Exposure Doesn’t Pay the Bills

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Outline

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    - Why model the streaming economy?
2. Related Literature
3. Model
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Intro and Motivation

- YouTube's 2021 Q3 Ad Revenue is $7.2B[1]
- Streaming Platforms are driven by **content creators**
- Content creation can be a full time job
- We should explore the evolution of quality and popularity
- Creators make content, but algorithm decides who sees it

[1] Source

Related Literature

Branding

- Klein and Leffler (1981)
- Shapiro (1983)

Superstar

- Rosen (1981)
- Macdonald (1988)

Related Literature, cont.

Streaming

- Thomes (2013)
- Aguiar & Waldfogel (2018)

My Niche

- Artist's optimal behavior
- Role of algorithmic uncertainty
- Time component

The Model

What should a model describe?

Consumer Behavior:

- Artist discovery
- Consumption based on quality

Streaming Platform:

- Algorithmic consumer-artist matching
- Useful but imperfect matching

Artist/Content Creator:

- Quality-quantity trade-off under audience uncertainty
- Maximize royalties from streams

Consumer behavior

- No ex-ante knowledge of an artist, require algorithmic exposure
- If consumer knows about an artist they consume based on quality, $n(z)$
- Consumer forgets about an artist with probability δ every period.
- All consumers the same

Artist Behavior

- Artist decides a quality, z, and quantity, m subject to cost
  - All releases same quality in one period
- Artist gets royalty r for every stream
- Artist can't choose audience size directly
- More releases $\longrightarrow$ more chances to go viral

Algorithmic Behavior

- Can't measure quality directly, can use consumer streams
  - Use last period's streams, n_{t-1}
- For every release by an artist, algorithm shows:
  - $I(n_{t-1}) + \varepsilon_{it}$, iid mean zero

Putting the pieces together:

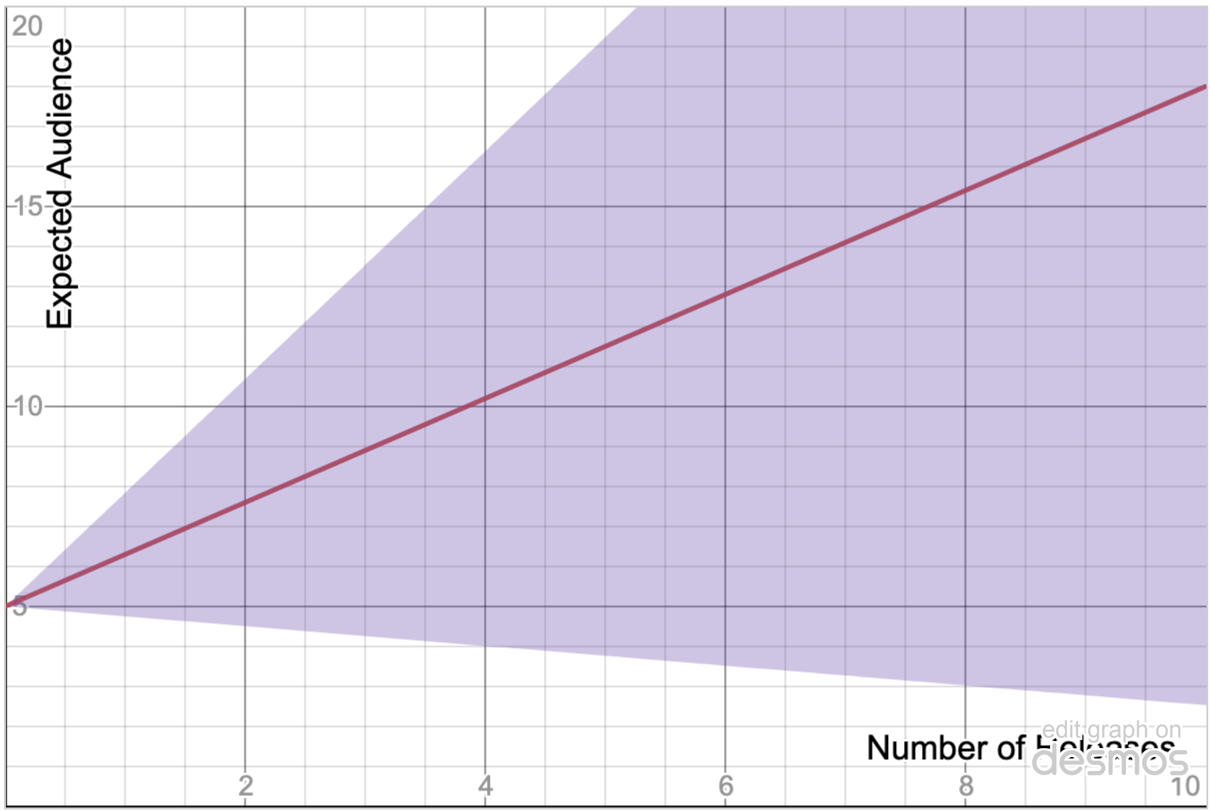
Total Audience size:

$$A_t(m) = (1 - \delta)A_{t-1} + mI(n_{t-1}) + \sum_{i=1}^{m} \varepsilon_{it}$$

Per-period revenue:

$$rA_t(m)n(z) - C(m, z; \kappa)$$

Visualizing Audience Uncertainty:



The Artist's problem:

$$\max_{m,z}\left\{E\left(A_t(m)n(z) - C(m,z;\kappa)\right)\right.$$

$$s.t.$$

$$\left. A_t(m) = (1-\delta)A_{t-1} + mI(n_{t-1}) + \sum_{i=1}^{m}\varepsilon_{it}\right\}$$

Initial Findings & Next Steps

A nice result from a binary choice case

1 piece at quality $\overline{z}$, or 2 pieces at $\underline{z}$

$$\begin{cases} 2, & \frac{n(\overline{z})}{n(\underline{z})} < \left(1 + \frac{I_0}{I_0+(1-\delta)A_0}\right) \\ 1, & \frac{n(\overline{z})}{n(\underline{z})} > \left(1 + \frac{I_0}{I_0+(1-\delta)A_0}\right) \end{cases}$$

Established artists choose high quality, new artists choose more exposure

Next Steps

- Solve this in the two-period case (then ∞-period)
- Further explore how κ reveals itself in the distribution of successful artists

Thanks, Questions?

Aguiar, L. and J. Waldfogel (2018). "Quality Predictability and the Welfare Benefits from New Products: Evidence from the Digitization of Recorded Music". In: Journal of Political Economy 126.2. http://www.journals.uchicago.edu/doi/full/10.1086/696229, pp. 492–524. ISSN: 0022-3808. DOI: 10.1086/696229.

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