contrast, in savings-program localities, subsidy impacts on fertilizer use do not persist: households shift resources away from fertilizer, instead accumulating savings in formal bank accounts. The savings programs also appear to improve household ability to cope with risk. These patterns are consistent with the theoretical case of dynamic substitution of subsidies; demand for self-insurance is so high that households scale back technology adoption so as to accumulate savings buffer stocks.

Keywords: savings, subsidies, technology adoption, fertilizer, risk, agriculture, Mozambique

JEL classification: C98, D98, D99, G28, O12, O13, O16, Q12, Q14

1. Introduction

For decades, governments and aid agencies have sought to speed up technology adoption in developing-country agriculture by subsidizing modern agricultural inputs, such as fertilizer and improved seeds. An open question is whether responsiveness to such subsidies depends on the level of development of household financial services. In theory, the presentation of financial services (such as credit, savings, and insurance) in the population could either magnify or diminish the impact of technology-adoption subsidies. In this paper,

Email address: mrcarter@ucdavis.edu (Michael R. Carter), r.laajaj@psse.univ-paris1.fr (Rachid Laajaj), deanyang@umich.edu (Dean Yang).

A disclaimer is required: Rachid Laajaj and Dean Yang provided outstanding field management. This research was conducted in collaboration with the International Fertilizer Development Corporation (IFDC), and in particular we thank Alexander Iyemba, Robert Gwasa, Erik Shamba, and Harriet Vanhook. We appreciate the feedback we received from previous participants at Brown University, PSE/CEPR 2015, and the University of Washington. Generous financial support was provided by the BREAD research program through the United States Agency for International Development grant number 0000-0001-0000-00.

Savings, Subsidies, and Technology Adoption: Field Experimental Evidence from Mozambique

We investigate the impacts of subsidies for technology adoption, and how savings constraints affect subsidy impacts. In a theoretical model in which risk-averse households face liquidity constraints as well as incomplete insurance, alleviating savings constraints could promote persistence of technology adoption over time (dynamic enhancement), or could instead reduce technology investment by encouraging savings accumulation (dynamic substitution).

We implemented a field experiment in rural Mozambique, randomly assigning households one-time subsidies for adopting modern agricultural technology (chiefly fertilizer). Entire localities were later randomly assigned programs facilitating formal savings. In localities with no savings program, subsidy recipients raise their fertilizer use in the subsidized season and for two subsequent unsubsidized seasons. By contrast, in savings-program localities, subsidy impacts on fertilizer use do not persist: households shift resources away from fertilizer, instead accumulating savings in formal bank accounts. The savings programs also appear to improve household ability to cope with risk. These patterns are consistent with the theoretical case of dynamic substitution of subsidies; demand for self-insurance is so high that households scale back technology adoption so as to accumulate savings buffer stocks.

January 29, 2016