IPR's Regimes, Firms and the commoditization of Knowledge

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Introduction

- IPR is “not an end it itself” : it is a “social contract” between inventors and society ; it changes over time

- IPR is strategic in that it frames the process of “knowledge commoditization”, which is a key driver of the economic dynamics in capitalist economies

- The historical (US) evolution : 3 “regimes”
  - 19th century: a “pre-fordist” regime based on individual inventors
  - The formation of the corporate capitalism, and the “fordist” era
  - The institutional transformations of the 80th and the constitution of a “post-fordist” regime
- … framing a series of very different knowledge markets

I - The « pre-fordist » regime: Individual inventors and market for technology

- The formation of a "modern" patent system *"*designed to stimulate the **individual** to invent
  - **Low registration fees**, impersonal application procedure.
  - Reservation for only the "first and true" inventor *in the all world.*
  - **Creation of *an examination system***, by trained experts, replacing the previous simple registration system (*1836 Patent Act*)
  - **Granting of *an exclusive property right***
  - The legal system defines a set of rules and principles protecting the (property) rights of patentees, *and of those who purchase or license patented technologies* (Khan, B. Zorina. 1995.)

KEY FEAUTURES

- The patent system favored **individual inventors**: patentees must be individuals. Inventor alone can receive a patent.
- Firms could not receive patents ***directly*** for inventions developed inside the firm.
- The firm has no right on an employee's invention, even if the invention has been developpped inside the firm, « in the absence of an express agreement » (Supreme court, 1893)

Key consequences and results:

- A strong growth in patenting, mainly between 1840 à and 1870
- The formation of a significant market for patented technologies
- With transactions between individual inventors and firms, or other individuals

2 - The ‘Fordist’ Era: IPR and Firm in Corporate Capitalism

2.1 A global transformation: emergence of the large corporation and of a new research system.

- The formation of the “Chandlerian Firm”
  - A *hierarchical structure*, and the *centralization* of assets and activities inside large multi-units entities.
  - Vertical integration. And **internalization of the inventive-innovative activity**.
  - High degree of integration of the workers inside the firm, with the construction of a new labor status (a new “wage-labor nexus”)

- The Institutionalization and professionalization of innovation and R&D, based on a dual institutional system ..
  - (Large) Firms versus public (or non profit) research and education institutions
  - Realm of Technology versus republic of Science
- … Implying a dual knowledge property regime (“personal” vs. corporate”

2.2 The evolution of the patent system: from an individualistic to a corporate intellectual property regime

- Increasing awareness of the relevance of technological knowledge as "strategic assets"
- The new emerging large corporations were confronted to two questions:
  - How to take the 'control' on technological knowledge and capabilities possessed by workers? (Cf. Taylor)
  - How to exploit the monopoly power given by intellectual property law?

➢ Change in the focus of the patent system **: from the protection of <u>individual inventors</u> to the support of <u>the corporate interest</u>**

- An example of institutional complementarities, and conflicts:
  - Between intellectual property law and labor law
  - Between intellectual property law and anti-trust regulations

a) Intellectual property and employment relation: the status of the 'employee-inventor'

- The decline of the individual independent inventors/the rise of the "employee/inventor"
- The new strategies of firms: in-house inventions, and the necessity to control employee's knowledge and capabilities.

➢ the importance of the rules governing **the ownership of patents**: how to allocate the rights on the inventions create inside the firm?

– Early 19th century: employees usually owned the entire right on their inventions
– in the 1880s: courts began to attend more to *the nature and existence of the employment relationship* when deciding ownership of inventions.

- What append then **? An evolution towards the appropriation of patents by the firm**, in two steps, (Fisk, 1998):

  1) Late 19th century: the employee-inventor owned his inventions but **the employer can have an exclusive license to use them, without paying royalties**.

     Justification: the employer has "sponsored" the development of the invention, by paying the employee/inventor, and providing him his tools : **The "shop right" doctrine**.

  2) The 20th century: **the employer can get the complete property of the patents developed inside the firm, as soon as the employees have been "hired to invent".**

     The appropriation of the invention is based *on the labor contract* :

     "the respective rights and obligations of employer and employee, touching an invention conceived by the latter, spring from the contract of employment" (Supreme court, 1933)

- The “**preinvention assignment agreement**”: by contract (explicit or implied), the employee assign to the firm all the rights on the inventions conceived within the context of his job, with the resources given by the firm.

  “Today, virtually all technical employees agree, as a condition of employment, to assign to the employer all rights to inventions conceived by the employee while at work, or in subject matters related to work, or while using any resources of the employer” (Cherenski, 1993)

- **A radical transformation of the intellectual property regime**

  - The **“preinvention assignment agreement”** as part of a new “wage-labor nexus”: the key place of the employment relation in the ‘fordist’ system.

  - The patent system became, first, **an instrument of firm’s strategies.**

b) The patent system and antitrust regulations

- Prindle (Mechanical engineer and patent lawyer, member of the American Patent Law association, founded in 1897) :

  "Patents are the best and most effective means of controlling competition. They occasionally give absolute command of the market, enabling their owner to name price without regard to cost of production… patents are the only legal form of absolute monopoly."

- The key issue is not merely that a patent gives a (temporary) monopoly, but that the running of a patent portfolio can be used to gives a firm, or a group of firms (Through a patent pool for example) a lasting control of a market, a technology or an industry.

- A potential conflict between Intellectual property rights and antitrust policies?

- The articulation between antitrust policy and intellectual property, after the Sherman Act. Three periods:

- Until the beginning of 20th century: few constraints.

« *the general rule is absolute freedom in the use or sale of patent rights under the patent laws of the United States. The very object of these laws is monopoly*" (Supreme Court, 1902)

- From the first World war: a weak anti-trust policy. Few constraints on collusion and cooperation, allowing the rise of patent pools.

- After 1940, a much stronger antitrust policy: "a more aggressive prosecution ad court decision and decrees which reflect as never before, the purpose of the Sherman act" . With a correlative relatively permissive intellectual property regime (Mowery and Rosenberg, 1998)

- The specificities of the post world war II period for the U.S. Economy:

  - The **strong anti-trust policy** made it difficult to acquire firms in connected technologies or industries, and thus reinforce the resort to in-house technology development by large corporations
  - The relatively **weak of intellectual property regime** favor the diffusion of technologies and the emergence of new firms.

  - The ideological, institutional and policy evolutions of the 80th will completely transform the scene.

3.

The 1980’s and the passage to a third (finance driven ?)

Regime

Key Evolutions and Changes

- **A dramatic change in the IPR Regime**

Coupled/articulated with …

- **A change in financial regulations impacting the financing of research & innovation**

At the origin of …

- **New institutional complementarities IPR/Finance**

Giving birth to …

- renewed and redesigned knowledge markets

Changes in the IPR Regime
Legislative Changes

Results of publicly funded research (ie “university research”)

- become patentable (Bayh-Dole Act)
- … & transferable to private entities through « exclusive licences »

- Installation of CAFC (1982)
    - To put an end to the classical « antitrust doctrines » of existing the Courts of Justice
    - Creation of new « pro-patent » doctrines
- Special 301 of the Trade Act
- International dimension : Signing of the TRIPS (1994)

Changes in the IPR Regime (cont'd)
Courts Rulings

- A dramatic extension of "patentable subject matters" through courts rulings
  - Basic research : genetic engineering and biotech (living entities, genes, research tools…)
  - Generic knowledge : software industries , (math algorithms, …)
  - "broad scope" patent
- New patentable subject matters
  - Business (& financial) methods..

Meaning of the changes : Theoretical views

- Erosion of the classical borders between the domains of public « open science » and private « kingdom of technology » (Dasgupta and David, 1994) which was on the pillars of the fordist era)

- Patents (*i.e.* rights to exploit inventions and to exclude rivals), seem no more designed primarily as rewards for inventors,

  but granted

  - *a priori*
  - at the « exploration » phase (Kitch)
  - in "exclusive" forms

- Welfare considerations (Arrow 1959, Nelson, 1962) seem no more at the heart of the patent system

Changes in Financial Regulations & the Venture Capital Market

- Regulatory changes regarding Pension Funds and the Venture Capital industry
  - 401k : from “Defined Benefits” to “Defined Contributions”…
  - New content given to the “Prudent man” rules (new portfolio theory)

    - ➢ Pension Funds allowed to invest in risky assets : ie in the venture capital industry
    - ➢ Launching of start ups is boosted

- New regulations on Nasdaq with the opening in 1984 of the so called “Alternative 2” (Orsi, 2001)
  - Loosing companies to be listed if they exhibit sufficient values of their “intangible assets” (patents and other IPR’s)
    - ➢ New possibilities of « exits » opened to start up firms raised by venture capitalists

3.3 The « Institutionnal Complementarities » IPR/Finance & the rise of a new knowledge markets

If we define IC's as

" … based on multilateral reinforcement mechanisms between institutional arrangements, where each one, by its existence, permits or facilitates the existence of the others…" (Amable, 2001)

Then the "multilateral reinforcement mechanisms between Finance and IPR dramatically have reshaped the knowledge markets

Dramatic increase of pieces of knowledge marketed

Boosting of a « market of firms »

Some Consequences of the New IC IPR/Finance

- Rise of new types of firms : « specialized in basic research » (Rosenberg, 1980)
- Nasdaq as a new market for « innovative firms »

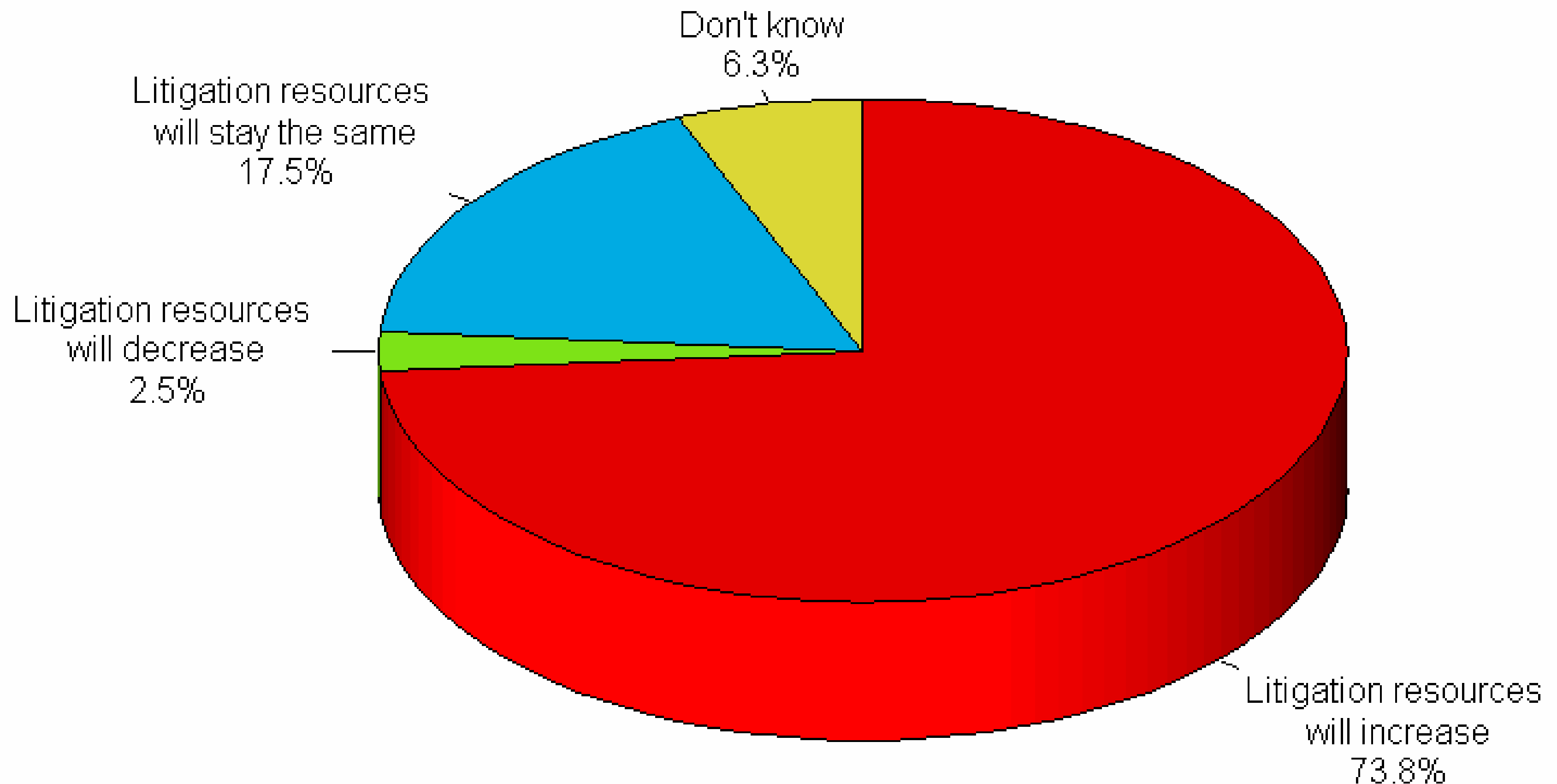
- New relaxations on competition policy (R&D coop as « safe harbors »…)
- New changes in the WLN
  - Firms (start ups) built around « star scientists»
  - … star scientists as share-holders (vs. « employees », vs. « researchers « hired to invent »)

Key features of the « new » knowledge market(s)

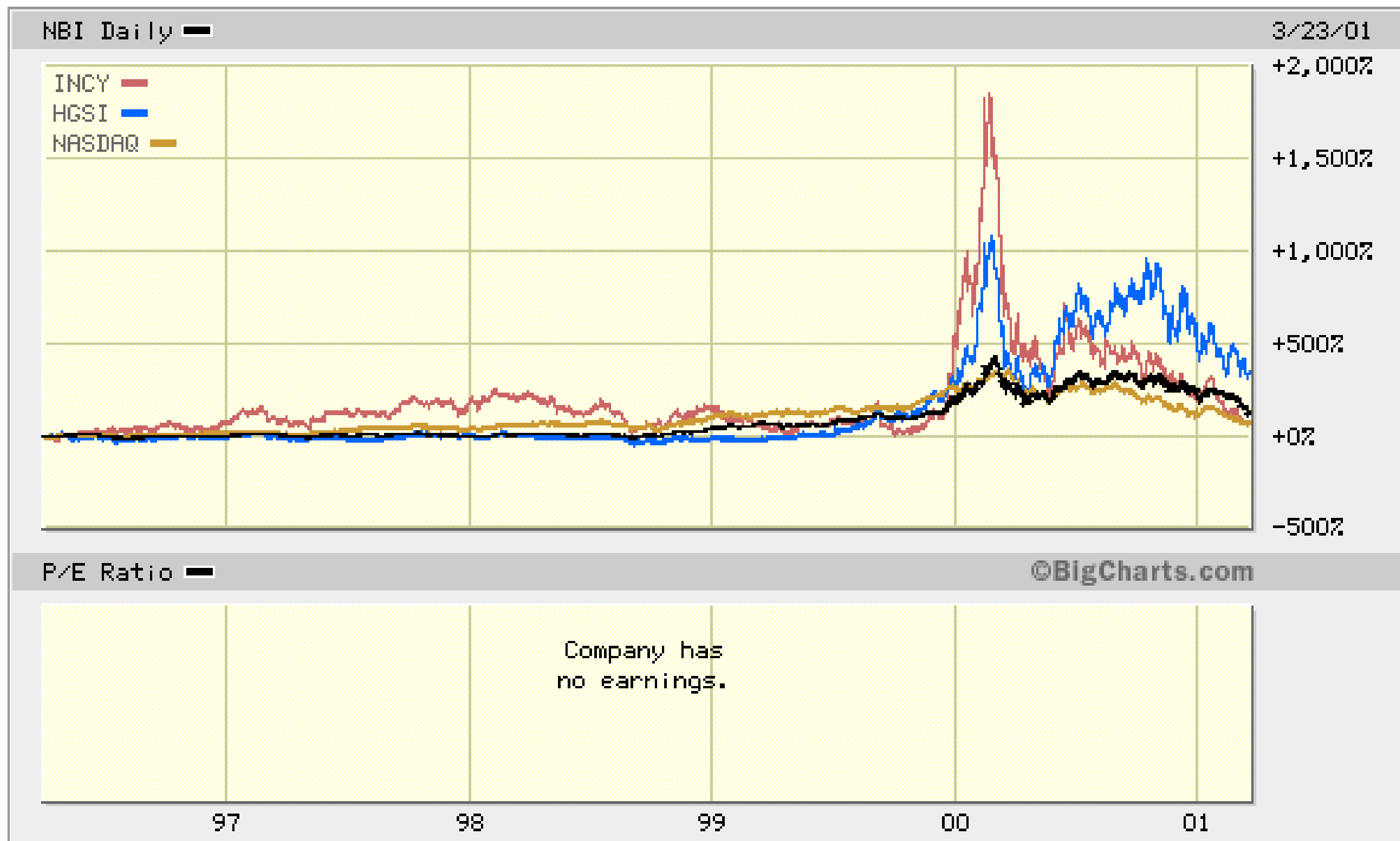
- High level of « fragmentation » of the types of knowledge marketed
  - High transaction and litigation costs to enforce the fragmented IP rights provided to firms …
  - …Leading to an « anticommons tragedy (Heller and Einsenberg)
- Birth of a market for "firms" highly intensive in research
- Largely finance driven
- A series of very "imperfect markets"
- Large variety of "regime of appropriability" (Teece)

Sharp decreases on Patent Quality

Over the next 3 years do you expect the ressources your company spends on patent litigtation will increase, decrease, stay stable ?



Evaluation of Intengible assets
The biotech and Internet bubles



Conclusions

- **Historical variety of IP regimes (at least 3 in the last century**…)
- **Complementarity and tensions of IP regimes with**
  - Wage Relations Nexus
  - Competition policy
- **Instability of the new « finance led » regime**
  - Nasdaq and Internet bubbles
  - International contestations on TRIPS
    - Drugs and generic medicines
    - Biodiversity and bipiracy…

Research Questions

1. **Which future for the process of «commoditization of Knowledge" via the new "post-fordist" IPR regime**
   - **A new stable trait of the financial led acc regime ?**

2. **Which alternatives ?**
   - **Open source movement (software & biotech)**
   - **Creative commons (copyrights) & "Commons"**
   - **South-South cooperative networks : the case of the Tech Network on HIV/AIDS**
   - **Patent Pools**
   - **Hybrid forms (proprietary + open source)**
   - **…**

Appendix

Some additional data on patent applications

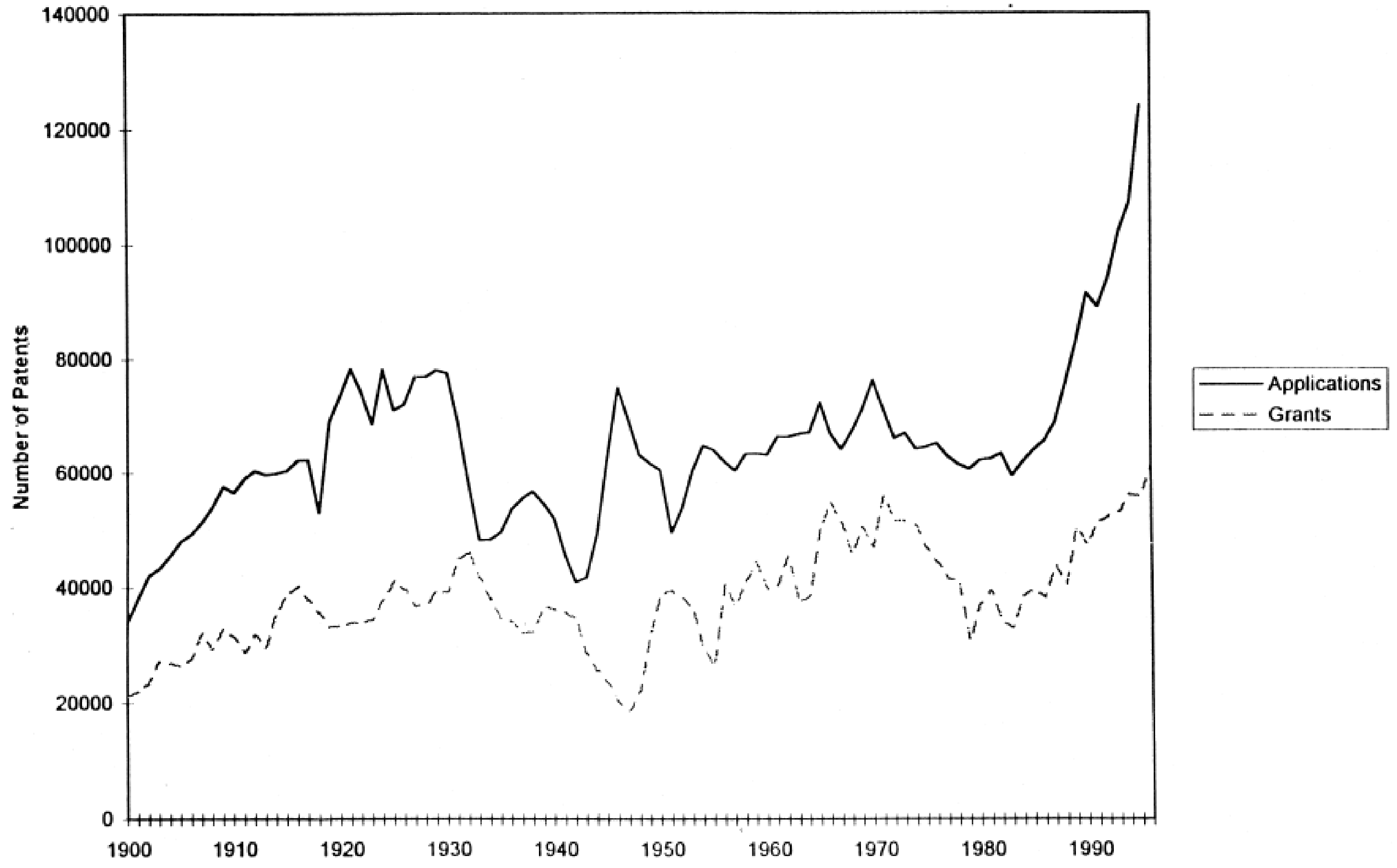


Fig. 1. Patents by US investors.

Source: Kortum and Lerner (1999)

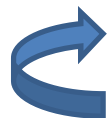
Patents Per Million Residents in the United States, 1790–1998

All Patents
Patents Awarded to U.S. Residents

600
500
400
300
200
100
0

1790 1799 1808 1817 1826 1835 1844 1853 1862 1871 1880 1889 1898 1907 1916 1925 1934 1943 1952 1961 1970 1979 1988 1997

Source: Khan and Sokoloff (2001)



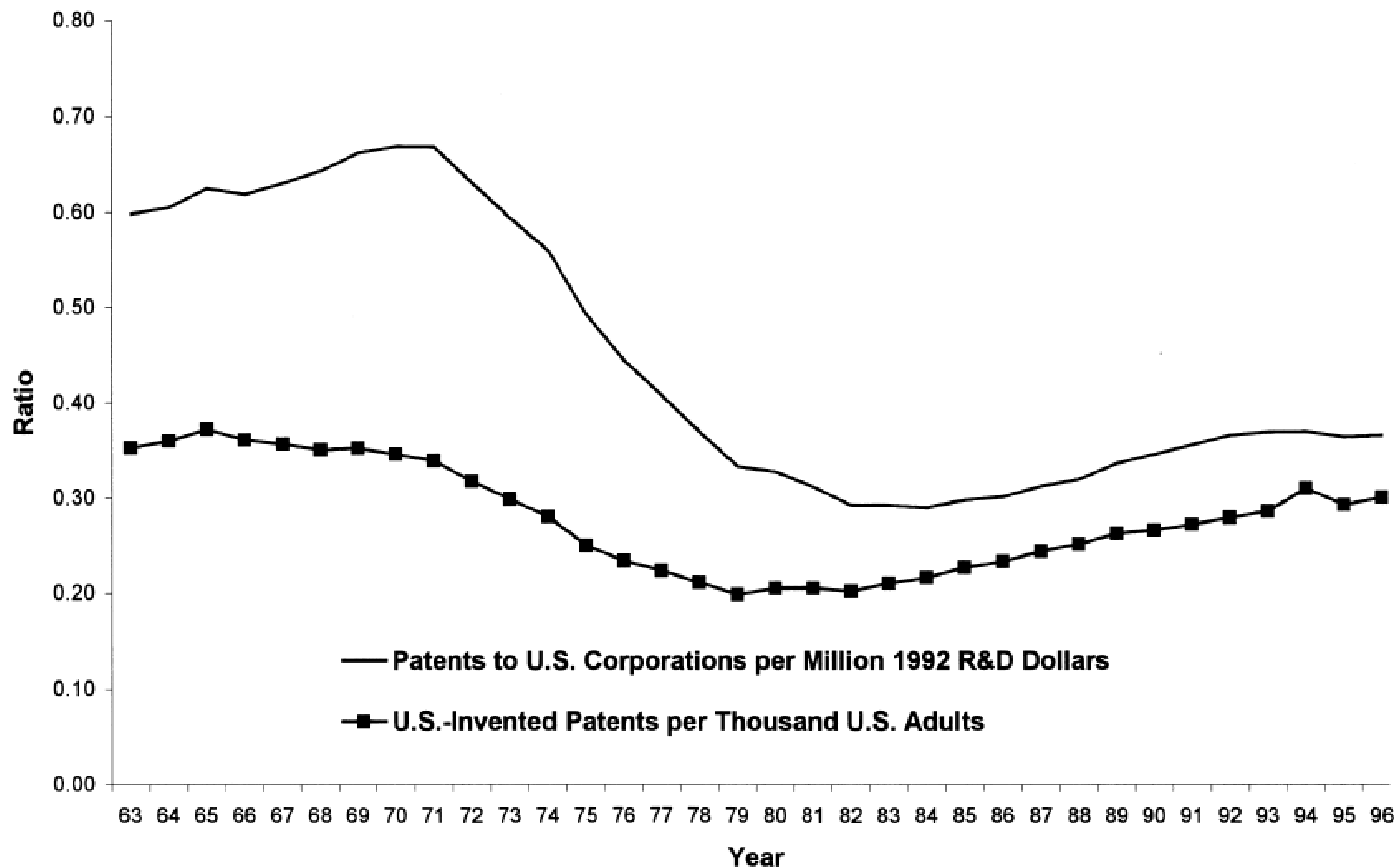


Fig. 2. Patent ratios over time (5-year moving averages). Source: USPTO (1998a) and National Science Board (1998).

Source: Adam B. Jaffe, "The U.S. patent system in transition: policy innovation and the innovation process", *Research Policy,* 29, 2000, 531–557