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Title:THREE ESSAYS ON THE POTENTIAL ECONOMIC IMPACTS OF BIOTECH CROPS IN THE PRESENCE OF ASYNCHRONOUS REGULATORY APPROVAL

Since their commercial introduction in 1996, genetically modified (GM) crops have been quickly adopted world wide, but some GM crops/varieties have not received regulatory approval for use in some importing countries, leading to asynchronicity in regulatory approvals. In this context, the international agricultural trade relied on analytical GMO testing which is a statistical process, along with identity preserved systems to segregate GM and non-GM crops. This led to a situation where measurement uncertainty became an important issue as it can lead to potential holdups at the point of import. In this background, the first essay examines the implications of measurement uncertainty associated with GMO testing on the behavior of importers and exporters in a game theoretic framework. The results also indicated that relative size of identity preservation costs, testing and rejection costs, the premiums offered in the non-GM markets and measurement uncertainty all have direct impacts on the behavior of importers and exporters. In the second essay the market and welfare effects due to the trade disruptions from unapproved GM crops are analyzed. In the third essay the potential economic impacts from the introduction of a new GM soybean variety are analyzed. A partial equilibrium international oilseed model has been used for the analysis. Based on the results, conclusions were drawn on the likelihood of various adoption scenarios, the possibility of trade disruptions, and the possibility of redistribution of innovation rents in the event of asynchronous regulatory approval of the new GM soybean variety.