The Role of Intellectual Property Rights in Seed Technology Transfer through Trade – Evidence from U.S. Field Crop Seed Exports

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Introduction

- Research question: How do country’s IPRs affect U.S. (field crop) seed exports to this country?
- Motivation: Access to improved seed varieties is essential for feeding an increasing global population in a sustainable fashion.

IPRs --- facilitate seed innovation and technology transfer, most valuable asset of the seed industry

U.S. --- global leader in seed production and exporting

Field crop seeds --- account for over 1/3 of planting seed exported, include major GM crops

Literature Review

Theoretical work is ambiguous due to IPRs two countervailing effects on market access: market expansion vs. market power

Empirical work:
- Yang and Woo (2006): apply linear dynamic model and find no significant effect of IPRs on U.S. aggregate seed exports;
- Eaton (2009): uses quantile regression model but fails to detect significant effect of IPRs on U.S. and EU aggregate seed exports;
- Galushko (2012): employs Heckman selection model and finds the effect of IPRs varies across different types of crops using U.S. seed export data.

Results

Data

- Dataset: Data: coverage/range - 134 countries over 26 years (1985-2010), but about half of the export values are zeros

- Relevant international IPR treaties:
  - UPOV --- International Convention for the Protection of New Varieties of Plants
  - TRIPs --- (WTO’s) Trade related aspects of intellectual property rights

- Variables of interest:
  - UPOV10 = 1 if country has signed up to 1978 Act, but not 1991 Act yet
  - UPOV01 = 1 if country has signed up to 1991 Act, but not previously sign up to 1978 Act
  - UPOV11 = 1 if country has signed up to 1991 Act, and previously signed up to 1978 Act
  - WTO_TRIPs = 1 if WTO member has implemented TRIPs
  - WTO_trans = 1 if WTO member is given TRIPs transition period

- Control variables:
  - logGDP Represents economic size
  - logCropProd Combined output of cereals, coarse grain, and oilseed crops; indicates market size
  - FTA = 1 if country has free trade agreement in force with U.S.
  - growGM = 1 if country grows genetically modified crops

Methodology

Two-way fixed-effects models:

- Linear model: \( \log (y_{it}) = x'_{it} \beta + \alpha_i + \gamma_t + \varepsilon_{it} \)
- Poisson model: \( y_{it} = \exp(x'_{it} \beta + \alpha_i + \gamma_t) + \varepsilon_{it} \)

Discussion

- WTO_TRIPs is found to have significantly positive impact on seed exports in both types of models, with its magnitude larger in Poisson models.
- Membership dummies have drawbacks
- Results also complicated by firm’s FDI and licensing efforts, as exports are not only way to sell products and technology.
- For future research, we would also consider estimating both linear and nonlinear dynamic models, and
- How IPRs influence the mode of serving foreign markets

References