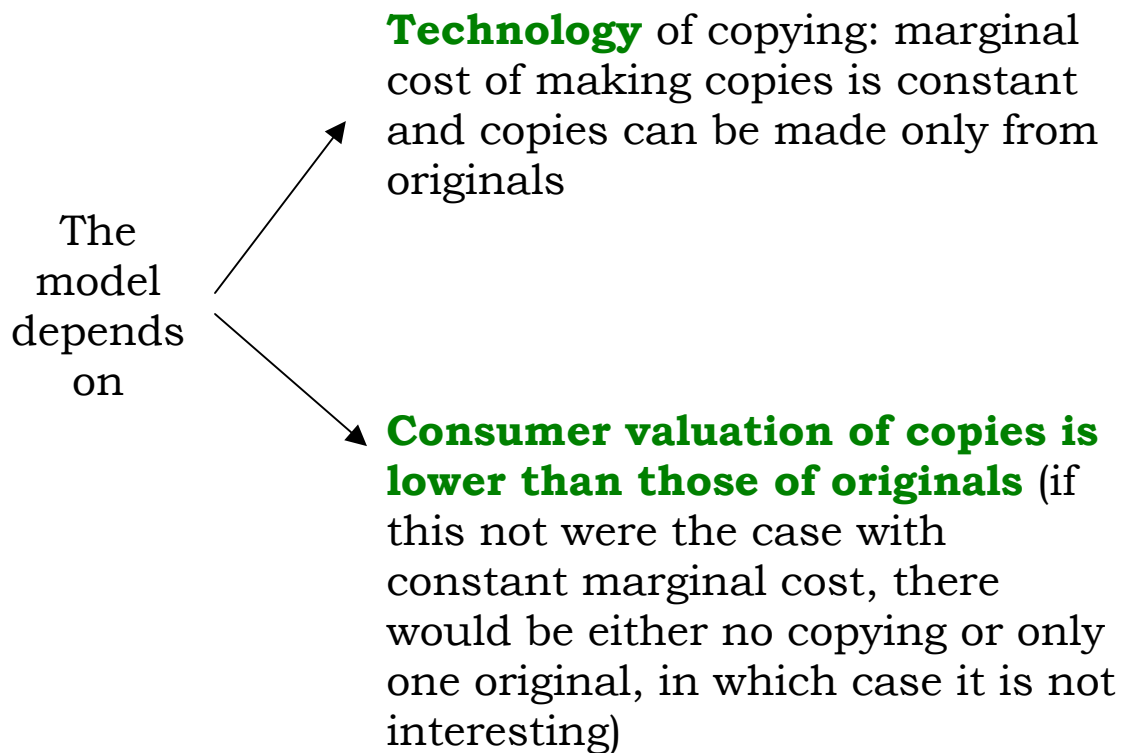


## Private copying

The economic literature on private copying discusses 2 main types of cases

### ① Direct appropriability

**Copiers pay only the cost of making copies and do not contribute to the cost of originals**



Assumptions:

- Demand for a work is linear and decreasing.
- Marginal cost of copies is constant.
- Consumer valuation of copies is only a fraction of that of an original.
- Marginal cost of originals is constant,  $c$ .

a) In the first stage, the producer of copies is a monopolist.

We have the standard monopoly equilibrium

$$P = a - b Q$$

$$M_gR = a - 2b Q$$

$$c = a - 2b Q \Rightarrow \left\{ \begin{array}{l} Q1^* = \frac{a - c}{2b} \\ P1^* = \frac{a + c}{2} \end{array} \right.$$

We introduce copying activities with the following assumptions.

- Marginal cost of copies is constant,  $r$
- Consumer valuation of copies is only a fraction of that of originals.

Demand for copies is:

$$P_{\text{cop}} = \alpha a - \alpha b Q$$
$$0 < \alpha < 1$$

- Sellers of copies compete, driving  $P_{\text{cop}}$  to marginal cost of copies.
- Producers of originals are unable to prevent copying, for legal and practical reasons.

First, we need to know the new demand for originals.

$$P_{\text{or}} = a - b Q$$

$$P_{\text{cop}} = \alpha a - \alpha b Q$$

If we subtract the 2<sup>nd</sup> from the first we get

$$P_{\text{or}} = a (1 - \alpha) - b (1 - \alpha) Q + P_{\text{cop}}$$

and because copiers operate at  $P_{\text{cop}} = r$ , we get the new demand curve for originals after the introduction of copying.

This, in turn, implies, that the new equilibrium quantity

$$Q_2^* = \frac{a}{2b} - \frac{c - r}{2b(1 - \alpha)}$$

This is not straightforwardly comparable to  $R_1^*$

The comparison depends on

$$C \begin{array}{l} > r \\ \frac{\quad}{\quad} \\ < \alpha \end{array}$$

$$\begin{array}{l} 3 \\ \text{situations} \end{array} \rightarrow \begin{array}{l} Q_2^* < Q_1^* \\ Q_2^* = Q_1^* \\ Q_2^* > Q_1^* \end{array}$$

## ② Indirect appropriability

**Copiers contribute to cover the cost of the original producer through higher prices that are paid for the original**, because copies are made out of it)

- **Marginal cost of copying is increasing** on the number of copies  $\Rightarrow$  incentive to form clubs in order to share the cost of originals.
- Copies can only be made out of originals.
- Costs are identical for all groups of users.
- All members consume, 1 copy, and the founder, 1 original.

2 possible subcases:

A/ **Perfect substitution** between originals and copies.

Optimal membership balances the increase in average variable costs (remember, marginal cost is upward sloping) with the decrease in average fixed cost  $\Rightarrow$  minimize average costs.

If there is competition in the formation of clubs the price of membership will be driven to marginal cost.

But because marginal cost is increasing, the revenues collected will exceed total cost of making copies.

This surplus will be reflected in the demand for originals, and so in its price  $\Rightarrow$  indirect appropriability.

Plausible results in terms of welfare:

- If marginal cost of originals is high relative to the cost of forming clubs.

copying  $\Delta$   $\left\{ \begin{array}{l} \text{Producer welfare} \\ \text{Consumer welfare} \end{array} \right.$

- If the relative cost of club formation is high, both producers and consumers lose.
- If both are low, producers lose and consumers gain.

## B/ **Imperfect substitution**

The results are similar to the previous subsection but with identifiable club organisers:

those for whom  $(V_0 - P_0) - (V_C - P_C)$  is maximum

## Digital copying in the information society directive

- Compulsory **exception favouring ISP**: the reproduction of copyrighted material by ISP is exempted provided that it
  - i. Is temporary
  - ii. Is transient or incidental
  - iii. Is an essential part of a technological process
  - iv. Has as sole purpose a transmission within a network or a lawful use
  - v. Has no independent economic significance
  
- Drafting of exception has to satisfy the **3-step Berne test** (arguably, even more restrictive)
  
- Exception is **in line** with those provided by Directive 2000/31/EC, of 8 June 2000 (**e-commerce Directive**) regarding illegal activities
  - i. Mere conduit: transmission, without initiating, selecting or modifying information
  - ii. Caching: temporary storage for more efficient information transmission

- iii. Hosting: storing information provided by a service recipient and at its request

Do not imply liability if **ISP does not have actual knowledge** of illegal activity. Moreover, Member States cannot impose on ISP a general obligation to monitor for illegal activity

- ☐ Anti-circumvention provisions: the Directive contains very **strict rules against circumvention** of copyright-protective technologies
- ☐ Concept of **technological measures** to protect copyright: any **device designed to prevent or restrict acts not authorised** by the copyright holder
- ☐ It should be **illegal** in EU States:
  - i. **Knowingly** (with actual or constructive knowledge) circumvent technological measures
  - ii. **Produce**, promote or sale **devices for circumvention purposes**
- ☐ Some of the **general exceptions should be ensured despite anti-circumvention rules**: photocopying, privileges of libraries and archives, ephemeral recordings of broadcasters, reproductions by social

institutions, teaching and research, uses by the disabled, uses for public security or functions

- Exceptions **need not be ensured** when
  - i. **Works have been made available to the public on contractual terms** and are accessible at time and place chosen by users
  - ii. **Private use** exception, when rightholders have already made it possible, → copyright holders can use **technological measures to limit the number of reproductions** under the private use defence
  
- Directive includes **rules against removing, altering or tampering with digital rights-management information** (=information about content, rights and conditions of use of a copyrighted work)

## Economics of digital copying

- Theoretically, some factors and considerations bear on the possible impact of digital copying upon copyright holders
  
- Space for **indirect appropriability**: in principle, **limited** due to the high quality and substitution effect of copies, and the decentralized and non-predictable extent of the copying activity,
  - i. Although an original is not needed to make copies, it is **costly to copy with few originals**→ allow some sales of originals
  
  - ii. **Matching rule**→ downloads=uploads increases demand for originals (but maybe not the ones that generate more revenue)
  
  - iii. Encryption and **DRM systems**
  
  - iv. **Compulsory license** systems→ untenable if substitution effect is big
  
  - v. **Tax on recording equipment**
  
- **Exposure effects**→ likely to be weak, even if sampling is important

If **sampling** is an effective method of better matching works and tastes, it increases willingness to pay for originals → **increases consumer welfare** and overall welfare, but **not necessarily producer's** welfare that is the source of incentives for new works

- **Positive demand-side effects** (network externalities) are possible: if more people copy a song, other people, knowing its popularity, might want to buy legitimate copies, increasing demand; if more CD are available, more people would buy CD players, which are complements also to non-pirated copies

These network externalities are plausibly **much smaller than in the computer programs sector**

- **Empirical evidence** on the impact of digital copying: contradictory results, but it is likely to have been, up to now, **lower than copyright holders claim** (Hui and Png 2002 estimate a global loss of 6,6% of revenue due to piracy, digital and analogue, assuming the industry did not adjust pricing to combat piracy)

In the **future**, as digital copying technology improves, and networks expand devices become more widespread → likelihood of **high substitution effects**

- **DRM and fair use** in the digital world
  - i. DRM increases the possibilities of perfect **price discrimination**→ charge each consumer for the value of each single and individual use
  - ii. Increased price discrimination implies **greater profit** (and incentives) for creators, **without a decrease in output** and the associated monopoly evils
  - iii. Consumer welfare will decline but producer's welfare and social welfare increase
  - iv. **Impact on costs of creation will be low**→ DRM does not (significantly) raise costs of productive uses, but charges for consumptive uses→ number of works will increase
  - v. Create **more efficient** (reduced transportation, storage and personnel costs) **electronic means of distributing works**, partially replacing less efficient physical distribution channels