ADOPTION AND DIFFUSION OF AGROBIOTECHNOLOGIES IN THE US COTTON PRODUCTION

Pasu Suntornpithug

Dr. Nicholas Kalaitzandonakes, Dissertation Supervisor

ABSTRACT

The study examines the farm level adoption and county level diffusion of three cotton biotechnologies in the US: insect resistant (Bollgard®), herbicide tolerance (Roundup Ready®), and stacked trait (Bollgard® & Roundup Ready®). Adoption and diffusion of these cotton biotechnologies are interdependent. A theoretical framework is developed to consider the adoption decision first. An optimal control model explains the effects of various learning mechanisms on the adoption of multiple, interdependent, and divisible innovations. Empirical specifications use a Generalized Method of Moments framework. Farmers are found to simultaneous adopt multiple technologies influenced by perceived economic gains, learning from own experience, and their neighbors' adoption. Other factors also influence adoption decision including: interdependencies among biotechnologies and certain agronomic practices (e.g. minimum tillage). Adoption is found to be scale neutral. Aggregate (county level) models confirm that potential economic gains, learning, innovation interdependencies and complementarities with agronomic practices drive the diffusion of the cotton biotechnologies.