

# Issues and Possible Reforms of the Patent System

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# Overview

- ▶ Brief economics of patents, innovation, and competition
- ▶ Evolution of patent systems in the past quarter century and current trends
- ▶ Recent research on patent thickets

# The Patent System Viewed by a Two-Handed Economist

Effects on	Benefits	Costs
Innovation	creates an incentive for R&D; promotes the diffusion of ideas	impedes the combination of new ideas & inventions; raises transaction costs
Competition	facilitates entry of new small firms with limited assets; allows trading of inventive knowledge, markets for technology	creates short-term monopolies, which may become long-term in network industries

# Which effect dominates?

- ▶ Economic theory: mixed
  - an incentive for innovation, but
  - can slow advance in cumulative technologies
  - litigation fears discourage investment
- ▶ Across U.S. industries: great variation
  - Clearest benefits: pharma, chemicals, medical devices
  - Ambiguous: semiconductors, other ICT
- ▶ Across countries and time:
  - Not much evidence that strengthening IP protection induces more domestic R&D and innovation

# Conclusions from empirical research

- ▶ Introducing or strengthening patent system results in an increase in patenting and the strategic uses of patents.
- ▶ Not clear that it increases innovation, although it may change its direction.
- ▶ Most responsive sectors are pharmaceuticals, biotechnology and specialty chemicals.
- ▶ Existence and strength of patent system affects organization of industry by facilitating trade in knowledge assets.

# Designing a patent system to encourage innovation

## ▶ Principles

- Reward real inventions
  - Encourage trade in technology
  - Encourage disclosure
  - Discourage opportunistic litigation
    - ▶ Disproportionate rewards
    - ▶ Free-riding problem
  - Discourage patent flooding
- ▶ Reminder: the goal is *not* to enrich or even to employ patent lawyers (or economists)

# Evolution of the U.S. Patent System since 1980

- ▶ Patenting extended to
  - new technology (biotechnology)
  - technologies previously not subject to patent protection (business methods, software)
  - upstream scientific research tools, materials, and discoveries
- ▶ Emergence of new players (universities and public research institutions)

# Evolution of the patent system, cont.

- ▶ Position of patent holders strengthened vis-à-vis alleged infringers
  - Court of Appeals for the Federal Circuit → higher validity rates from 1982
  - Process Patent Amendments, 1988 (blocks imports)
  - Major damage awards (e.g. *Polaroid v. Kodak*, 1986/1991)
  - TRIPS Agreement, 1994
  - Weak research exemption (*Madey v. Duke*, 2002)
- ▶ Antitrust constraints on patent use relaxed

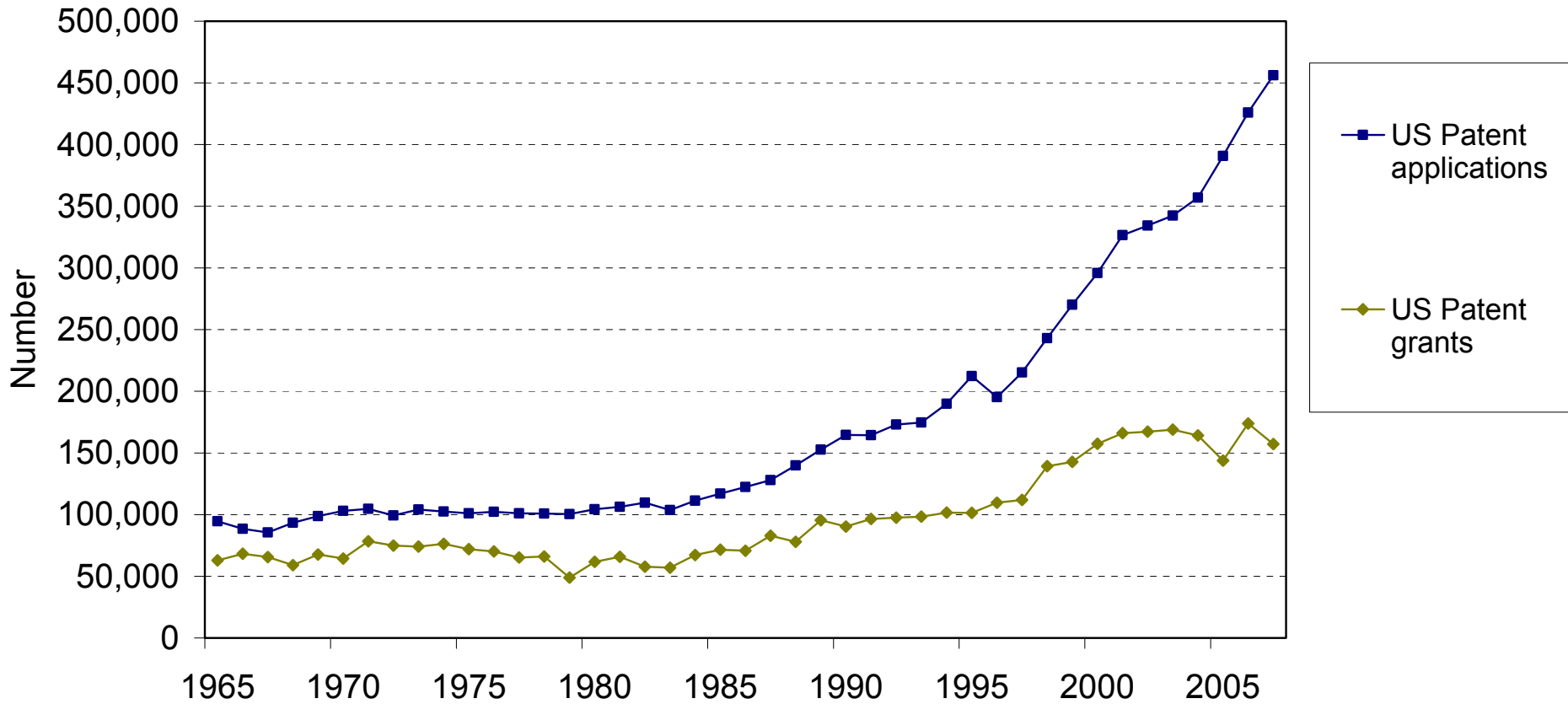
# Contributing to...

- Doubling of patent applications and grants (to 100 per working hour), 1992-2002
- Higher renewal rates
- More frequent assertion of patents
- Doubling of U.S. District Court patent suits, 1988-2001
- ▶ All growth 1985-2000 at the USPTO accounted for by firms in the ICT sector (Hall 2007)
- ▶ Response by multinational firms to these changes has spread the effects to other patent offices

# Current trends

- ▶ Increasing number of claims per patent (at EPO as well as at USPTO)
- ▶ Larger family sizes, more shared priorities (divisionals and continuations)
  - Especially in ICT
  - US, Japanese, and British applicants
- ▶ Lower opposition rates at EPO overall
  - Higher in pharma/cosmetics – oligopoly
  - Almost zero in electronics

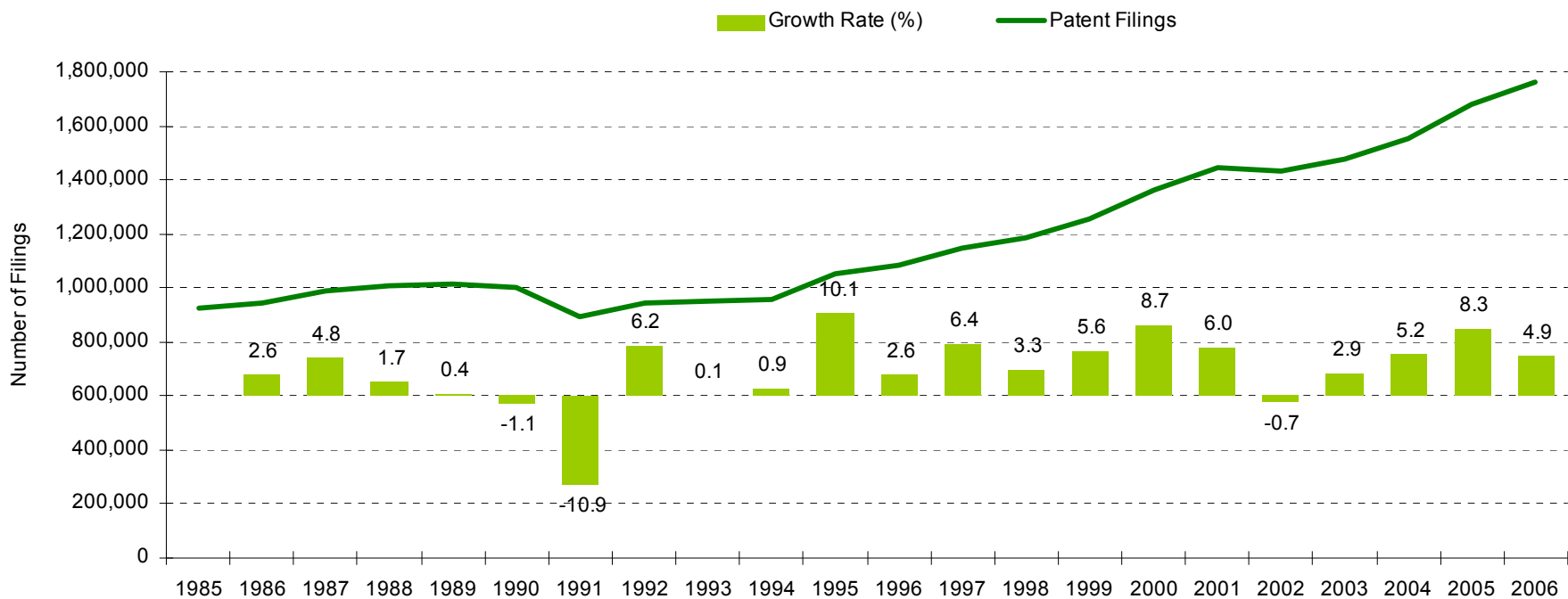
## USPTO Utility Patents 1965-2007



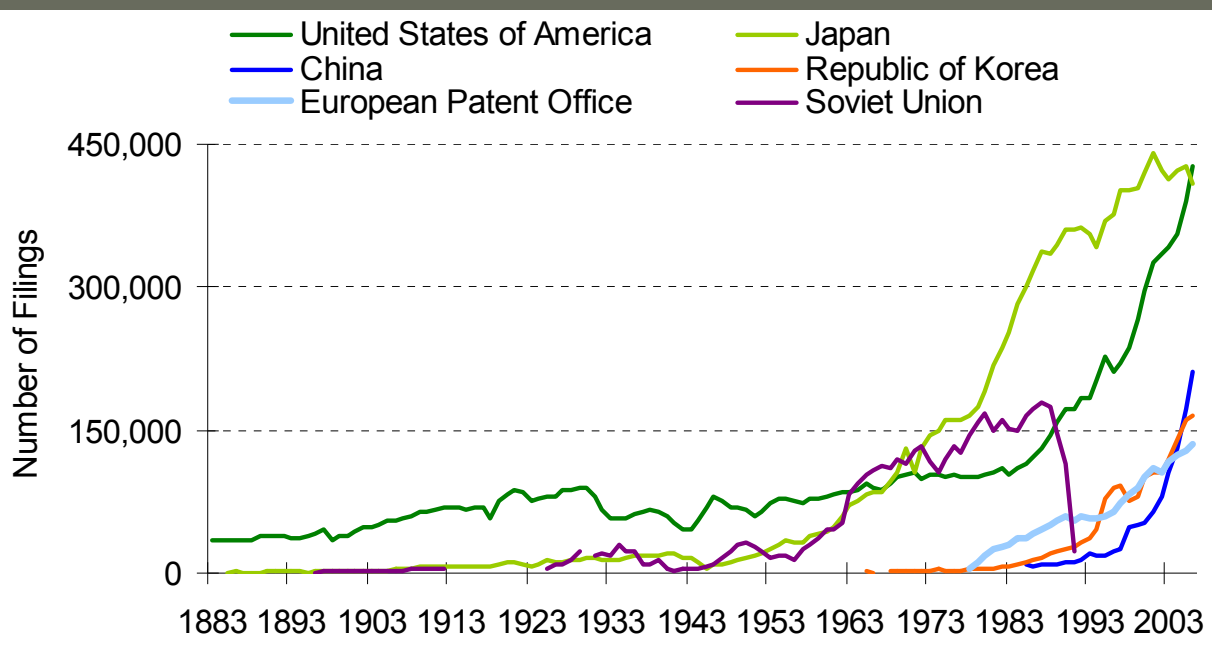
Source: <http://www.uspto.gov/web/offices/ac/ido/oeip/taf/tafp.html>

# WIPO statistics 1985-2006

## Total patent filings

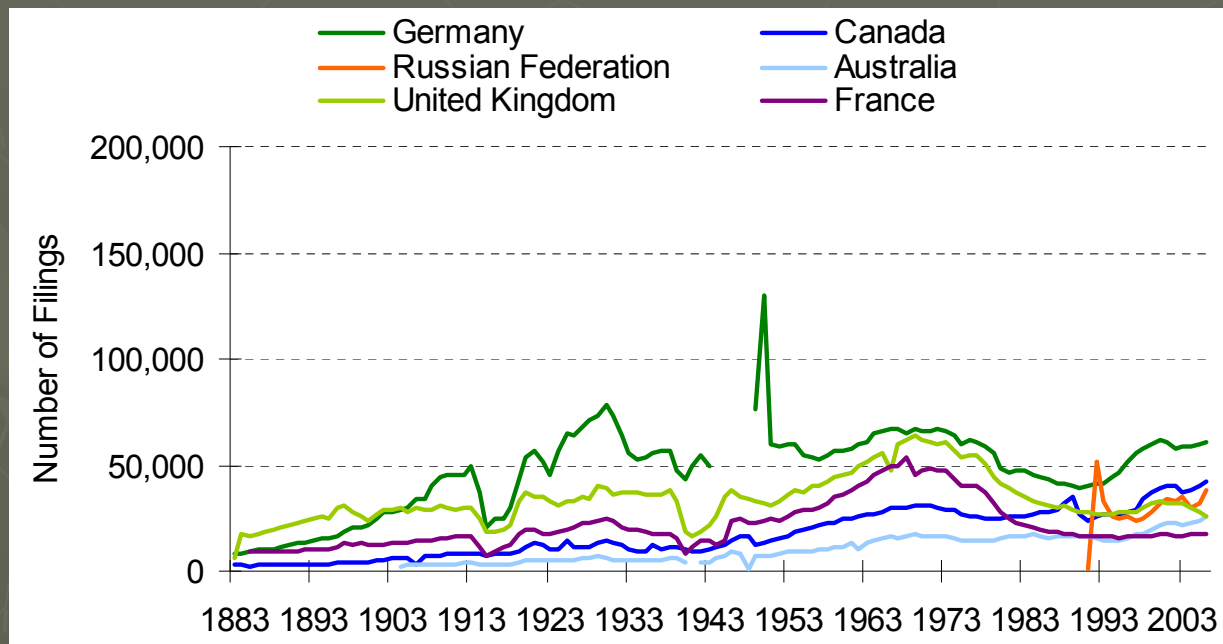


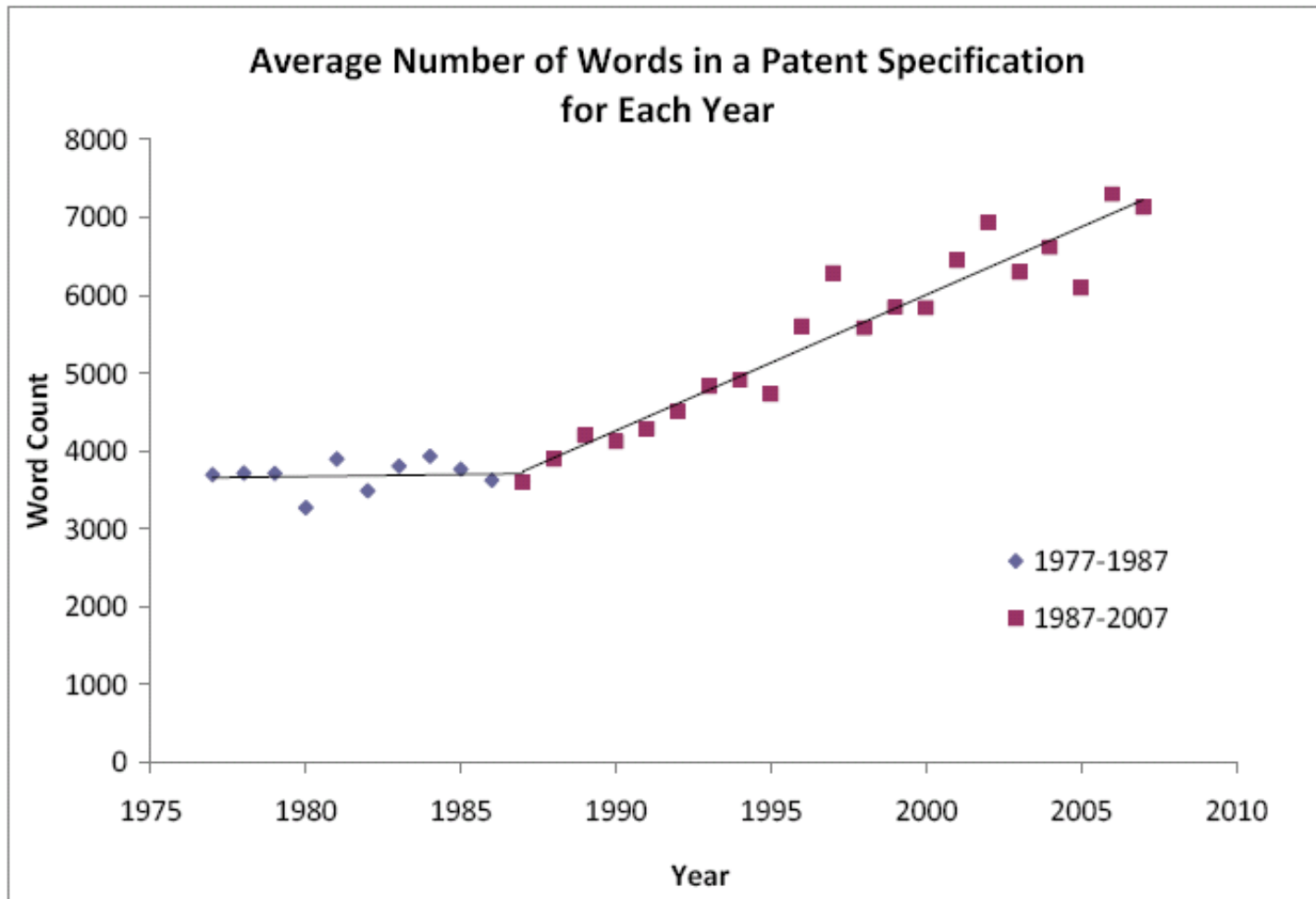
Source: WIPO Statistics Database, July 2008



Filings by national office

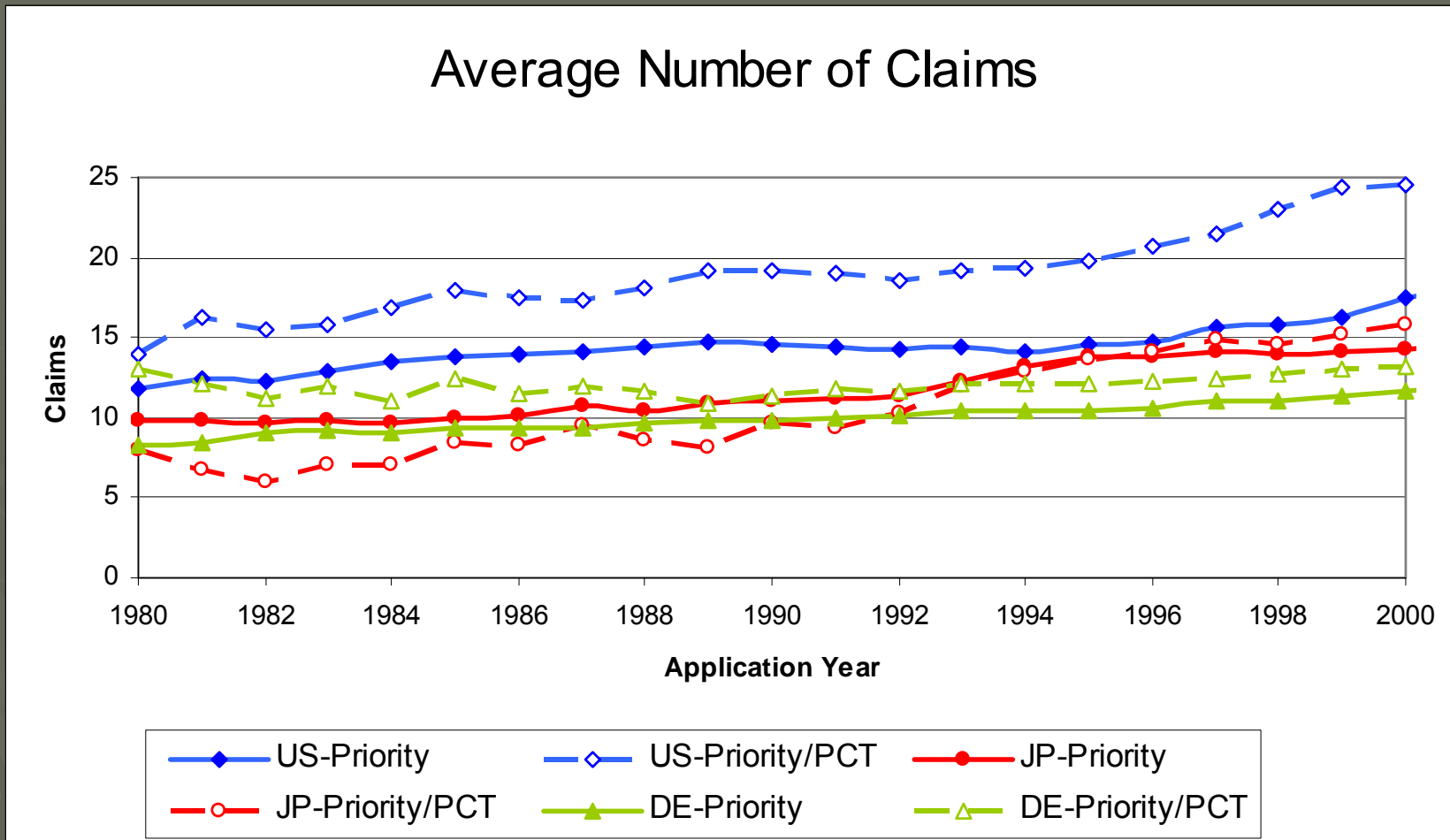
Source: WIPO statistics, July 2007





The graph shows the average number of words in the description portion of each USPTO-issued patent, excluding claims, title, abstract, references, and other identifying info. **Source: Dennis Crouch, Patently-O Blog, December 2007**

# Number of Claims in EPO Applications



Source: Harhoff 2007, Intellectual property and competition

# Raising concern about.....

- ▶ Volume of patent applications threatens to degrade quality or lengthen backlog or both
- ▶ Decline in quality from other sources (prior art)
- ▶ Rising costs for acquiring and defending patents and securing licenses
- ▶ Increase in defensive patenting
- ▶ Difficulty negotiating patent thickets/risk of hold-ups, especially in cumulative technologies
- ▶ Some impediments to research

# Response of the system - US

- ▶ Trilateral (USPTO, JPO, EPO)
  - Various agreements and pilot programs for work-sharing
- ▶ USPTO
  - Administrative reforms – proposed higher fees for many claims and continuatons – now in litigation
  - **In re Bilski** – FTC clarified the patentability of business method patents under Section 101.
    - ▶ invention related to a "pure" business method that is not limited to performance on a computer; produces only abstract results such as manipulation of documents, information, or data - not patentable subject matter.
    - ▶ If method performed on a computer and limited to operations on particular types of data - may be patentable.
  - Second pair of eyes (bus method, extended to other technologies)

# Response of the system - Europe

## ▶ Europe

- **Community patent** remains unachieved
- **London protocol** ratified Feb 2008
  - ▶ applicants in Denmark, France, Germany, Iceland, Latvia, Liechtenstein, Monaco, the Netherlands, Slovenia, Sweden, Switzerland or the UK no longer required to translate the patent into each country's national language.
- **EPO – new president Alison Brimelow**
  - ▶ Dec 2007 - punitive fees for those who submit long and complex patent applications; substantial increase of renewal fees for pending applications in April 2008
  - ▶ Requested the Enlarged Board of Appeal to address the patentability of computer programs in Europe

# London protocol

- ▶ States dispensing with translation requirements
  - France, Germany, Liechtenstein, Luxembourg, Monaco, Switzerland, United Kingdom
- ▶ States requiring that the **description** of the European patent be supplied in the official language of the EPO prescribed by that state
  - Croatia (English), Denmark (English), Iceland (English), Netherlands (English), Sweden (English)
- ▶ States dispensing with translation requirements for the **description**
  - Latvia, Slovenia
- ▶ States requiring translation of the **claims** of the European patent into one of its official languages be supplied
  - Croatia (Croatian), Denmark (Danish), Iceland (Icelandic), Latvia (Latvian), Netherlands (Dutch), Slovenia (Slovenian), Sweden (Swedish)

# Patent thickets

“a dense web of overlapping intellectual property rights that a company must hack through in order to actually commercialize new technology”

Carl Shapiro (2000, p. 120)

- ▶ patent thickets occur when products read on many patents held by different parties
- ▶ Creates a kind of “tax” on innovating firms in the form of litigation and the costs of defensive patenting:
  - Litigation by competitors – patent portfolios a defense; allows cross-licensing
  - Litigation by non-producing entities – patent portfolio defense fails and holdup for more than the value of the patent a real possibility

# Empirical research on thickets

## ▶ Ziedonis (2004)

- Hall-Ziedonis (2001) found that capital intensity predicted patent portfolio accumulation, to avoid holdup
- Especially capital-intensive firms that draw on rights from a number of other firms (fragmentation)

## ▶ Galasso-Schankerman (2008)

- Lichtman (2006) predicts faster settlement when rights are fragmented
- True empirically, but total settlement time can be longer for complementary patent rights, confirmed by their estimates.

# Empirical research on thickets

- ▶ Von Graevenitz, Wagner, and Harhoff (2008)
  - Complex technologies – areas where many mutually blocking triples of firms exist (via XY references)
  - Fewer tech opties & more competitors increase patenting in complex tech industries; reverse in discrete tech industries – confirmed by empirics
- ▶ Cockburn, MacGarvie, and Mueller (2009)
  - Firms in more fragmented areas in-license more and product-innovate less, especially if they have small patent portfolios themselves

# Technologies with thickets

<i>Technology (OST-30)</i>	<i>Mean number of blocking triples</i>
Audiovisual technology	116.48
Telecommunications	99.64
Semiconductors	62.84
Optics	57.30
Information technology	57.16
Electrical machinery, Electrical energy	24.23
Engines, Pumps and Turbines	21.72
Handling, Printing	20.26

For comparison: biotechnology, consumer goods, agriculture, food, civil engineering, space & weapons tech have no blocking triples.

Source: von Graevenitz, Wagner, and Harhoff (2008)

# Practitioner's comment

"My observation is that patents have not been a positive force in stimulating innovation at Cisco. .... Everything we have done to create new products would have been done even if we could not obtain patents on the innovations and inventions contained in these products. ....The only practical response to this problem of unintentional and sometimes unavoidable patent infringement is to file hundreds of patents each year ourselves, so that we can have something to bring to the table in cross-licensing negotiations. ....The time and money we spend on patent filings, prosecution, and maintenance, litigation and licensing could be better spent on product development and research leading to more innovation."

**(Robert Barr, Chief Patent Counsel, 2001 FTC Testimony)**

# Conclusion

- ▶ Empirical evidence for existence of thickets in several ICT industries fairly strong
- ▶ Lead to higher transaction costs in commercializing innovation – if high enough, deals do not take place
- ▶ Patent portfolio races threaten quality at the patent offices
- ▶ Weak (low quality) patents can be enforceable due to a combination of free-riding and hold-up

# Backup slides

US patent reform prospects

# Current prospects for reform

- ▶ High interest in U.S. Congress
  - Response to NAS and FTC reports
  - Lamar Smith (House) Orrin Hatch (Senate)
  - Hearings - April, June, July, September 2007
  - HR 2795 introduced in June, substitute in Sept. 2007
- ▶ Interested groups
  - AIPLA, IPO, ABA IPL Section, BIO, BSA
  - Coalition – 37 large cos. plus these groups propose a reform package

# H. R. 2795 as proposed (amended)

- ▶ Changes the current "first to invent" standard to "first inventor to file"; one year grace period (§3)
- ▶ Eliminates the subjective "best mode" requirement from §112 of the Patent Act, delineating objective criteria that an inventor must set forth in an application (§4)
- ▶ Imposes a duty of candor and good faith on parties to contested cases before the patent office, eliminating inequitable conduct as a defense of patent unenforceability, unless at least one claim in the patent has already been found invalid. (§5).

# H. R. 2795 as proposed (amended)

- ▶ Reduces the scope of willful infringement by raising the standard of proof required, and limits the amount of damages a patentholder can collect from an infringer (§6). **Substitute bills change wording, limit to cases where notice has been given.**
- ▶ Limits patentees' ability to get injunctions (§7). **Removed.**
- ▶ Authorizes the director of the patent office to regulate continuation applications (§8). **Removed, but Dudas took the initiative with Fed Register proposal**

# H. R. 2795 as proposed (amended)

- ▶ Establishes a new post-grant opposition system in the patent office with 9 month window (§9).  
Subsequent 6 month window removed.
- ▶ Allows members of the public to introduce new information to the patent office up to six months after the date of publication of the patent application to challenge the patent and to provide a final quality check (§10)

# Will there be a bill?

- ▶ Eventually, yes – a lot of support for some provisions
- ▶ Not in 2007-2008 – problems with
  - apportionment of damages
  - injunctions when patent is not being “worked”
- ▶ In the meantime, USPTO goes ahead with reforms to stem the tide
- ▶ Not yet clear what will happen in the Obama administration