Impact of New Crop Technology Adoption on a Global Scale

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Abstract

Agriculture is the main source of food, the major source of income for the global poor, and a key driver of global deforestation and pollution. Here we show that the adoption of genetically modified (GM) crops by some countries has led to a global redistribution of agricultural production and its associated externalities. To estimate the effects of GM crop adoption on the global redistribution of agriculture, we develop a regression framework that captures local effects and the spillovers in a single reduced-form equation based on the recent trade literature. Further, to address the endogeneity of the adoption decision, we predict GM crop adoption with the approval of GM crops for consumption by the countries' trade partners. Our results show that local GM crop adoption has no impact on total agricultural area in adopting countries but a positive impact on GM crop shares, indicating that GM crop expansion occurs at the expense of crops without GM varieties and not on non-agricultural land. We also find that agricultural production increases in adopting countries while it declines in non-adopting countries, suggesting the reallocation of agricultural production to adopting countries. Additionally, the results show that GM adoption leads to an increase in herbicide use and a decrease in insecticide use.