

## Miceli and Adelstein model of fair use

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- ☐ In their model the intellectual good is one that may arrive to consumers in different varieties or versions
- ☐ At one extreme (top quality, as we might describe it) there is the original, and copies of differing quality or extent lie along a continuum
- ☐ Some consumers value the entire original most, others will be satisfied with inferior quality copies or with portions of the original → original work and copies are differentiated products, and that consumers differ in their valuations of various versions of the underlying good
- ☐ They analyze the setting with a spatial model of differentiated products
- ☐ Assumptions:
  - Consumers are distributed uniformly on the unit interval, locations indexed by  $z \in [0,1]$ . The original is  $z=1$
  - Author can produce units of the original at a constant marginal cost of  $c$ , fixed cost of creation,  $F$

- Consumers purchase at most 1 unit with gross valuation of  $v$  per unit
- Consumers incur a cost of  $(1 - z)t$ , representing consumer preferences over the various versions of the good → a consumer at  $z$  values the original at  $v - (1 - z)t$
- Total cost of purchasing original work at a price  $p$  is  $p + (1 - z)t$  for a consumer located at  $z$

## 1. Prior to copying

First, they analyze equilibrium in the absence of copying (author is sole supplier)

A consumer will buy iff

$$\begin{aligned}
 v &> p + (1 - z)t, \text{ or} \\
 z &> 1 - (v - p)/t \equiv zM(p)
 \end{aligned}
 \tag{1}$$

Normalizing the measure of consumers to 1, then the demand for the original is

$1 - zM(p)$ , which is downward sloping in  $p$

Author acting as a monopolist, will choose price to maximize profit given by

$$\pi = (p - c)(1 - zM(p))
 \tag{2}$$

which yields monopoly price

$$PM = (v+c)/2 \quad (3)$$

The threshold between consumers and non-consumers is

$$z_M = 1 (v-c)/2t \quad (4)$$

Consumers below  $z_M$  do not buy original, whereas those above  $z_M$  do buy it

## 2. Introduction of Copying

Assume consumers can make copies of the original → a consumer at location  $z$  can “self-produce” the preferred version of good at a cost of  $cCz$

They assume  $cC > c$ , and thus consumers will find copying attractive if  $v \geq cCz$ , so consumers located at

$$z \leq v/cC \equiv z_c$$

are potential copiers → they prefer to make a copy than doing without the good

They also assume that  $v < cC$  or that  $z_c < 1$

As a result, consumers sort themselves into 3 groups, depending on their preferences:

Consumers located between 0 and  $z_c$  make a copy, those located between  $z_c$  and  $z_M$  do not consume the good, and those between  $z_M$  and 1 buy the original

The situation of  $z_c$  with respect to  $z_M$  is crucial for the harm of copying to the author. If  $z_c < z_M$ , copying has no effect on author's profits, but it does affect them if  $z_c > z_M$

If price of original is  $p$ , a consumer will buy the original if  $p + (1-z)t \leq cCz$ , that is

$$z \geq \frac{p+t}{cC+t} \equiv \hat{z}(p) \quad (5)$$

Demand for original in this case is  $1 - \hat{z}(p)$

Author will maximize

$$\pi = (p-c)(1-\hat{z}(p)) \quad (6)$$

This yields the equilibrium price

$$\hat{p} = \frac{cC+c}{2} \quad (7)$$

and

$$\hat{z} = \frac{(cC+c/2 + t)}{cC+t} \quad (8)$$

The resulting price when copying exists and the market for copies and originals overlap,  $\hat{p} > p_M$  given that  $c_C > v$

Author's profit is lower by definition, as they get lower the lower is  $c_C$  (that is, the lower is the cost of copying) assuming there is no matching decrease in  $c$ , that is, the cost of producing originals

### 3. With fair use defense

Fair use is defined formally as  $\bar{z}$ , an upper limit on the amount of legal copying by consumers  $\rightarrow \bar{z} < z$  is fair use, but  $\bar{z} \geq z$  is not

When  $\bar{z} \leq z_M$ , the author is unaffected by fair use, because only consumers who would never have bought the original benefit from fair use

When  $\bar{z} \geq z_M$ , 2 situations may arise:

- a) The constraint set by the fair use defense is binding (author operates only in the non fair use area)

The author retains monopoly power over the range  $[\bar{z}, 1]$ , and so prefers to serve all consumers in this range, while the rest make copies under the umbrella of fair use. Author maximizes profit by extracting surplus from the last consumer to buy

the original and decides not to copy (marginal consumer)  $\rightarrow p + (1 - \tilde{z})t = v$ , yielding a price

$$\tilde{p} = v - (1 - \tilde{z})t \quad (9)$$

This price  $\tilde{p} > p_M$  for  $\tilde{z} \geq z_M$ , but the profit for the author is decreasing in the level of authorized fair use

$$\partial \pi / \partial \tilde{z} < 0 \quad (10)$$

So the author's profit decreases with the level of authorized copying, even if the price charged is going up

b) Fair use is so generous that author prefers to lower prices and compete with copies

If  $\tilde{z}$  is high enough, the author no longer finds it profitable to serve only those above the fair use location, so he lowers the price and compete with copies, setting the price  $\hat{p}$  (as in expression (7) above)

The switch point from case a) to case b) occurs when the profit in one equals the profit in the other, that is

$$\pi(\tilde{z}) = (\tilde{p} - c)(1 - \tilde{z}) = \pi(\hat{p}) = (p - c)(1 - z(p)) \quad (11)$$

## 4. Welfare analysis

Subsection 3 has dealt with the author's reaction to fair use. Miceli and Adelstein then consider how to determine the socially optimal level of fair use, taking that reaction as given

The starting point is to find the optimal cut-off point between copying and buying the original

$z^*$  is the optimal dividing point and social welfare is

$$W = \int_0^{z^*} (v - cCz) dz + \int_{z^*}^1 [v - (1-z)t - c] dz \quad (12)$$

First term is consumers' surplus from copying: second is the sum of the producer's profit and consumers' surplus from original

Maximizing welfare with respect to  $z$ ,

$$z^* = \frac{c+t}{cC+t} \quad (13)$$

At this point, the cost of producing copies equals production plus transportation costs for originals

$$cCz = c + (1-z)t \quad (14)$$

This situation is generally not attainable, because the author is a monopolist of originals, which prevents the optimal solution

There can be 3 cases relevant for copyright policy in setting permitted copying (fair use)

- Case a)  $\rightarrow z^* < z_M$

Author, by raising the price above marginal costs, overly limits the market for the original below what would be optimal

The desirable copyright policy is to increase  $\tilde{z}$  up to  $z_M$  to maximize consumer's surplus from copying. Still second-best, because consumers in the range  $[z^*, z_M]$  should optimally buy the original, and would do so if the price of the original were competitive ( $p=c$ )

Extending fair use up to  $z_M$  does not harm the author because he does not serve consumers with  $z < z_M$

- Case b)  $\rightarrow z^* > z_M$ , and  $\pi$  at  $\tilde{z} = z^* > F$

Optimal copyright policy would set  $\tilde{z} = z^*$ , and then the first-best optimum can be achieved. Author sees a decrease in profit, but not so much as to discourage creation in the first place  $\rightarrow \pi > F$

- Case c)  $\rightarrow z^* > z_M$ , and  $\pi$  at  $\tilde{z} = z^* < F$

Optimal copyright policy would set  $\tilde{z} = z_F$ ,  $\pi(z_F) = F$ , because otherwise the author would not create the original and all welfare will be lost  $\rightarrow$  accepted copying should be reduced to a level guaranteeing recovery of  $F \rightarrow$  first best optimum is not achievable, given that  $\tilde{z} < z^*$

Moreover,  $\tilde{z} \leq \hat{z}$ , implying that fair use level should not be set so high as to force the author to lower prices to compete with copiers