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Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

PROFESSORSHIP FOR INTELLECTUAL PROPERTY

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Standards and Patent Pools

F. Lévêque

November 2008

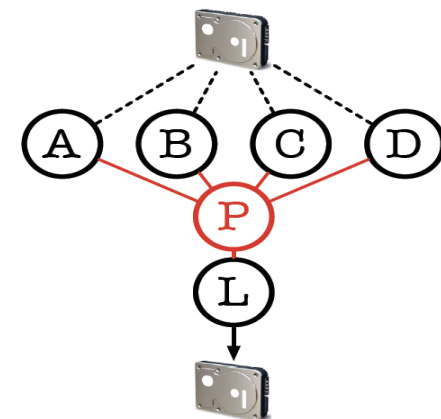
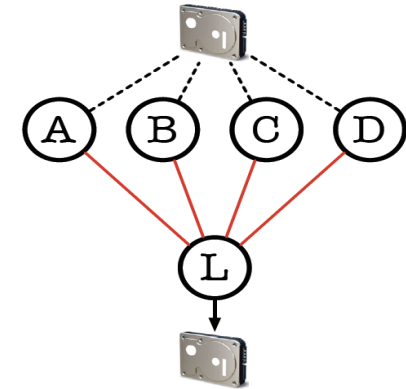
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Workshop & Lecture Series on the Law & Economics of Intellectual Property: Schedule fall 2008



Introduction

- Protected technologies incorporated in a standard belong to several different patent owners
 - Digital Versatile Disk (DVD): Hitachi, Matsushita, Mitsubishi, Sanyo, Sharp, Toshiba, Victor, Warner Bros, Sony, Philips, Pioneer, Thomson
 - A manufacturer of a DVD reader needs a license from all the patent owners
- A pooling arrangement is a way to centralize the licensing process; it offers a one-stop shop to standard-compliant product manufacturers



(H. F. Kaizer, 2007)

Examples



MPEG-2

INTRO
PATENT LIST
ESSENTIALITY
LICENSORS
LICENSEES
AGREEMENT
FAQ

INTRODUCTION

MPEG LA's MPEG-2 Patent Portfolio License provides fair, reasonable, nondiscriminatory access to essential MPEG-2 Video and Systems patents owned by many patent holders as an alternative to negotiating separate licenses.

The License includes essential patents owned by Alcatel Lucent, British Telecommunications plc, Canon, Inc., CIF Licensing, LLC, Columbia University, France Télécom (CNET)**, Fujitsu, General Instrument Corp.*, GE Technology Development, Inc., Hitachi, Ltd., KDDI Corporation (KDDI), LG Electronics Inc., Matsushita, Mitsubishi, Nippon Telegraph and Telephone Corporation (NTT), Philips, Robert Bosch GmbH***, Samsung, Sanyo Electric Co., Ltd., Scientific-Atlanta, Sharp, Sony, Thomson Licensing, Toshiba, and Victor Company of Japan, Limited (JVC). MPEG LA's goal is to provide worldwide access to as much MPEG-2 essential intellectual property as possible; new Licensors and essential patents may be added at no additional royalty during the current term.

Wide acceptance of the MPEG-2 Patent Portfolio License is responsible for the worldwide utility of MPEG-2 technology. The Program's Licensees make most MPEG-2 set-top box, professional (e.g., encoders, file servers and multiplexers) consumer electronics (including DVD player and television receiver/decoder), personal computer and packaged medium products in the current world market.

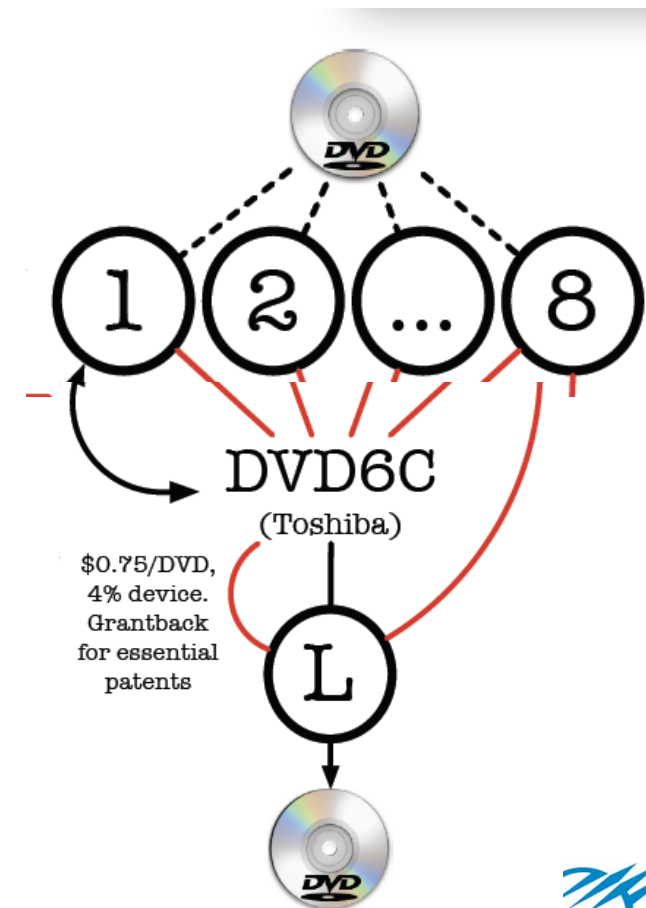
MPEG-2

ATSC

AVC/H.264

VC-1

MPEG-4 VISUAL



The economic rationale for patent pools

- Reducing transaction costs, obviously
- Mitigating the multi-marginalization problem, more fundamentally
 - = royalty stacking = tragedy of the anti-commons = Cournot problem
- Cournot theorem (1838)
 - The merger between two vertical monopolists is beneficial for both shareholders and consumers
 - Intuition: without price coordination, each monopolist sets its price regardless the effect of its decision on the other monopoly (an increase in price of its component decreases the demand for the other component)
 - Extension to complementary patents:
 - In a standard each patent is supposed to be essential (i.e., monopoly)
 - Finding an arrangement to centralize the royalty setting decision (+ a rule for sharing the global royalty between the different patent owners)

Patent pools are unstable (like cartels)

- Because of free ridding
 - In staying out of the pool, a patent owner can benefit both from a large diffusion of the standard (thanks to the pool that reduces the cost of licensing for users) and high royalties on her own patents
 - = The so-called hold-out problem
- In practice, patent pools often fail to rally all patent owners
 - 3G (W-CDMA): without Qualcomm, Motorola, Ericsson and Nokia
 - DVD2: 6C + 3C (Sony, Philips, Pioneer) + Thomson

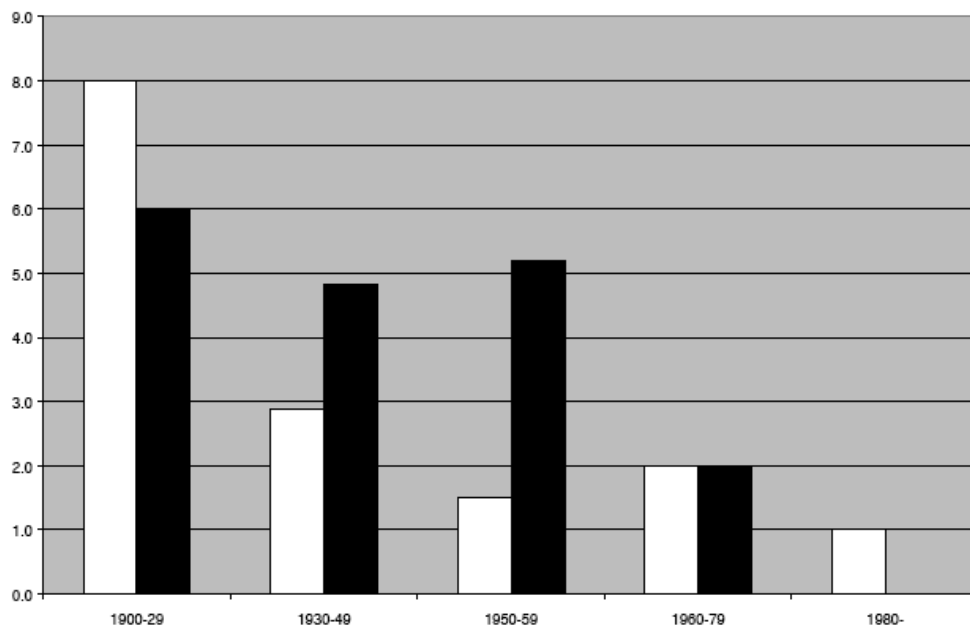
Antitrust Authorities' attitude vis-à-vis patent pools

For a long time, antitrust authorities were suspicious vis-à-vis patent pools; they were viewed as a price-fixing agreement between competitors (and some were!)

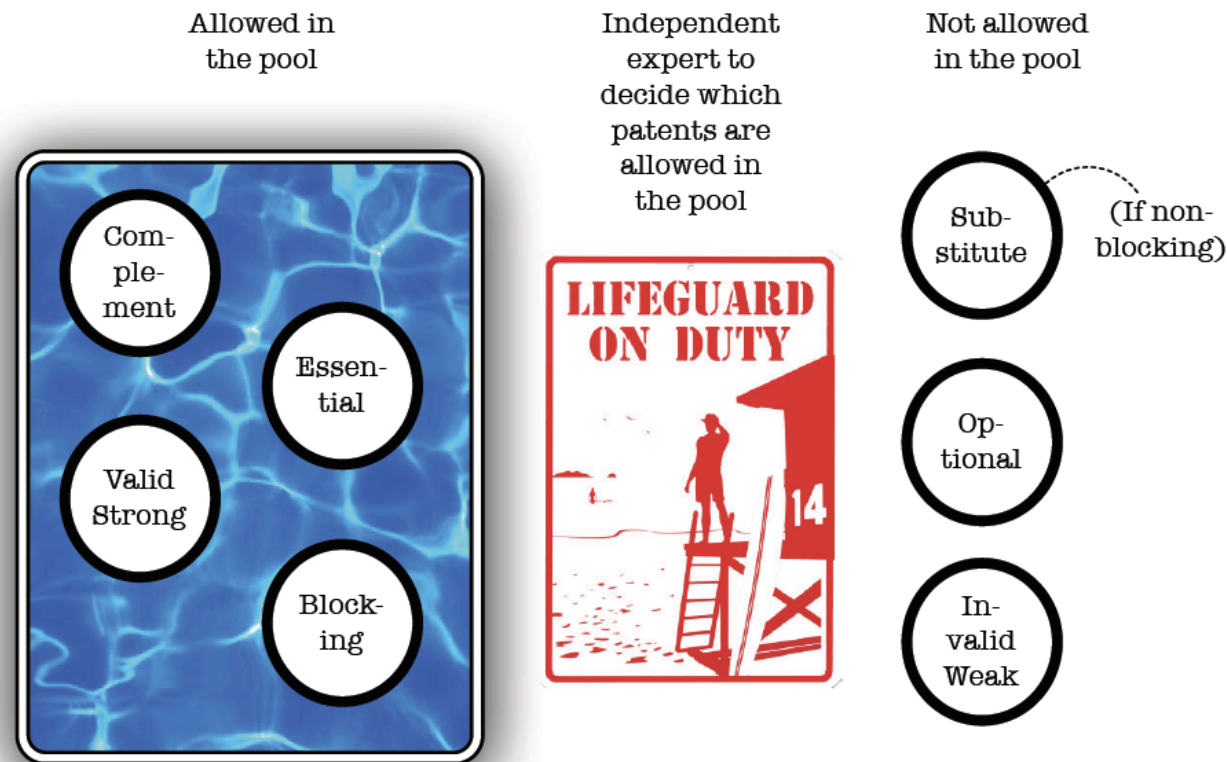
Procompetitive effects are now recognized

Safeguards (*DoJ business review letters and EU Commission comfort letters on MPEG2, DVD...; Guidelines for the application of Article 81 of the EC Treaty to technology transfer agreements, section 4*)

- Only essential patents (that is, they cover complementary technologies, not substitutable technologies; they are valid; they are necessary)
- Each patent can be licensed individually as well as in a package
- Freedom of licensees to develop and use alternative technologies



Who gets to swim in the pool?



(H. F. Kaizer, 2007)

The art and science of classifying patents in a pool

Classification	Concept	Competitive effects
Substitute (“rival”) or complement	<ul style="list-style-type: none"> • L can use either A or B to make P (substitute). • L can use A and B to make P (complement). 	<ul style="list-style-type: none"> • Pooling substitute patents diminishes licensee choice. • Possible price fixing if joint royalty setting. • No issues if royalty-free cross license.
Blocking or non-blocking	<ul style="list-style-type: none"> • The use of A infringes B and vice versa (blocking) • A can be used without infringing B (non-blocking) 	<ul style="list-style-type: none"> • Pooling blocking patents is a justification for pooling substitute patents • 2-way blocking is more significant than 1-way blocking
Essential or non-essential	<ul style="list-style-type: none"> • L needs A (or B) to make P (essential). • L doesn’t need A (or B) to make P (non-essential) 	<ul style="list-style-type: none"> • Pooling non-essential patents raises tying/bundling concerns • Exclusion of patents competing with non-essential pooled patent
Valid/strong or invalid/weak	<ul style="list-style-type: none"> • A (or B) is valid/strong or invalid/weak 	<ul style="list-style-type: none"> • Same as non-essential (tying) • Keeps weak patents (that the licensee paid for!) from being invalidated

SSOs attitude vis-à-vis patent pools

- Generally speaking, SSOs' IP policies prohibit collective discussion on royalties between members who own protected technologies that might be incorporated in the standard
 - Whereas antitrust authorities are more open
 - ‘Undertakings setting up a technology pool that is compatible with Article 81, and any industry standard that it may support, are normally free to negotiate and fix royalties for the technology package and each technology's share of the royalty either before or after the standard is set’ Guidelines on the application of article 81 of the EC Treaty on technology transfer agreements, section 4)
 - ‘Joint ex ante royalty discussion do not warrant per se condemnation’ Deborah P. Majoras, September 23, 2005 ‘*Recognizing the procompetitive potential of royalty discussions in standard setting*’
- Patent pools are formed after the standard is set
 - ➔ What happen if a patent pool is formed and commits on royalty BEFORE the entry of users on the market?

The paper

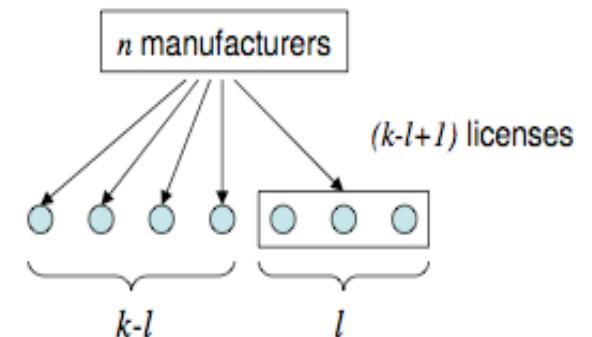
Early commitments help patent pool formation
Cerna Working Paper, F. Lévêque and Y. Ménière, April 2008

- Connects the hold-up and double marginalization problems

- Numerous patent owners
 - Joint licensing or not?
- Irreversible cost of standard adoption
 - (binding) ex ante commitment or not?

- Key hypotheses

- k essential patents are licensed by k patent owners ($k > 2$) to a group of n manufacturers competing on the same market
- Cournot competition. Manufacturers incur a unit cost $c + R$ (where R stands for the royalty) and a fixed (and sunk) entry cost $I = l$; Free entry $\Rightarrow n$ is endogenous. Zero profit for manufacturers (they just recoup the fixed costs)
- Ex ante commitments by the pool are binding whereas those by independent licensors are not
- The pool does not gain more profit than an independent licensor (e.g., if $k=3$ each pool member gets $1/3$ of the royalty of an independent licensor)



Scenarios

Scenario 1: Ex post pool

1. Manufacturers enter the market
2. Patent owners decide to join or not a patent pool
3. The patent pool and independent licensors fix royalties

Scenario 2: Ex ante pool

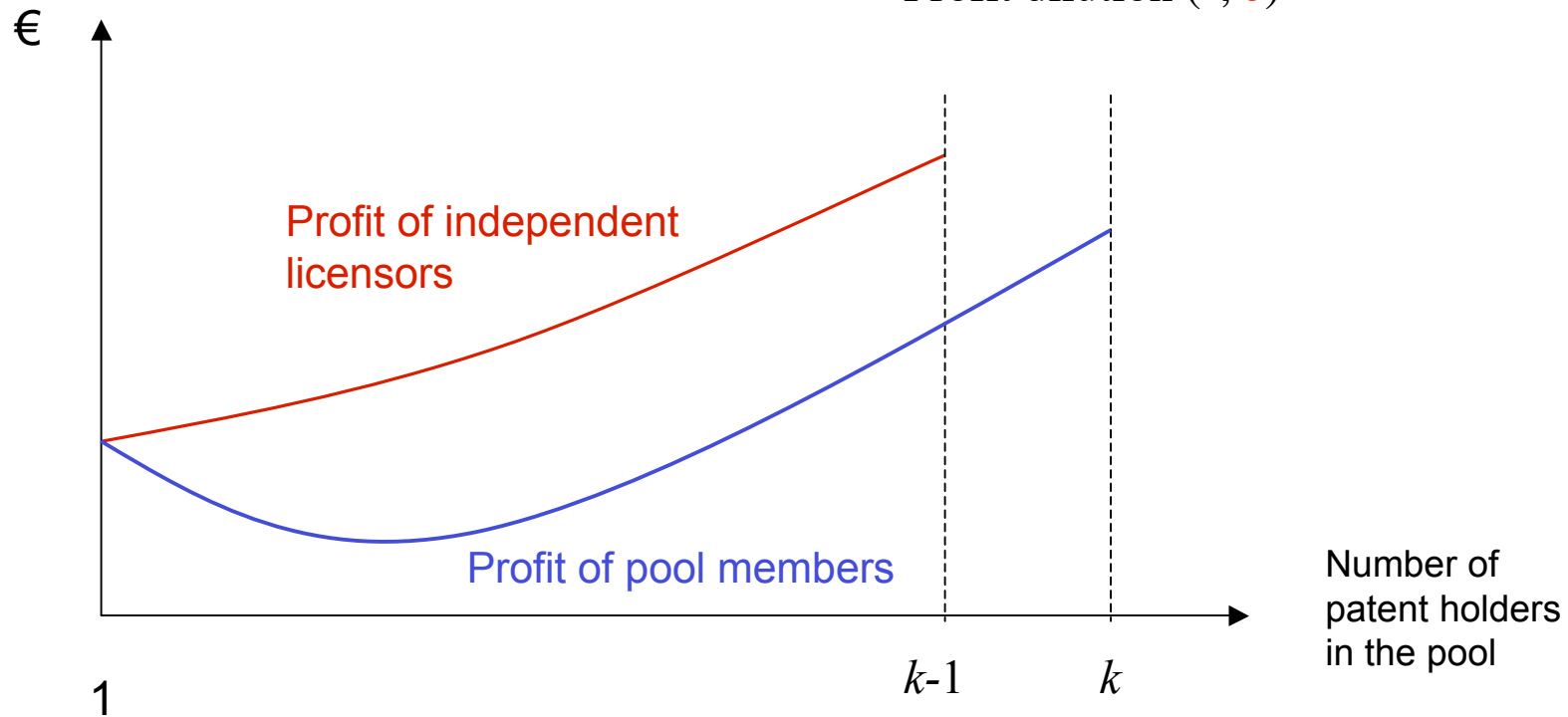
1. Patent owners decide to join or not the patent pool
2. The pool commits on a royalty
3. Manufacturers enter the market
4. Independent licensors fix royalties

Ex post pool and hold-out

A pool is unstable because of free riding

2 effects:

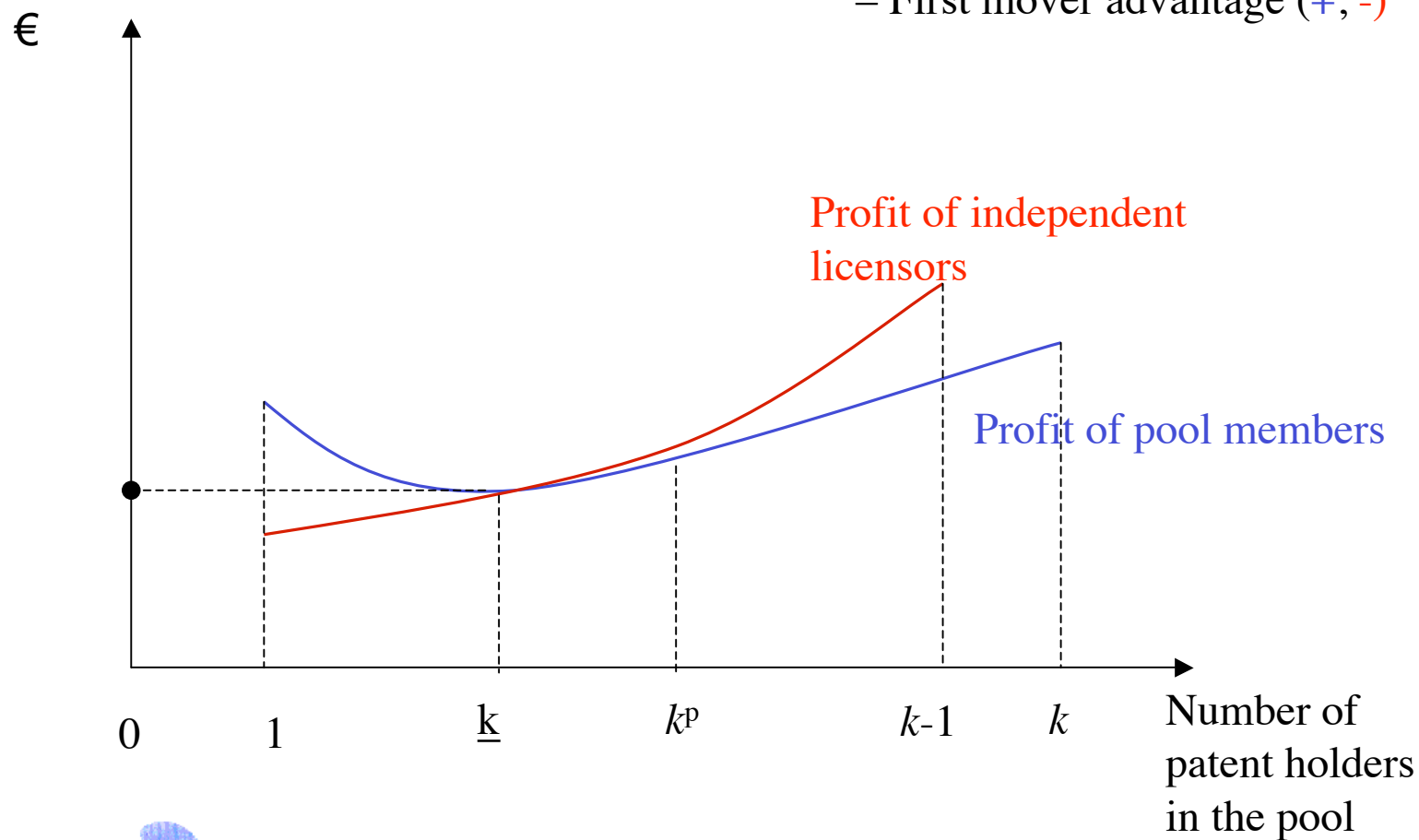
- Double marginalization mitigation (+, +)
- Profit dilution (-, 0)



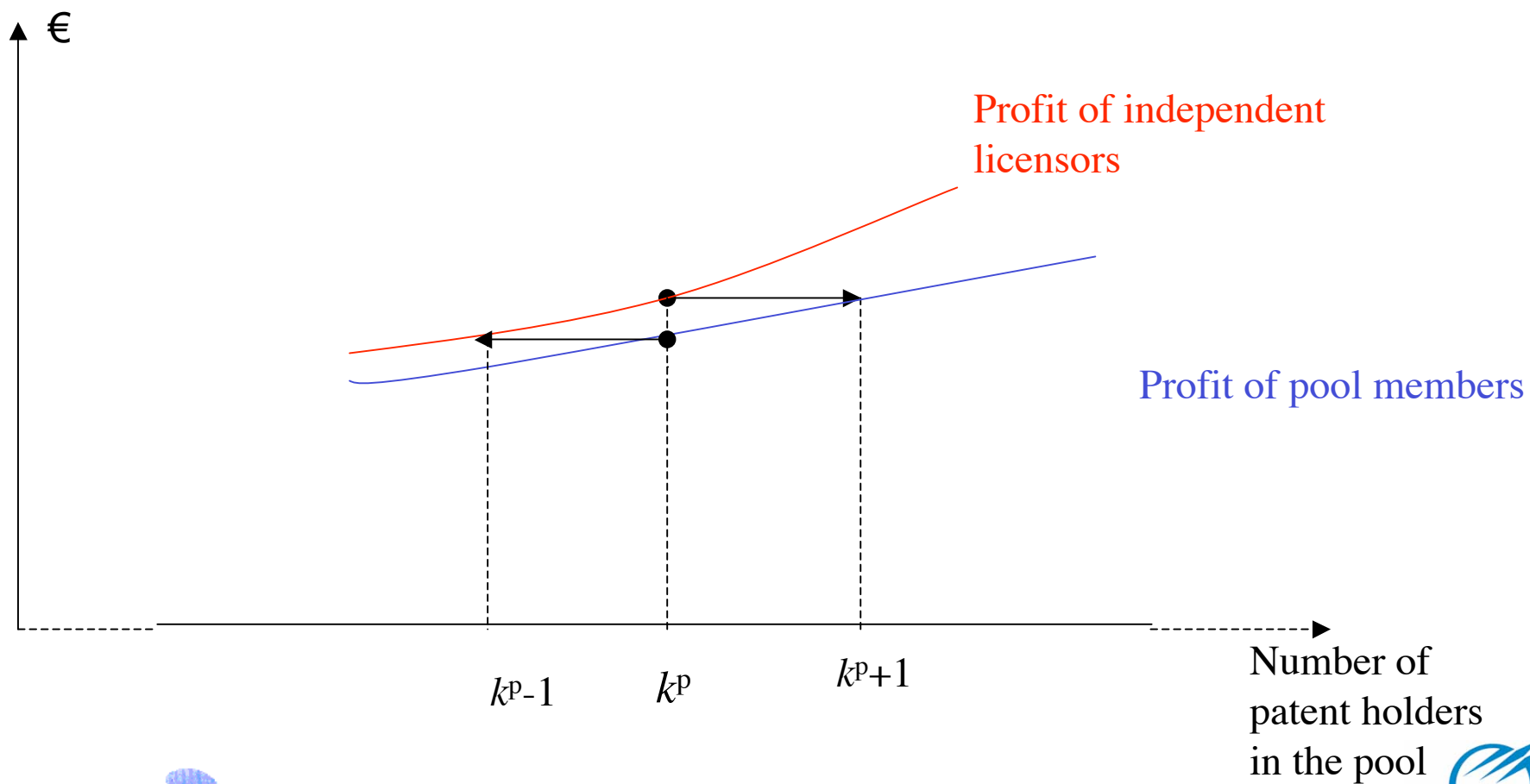
Ex ante pool

4 effects

- Double marginalization mitigation (+, +)
- Profit dilution (-, 0)
- Entry promotion (+, +)
- First mover advantage (+, -)



Ex ante pool



Main results of the model

- Allowing patent owners to opt ex ante for delegating the licensing of their patents to a single body is
 - ✓ Effective in generating stable patent pools
 - ✓ Patent owners and consumers will be better off
 - ✓ Although it is not the first best (i.e., the grand coalition)
- In other words, binding commitments allow the formation of pro-competitive ex ante pools
- However, such commitments might require appropriate IP policies in SSOs

Conclusions

- In paper 1, we have shown that the setting of the conditions of licensing in advance improves both the consumers and the patent owner's welfare, in so far as commitments are binding
- In paper 2, we have shown that binding commitments facilitate patent pool formation and therefore mitigate the royalty stacking problem
- So making SSOs members' commitments binding is a way to mitigate both patent hold-up and royalty stacking