

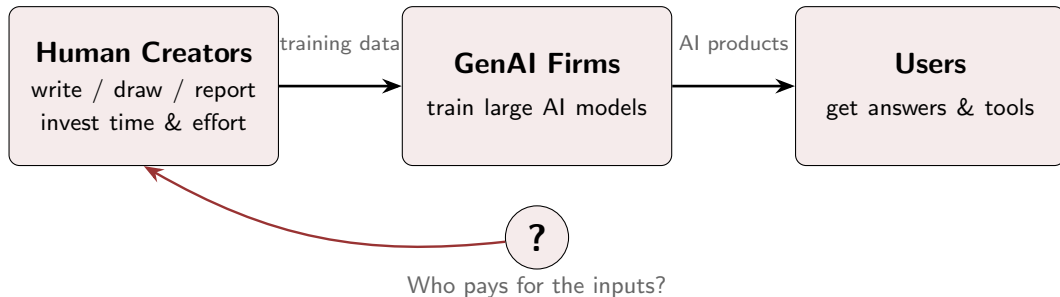
# Market Design for Generative AI: Beyond the Copyright Binary

<https://arxiv.org/abs/2606.12260>

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**GenAI delivers fast and cheap content, but is laden with both promise and peril**



**A data market for human content that:**

(i) enables technological progress    and    (ii) preserves incentives to create

# Why this matters to MSOM?

## Both creators and AI firms need a sustainable data market

### For AI product builders

- Data access drives model quality
- Legal risk becomes product risk
- Licensing costs & delays matter

### For creators and publishers

- AI (already!) diverts traffic & revenue
- Incentives shape what gets created
- Less willing to be “original” (soon...)

# The copyright binary (and why it fails)

## Free-for-all

“fair use”

price to creators = 0

⇒ “free rider” problem

## Full IP rights

“infringement”

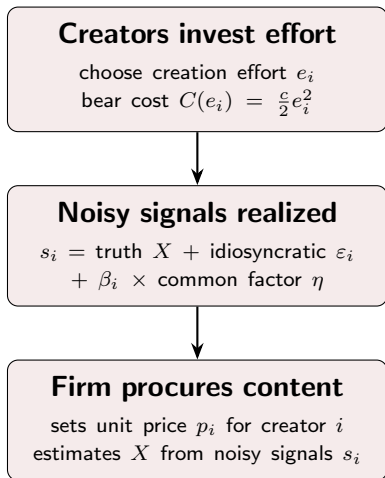
even frictionless bargaining

⇒ “originality penalty”

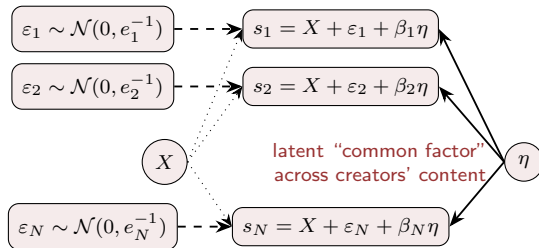
Both extremes can under-deliver on long-run quality

**Need “something in between”**

# Our theoretical model



content is a noisy signal of “ground-truth”  $X$



price  $p_i \implies$  best response  $e_i = p_i/c$

service quality  $Q := \text{Var}(\hat{X})^{-1}$  of BLUE  $\hat{X}$

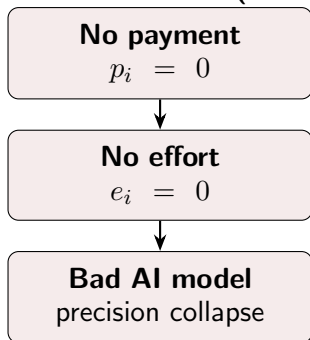
profit  $\Pi := Q - \sum_i p_i e_i = Q - \sum_i c e_i^2$

# Benchmark: First-best (social optimum) effort

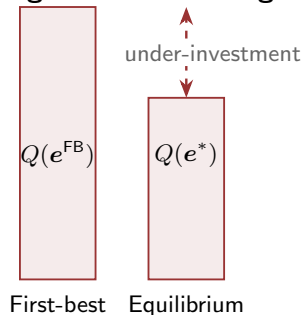
First-best solution by a social planner

$e^{\text{FB}}$  maximizes social welfare  $W := Q - \sum_i \frac{c}{2} e_i^2$  (cf. firm's profit  $\Pi = Q - \sum_i c e_i^2$ )

**Regime 1: Free-for-all (“fair use”)**



**Regime 2: Full IP rights**



**But who suffers the most?**

# Static market failure: an “originality penalty”

## Innovators vs. Imitators

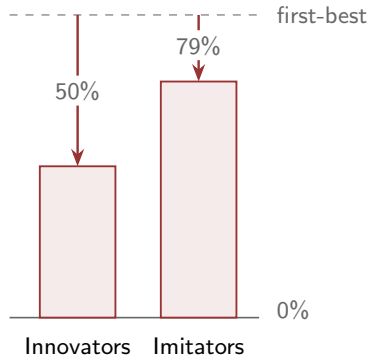
- **Innovators:** unaffected by trends ( $\beta_i \approx 0$ ).
- **Imitators:** follow the crowd ( $\beta_i \gg 0$ ).

Does scarcity command a premium? **No!**

The equilibrium–first-best effort ratio

$$R_i := \frac{e_i^*}{e_i^{\text{FB}}} \approx \begin{cases} 50\%, & \text{for innovator} \\ 79\%, & \text{for imitator} \end{cases}$$

and  $R_i$  is strictly increasing in  $\beta_i$

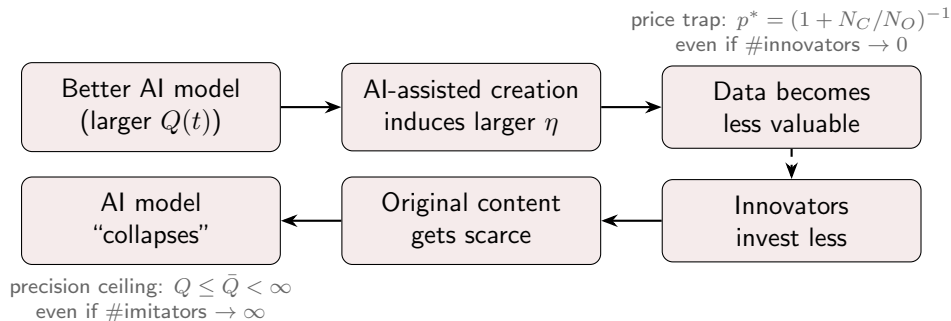


- **Why 50%?** Cost  $C(e_i) = \frac{c}{2}e_i^2 \implies$  firm's marginal cost  $2ce_i$  vs social  $ce_i \implies \frac{1}{2}$ -monopsony markdown
- **Why 79%?** Diminishing returns (marginal contribution  $\frac{\partial Q}{\partial e_i} \propto e_i^{-2}$ )  $\implies$  “lowering prices” becomes harmful to the firm itself  $\implies$  ratio  $\rightarrow \frac{1}{3^{1/2}} \approx 79\%$  when all creators are imitators and  $N \rightarrow \infty$
- **Caveat.** 79% appears in a homogeneous market full of imitators. In some cases  $R_i > 1$ , i.e.,  $e_i^* > e_i^{\text{FB}}$ !

# Dynamic market failure: a “curse of precision”

A continuous-time fluid model with time  $t \in [0, \infty)$

- Market price  $p(t)$  draws in a mass  $N_O(t)$  of innovators &  $N_C(t)$  of imitators
- Creators’ content builds a depreciating data stock  $\implies$  fresh inflow always needed
- **AI-assisted creation:** better model  $\implies$  larger common factor  $\text{Var}(\eta) \propto Q(t)$



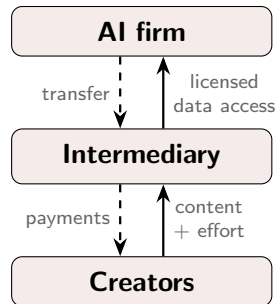
**Takeaway.** Even with constant input of human data, “model collapse” still happens!

# Toward a solution: a data intermediary with a two-part tariff mechanism

- Negotiates **collectively** to counter monopsony power
- Rewards **originality** across human creators

## What the intermediary offers

- To AI firms: licensed data access
- To creators: a fair share of surplus
- To society: implements the first best



$$\text{Payment } P_i(e) = \underbrace{c e_i^{\text{FB}}}_{\text{unit price}} \times e_i + \underbrace{B_i}_{\text{subsidy}}; \text{ Transfer } T(e) = \sum_{i=1}^N c e_i^{\text{FB}} \times e_i + \underbrace{L}_{\text{lump-sum}}$$

- Unit price  $c e_i^{\text{FB}}$  induces best response  $e_i^{\text{FB}} \implies$  Incentive Compatibility (IC)
- $L$  via Nash bargaining,  $B_i$  via Aumann–Shapley  $\implies$  Individual Rationality (IR)
- Intermediary bears neither deficit nor surplus  $\implies$  Budget Balance (BB)

## Main Takeaways

- In Generative AI data market, creators' content is **inherently correlated**
- Full IP rights **underpower incentives** and further create an **originality penalty**
- AI-assisted content creation amplifies the failure to a dynamic **curse of precision**
- We propose a **data intermediary** utilizing two-part tariff mechanisms as a solution

**Thank you!**

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