

Economics 124/PP 190-5/290-5 Innovation and Technical Change

RJVs, licensing, and antitrust policy
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Outline – 16, 18, 23 Nov

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2. University science and the public-private interface
3. Antitrust (competition) policy and innovation
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 - R&D collaboration
 - Joint ventures, alliances
 - Antitrust policy in R&D-intensive industries
 - Network industries
 - Technology licensing
 - Patent pools
 - Microsoft case

Introduction

- Why do firms ally or license technology?
 - To produce more efficiently
 - To enable use of IP as inputs (research tools)
 - To enable development of complementary innovations (and standards)
 - To consolidate market power, extend market power to other products
- Do we need policies toward RJVs and licensing? Conflict:
 - IP policy creates a monopoly (market power)
 - Antitrust policy tries to reduce market power

R&D Collaboration

- Types of Research Joint Ventures (RJVs)
 - Alliance between two firms (domestic or international)
 - Alliance between universities and firms
 - Consortia among (large) groups of firms with or without government help
 - US: EPRI, Sematech
 - Europe: Eureka (cross-border), Airbus
- All types have increased during 1980s/1990s

Welfare effects of alliances

- Costs
 - Reduced diversity in R&D
 - May enable anti-competitive behavior by partners (makes it easier to raise prices)
- Benefits
 - In combination, firms may lower R&D cost
 - Enables larger projects via pooling of resources and internalizing spillovers
 - Vertical arrangements more likely to be efficiency-enhancing

Why have RJVs increased?

- Complexity of modern technology
 - Internalizing spillovers and preventing research duplication
 - Access research at lower cost
 - Monitor developments in related technologies
- Globalization
 - Protecting assets
 - Specialized technical skills in foreign firms
 - Non-tariff barriers to trade
- NCRA 1982 – antitrust immunity in US

Transactions costs view

- Why ally? Why not license? Buy technology? Do FDI (Foreign Direct Investment)? Choice depends on
 - Level of uncertainty (risk)
 - Small numbers leading to hold-up after specific investments made (opportunism)
 - Bounded rationality makes contracting difficult when development is complex
 - More specialized investments like R&D easier to hold-up

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Choice of R&D transaction (TCE)

Type of transaction	License	Joint venture	FDI; buy partner
	Arm's length contract	Both parties place assets at risk	Politically risky; potential antitrust problems
Integration	None to full		
Uncertainty	Less to more		
# of potential partners	Many to few		
Complexity	Less complex to more complex		
Asset specificity	Less specific to more specific		

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Who forms R&D JVs?

- Larger firms in R&D-intensive sectors
- Firms in more concentrated sectors
- Firms in sectors where patents less effective (so licensing not as attractive)
- Firms in smaller countries more likely to form an international RJV
- Firms with past experience in RJVs (specialization)

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R&D Consortium example - Sematech

- Founded 1987, with 80% of domestic mfg capacity as members (response to Japanese competition)
 - ATT, AMD, IBM, Dec, HP, Intel, Motorola, NCR, National Semi, Rockwell, TI
 - Harris (exit 93), LSI, Micron (exit 92)
- 50-50 sharing with Defense Dept for 10 years (\$100M per year)
- Pilot manufacturing facility

Sematech continued

- Redirected towards vertical alliance with equipment manufacturing in 1990
 - SME (semiconductor materials & equipment consortium) has about 140 members
 - Resulted in some anti-competitive behavior
 - Member firms had the right to license equip & materials improvements royalty-free
 - Improvements held back for a year from other firms
 - Shift toward privately appropriable research

Other examples

- Government-industry (ATP): flat panel display – 1994 DOD-initiated response to Japan/Korea
 - Increased research pace; reduced individual firm cost
 - Kept US in race, but not clearly a success
- Microelectronics and Computing Tech Corp (MCC) – 1983
 - Large scale research corporation for firms in IT, not including IBM or ATT
 - Competitive response to 5th generation Japan project
 - Research in software CAD, packaging and advanced computing technology
 - Cost-sharing – supplemental R&D to participants, not much information sharing.

Antitrust policy overview

- Economics of antitrust policy – tradeoff between
 - More efficient (lower cost production *and* invention) firms
 - Higher prices and lower consumer welfare; deadweight loss
- Firm behavior examined by FTC (Federal Trade Commission) or DOJ (Department of Justice, Antitrust Division):
 - Collusion
 - Tacit (not really illegal unless...)
 - Naked (direct agreement) – *per se* illegal
 - Mergers – use guidelines (rule of reason)
 - Other restraints to trade – rule of reason; some are *per se* illegal

Antitrust in R&D industries

- Antitrust issues raised in innovative industries from the following:
 - Forming a joint venture to do R&D
 - Licensing technology
 - terms and restrictions in license
 - exclusivity
 - *Ex post* alliance – patent pools

Antitrust and RJVs

- Required to register by the NCRA 1982
- Rule of reason enforcement
 - Good - pooling R&D can reduce costs without raising prices if firms compete on output market
 - Bad - there can be underinvestment in R&D by joint ventures (like a monopolist, they may delay innovation relative to social optimum)
 - Relatively little effect either way if there are third parties not in the RJV

Network industries

- Characteristics:
 - primary product is information
 - importance of standards
 - technologically complex
- Examples:
 - software
 - databases
 - publishing
 - films
 - television
 - recorded music
 - telecommunications

Network industries

- Cost structure
 - Marginal cost approximately zero
 - high fixed costs
 - copying easy, so IP is important
- Consumers *and* firms benefit from standards
 - hardware/software interaction
 - cost structure implies that standardized products are lower cost
 - more units to spread the Fixed costs over
- Innovation is cumulative and recombinant
 - products based on webs of technology drawn from different firms (due to technology specialization)
- Dynamic change (Schumpeterian) as important as price for consumer welfare
 - incentives for innovation are important for welfare

Network industries

- Standards, complexity mean that there will be many technology transactions among firms
 - Alliances
 - Licensing
 - Patent pools
- Raises antitrust concern

Technology licensing

- Definition - agreement by the IP owner to allow use of IP by another
- Possible terms
 - Exclusive license by licensor
 - Exclusive dealing by licensee
 - Grantback – licensor claims share of output of use of his IP
- Usual fee structures
 - Per sales royalty (influences price)
 - Fixed fee (influences division of profit)

Why license technology?

- Many products cannot be made without combining technologies from different producers - difficult for a single firm to be good at everything. Examples:
 - software and hardware
 - gene-splicing technologies for manufacture of biotech products
 - process technologies for semiconductor manufacturing; plastic casing for chips from Texas Instruments widely used in industry
- Increase in patenting facilitates the construction of cross-licensing contracts between firms
 - semiconductor example - doubled their patent yield from R&D in the last 10 or so years

Patent pools (grouped licenses)

- Lowers the transaction costs of combining multiple patents to make one product
- Examples:
 - Aircraft (1914) – Manufacturer's Aircraft Association
 - Radio (1920s) – RCA Corporation, a consolidation of Marconi, patents held by ATT, GE, Westinghouse
 - MPEG-2 video compression
 - DVD-video and DVD-ROM

Patent pools

- Antitrust enforcement based on whether technologies are
 - complements – allows combination at relatively low cost (MPEG, etc)
 - substitutes – acts as collusive agreement (Visx-Summit (Lasik) settled in 1998)
- Can function as a barrier to entry
- Profit division depends on outside option (dropping out)

Antitrust Policy and Licensing

- Potential welfare problems:
 - firm may use a patent to extend market power to non-patentable product (via tying)
 - patent on a technological standard may impede competition that uses the standard
 - patent may prevent efficient combinations of technology if firm refuses to license it or licenses at high cost
 - innovation that builds on the information in a patent may be costly for other firms to perform

Antitrust policy and licensing

- Principle of antitrust enforcement in relationship to IP protection
 - Monopoly power granted by the patent should not be extended to other activities of the firm or used to shift the demand curve for the patented product outward at the expense of competition from substitute products
- Particularly important in information industries, characterized by network externalities

Antitrust policy and licensing

- We ask the following questions about licensing or other activities involving IP:
 - Are there antitrust reasons to prohibit certain activities?
 - In the case of conflicting IP rights, could the firms bargain to attain efficient outcomes?
 - Is there room for entry if consumer welfare is not being served?
 - Will innovation be facilitated or stifled by the license?

The Nine No-Nos (pre-1995)

- Restraints on licensee's ability to use products outside patent scope (probably illegal):
 1. royalties not reasonably related to sales of product
 2. restraints on licensee's commerce outside scope of patent (tie-outs)
 3. requiring purchase of unpatented materials (tie-ins)
 4. mandatory package licensing

The Nine No-Nos (pre-1995)

- Possibly pro-competitive, but can also stifle innovation:
 5. requiring licensee to assign to patentee patents obtained after arrangement granted (grantbacks)
 6. veto power over future licenses (exclusivity)
- Vertical restraints on trade or resale price maintenance (possibly efficiency-enhancing):
 7. restraining sales of unpatented products made with a patented process
 8. post-sale restraints on resale
 9. mandatory prices on resale of patented products
- Until the 1995 guidelines, firms found to have violated one of these prohibitions were guilty of extending their market power, regardless of their motivation (*per se*)

The 1995 Guidelines

- For the purpose of antitrust analysis, IP (once granted) is comparable to any other form of property
- Do not presume that IP creates market power that antitrust policy needs to address
- Recognize that IP licensing generally pro-competitive (allows combination of complementary inputs)

Microsoft Case History(1)

- 1990 – FTC begins investigation
 - based on IBM/MS discussions over OS/2 and Windows
 - result – FTC deadlocked; OS/2 competes
- 1994 – Justice brings Sherman 1&2 suit and settles with MS – consent decree:
 - Restrictions in licensing agreements (no longer will “force” consumers to pay extra for a different OS)
 - No admission of liability

Microsoft Case History(2)

- 1997 – DOJ files again, alleging bundling of IE with Windows 95
 - overturned on appeal
- 1998 – DOJ brings a new Sherman 1&2 suit:
 - Illegally continued and extended monopoly.
 - Melding of IE into Windows (95, then 98)
 - Restrictions on non-IE browsers appearance on opening desktop of new Windows machines

MS Market Share

Year	MS-DOS/Windows share of all PC OS	MS-DOS/Windows share of Intel PC OS
1980s		70%
1990	63%	88%
1992	67%	90%
1998		90%

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The Economic Questions

- Does MS possess monopoly power in the market for PC operating systems?
- Did it maintain its monopoly power by anticompetitive conduct?
- Did it use its monopoly power to distort competition or achieve monopoly power in markets other than the market for PC OS?

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Government case (1)

- Yes
 - share of the relevant market (operating systems for desktop and laptop PCs) stands at about 90-95%
 - The price of Windows has gone up while the price of most other software has gone down
 - Own a stake in Apple, their largest competitor in the OS market
 - Microsoft Office has a monopoly on the Mac, and a near monopoly on Windows

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Government case (2,3)

- Excluded competition in browsers and Java by various illegal means to maintain it.
 - Tied browser; excluded others from distribution channels (new PCs)
 - Forbade removal from desktop; restraints on online service providers
 - Polluted Java
- Some of this is and/or threatens leveraging of current monopoly into other software areas.

Microsoft Case

1. No – price of DOS/Windows too low; entry threat from other OS
2. Hard competition in the face of displacement threat
3. Product improvement via integration (efficiency argument)
