Survey of Research

• Overview

• Background Trends

• Theories about Intellectual Property Rights (IPR)
  • Implications for Innovation, Technology Transfer, and Economic Development

• Empirical Evidence
  • Measurement Issues
  • Patents, Copyrights, and Trademarks
  • Lessons
Overview

• Rationale for IPR
  • Public Good (non-excludability, non-rivalry)
  • *Missing Markets problem*

• Globalization of IPR
  • Trade and Foreign Direct Investment (FDI) in IP goods/services
  • Strategic Trade
  • International Knowledge Spillovers

• Key Issues
  • How important are IPRs in technological progress?
    • *Complementary factors vs. Alternative factors*
  • Optimal IPR (i.e., balancing benefits & costs)?
  • Appropriate level for developing countries?
Context

- Demand (Consumers/Users)
- Production
- Resources
- Technology (Domestic & Foreign)
- Institutions (IPR)
## Trends

**Measures of Innovation and Technology Transfer over Time**

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# Trends

- **Measures of Innovation and Technology Transfer Between Groups**

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Trends

• Perceptions of Intellectual Property Enforcement
  • Global Competitiveness Report, various issues
Theories about IPRs

• North – South Models

• Resources in N allocated between R&D and manufacturing

• Effects of tighter Southern IPR on Northern innovation & tech transfer are conditional on (i) whether N engages in FDI & licensing in S; (ii) costs of imitation.
Theories about IPRs

- Nonlinearities

Rate of Innovation

Duration of IP Protection or Breadth of IP Protection

- Role of Competition/Rivalry; impact on follow-on innovation
Theories about IPRs

- Stages of Economic Development

  - Optimal IPR should vary with
    - Market Size
    - Innovative Capacity

- South’s optimal IPR < North’s optimal IPR

- Role of Utility Models (Petty Patents)
  - Reward adaptive, imitative innovations
  - Minor inventive activity as a stepping stone for major (future) innovations
  - China, S. Korea, Taiwan
Theories about IPRs

• Technology Transfer
  • Effect of IPR on TT depends on
    • Market Expansion Effect
    • Market Power Effect

• Effect of IPR on Composition of TT
  • Depends on Wages and Imitation Risks abroad
  • Possible sequence: Export → FDI → License

• Relevance of Composition of TT
  • Empirical Work (volume vs. switching effects)
  • Implications for employment, costs, and knowledge diffusion
  • Quality/Type of technologies transferred and purpose of FDI
Empirical Evidence

Framework:

• Regression Analysis

\[ Y = \alpha + \beta X + \gamma Z + \text{error} \]

• \( Y \) = variable (outcome) of interest
• \( X \) = measure of IPR
• \( Z \) = vector of control variables
# Index of Patent Rights

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**Total Score** 0 - 5
# Quantifying IP Regimes

## Index of Copyrights

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Index of Patent Rights

Year | North | South | Latin Am
--- | --- | --- | ---
1995 | 3 | 2.5 | 2
2000 | 3.5 | 3 | 2.7
2005 | 3.8 | 3.2 | 2.9
2010 | 4 | 3.5 | 3.1
Correlations with IP Survey by World Economic Forum

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Evidence: Patent Protection & Innovation

• Measures of Innovation:
  • R&D (input) and Patent Filings (output)

• Samples: Multi-country panels

• Findings vary by income group:
  • Patent protection has a significant effect on R&D and patenting in the North, controlling for other factors.
  • Weak (insignificant) effects on Southern R&D and negative (in some cases) on Southern patenting, controlling for other factors.

• Possible Explanations:
  • lagged effect
  • threshold effect (if sufficient indigenous technological capacity exists)
  • imitative, adaptive R&D constrained
Evidence: Patent Protection & Technology Transfer

- Modes of TT: Exports, FDI, and Licensing

- Findings:
  - mixed but mostly positive $\beta$ estimates
  - varies by industry, type of intangible asset, and income group
  - effects are conditional on presence of other factors (human capital, wages, market size, governance, taxes)

- Limitations of Existing Work:
  - single mode
  - lack of non-U.S. data
  - inadequate information about ‘quality’ of TT or prices and access (quantity supplied).
Impact of Patents on Technology Transfer (holding other factors constant):

Range of Findings

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Symbol Key: + positive effect, - negative effect, 0 insignificant, ? indeterminate, n/a not avail.
Licensing: Affiliated vs. Unaffiliated

- Ivus, Park, and Saggi (2014) [in progress]
  - U.S. multinational activity in 44 developing countries, 1993 – 2009
- Two types of industries:
  - discrete (pharmaceuticals)
  - complex (machinery, electronics)
- Unaffiliated licensing lower in discrete industries.
- Sequence: typically affiliated licensing before arms-length
- Patent reforms raise both kinds of licensing, but favors unaffiliated licensing relative to affiliated, and more so in sectors facing greater imitation risks.
- Are there ‘substantive’ technology transfers?
  - Impact on local R&D, value added, and innovation is asymmetric:
    - parent’s affiliated licensing affects R&D of subsidiaries
    - but unaffiliated licensing affects patenting by indigenous firms. Therefore, more knowledge spillovers associated with unaffiliated licensing.
Evidence: Copyrights & Creativity

• Challenges:
  - Contribution of Copyright Industries to National Economies – lack causal structure
  - Limited metrics of innovation: equivalent of “R&D” spending; copyrighted works are not all registered (or need to be to obtain protection); sales data flawed (product of price and quantity).

• How do copyrighted works affect technological progress?
  - Copyrighted works relate to arts, entertainment, culture
  - Some deal directly with inventive activity: software, internet technologies (broadband, cloud computing), infrastructure
  - Education, Libraries, Museums/Archives, Databases affect human capital accumulation, scientific & other scholarly work.

• Role of Copyright Flexibilities and User Rights
  - Fair use, fair dealing, transformative use
  - Compare impacts on employment, business creation, research, and social welfare
Economic Effects of Piracy

- Estimates of Revenue Loss are inexact

- Piracy crowds out legitimate sales less than 1:1
  - Sampling effects, network externalities

- Determinants of piracy
  - copyright strength and enforcement, social norms, incomes
Trademarks

• Indicator of Innovation?
  • New product launches, or improvements upon existing goods
  • Positive correlation between patenting and trademarking

• Digression: Monopoly vs. Monopolistic Competition

- Competition among varieties, each of which is ‘exclusive’

• Correlation between PAT and TM high
  • in pharmaceuticals (i.e., helps maintain brand loyalty)
  • among product innovations more than process innovations
  • imperfect correlation since TM activity is intense in retail & advertising
Trademarks

• Tradeoffs
  • Benefits: creates incentive for firms to invest in product quality and promotion; reduces search costs for consumers (branding and reputation-building)
  • Costs: creates market power (cf. consumer preference)

• Empirical Research on effect of trademarks on Firm (Stock Market) Value and Productivity
  • Is ‘trademarking’ worth doing?
  • Findings: some supporting evidence that TM raises firm value, especially in services, and TM more valuable for relatively lower-tech firms (high tech firms dependent more on patents and R&D)
LESSONS

• IPR reforms have occurred worldwide. South has been catching up but gaps remain in levels of innovation and technology diffusion

• IPR create costs & benefits, and are among the factors that affect technological progress

• IPR have varied economic effects by industry, level of economic development

• Innovative capacity important for exploiting IPRs

• Technology transfer modes are affected as IPRs strengthen: from exporting to FDI to affiliated licensing to unaffiliated licensing

• IPR levels and enforcement in turn a function of economic development
References (General Surveys)


