

New Approaches and Data Session

Discussant Comments

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- An Anatomy of Trade Marking by Firms in the U.S.
 - Data matching between trademark applications file and Census Business Register
 - Multiple matches of TM to owners
 - Resulting data set: firms born after 1977 and their TM applications and registrations
 - Value added: Attach firm characteristics to the TM histories. Initially L, payroll, revenue, location, NAICs
- How Innovative are Innovators?
 - Original data survey of U.S firms 2010, manufacturing and services
 - Replicates questions from Community Innovation Survey in EU
 - Information on outcomes of the innovation process - introduce new product (firm or market), sales of new products, investments in K, skills, marketing
 - Value added: Comparison with EU, multiple dimensions of innovation

Trademark Findings

- Relatively few firms use TM - 3% in 2013
- Clear differences w.r.t firm size and age. In 2013, on average:

Firm Type	Employees	Age
No TM	12.9	11.6
Hold an existing TM	114.8	16.2
Apply for a new TM in 2013	193.7	10.8
First Application in 2013	4.6	0.1
First App Manufacturing	13.2	0.5
First App Prof Service	2.9	0.2

First time are extremely small and young (80% have < 20 employees, 75% are < 5 years)

Two groups - established firms that hold and add to TM, brand new firms with first applications

Motivation for Using TM

Is a trademark an output reflecting past success (past innovation) or an input/signal indicating likely future success.

- Older, established firms
 - Extend customer base (goodwill stock, brand loyalty) to new areas
 - Intangible Asset with monetary value
 - Insurance against theft
- Young, first-time applications
 - Insurance against future theft
 - Signal of expected future success
- Evidence: Firms with first application after age 2.
 - Revenue and employment growth increase significantly (20% over 2 years) following application.
 - Largest impact for young and small firms

- Evidence: Firms that do one of the activities (TM/Patent/R&D) are more likely to do the other two than the population as a whole.
- Question:
 - What are the linkages between these three activities?
 - Where do trademarks come into the innovation process?
 - TM choice should be modeled differently for young and old.

Extending the CDM Model to Incorporate TM

- R&D \longrightarrow Innovation \longrightarrow Productivity/Firm Value
- Value Stage - Profits depend on productivity $\pi(\omega_{it})$.
- Productivity evolution process - $G(\omega_{it+1}|n_{it+1}, \omega_{it})$. Depends on innovations and past productivity
- Innovation process - $F(n_{it+1}|r_{it})$
- Firm chooses R&D investment to max firm value

$$V(\omega_{it}) = \pi(\omega_{it}) + \max_{r_{it}} [\beta EV(\omega_{it+1}|\omega_{it}, r_{it}) - c(r_{it})]$$

$$EV(\omega_{it+1}|\omega_{it}, r_{it}) = \int_{n, \omega} V(\omega_{it+1}) dG(\omega_{it+1}|\omega_{it}, n_{it+1}) dF(n_{it+1}|r_{it})$$

F.O.C. R&D choice

$$\frac{\partial c(r_{it})}{\partial r_{it}} = \frac{\partial EV(\omega_{it+1}|\omega_{it}, r_{it})}{\partial r_{it}}$$

Incorporating Trademarks

- Reflects accumulated goodwill stock - Profit function, specifically demand curve.
 - important for older firms
 - scale of TM activity important - number of products, age of TM,
 - need data to estimate firm demand curves
- Insurance motive
 - Protecting $EV(\omega_{it+1}|\omega_{it}, r_{it})$
 - Incorporate probability of theft on future profits - differs by type of product
- Firm's Decision to Trademark
 - cost is low, filing and legal fees
 - benefit is in future, depends on future firm value
 - Use the TM decision to infer/bound expected future firm value

Dimensions of Innovation

- Relates to the CDM model - innovation function $F(n_{it+1}|r_{it})$
- Many dimensions to n_{it+1} - technical novelty, utility, distance, replicability
- CIS was designed to quantify these aspects.
 - technical novelty - patent
 - utility - how important are sales of new products
 - distance - investment in K, skills, marketing needed
 - replicability - number of rivals with similar innovation
 - separate innovators (new to market) and imitators (new to firm, not market)

Dimensions of Innovation

- Important conclusion -
 - mix varies substantially by industry (utility in software),
 - innovation is not important in many industries,
 - need industry-level analysis
- Sources of invention (earlier paper)
 - the value of inventions depends on their source, customers, supplier, tech specialist
 - tech specialists have highest gross benefits
 - customers have highest net benefits
- Indicates that data on sources of innovative inputs - licensing, purchases of new K equip, upgrading labor skills may be very helpful in assessing cost and benefits on investment in innovation.

Incorporating Dimensions of Innovation in CDM Framework

- Patents - direct indicator of an innovation, use with new product/process
- Sales of new products - profit/demand function
- Investment in K, skills, marketing - cost of innovation (more than just R&D)
- Innovations by rivals - profit function to affect payoff, innovation function to capture spillovers