

Organic Content, Embargoes, and Quality Obfuscation

Evidence from the Gaming Industry

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FTC Conference on Marketing and Public Policy

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- Influencers affect 49% of consumers' purchase decisions (Avery and Israeli, 2020)
 - Influencers come with **specialized knowledge, expertise, authority, social position, and/or personal relationships**
 - Consumers consider them **authentic, relatable, and trustworthy**

Influencer Marketing and Product Launches

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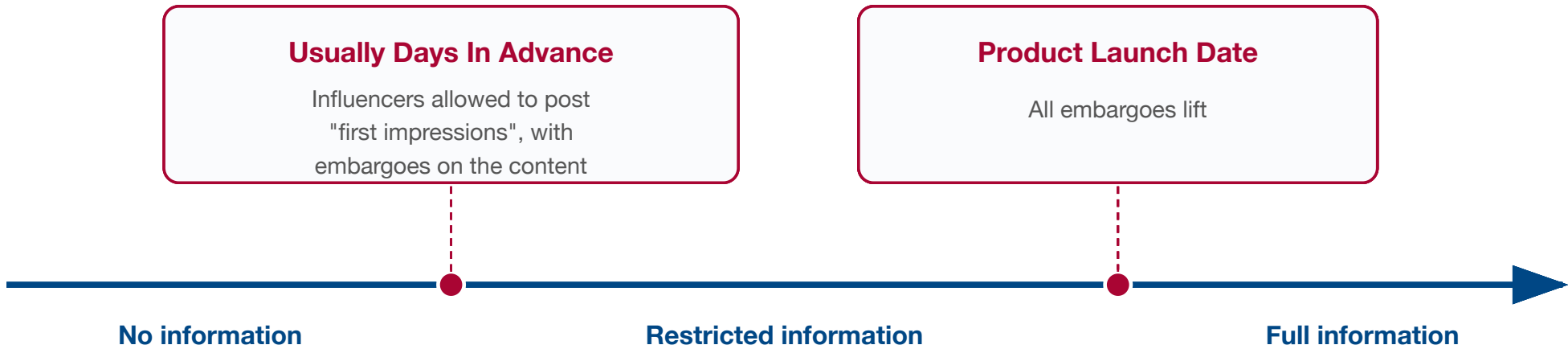
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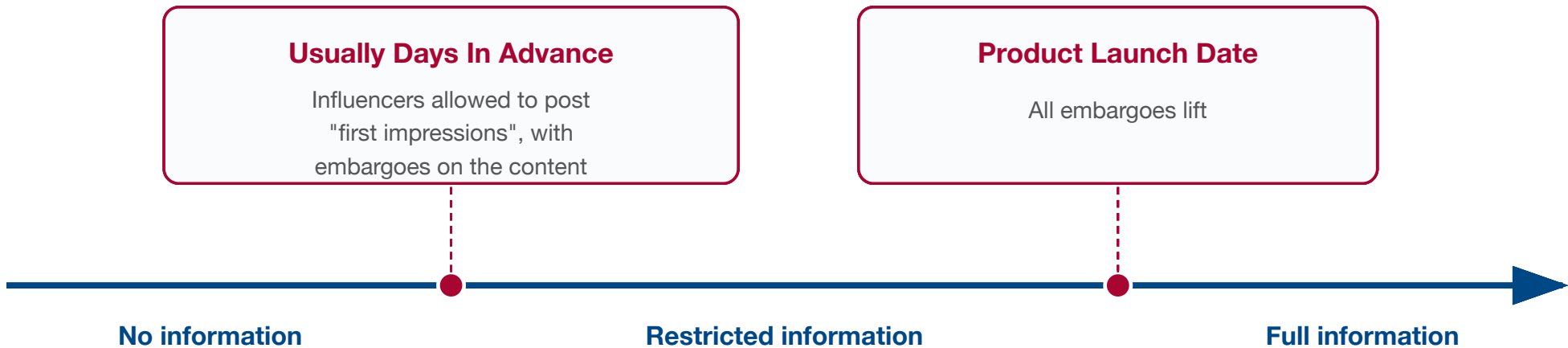
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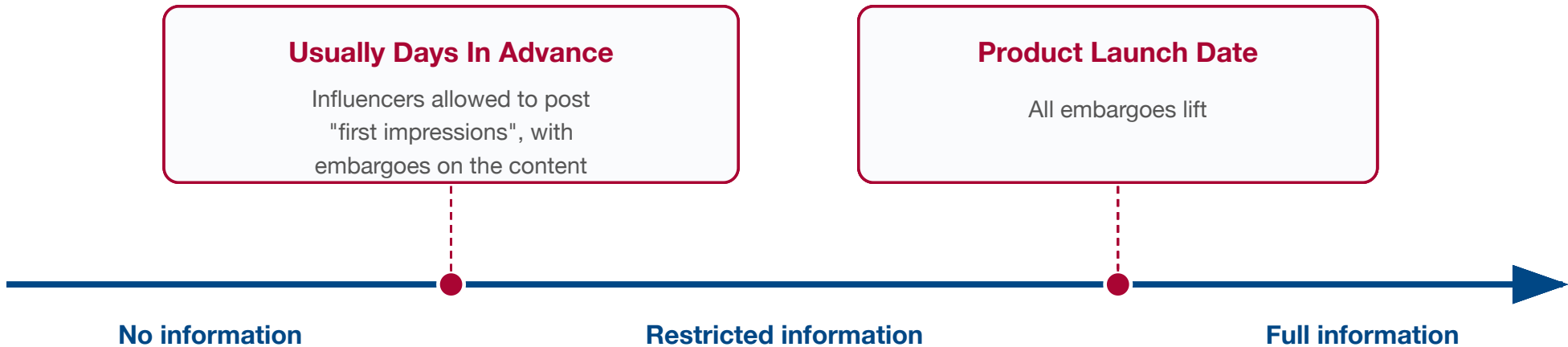


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- Is organic content influencers’ honest and full opinion?

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 - Microsoft Duo: Creators prohibited from discussing camera and processor performance (Greengart, 2020)
 - Pixel 7: Influencers restricted from sharing images/videos of new software features
 - Cyberpunk 2077: Influencers prevented from revealing critical performance issues, resulting in overwhelmingly positive pre-launch content (Bankhurst, 2020)

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Research Question: How Do Embargoes Affect Information Provision and Consumer Choice?

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- If consumers are **sophisticated enough** to recognize missing information, embargoes should have **a zero return**, generating similar engagement and sales as their unembargoed counterparts
 - If embargoes are on all products, rational consumers will infer medium quality from embargoes
 - Only low-quality products should have embargoes; consumers infer even lower quality
 - Iterating this line of reasoning, only the worst products will be embargoed
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 - Only low-quality products should have embargoes; consumers infer even lower quality
 - Iterating this line of reasoning, only the worst products will be embargoed
 - And consumers always infer quality correctly
- Otherwise, if consumers are **naive**, embargoes should have **a positive return**, generating more engagement and sales than their unembargoed counterparts

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- Examine the impact of embargoes on **organic social media content** and **market outcomes (consumer engagement, sales)** in the gaming industry
 - Develop and validate a measure of the extent of embargoes based on the content
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- Main Findings
 - Social media content under a greater influence of embargoes...
 - contains **less information** and is **more positive** in its language use than its unembargoed counterparts.
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 - Firms learn over time; limited consumer learning
- Policy implications for information provision and disclosure

Literature

- Information provision and disclosure
 - Limited strategic thinking in the movie industry (Brown et al., 2012)
 - Disclosure regulations affect post content and follower engagement (Ershov and Mitchell, 2022)
- Word of mouth (Chevalier and Mayzlin, 2006; Chintagunta et al., 2010; Ma et al., 2015; Proserpio and Zervas, 2017; Chevalier et al., 2018; Wang and Chaudhry, 2018)
 - Firms strategically manipulate online reviews (Dellarocas, 2006; Mayzlin, 2006; Mayzlin et al., 2014)
 - Fake reviews on Facebook increase the average rating and number of reviews on Amazon.com (He et al., 2022)
- Influencer marketing
 - Twitch streams increase sales (Huang and Morozov, 2024)
 - Reputation-burning effect on influencers (Cheng and Zhang, 2024)
 - Interactions among the firm, the influencer, and the consumer (Pei and Mayzlin, 2022)
- Video games industry (Ishihara and Ching, 2019; Haviv et al., 2020; Zhao et al., 2022; Simonov et al., 2022)

Empirical Context and Data

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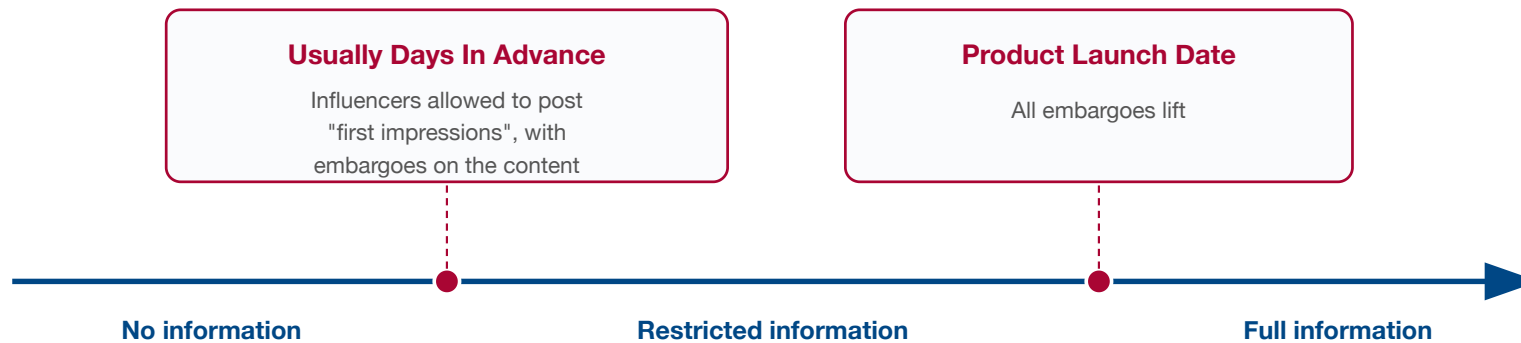
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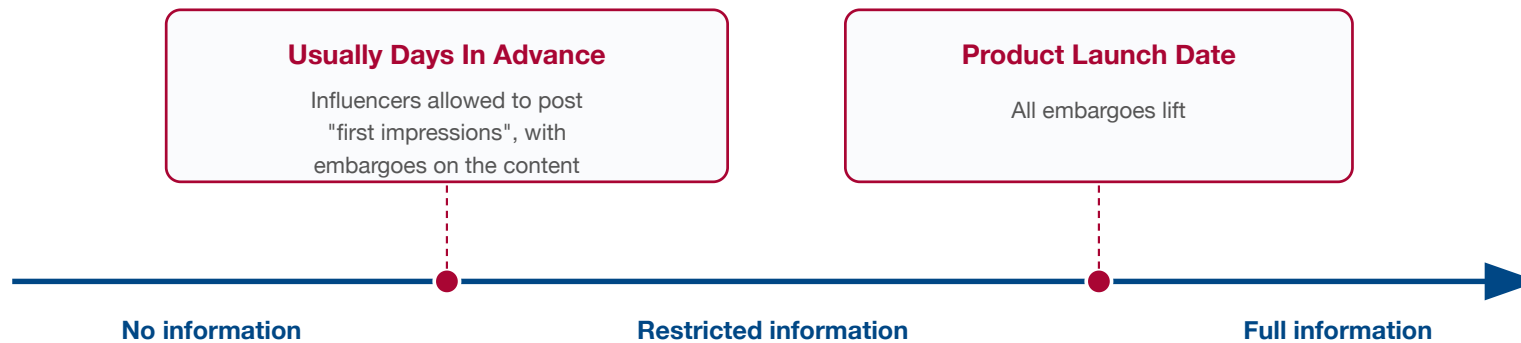
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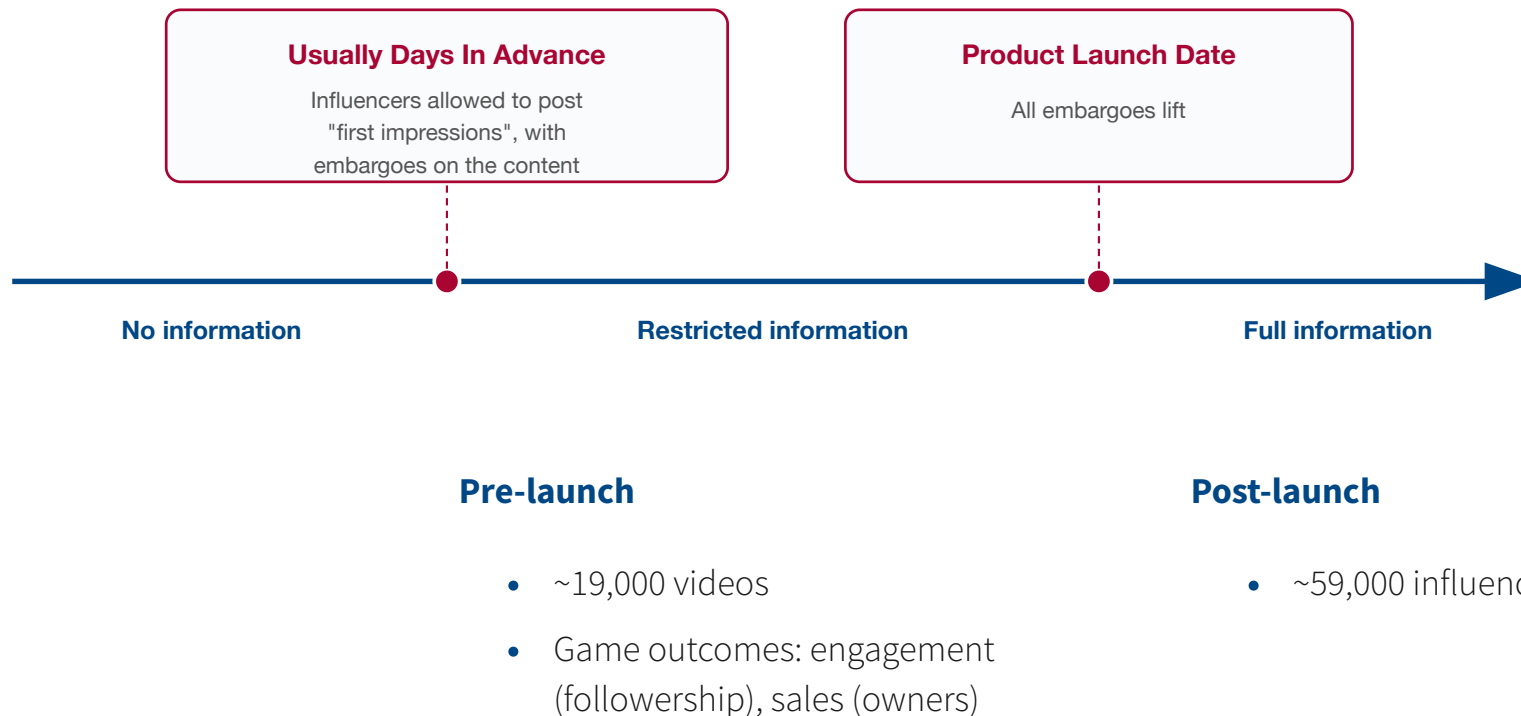


Pre-launch

- ~19,000 videos
- Game outcomes: engagement (followership), sales (owners)

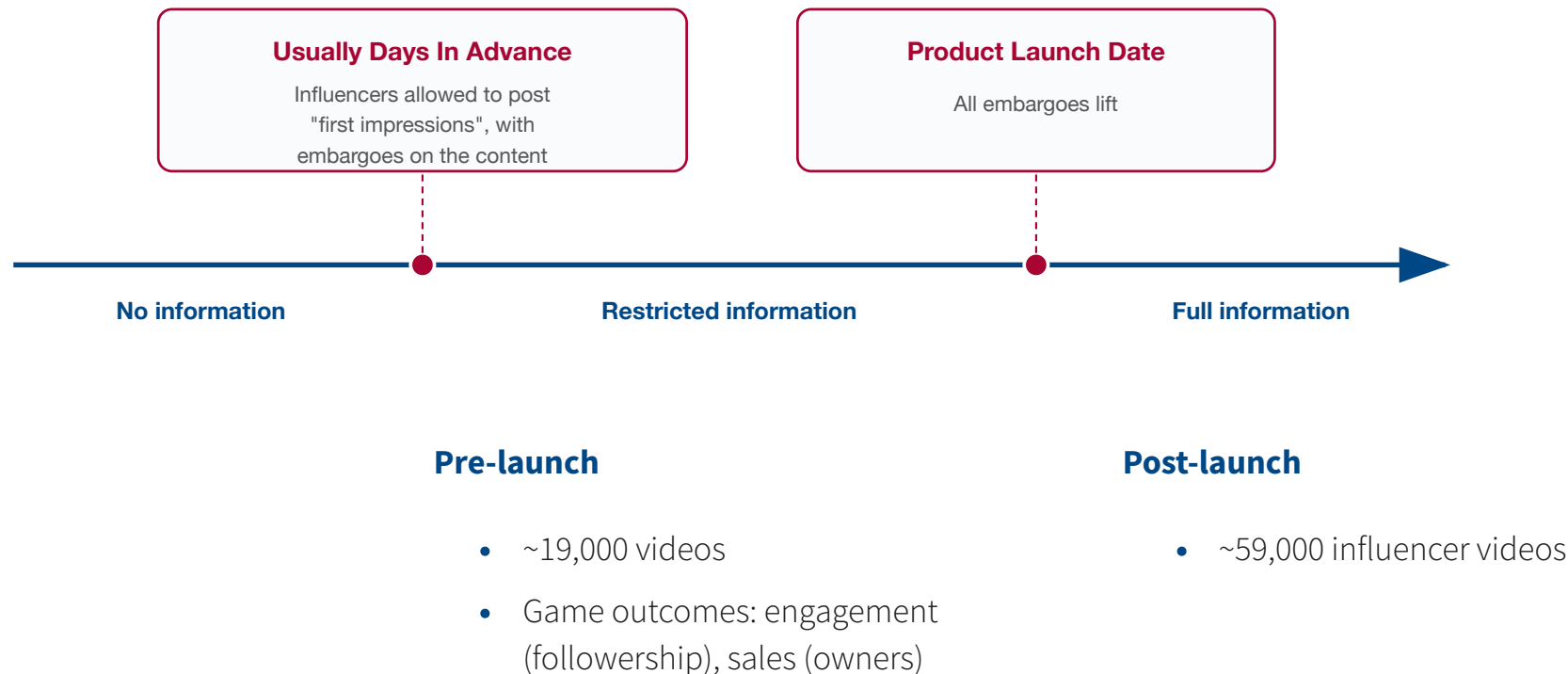
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- Sample: 504 games launched 2018–2021, 108,112 daily observations

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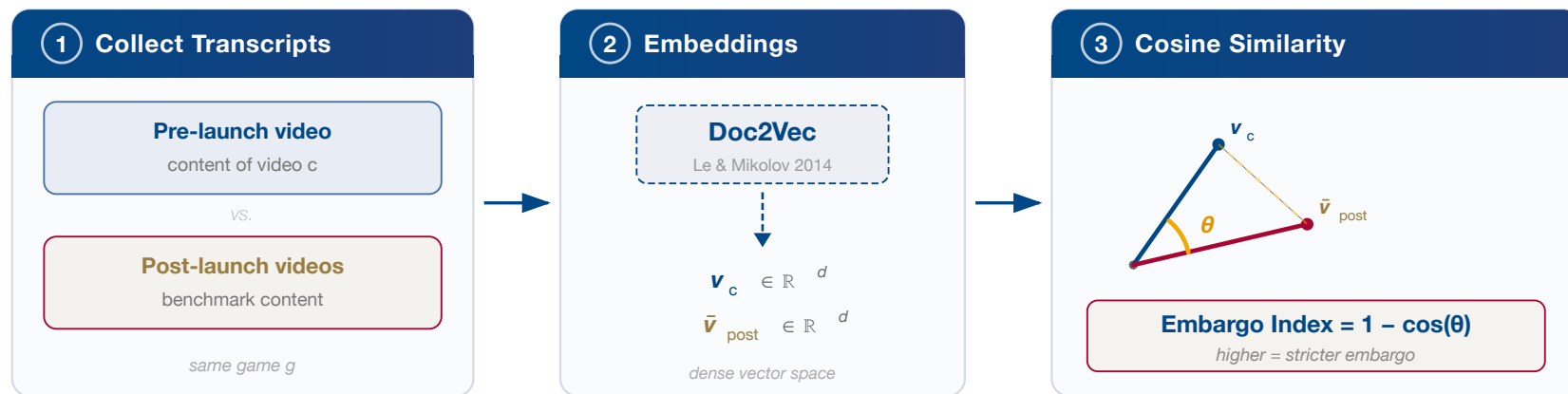
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Note: All embargo indices are standardized to range $[0, 1]$.

Embargo Stringency: Example



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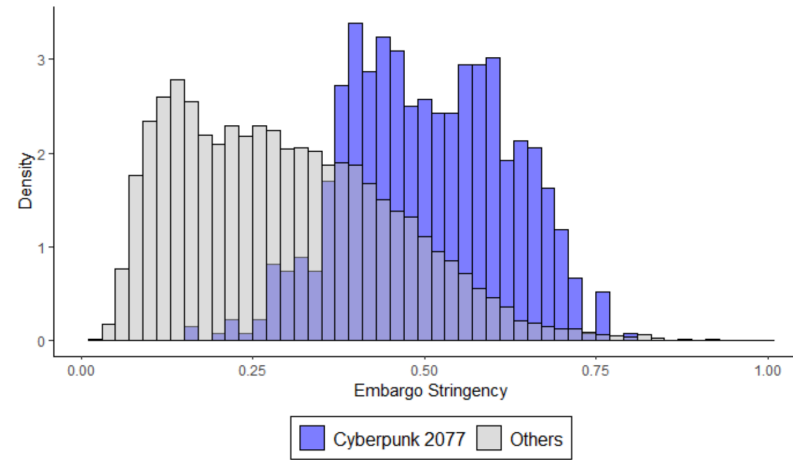


Figure A1 Distribution of Embargo Stringency

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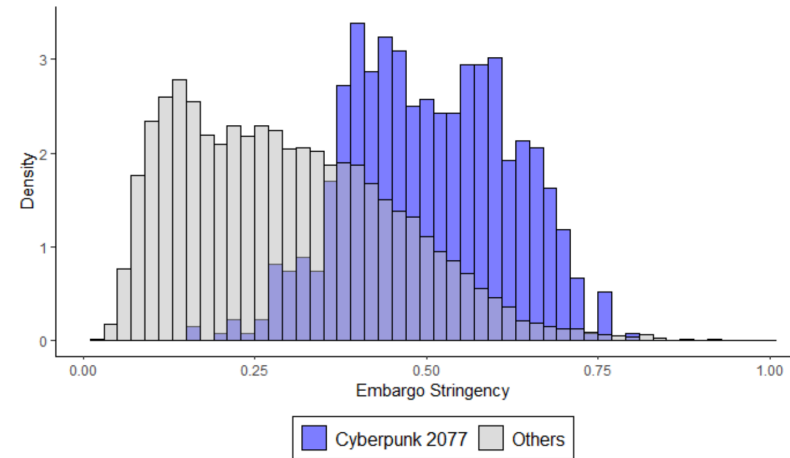


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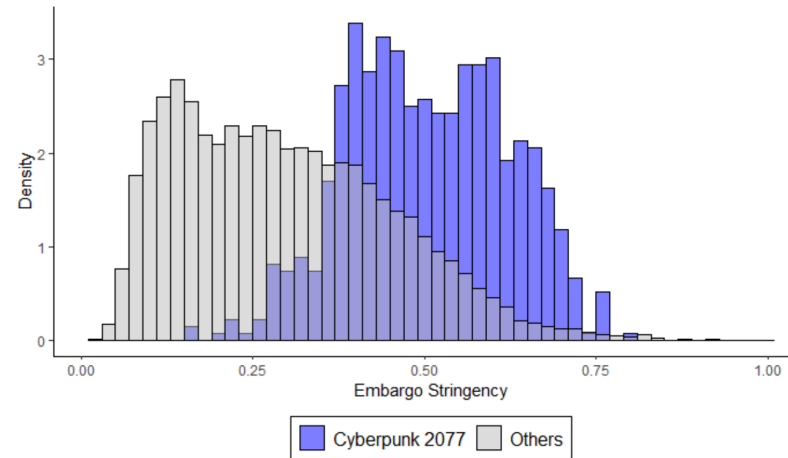


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- Cyberpunk 2077: Influencers were prevented from showing game footage before launch, resulting in **overwhelmingly positive pre-launch content** that diverged sharply from post-launch reviews (Bankhurst, 2020)
- Our stringency index correctly captures this: **70% above dataset mean**

Embargo Stringency and Content Characteristics

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Table 4 Correlation between Embargo Stringency and Influencer Content Characteristics

	(1) Duration	(2) Text Entropy	(3) Neutral Sentiment	(4) Positive Sentiment	(5) Negative Sentiment	(6) Positive Sentiment/ Negative Sentiment
Embargo Stringency	-4,149.096*** (169.515)	-1.026*** (0.058)	0.112*** (0.004)	-0.064*** (0.003)	-0.047*** (0.002)	613.776*** (157.921)
Game Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Channel Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	19,884	19,884	19,884	19,884	19,884	19,884
R-squared	0.584	0.623	0.609	0.521	0.564	0.275

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Robust standard errors clustered by games are reported in parentheses.

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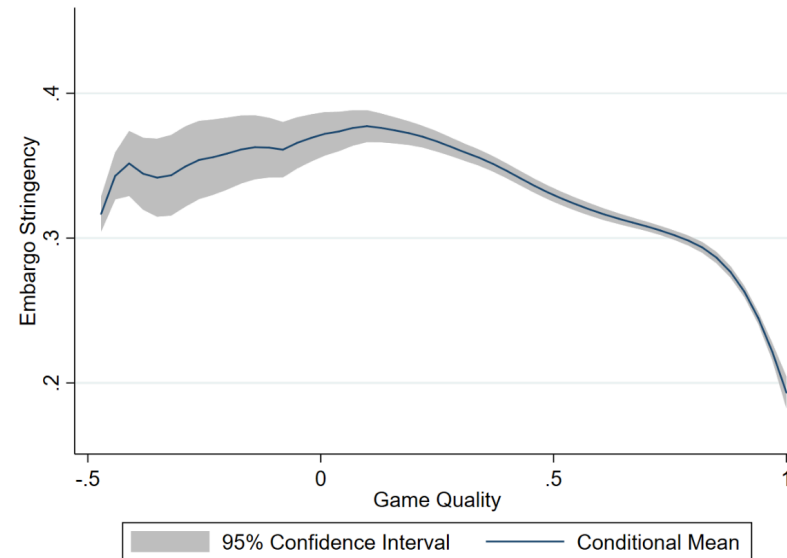
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- **Shorter** videos with **lower text entropy** (less information)
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- Embargoes suppress critical opinions while maintaining positivity

Selection Based on Quality

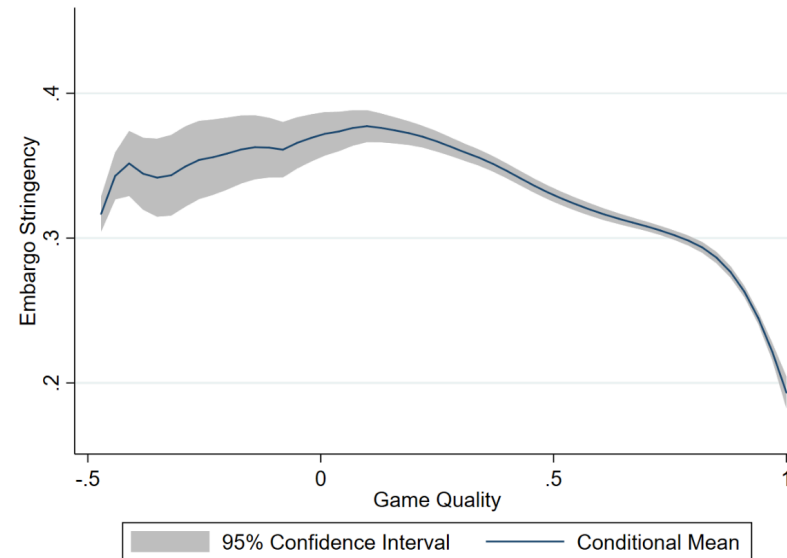
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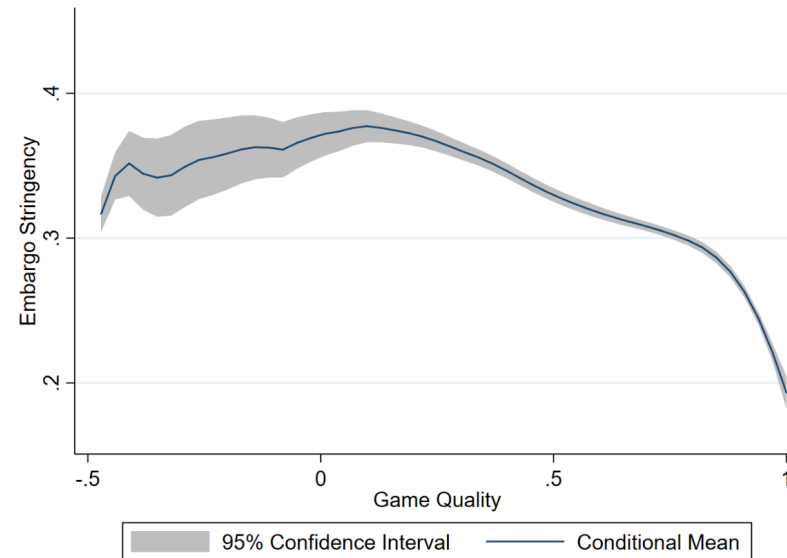


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Figure 3 Correlation Between Embargo Stringency and Game Quality

- Lower-quality games face **stricter embargoes**
- Consistent with **strategic quality obfuscation**: firms possess private information about product quality and deploy embargoes to manage consumer perceptions

Estimating the Effect of Embargoes on Product Outcomes

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- Central effect of interest: **the effect of embargoes on engagement and product demand**
- Identification challenges: firms may strategically implement embargoes on lower-quality games, so that **embargoes may correlate with game quality**
- Two complementary approaches:
 - **Covariate Balance**: construct weighted sample and compare each game with counterpart(s) that have **similar quality** using generalized random forest (Athey et al., 2019)
 - **IV: embargo stringency and quality of other games in the same category (genre)** as an instrument for embargo stringency (Hausman, 1996)

Workhorse Model

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$$\log Q_{gt} = \beta_1 \text{Has Video}_{gt} + \beta_2 \log \# \text{ Video}_{gt} + \pi \text{Embargo}_{gt} + \alpha_g + \delta_{t,r(g)} + \epsilon_{gt}$$

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- π measures **the return to embargoes**.

The Impact of Embargoes on Engagement and Sales

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Table 5 The Effects of Embargo on Product Interest and Product Sales

	Log Follower			Log Owners	
	Fixed Effects			GRF	GRF
	(1)	(2)	(3)	(4)	(5)
Embargo Stringency	0.856*** (0.307)	0.480*** (0.165)	0.478*** (0.166)	0.216*** (0.064)	0.045 (0.086)
Log Video Count	0.487* (0.259)	0.286** (0.219)	0.288** (0.129)	0.304*** (0.036)	0.292*** (0.045)
Has Video	0.608* (0.364)	0.301 (0.189)	0.302 (0.191)	0.120** (0.051)	-0.019 (0.076)
Lag DV	No	Yes	Yes	Yes	Yes
Game FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	No	No	No
Time-Genre FE	No	No	Yes	Yes	Yes
Observations	108,112	107,608	107,608	107,608	107,608
R-squared	0.550	0.682	0.685		

*Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. In column (1)-(3), robust standard errors clustered by games are reported in parentheses. In columns (4)-(5), bootstrap standard errors from 100 repetitions are reported in parentheses.*

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- A one-unit increase in embargo stringency leads to a **21.6% increase** in page followers
- The average embargo (stringency = 0.3) results in a **6.48% increase** in new followers compared to the least stringent embargo

Heterogeneity: Product Interest

Table 6 Heterogeneous Effects of Embargo on Product Interest

	Log Follower			
	Independent Games (1)	Major Games (2)	Free Games (3)	Paid Games (4)
Embargo Stringency	0.123* (0.077)	0.419*** (0.074)	0.371*** (0.092)	0.193 (0.064)
Log Video Count	0.324*** (0.043)	0.260*** (0.029)	0.373*** (0.037)	0.294*** (0.037)
Has Video	0.025*** (0.059)	0.327 (0.057)	0.202*** (0.068)	0.108 (0.051)
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Log Video Count	0.324*** (0.043)	0.260*** (0.029)	0.373*** (0.037)	0.294*** (0.037)
Has Video	0.025*** (0.059)	0.327 (0.057)	0.202*** (0.068)	0.108 (0.051)
Lag DV	Yes	Yes	Yes	Yes
Game FE	Yes	Yes	Yes	Yes
Time-Genre FE	Yes	Yes	Yes	Yes
Observations	73,804	33,804	13,593	94,015

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. All estimates are derived from GRF models. Bootstrap standard errors from 100 repetitions are reported in parentheses.

- Embargo effect larger for...
 - Developers with higher marketing budgets: **12.6%** higher product interest for major games vs. **3.49%** for indie games
 - Less sophisticated consumers: **11.3%** higher product interest for free games vs. **not significant** for paid games

Heterogeneity: Product Sales

Table 7 Heterogeneous Effects of Embargo on Product Sales

	Log Owners			
	Independent Games (1)	Major Games (2)	Free Games (3)	Paid Games (4)
Embargo Stringency	-0.004 (0.101)	0.151** (0.070)	0.248** (0.110)	0.015 (0.085)
Log Video Count	0.359*** (0.057)	0.145*** (0.026)	0.261*** (0.060)	0.296*** (0.044)
Has Video	-0.077 (0.092)	0.107* (0.055)	0.137 (0.106)	-0.042 (0.074)
Lag DV	Yes	Yes	Yes	Yes
Game FE	Yes	Yes	Yes	Yes
Time-Genre FE	Yes	Yes	Yes	Yes
Observations	73,804	33,804	13,593	94,015

*Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. All estimates are derived from GRF models. Bootstrap standard errors from 100 repetitions are reported in parentheses.*

- Embargo effect larger for...
 - Developers with higher marketing budgets: **4.5%** higher sales for major games vs. **not significant** for indie games
 - Less sophisticated consumers: **7.4%** higher sales for free games vs. **not significant** for paid games

Mechanisms

Table 8 The Effects of Linguistic Characteristics on Product Outcomes

	Log Followers
	GRF
	(1)
Text Entropy	0.022* (0.013)
Positive Sentiment	-0.269 (0.220)
Negative Sentiment	-0.715** (0.312)
Has Video	-0.076 (0.082)
Log Video Count	0.287*** (0.035)
Lag DV	Yes
Game FE	Yes
Time-Genre FE	Yes
Observations	107,608

*Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. All estimates are derived from GRF models. Bootstrap standard errors from 100 repetitions are reported in parentheses.*

Table 8 The Effects of Linguistic Characteristics on Product Outcomes

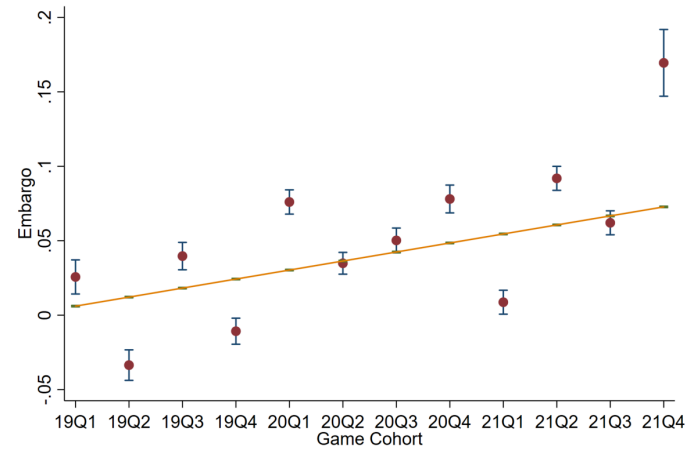
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- Text entropy: significant but small; consumers are insensitive to missing information
- Negative sentiment: negative, significant, and substantial; positive sentiment: insignificant; consumers rely heavily on **sentiment**, particularly negative sentiment
- **Omission is less damaging than explicit criticism**

Firm Learning

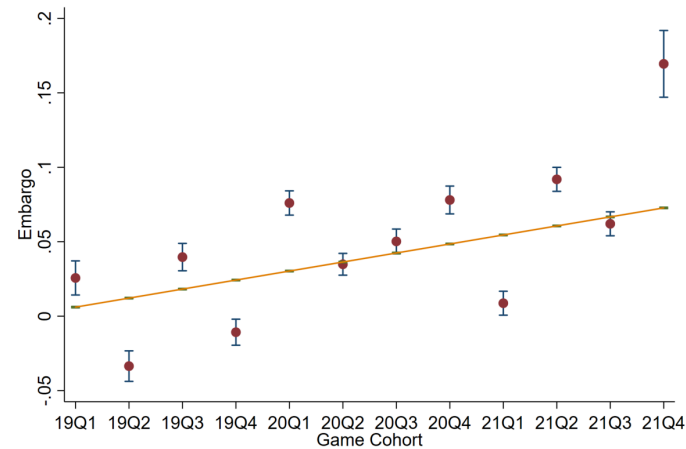
Firm Learning



Notes: The red dots are the coefficients δ_m from the regression $Embargo_{it} = \alpha + \sum_{m=1}^{12} \delta_m Season_i^m + \beta_1 Indie_i + \beta_2 Free_i + v_{it}$, which estimates the average embargo stringency for games launched across different quarters. The blue bars are the 95% confidence intervals for the estimates. The orange line is the estimated linear time trend across seasons from $Embargo_{it} = \alpha + \delta Season_i^m + \beta_1 Indie_i + \beta_2 Free_i + v_{it}$.

(a) Firm Learning: Variation in Embargo Stringency for Games in Different Cohorts

Firm Learning

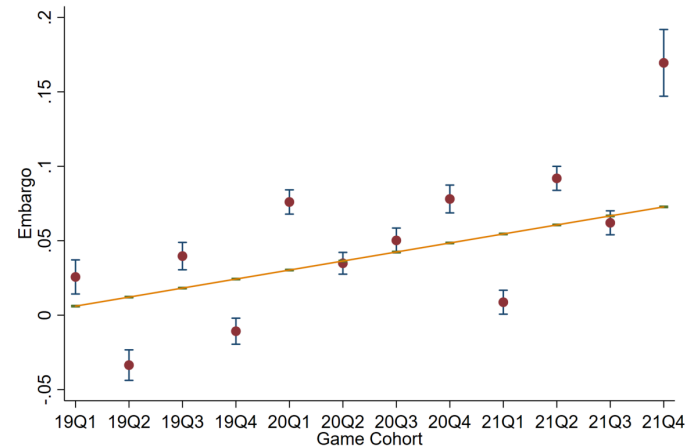


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(a) Firm Learning: Variation in Embargo Stringency for Games in Different Cohorts

- Gradual **increase in embargo stringency** from 2019 to 2021

Firm Learning



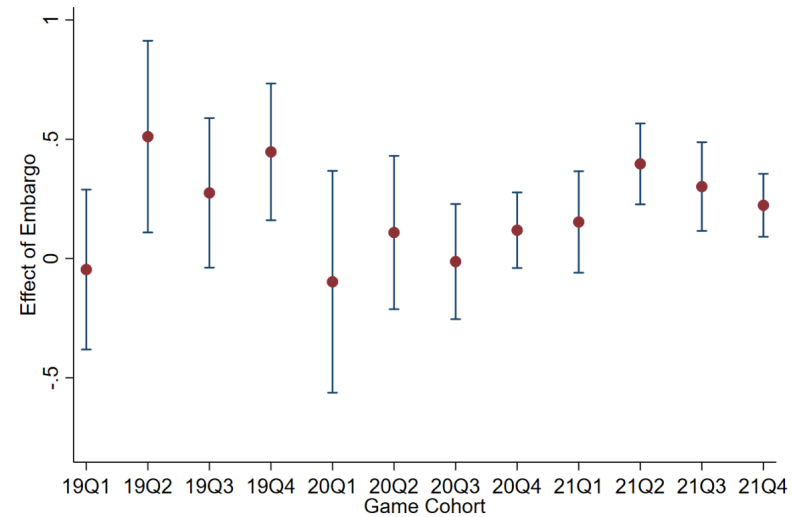
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(a) Firm Learning: Variation in Embargo Stringency for Games in Different Cohorts

- Gradual **increase in embargo stringency** from 2019 to 2021
- Firms appear to **tighten content restrictions** over time to better control pre-launch narratives

Consumer Learning

Consumer Learning

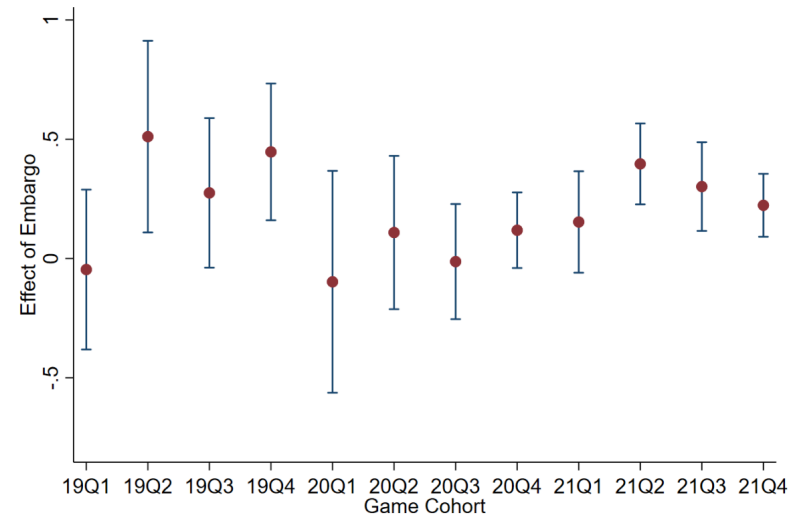


Notes: The red dots are the average effect of embargoes for games launched across different quarters from GRF. The blue bars are the 95% confidence intervals for the estimates from bootstrapping.

(b) Consumer Learning: Embargo Effects for Games in Different Cohorts

Figure 5 Firm Learning and Consumer Learning

Consumer Learning



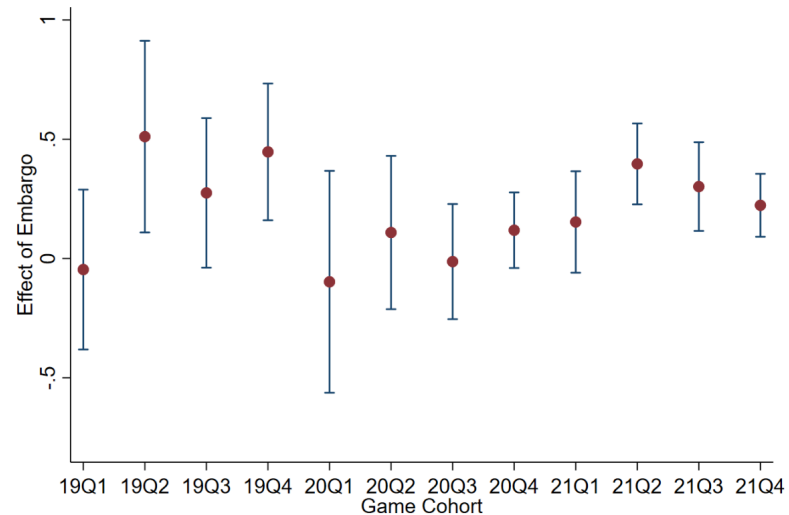
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(b) Consumer Learning: Embargo Effects for Games in Different Cohorts

Figure 5 Firm Learning and Consumer Learning

- **No systematic trend:** consumers remain equally responsive to embargoed content across time

Consumer Learning



Notes: The red dots are the average effect of embargoes for games launched across different quarters from GRF. The blue bars are the 95% confidence intervals for the estimates from bootstrapping.

(b) Consumer Learning: Embargo Effects for Games in Different Cohorts

Figure 5 Firm Learning and Consumer Learning

- **No systematic trend:** consumers remain equally responsive to embargoed content across time
- Consumers' ability to interpret embargoes remains **largely unchanged** despite increased exposure

Alternative Explanations

- Are we really measuring strategic selective disclosure, or just suspense?
 - We use GPT-4o to score **suspense** and **surprise** levels from video transcripts
 - Both suspense and surprise are **negatively** correlated with embargo stringency, opposite of what suspense management predicts
 - Suggests embargoes are used for **quality obfuscation**, not suspense management

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Summary of Findings

- Embargoes systematically alter influencer content by reducing information richness and suppressing negative sentiment.
- Despite limiting transparency, stricter embargoes generate higher product interest and sales, suggesting their effectiveness in shaping consumer quality perceptions during product launches.
- Why do embargoes work? Consumers respond more to the overall sentiment of the content than to the comprehensiveness of the information.
- While firms are adapting their embargo strategies over time, consumers do not exhibit significant learning behavior in response to embargoed content, indicating a persistent information asymmetry in the market.

Concluding Remarks

- Broader implications for experiential goods whose quality is unknown before consumption
- For firms:
 - By carefully controlling the nature of information released through influencers, firms can shape pre-launch consumer perceptions, thereby driving product interest and subsequent sales.
 - Embargo strategies should be tailored to both firm capabilities and target audience.
- For regulators:
 - Hidden embargoes prevent consumers from accurately assessing the reliability of organic content and product quality
 - To protect consumer welfare...
 - Mandate the disclosure of critical product information to ensure that consumers have the necessary details to make informed purchasing decisions.
 - Support tools to aid consumers in comprehending influencer content (e.g., AI-generated summaries that highlight key information).
 - Require disclosure of embargo agreements between firms and influencers.