



Rigorous empirical
research on
intellectual property



FRAND terms: Same price if different uses of the same SEP?

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Rigorous empirical research on intellectual property



Economic efficiency and field-of-use pricing of SEP licenses under FRAND terms

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Summary February 2019



Rigorous empirical research on intellectual property



FRAND licensing levels under EU law

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Summary February 2020

How do I use intellectual property to grow my business?



Why should I care about intellectual property?

PATENTS	© COPYRIGHTS	DESIGNS*	® TRADEMARKS	TRADE SECRETS
<p>Definition: a new and inventive way of doing something, or solving a technical problem</p> <p>See also: Here Here</p>	<p>A work, an original intellectual creation</p> <p>See also: Here Here Here</p>	<p>A new and original visual appearance of a product</p> <p>See also: Here Here Here</p>	<p>Distinctive signs that identify brands of products/services</p>	<p>Any type of useful information for business that is secret and kept confidential</p> <p>See also: Here Here</p>
<p>Protects products and processes in all lines of business</p> <p>Examples of successful patents by SMEs</p> <p>See also: Here</p>	<p>Audio-visual works, pictures, graphics, architecture, databases, software, designs, literature, novels, poems, plays, music and video, dramatic works</p>	<p>Packages, containers, furnishings, graphic symbols, computer icons, typefaces, graphical user interfaces, logos and maps</p> <p>More on designs: Here</p>	<p>Words, personal names, designs, letters, numerals, colours, shapes, packaging, sounds</p> <p>More on TMs: Here</p> <p>See also: Here Here</p>	<p>Any confidential information: business methods, customer lists, R&D data, financial information, cooking recipes, software, datasets, know-how, algorithms</p> <p>More on trade secrets: Here</p>
<p>Prevents unauthorised making, or selling of the patented product</p>	<p>Prevents the work being (without authorisation) copied, published, distributed or made available online</p> <p>Protects the integrity and attribution of the work</p> <p>Related rights: Public performance and display of the work</p> <p>See also: Here</p>	<p>Prevents unauthorised use of an identical or similar visual appearance for the same kind of products and/or services</p> <p>See also: Here</p>	<p>Prevents unauthorised use of distinctive signs for the same or related products or services</p> <p>See also: Here Here</p>	<p>Prevents others from using the confidential information, as long as it remains secret</p> <p>Allows to claim monetary compensation in case of unlawful disclosure of the confidential information</p>
<p>20 years</p>	<p>Lifetime of the author +50 to 70 years after death (depending on the country)</p>	<p>Up to 25 years for registered designs</p>	<p>Indefinitely, subject to use in commerce and renewals</p>	<p>Indefinitely, provided it is not revealed</p>

4 - STRATEGIC VALUE

Build an in-house innovation mindset with recognition and reward for inventors and make your company attractive for top talents

Improve your competitive edge

National Courts Guidance

Negotiating Licenses for Essential Patents in Europe

Increased clarity provided on the principle *Huawei v ZTE* process

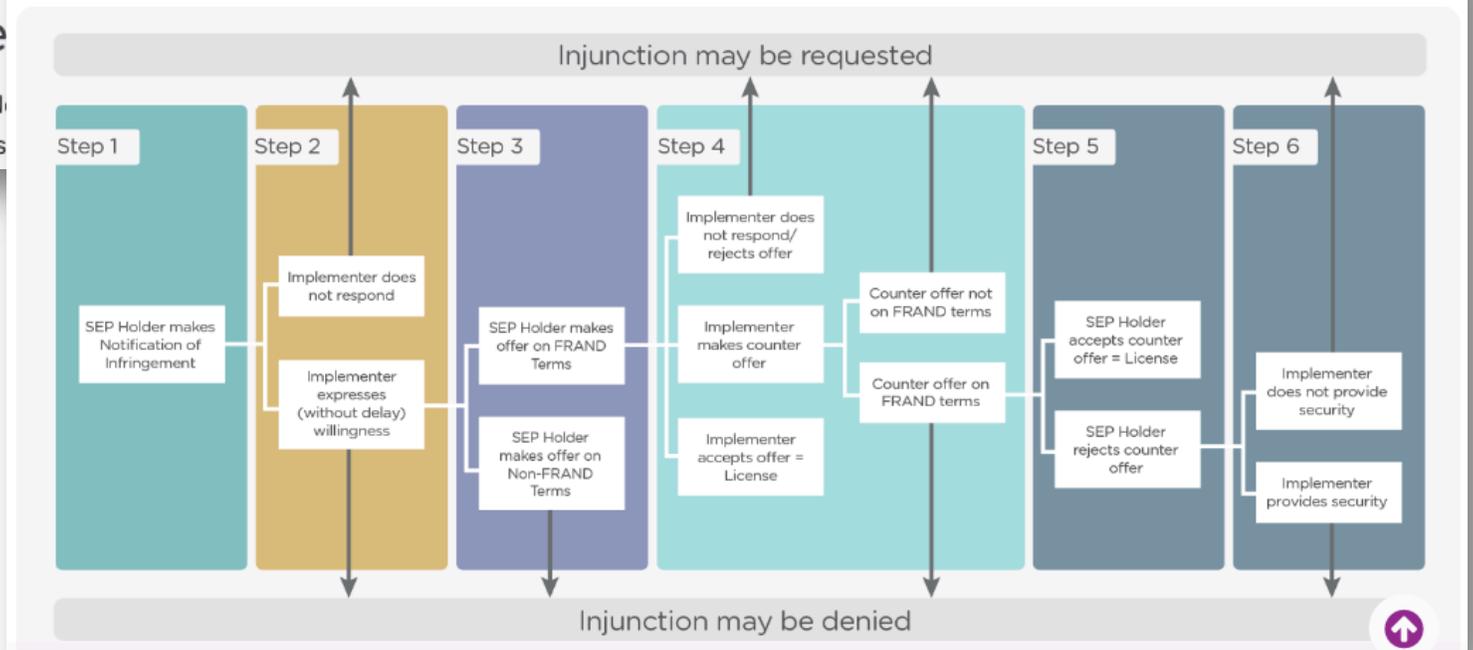
Justice of the European Union in *Huawei v ZTE*

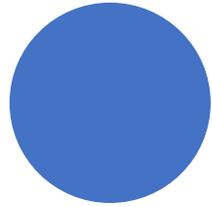
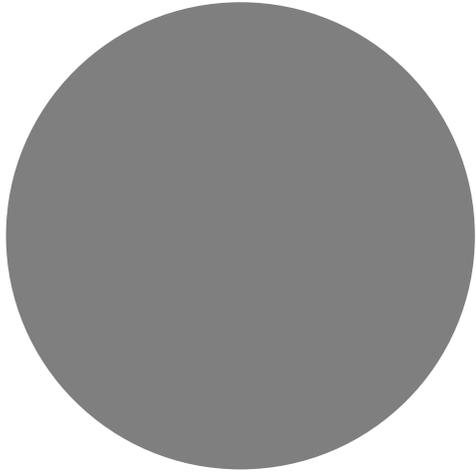
The Court of Justice of the European Union clarified, in *Huawei v ZTE* (Case No. C-170/13), the conditions for granting injunctive relief for infringements of FRAND-based standard essential patents. In doing so, the Court provided increased clarity on the principle *Huawei v ZTE* process.

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“Economists study theories about an economic system that does not exist. Instead we should *study choices* [that businessmen make].”

Ronald Coase, Nobel
Laureate in Economics
1991

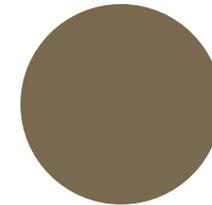
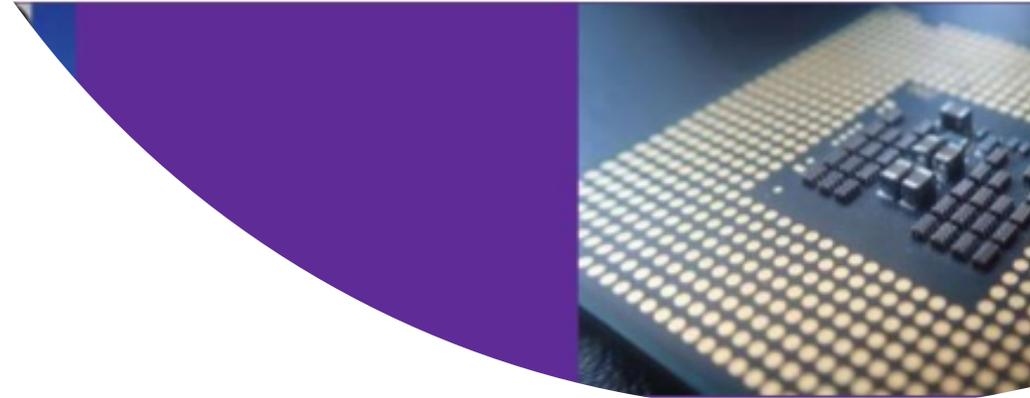
SEP - Standard Essential Patents

FRAND - Fair, Reasonable and Non-discriminatory Patent Licensing terms

- Price differentiation—charging different prices for the *same* product or service – is a common revenue generating strategy for high fix-cost businesses
- Travel (time, age/social), internet service providers (Mbit/s), electricity (peak load pricing), loyalty programs (volume, individual)
- A patent holder can choose licensees by *field-of-use* and what to ask, creating a mechanism to price differentiate
- Patented technology can be distributed, through this market mechanism, to a maximum number of firms
- Is it *economically efficient*, under FRAND terms, to charge the same price if different uses of the same SEPs?

Economic efficiency and field-of-use pricing of SEP licenses under FRAND terms

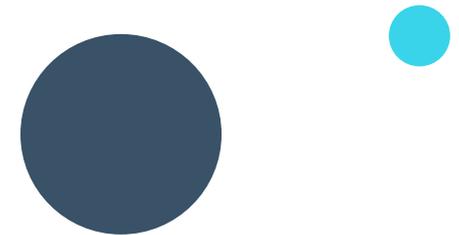
Queen Mary Journal of Intellectual Property, Vol. 9 No. 4, pp. 392–413



- Fair Reasonable and Non-Discriminatory terms used to provide global wireless tech. with interoperability
 - Internet of Things (IoT) where fields-of-use vary from low latency self-driving cars to utility meters
 - Geopolitical issue for 5G creating front-page news
 - Neo-classical economic theory suggest that price = marginal cost
 - But marginal cost of licensing plays little role in FRAND licensing, a negotiated approach needed
 - Limited literature: another way to think about prices and price differentiation for a range of usages of same SEPs needed
-

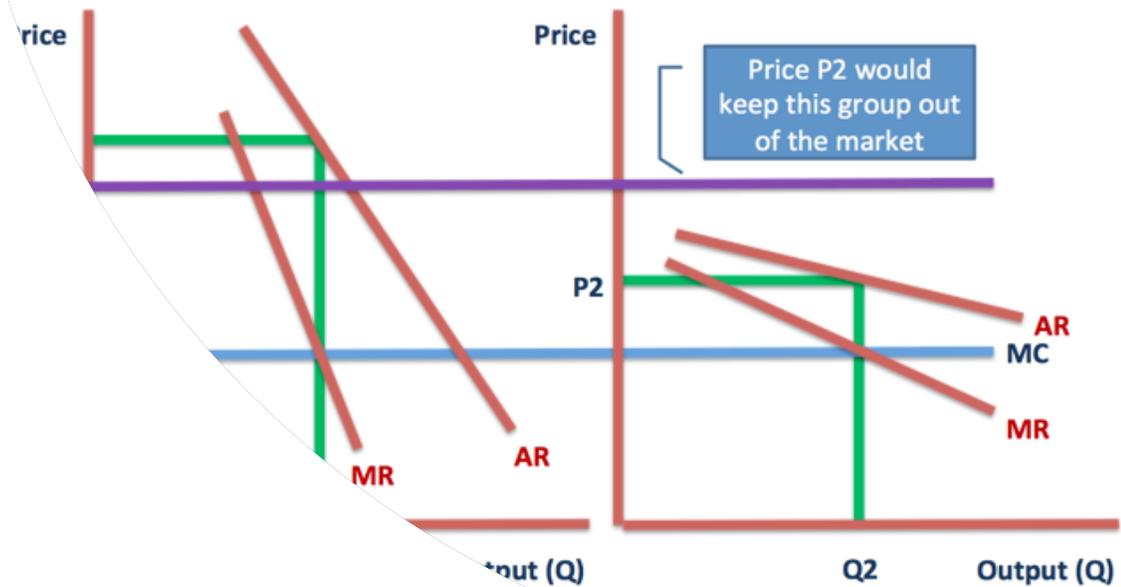


Why important?



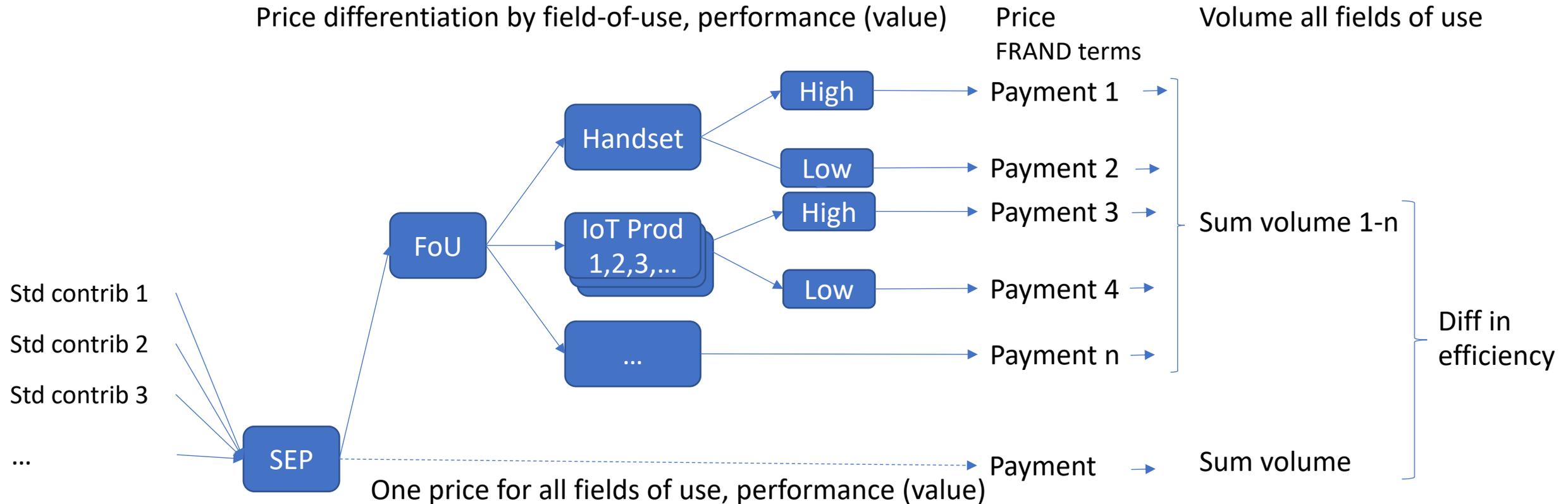
- Neo-classical approach: Price = marginal cost, means that you can only choose rationally on the value if same price for all usages
- Not applicable when all cost up-front (not in production) and licensing costs low
- Does not capture the value of using the invention in a product
- Willingness to pay (WTP) expresses the value of using the invention (considering their marginal costs of production)
- Negotiation of prices based on WTP (value) and WTA (cost) a more realistic approach
- A policy should follow what is efficient

3rd degree discrimination



Prices: value and cost,
willingness to pay

Price and Value: Value of technology may be different for field-of-use.



Literature review

A microeconomic system

Field-of-use
licensing of SEPs
under FRAND
terms



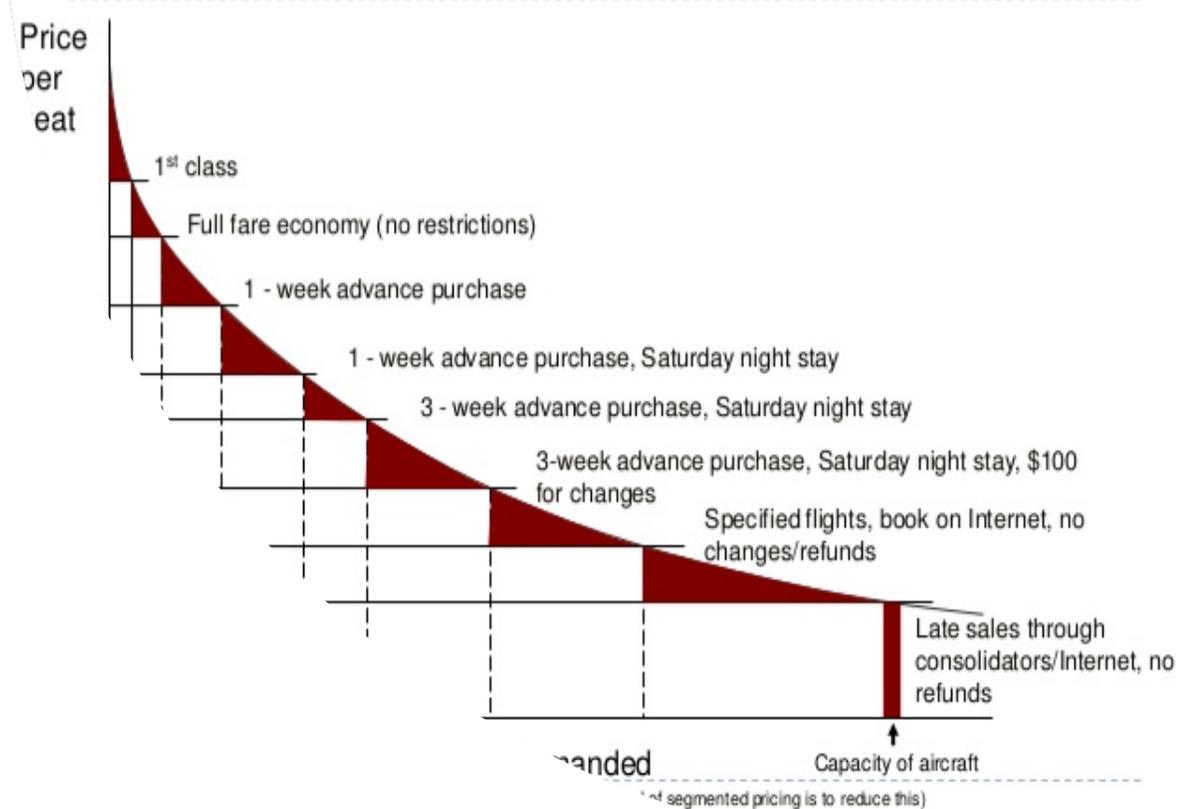
Literature based on
price taking agents

Literature based on
willingness to pay, WTP
and value (demand side)
of SEPs

Behavior of licensees and licensors are
taken into account to arrive at an
exchange, given *institutional rules*, in this
case FRAND terms

Literature based on an
experimental study as well as
auction theory of markets *similar*
to SEPs

- Airline industries
 - Differentiation of prices based on WTP for flexibility, time, “last minute”.
 - Started with deregulation in 1978
 - Increased social welfare by broadening the range of passengers that fly
- Other examples
 - Internet service providers – mbit/s
 - Digital Payment Services – by user
 - Peak load for electricity power – users marginal opp. cost
 - Algorithmic pricing (AI) - “real time” customer offers
 - IoT – low latency, ...
 - The European Patent System
- A whole range of industries use this strategy



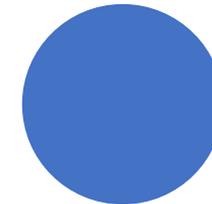
Price differentiation in other industries



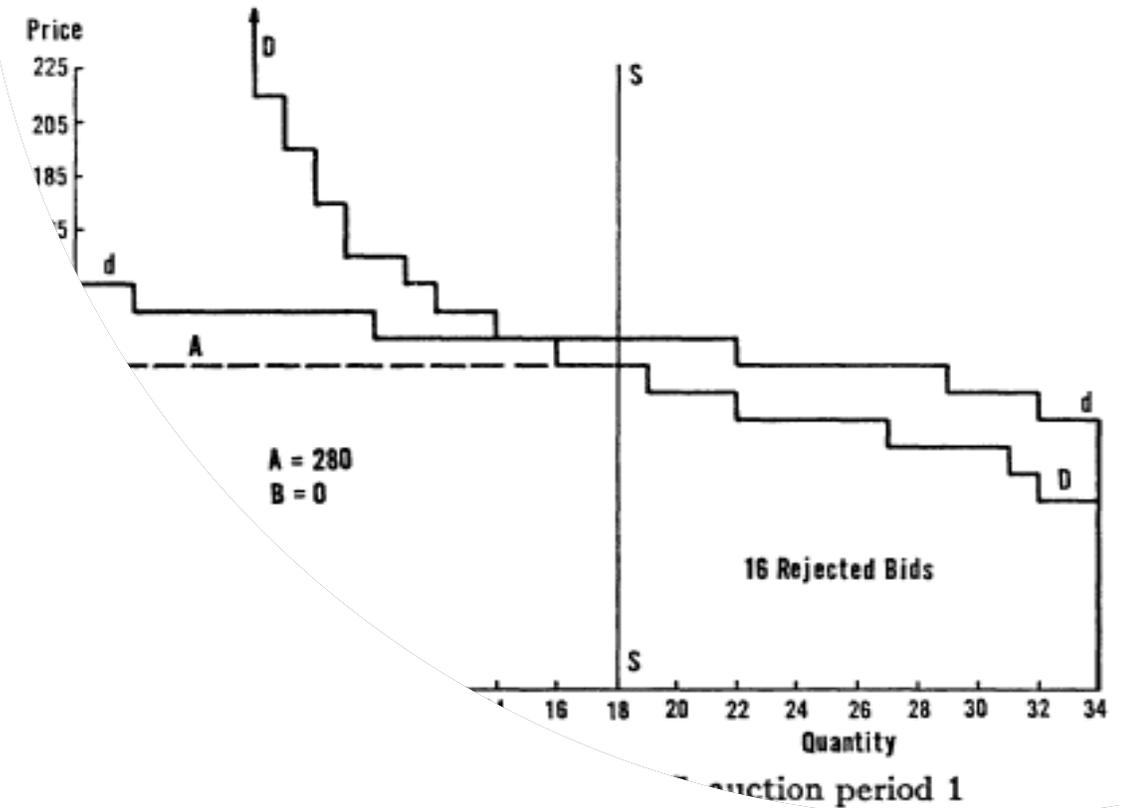
- 1. When are single competitive and differentiated prices efficient?
 - Experimental study; Field-of-us prices more efficient if dissimilar value. V. Smith, 1967
- 2. Does price differentiation increase prices?
 - Risk, auction theory, V. Smith, 1966
- 3. Differential pricing and marginal willingness to pay
 - Hal Varian, 1996
- 4. Will price differentiation increase market size?
 - Hal Varian, 1987
- 5. Is price differentiation of SEPs anti-competitive
 - Hausman and MacKie-Mason, 1988, Robinson 1933, Pigou, 1920



Price differentiation and SEP markets



- Experimental study with human subjects trading as a monopolistic seller under single competitive vs. differentiated prices (similar to SEP)
- Price volatility (risk) is higher with one price, than two prices, especially when a large number of low-value buyers get their bids rejected by sellers (cmp. low-value use of SEPs)
- Differentiated prices more likely to be accepted than one price, except when more than 50% are rejected
- Revenues of seller higher with single price when few rejections but better with two prices if many rejections (if the value difference is small, then SEP holders may be better off with a single price)
- The absolute difference in value decides whether a single or differentiated prices are more efficient
- This experiment “scratches the surface” of price differentiation in a behaviorally richer environment than theory

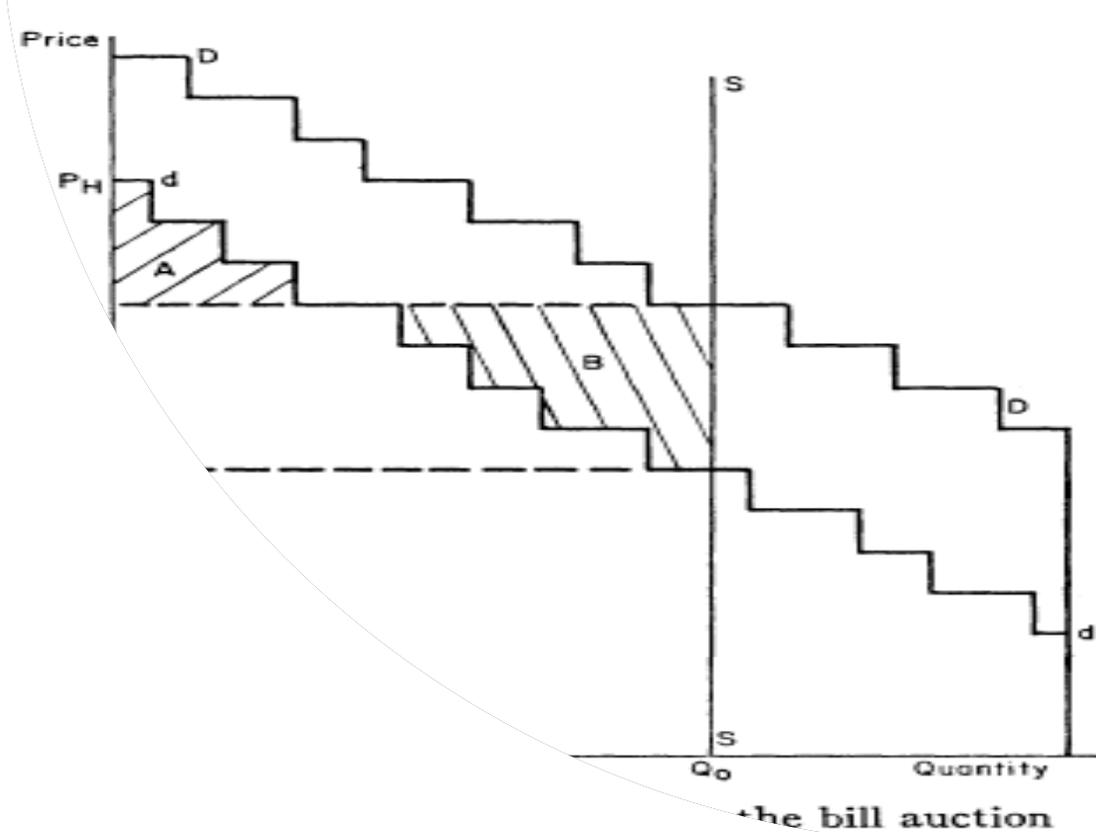


1. When are single competitive and differentiated prices efficient?

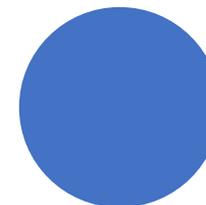
(V. Smith, 1967)



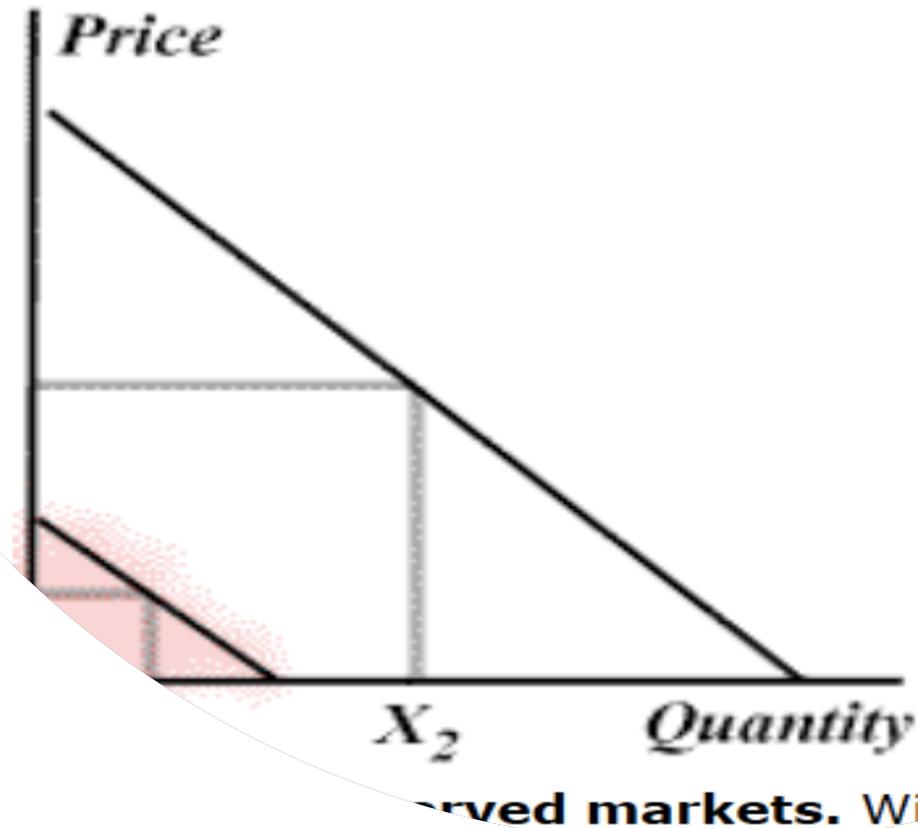
- Auction theory approach to treasury bill prices under uncertainty (risk)
- Similarities to SEP licenses which are negotiating under uncertainty in value, “formal” negotiation under FRAND terms
- If differentiated prices under uncertainty of value then lower bids compared to single price
- Depending on additional field-of-use revenues, the sum may be higher
- If values similar, then sum of two revenues lower.
- If values different, then sum of revenues may be higher or lower



2. Does price differentiation increase prices?
(V. Smith, 1967)



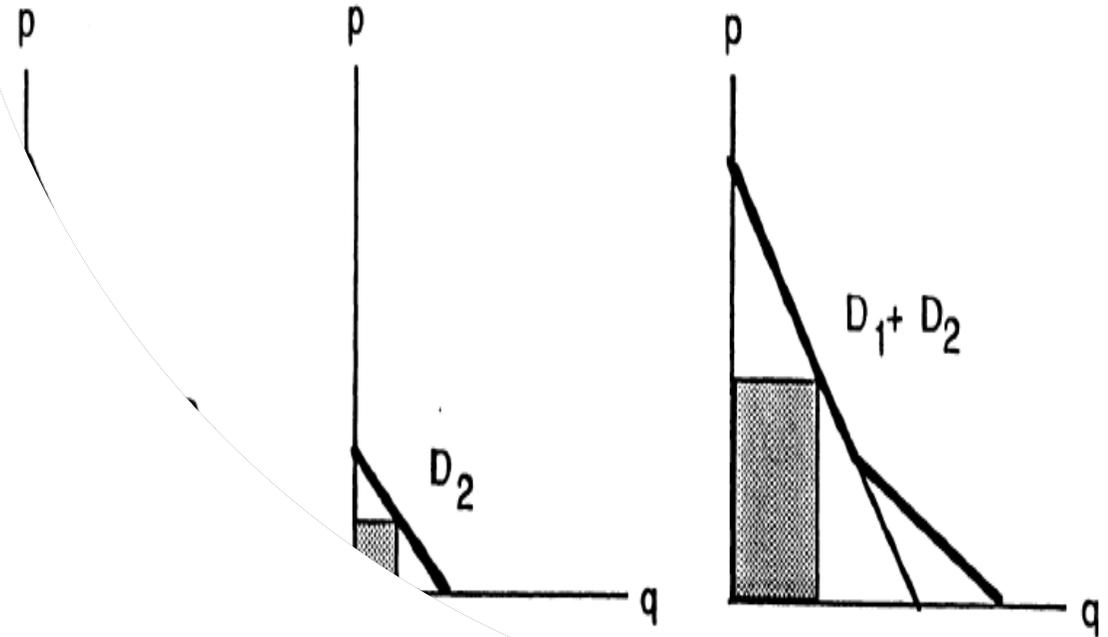
- The key concern in examining the welfare consequences of differential pricing is whether or not such pricing increases or decreases total output
- Discussion of how products/services exhibiting large fixed costs or economies of scope in telecom should be priced
- Should be based on Willingness to Pay, as marginal cost of licensing, close to 0, insufficient to recover the investment in R&D
- It may be *necessary* to differentiate prices in order to serve a bigger market and have technology distributed broadly
- Alternative is one price, where large players may, due to volume, result in lower prices (market power), insufficient to recover cost.
- One price may result in that sellers only sell to high-end users not to niche markets
- By expanding the market, social gains increase



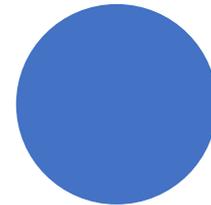
3. Differential pricing and marginal willingness to pay (Hal Varian, 1996)



- A review of the price differentiation literature of different industries
- Theory has limitations on effect of marketing, and efficiency effects on elaborate price schemes such as airline industry
- Deregulation resulted in price differentiation but should be thought of as a single commodity market
- The simple theory suggest that price differentiation by segment will typically enhance welfare if it provides means to serve markets otherwise not served
- This has direct bearing on SEPs where exclusion is possible even under FRAND terms
- The argument of expanding the market is supported by this theory

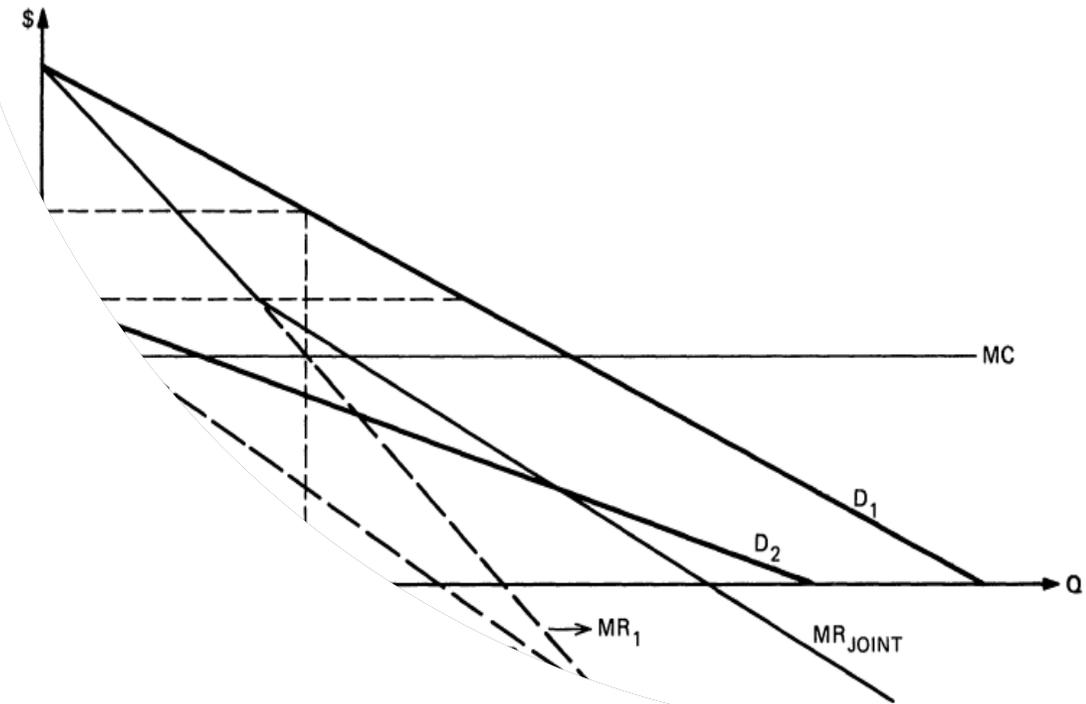


4. Will price differentiation increase market size? (Hal Varian, 1987)



- Are there dynamic welfare gains – incentives to invent the next generation of technology and innovate?
- Price differentiation as a trade-off between dynamic and static efficiency effects
- Even ignoring dynamic gains price differentiation by segments can raise the static effect, so no trade-off exists
 - Under opportunities to serve new markets
 - Achieving scale and learning economies
- Even with welfare losses, price differentiation may be better than patent life (incentives to invent)
- Price differentiation of SEPs may therefore not be anti-competitive under conditions of expanding markets
- This supports the view that field-of-use pricing is socially desirable, if expanding markets

FIGURE 1
PARETO IMPROVEMENT FROM A NEW MARKET



5. Is price differentiation of SEPs anti-competitive?

(Hausman and MacKie-Mason, Robinson, Pigou)

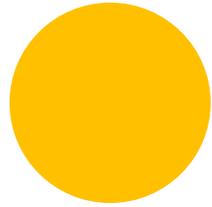
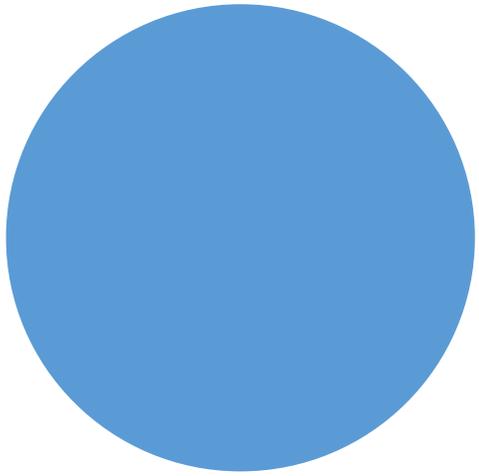


Key points:
No more
“high-tech for
bananas”?

- Limited literature and theory today - create work in this field!
 - Price should be based on willingness to pay not *producers* marginal cost of producing one more unit (or user's marginal opportunity cost, Hirschleifer)
- Need to move from “high-tech for bananas” –technology as products– to “high-tech for high-tech”–technology enabling many products and services
- A single competitive price has to be rejected, on principle and efficiency
- (i) if you can serve markets that are not served (expanding market argument without reducing competition in product/service markets)
- (ii) if field-of-use values are “dissimilar”, if “similar” single price is better, as price risk (volatility) lower
 - Lower price risk increases investments in high risk technology
 - Revenues may be higher or lower for sellers
- Important because 5G designed for multiple usage
- Allows patent holders to achieve economies of scale or learning (dynamic)
- May be “necessary” when high fixed costs, as actors with market power lower revenues and suppress niche segments
- Less free-riding with field-of-use prices; tapping export markets legally
- The need for a policy of price differentiation for sustained tech advantage

Conclusions

- A broader range of value propositions from the same SEPs can be realized in a fair and non-discriminatory way in a static setting through price differentiation under conditions of dissimilarity of value.
- Such pricing policy also likely carries incentives for a sustained development in a dynamic setting, that is, generational standard development over time.
 - The next generation of cellular connectivity (5G standard) is now on its way. In contrast to previous cellular generations, which were specifically designed for mobile phones, 5G is developed for multiple 'use cases'.
- Thus, inventors are entitled to get returns from all imaginable use cases, such as Industry 4.0, MedTech and FinTech.
- Inventors think in terms of many 'field-of-use' possibilities for the standard when developing the technology that builds the infrastructure for the digital economy.
- 5G, is designed specifically with a much broader fields-of-use spectrum in mind.
- The 5G cellular standard is, therefore, in itself a case in point of this dynamic learning process, potentially benefitting from field-of-use price differentiation of SEPs under FRAND terms.



Questions
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