

THE ECONOMIC AND PERFORMANCE IMPACT OF TECHNOLOGY ADOPTION

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ABSTRACT

Since first commercialized in 1996, biotech corn has experienced rapid adoption. By 2010 over 75% of the corn planted area in the United States, Canada, Argentina, Brazil, South Africa, and the Philippines was planted with biotech seed. These countries represent a significant presence in the global corn markets—averaging 53% of world production and 83% of world exports from 1996-2010. The purpose of this research is to evaluate the ex post global economic efficiencies generated from the commercialization of biotech corn in these six countries. This study only focuses on the quantifiable market benefits accruing to producers and consumer stakeholders. As such, this analysis does not include the benefits to the input market or the value of non-pecuniary benefits. Global economic efficiency is evaluated on: 1) the extent to which the adoption of biotech corn has impacted yields, and 2) the extent to which the adoption of biotech corn has impacted world production, price and distributional welfare. The extent to which biotech adoption has impacted corn yields is econometrically estimated via a model for technical inefficiency effects in a stochastic frontier production function for panel data. A partial equilibrium seven-region world model of the corn market calibrated to the 2000-2010 decade is developed to evaluate the ex post counterfactual world supply, demand and price impacts of biotech corn adoption. The cumulative 1996-2010 net global economic welfare gain realized from corn biotech adoption was \$38.85 billion. Of this total, the largest share (\$25.05 billion) went to U.S. corn consumers followed by U.S. producers (\$7.13 billion). The cumulative economic welfare gained by all consumers was estimated at \$77.97 billion. The adoption of biotech corn has significantly increased production efficiencies of adopting producers which has led to larger and cheaper food supplies for all consumers.