Commitment in Standard Setting Organizations

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EAGCP workshop
March 2014
Incomplete Contracting:
SSOs vs Patent Pools
Technology (ies) available

Ex-post

Other investments

Production and distribution

Courts

Negotiate royalties

Other investments

Ex-post

Production and distribution
Legal incompleteness

- Validity of IPRs
- Cost of infringement
Legal incompleteness

- Validity of IPRs
- Cost of infringement

Patent pools

- Double marginalisation versus oligopolistic dominance
- Independent licensing and caps (Lerner-Tirole, Rey-Tirole, Boutin, Quint)
Technological incompleteness

- Coordination between firms for developing **NEW** technologies
- Market solution leads often to coordination failures
- Need to bring on board current developers but also manufacturers, end users, …
SSOs

- A platform to facilitate coordination.
- How to induce the participation of all stakeholders?
- Does the current system need fixing?
Incomplete Contracting
Teachings from the Literature

❖ Who has ownership, who has bargaining power, matters for ex-post outcomes.
❖ What happens ex-post also affects incentives to invest ex-ante.
❖ Participation may be discouraged ex-ante if there is the “wrong” ownership allocation, or the “wrong” bargaining power allocation.
❖ Use of instruments, like ex-ante and ex-post commitment, may help.
Remark 1:
Ex-ante commitments and the sequential nature of investment incentives
In practice

- Examples of SSOs requiring ex-ante commitment on royalties (VITA proposal)
- But plenty of other SSOs without this requirement
- Are those SSOs not requiring commitment choosing an “inefficient contract”?
- Not so.
Developers choose to participate in SSO s.t. internal rules

Standard developed and SEPs defined

Manufacturers adopt and invest

Royalties negotiated
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Cost $p$ of participation

“Create” $S$ at cost $c(S)$
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Cost \( p \) of participation

“Create” \( S \) at cost \( c(S) \)

Cost \( k \) of adoption

Benefit \( B(S) \)

Negotiated royalties: \( r(S) \)
Second-Best

No commitment

\[ \max_S r(S) - c(S) \]
\[ \text{s.t. } B(S) - r(S) \geq k \]
Second-Best

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\begin{align*}
\max_S & \quad r(S) - c(S) \\
\text{s.t.} & \quad B(S) - r(S) \geq k
\end{align*}
\]

Commitment

\[
\begin{align*}
\max_S & \quad \min(r^*, r(S)) - c(S) \\
\text{s.t.} & \quad B(S) - \min(r^*, r(S)) \geq k
\end{align*}
\]
Special case of linear royalties: $r(S) = r \times B(S)$

$k$ small: No value of commitment
Special case of linear royalties: $r(S) = r \cdot B(S)$

$k$ small: No value of commitment

$B(S) - r(S) > 0$
k small: No value of commitment

\[ B(S(0)) - r(S(0)) < k \]
k small: No value of commitment

\[ B(S(0)) - r(S(0)) < k \]

\[ B(S) - c(S) - k \]
without commitment: over-investment to induce participation

k large: Value of commitment
without commitment: over-investment to induce participation

with commitment: reduce over-investment and get the first best investment by using

\[ r^* = B(S^*) - k \]
Value of ex-ante Commitment?

- If $S$ is variable and $k$ is fixed:
  - Commitment has value if and only if the first-best $S^*$ is not consistent with investment by the manufacturer $(B(r^*)-r(S^*) < k)$. In this case, ex-ante commitment leads to the first best.
  - Commitment has value for the “upstream” participants only if the investment of “downstream” participants is important enough.
- Caveat: one IPR and one manufacturer.
Remark 2: Hold-Up Among IPR holders
Heterogeneity and Commitment

Heterogeneity: value of IPRs for end users; type of IPR holders (vertically integrated or mainly downstream producer)

- If only individual commitments, whose commitment is “more valuable”?

- Hold-up is not necessarily on the end-users, but also among SSO participants (consistent with Simcoe AER 2013 findings).

- Commitment by “small” firms may be more valuable than those by “big” firms.
An Example

- Three technologies A, B, C
- Consumers value any standard combining technologies AC or BC but no other combination.
- Standard increases the quality of products embedding technologies
**No SSO vs SSO**

<table>
<thead>
<tr>
<th>No SSO</th>
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</tr>
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<tbody>
<tr>
<td>Demand is 1- R</td>
<td>Demand is $S - R$, $S&gt;1$</td>
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<td>A, B, C compete and equilibrium is</td>
<td>Participation in the SSO involves a cost $p$</td>
</tr>
<tr>
<td>$r_A=r_B=0$, $r_C=1/2$</td>
<td>Probability $\frac{1}{2}$ of being selected for A or B</td>
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<td>Hence C makes (monopoly) profit of $\text{Profit}(C \mid \text{no SSO}) = \frac{1}{4}$</td>
<td>C participates if his profit is greater than $\frac{1}{4}+p$</td>
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Using Pool in SSO
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No Pool

• AC standard used only if
  \[ 1 - r_B - r_C < S - r_A - r_C \]

• If \( S < 3/2 \):
  \[ r_B = 0, \ r_A = S - 1, \ r_C = 1/2 \]

• Then \( \text{Profit}(c|\text{SSO}) = 1/4 - p \)

• No SSO!
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- No SSO!

**Pool**
- \( R^* \) max R(S-R) : \( R^* = S/2 \)
- A claims \( (S-1)/2 \)
- C gets at most \( 1/4 + (S-1)^2/4 - p \)
- No participation if \( p > (S-1)^2/4 \)
## Using Pool in SSO

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In both cases ex-ante commitment by A generates participation
Conclusion (1):
Distribution is Key for Creation of the Standard

- Natural hold up problem among contributors to the standard.
- *Self-imposed* ex-ante or ex-post caps are most likely pro-competitive in an *open-access* environment.
- Cap on *total royalty* helps for ex-post investment, but *distribution* of royalties helps for participation ex-ante.
- Beware of piece-meal policies:

  Constraints that facilitate adoption ex-post may prevent the creation of the standard.
Conclusion (2): Pools and SSOs

“Insider-Outsider” Effects

- Impose *full* participation in pools ex-post?
- Plus: prevents free riding
- Minus: gives veto rights to some players who may leverage this during pool negotiations, with eventual effect on ex-ante participation.
Pools are currently the only instrument used for committing ex-post to a total royalty, but involve SEPs only:

Should firms who do not have SEPs but who contributed to the technology (without patents) be part of the negotiation?

Who “owns” the standard?