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 a 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**

- **Dataset:** 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
  = 0 otherwise
- **UPOV01** = 1 if country has signed up to 1991 Act, but did not previously sign up to 1978 Act
  = 0 otherwise
- **UPOV11** = 1 if country has signed up to 1991 Act, and previously signed up to 1978 Act
  = 0 otherwise
- **WTO_TRIPs** = 1 if WTO member has implemented TRIPs
  = 0 otherwise
- **WTO_trans** = 1 if WTO member is given TRIPs transition period
  = 0 otherwise

**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.
  = 0 otherwise
- **growGM** = 1 if country grows genetically modified crops
  = 0 otherwise

**Methodology**

**Two-way fixed-effects models:**

- **Linear model:** \( \log (y_{i,t}) = x'_{i,t} \beta + \alpha_i + \gamma_t + \epsilon_{i,t} \)
- **Poisson model:** \( y_{i,t} = \exp(x'_{i,t} \beta + \alpha_i + \gamma_t) + \epsilon_{i,t} \)

**Results**

- **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**