FROM BOOTLEG TO BINGE: USER MIGRATION AND LEGAL DEMAND FOLLOWING BRAZIL'S MEGAFILMESHD SHUTDOWN

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ABSTRACT

In November 2015 the Brazilian Federal Police shut down *MegafilmesHD.net*, a piracy streaming site that accounted for roughly 60 million monthly visits—more traffic than any other piracy site in the country. We assemble a balanced click-stream panel of 2,557 Brazilian Internet users and estimate a generalized difference-in-differences model to determine the effect of this shock on legal and illegal consumption. The event caused treated users to substitute to streaming piracy sites by 20 % (minutes +61%) and, despite this diversion, raised their Netflix visits by 6 % (minutes +11 %).

Because the panel includes self-reported demographics, we shed light on *who* pivots after enforcement. Men, urban residents, and professional-class users divert more heavily to alternative piracy sites, whereas income-constrained segments (students and the unemployed) are least likely to adopt paid streaming in response to the shutdown.

Taken together, the evidence shows that even a single-site shutdown can generate measurable legal uptake in an emerging market, but legal conversion is concentrated among higher-income users. Price discrimination or ad-supported versions of legal services may therefore complement enforcement by attracting the more price-sensitive pirates.

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1. Introduction

Digital piracy and its effect on legal marketplaces have been central topics in economics and information systems research for two decades. A growing empirical literature now measures how different anti-piracy policies – site blocking, graduated response, notice-and-takedown – shift consumption between illegal and legal channels (e.g., Adermon and Liang 2014; Aguiar et. al. 2018; Danaher et. al. 2020).

Yet we know far less about *who* changes behavior when a piracy supply shock occurs. Prior work profiles pirates demographically, but has not answered the more policy-relevant question: which users respond to enforcement by substituting into legal markets versus evading the policy? Pinpointing these margins of adjustment could help rights-holders and regulators target interventions more efficiently.

We address this gap by analyzing the November 2015 shutdown of MegafilmesHD.net – then Brazil's most visited piracy streaming/link site. While the event predates today's site-blocking waves in Brazil and other countries, domain-level shutdowns remain a primary enforcement tool worldwide; thus the mechanisms we identify continue to matter for current policy debates. Though MegafilmesHD was only a single piracy site, it provided a highly convenient way for Brazilian viewers to access pirated content, with an interface that used the Portuguese language and frequently pointed to pirated files containing Brazilian films or films with Portuguese subtitles or dubbing.

Analyzing a panel of the clickstream web browsing behavior of 2,557 Brazilian Internet users, we employ a generalized version of the difference-in-differences model following Card (1994) and, more recently, Danaher et. al. (2020). We find that the shutdown reduced visits to MegafilmesHD

by over 90%, but it also induced a 20% increase in affected users' traffic to other similar piracy linking/streaming sites, with no shift towards piracy cyberlockers or P2P piracy sites. Importantly, treated users also raised their Netflix visits by 6% and time spent at Netflix by 11%, indicating some evidence of substitution into paid legal viewing.

Demographic heterogeneity is striking. Men and more educated individuals were more likely to locate and use alternative piracy sources, while women were more likely to curtail their piracy in response to the shutdown. Increases in Netflix usage were concentrated among those with higher disposable income: students and the unemployed showed statistically less legal uptake. These patterns likely highlight price sensitivity as a key barrier to migration from piracy to paid services.

Our contribution is two-fold. First, we provide the first causal estimate of the MegafilmesHD shutdown's impact on both substitute piracy and on paid streaming – extending the existing website-closure literature to a major emerging market and adding an important replication datapoint. Second, we uncover systematic demographic differences in post-shutdown behavior. Although we cannot identify the precise mechanism or reason for these differences (e.g. price sensitivity versus search costs), identifying *which* groups switch to legal channels and which persist in piracy is a necessary step toward designing more effective, targeted interventions – a topic to which we return in the concluding section.

2. Background

2.1 Film, Television, and Piracy in Brazil

According to the Motion Picture Association (MPA), Brazil ranked 11th in global box-office revenue in 2014 ($800 million) and was projected to grow to become the world's 4th largest audiovisual market over time given its pattern of rapid growth. Brazil also placed 8th in Video-on-

Demand (VOD) revenue in 2016 ($352 million). Piracy, however, is pervasive in Brazil. An MPA-commissioned study identified 400 piracy websites tailored to Brazilian users; 57 of these sites drew more than one million monthly visitors and together offered 13,000 titles.[1] A piracy site is "tailored" to Brazil chiefly by using Portuguese interfaces, supplying Portuguese-subtitled or dubbed copies, and featuring locally produced films and tv shows.

2.2 MegafilmesHD.net Shutdown

MegafilmesHD indexed roughly 150,000 links to infringing content – nearly all filmed, subtitled, or dubbed in Portuguese. By 2015, it ranked as the 48th most visited website in Brazil, attracting 60 million monthly visits.[2] Google Trends confirms its popularity was almost entirely domestic – see Figure 1.

MegafilmesHD was characterized as a link-streaming piracy site. Unlike cyber-lockers (which host files) or P2P trackers (which coordinate peer-to-peer downloads), MegafilmesHD acted as a search and curation layer; it cataloged links hosted elsewhere and embedded them in a friendly, thumbnail-based interface in Portuguese. Clicking these links allowed one to easily stream the title in an embedded video player. Prior research shows that lower search costs can expand consumption and increase consumer surplus in digital markets (Brown and Goolsbee 2002; Brynjolfsson et. al. 2010, Nagaraj and Reimers 2023) and in piracy specifically (Rajavi et. al. 2024). Figure 2 illustrates the site's convenient Portuguese UI, simple search bar, and genre filters.

On November 18th, 2015, the Brazilian Federal Police raided the locations hosting the servers behind MegafilmesHD; within days the domain went dark.[3] This takedown did *not* remove the

[1] https://www.mpa-americalatina.org/wp-content/uploads/2018/06/MPAAL_10_04_2016-english-fv.pdf
[2] See https://torrentfreak.com/arrests-as-police-target-latin-americas-largest-pirate-site-151119
[3] https://iipa.org/files/uploads/2017/12/2016SPEC301BRAZIL.pdf

underlying files from cyber-lockers, nor did it eliminate substitute link sites. Thus, two opposing hypotheses arise.

Disruption hypothesis – if MegafilmesHD materially lowered search costs relative to other options, its removal could reduce overall piracy and prompt some users to pay for the convenience of legal services.

Substitution hypothesis – Users may simply migrate to competing piracy link/streaming sites or search piracy cyberlockers directly, leaving total piracy and legal consumption unchanged.

Earlier evidence from other piracy shutdowns is mixed. While Danaher and Smith (2014) find that the shutdown of Megaupload.com cyberlocker site increased digital movie sales by 6.5-8.5%, Aguiar et. al. (2018) found no increase in legal consumption when Germany shut down kino.to, a piracy link/streaming site. This suggests that outcomes may depend on site prominence and convenience, or the local market context. Our study tests which scenario prevailed in Brazil.

2.3 Netflix and Legal Consumption in Brazil

During our study window, Netflix dominated Brazil's subscription video on demand (SVOD) market – industry estimates place its 2015-2016 share above 70%.[4] While we cannot observe box-office attendance or transactional VOD (e.g. iTunes downloads) in our data, we do record panelists' visits and minutes on Netflix.com. We therefore treat these metrics as proxies for paid legal viewing and ask: Did the shutdown shift any consumption toward Netflix? Is this effect stronger among any specific user segments?

[4] See, for example, https://www2.itif.org/2018-testimony-global-digital-trade.pdf or https://www.statista.com/statistics/867894/most-popular-video-on-demand-platforms-brazil/#statisticContainer

3. Related Literature

3.1 Digital Piracy and Sales of Information Goods

A large empirical literature finds that piracy displaces legal demand. Danaher, Smith, and Telang (2017) review twenty-six peer reviewed publications and report that twenty-three of them document a negative effect of piracy on sales. For the Brazilian market in particular, Nishijima et. al. (2020) show that broadband-enabled piracy reduced box office revenues. Frick et. al. (2023) specifically show that piracy is an economic substitute for Netflix. These findings motivate research on whether enforcement can reverse such losses / substitution.

3.2 Antipiracy Enforcement and Strategies

Antipiracy enforcement actions can vary in scope and effectiveness. Demand-side notices or legal penalties can increase music sales when credibly enforced (Danaher et. al. 2014; Adermon and Liang 2014), but have little impact on movie box office (McKenzie 2017). Supply-side interventions yield mixed results. Seizing and shutting down Megaupload.com boosted digital movie sales by 6.5-8.5% and shifted box office revenues toward blockbusters and away from smaller, independent films (Peukert et. al. 2017). By contrast, blocking The Pirate Bay in the Netherlands and in the UK had limited effects on total piracy or legal consumption (Poort et. al. 2014; Danaher et. al. 2020). Aguiar et. al. (2018) find that shutting down Germany's link streaming site kino.to merely displaced piracy to substitute piracy sites with no legal uptick. Blocking 19 major piracy sites in the UK in 2013 and over 50 sites in 2014 both caused increases in legal consumption (Danaher et. al. 2020). The effectiveness of supply-side antipiracy interventions may therefore depend on the degree to which they increase the search and learning costs of piracy.

3.3 Demographics, Psychology, and Piracy

Evidence consistently shows that men and younger individuals pirate more than women and older cohorts (Kwong et. al. 2003; Mandel and Süssmuth 2012). Theoretical work attributes these patterns to cognitive dissonance (Festinger 1957; Redondo and Charron 2013) and neutralization techniques (Sykes and Matza 1957; Ingram and Hinduja 2008), which pirates use to rationalize illegal behavior. Survey evidence from Riekkinen (2016) suggests that men rely more on neutralization (e.g. "I only pirate because the industry charges so much" or "I wouldn't pirate if the industry didn't make it so hard to find content"), whereas women are more likely to practice cognitive dissonance (e.g. "piracy is not a 'real' crime" or "piracy is victimless").

What remains largely unexplored is whether these demographic and psychological differences translate into differential responses to enforcement. Reis et. al. (2024) provide the only causal evidence we are aware of, showing that DNS blocking reduced piracy less for households with younger members. We extend this line of inquiry by examining gender, education, and income heterogeneity following the MegafilmesHD shutdown, and by measuring both illegal substitution and legal uptake.

4. Data

4.1 Panel Source and Construction

We use clickstream data from Netquest, a market research panel that installs passive tracking software on the personal computers of consenting users. From the full panel we select the 2,557 Brazilian users who are observed continuously between August 18, 2015 and February 17, 2016 – exactly three months before and after the MegafilmesHD shutdown – yielding a balanced six month panel. Thus the shutdown occurred on the first day of the fourth month in our data.

For each user-month we observe the following: (i) visits and minutes on MegafilmesHD.net; (ii) aggregate visits/minutes to other link streaming piracy sites, cyberlocker/host piracy sites, and P2P tracker piracy sites; (iii) visits/minutes to Netflix.com, the dominant legal SVOD service. Site lists for each piracy bucket are in Appendix A, and the construction protocol is described in Appendix B. All variables are measured as total monthly counts, and we treat each panelist with equal weight.

4.2 Descriptive Statistics

Table 1 reports means and standard deviations. As is common with web traffic, distributions are highly right-skewed. Pre-shutdown, MegafilmesHD averaged 3.28 monthly visits per user, exceeding any single piracy site and rivalled only by Netflix (3.56 monthly visits per user). Streaming/link piracy sites dominate minutes because users watch videos in-browser or in a video player while on the site, while P2P and cyberlocker sites mainly facilitate downloads.

Post-shutdown, traffic to MegafilmesHD collapses (-90% visits, -99% minutes)[5], confirming the effectiveness of the takedown. Visits to other link/streaming sites rise by ~70%, while Netflix visits increase more modestly (about one extra visit per month, and a 40% increase in minutes). These raw changes motivate the causal analysis but are not themselves determinative, given pre-existing regional growth in Netflix adoption.

4.3 Treatment Intensity

Our identification strategy exploits heterogeneity in pre-shutdown usage of MegafilmesHD, which we use as a proxy for the "bite" of the treatment on a given user. Notably, this is the same

[5] The remaining visits occurred in the first month of the post-shutdown period, when some tech/piracy blogs reported the site had sporadic uptime but with limited piracy link availability. https://torrentfreak.com/arrests-as-police-target-latin-americas-largest-pirate-site-151119/

identification strategy used in Danaher et. al. (2020) to study the effect of the 2012, 2013, and 2014 waves of piracy website blocks in the UK. The intuition is that users who did not visit MegafilmesHD during the pre-period likely would not have attempted to do so in the post-period, making them similar to a control group. Heavy users of MegafilmesHD during the pre-period were likely more affected by the treatment than lighter users. This intuition backs our implementation of the generalized difference-in-differences model with a continuous metric of treatment intensity – namely, the user's pre-period visits to MegafilmesHD.

Table 2 shows that 60% of users never visited MegafilmesHD (the "control" group), while the treated 40% display wide variation in pre-shutdown usage – from occasional browsers (<=5 visits/month) to heavy users (>50 visits/month). This dispersion provides the continuous treatment intensity required for our generalized difference-in-differences estimator.

4.4 Demographic Covariates

Netquest collects self-reported demographics: gender, age, urban/suburban/rural location, socio-economic class, employment and student status, number of children, and whether the respondent is the primary earner. Following the literature review, we focus on gender, student status, and age as theoretically relevant moderators, and additionally we use socio-economic class, employment status, and urban residence as proxies for income and education, neither of which are directly observable in our data. We also consider the number of children in the household given results from the prior literature (Reis et. al. 2024). Table 3 summarizes the sample: 52% female; 47% located in Brazil's two largest metro areas; 8% students; 10% unemployed; and 29% in the professional class.

5. Empirical Model and Results

5.1 Overall Effect of the Shutdown

Descriptive statistics in Table 1 show traffic shifts after the MegafilmesHD raid, but simple before-after comparisons cannot separate the policy effect from underlying trends, such as the secular rise of Netflix in Brazil. We therefore exploit individual heterogeneity in pre-shutdown usage of MegafilmesHD to estimate the causal impact.

Let Pre_Megavisits$_i$ denote the number of visits user i made to MegafilmesHD during the three months before the takedown. We treat this as a continuous measure of treatment intensity; users with Pre_Megavisits$_i$ = 0 form a control group, while heavier users experienced a larger "bite" of the policy than lighter users. The key identifying assumption is parallel trends in intensity: we must assume that, absent the shutdown, changes in visits to any outcome site would be uncorrelated with Pre_Megavisits$_i$.

We first estimate a month-by-month event-study:

$$visits_{it} = \beta_0 + \beta_1 \underbrace{Pre_Megavisits_i}_{Treatment\ Intensity} + \sum_{t=1}^{6} \beta_2 Month_t + \underbrace{\beta_3 Month_t * Pre_Megavisits_i}_{Coefficient\ of\ Interest} + \mu_i + \varepsilon_{it} \quad (1)$$

Where $visits_{it}$ represents the number of visits made by individual i during month t to the outcome sites (any of the buckets of remaining piracy sites, or Netflix), $Month_t$ represents a vector of month fixed effects, $Pre_Megavisits_i$ is the treatment intensity of user i, μ_i is a vector of individual fixed effects, and ε_{it} is a stochastic error term. We omit month t=3 as it is the month just before treatment. The β_3 coefficients trace how month-to-month changes in outcome visits vary with treatment intensity. Our outcome variable – visits – is a count variable with relatively

low counts and with over-dispersion. We therefore estimate (1) with the conditional fixed effects negative binomial estimator (FE-NB) of Hausman, Hall, and Griliches (1984), which avoids the incidental parameters bias associated with unconditional fixed effects negative binomial models.[6]

Figure 3 plots β_3 for each outcome. Pre-period coefficients (t = 1, 2) are indistinguishable from zero, supporting the parallel trends assumption for all outcomes. Post-shutdown, β_3 are also indistinguishable from zero for remaining P2P and cyberlocker piracy sites, implying no diversion to those channels. β_3 are positive and statistically significant for other link/streaming piracy sites in months 4-6, though this declines some over time. This could be the result of thwarted MegafilmesHD users visiting a number of piracy link sites shortly after the shutdown to find ones that work for them, and then settling into those sites. Finally, β_3 are positive but individually insignificant for Netflix visits, yet a Wald test rejects the null hypothesis that these coefficients are jointly equal to zero for months 4-6 ($p<0.05$).

Repeating the analysis with ln(minutes + 1) as the outcome and a standard fixed effects OLS estimator[7] (Figure 4) yields similar patterns, with β_3 individually significant for Netflix in all post-shutdown months. Coefficient estimates supporting Figures 3 and 4 can be found in Tables 5-6.

To summarize the total post-shutdown effect we collapse months 4-6 into a single $Post_t$ indicator:

$$visits_{it} = \beta_0 + \beta_1 Post_t + \beta_2 \underbrace{Pre_Megavisits_t}_{Treatment\ Intensity} + \underbrace{\beta_3 Post_t * Pre_Megavisits_i}_{Coefficient\ of\ Interest} + \mu_i + \varepsilon_{it} \qquad (2)$$

[6] The conditional NB estimator does not estimate a true fixed effect and therefore retains time-invariant covariates – for example, Pre-Megavisit$_i$.

[7] Cameron and Trivedi (2005) suggest generalized linear models like negative binomial for count data when the expected value is below ten (as it is with visits) but using OLS when it is ten or above (as it is for minutes).

Here, β_3 is our coefficient of interest. Table 4 reports estimates for both outcomes (visits and log minutes) for each bucket of sites. In columns (1) through (4), we observe no significant effect of the shutdown on visits or minutes on P2P or cyberlocker piracy sites. We observe a statistically significant ($p < 0.001$) increase in link piracy site visits such that for each additional pre-period visit to MegafilmesHD, a user increased post-period visits to substitute link piracy sites by an additional 0.33%. We observe a smaller but statistically significant ($p < 0.05$) increase in visits to Netflix, such that a user with one more pre-period visits to MegafilmesHD increased her visits to Netflix by 0.17%. Together, these estimates indicate that shutting down MegafilmesHD diverted a sizeable fraction of its users to other link piracy sites and a smaller but significant share toward legal SVOD consumption.

While we prefer the NB model for visits and OLS for minutes, the conditional FE-NB model does not allow for clustering of standard errors at the user level. In Appendix C we validate the significance of our results using traditional fixed effects OLS estimation with ln(visits + 1) as the dependent variable, and we cluster standard errors at the individual level. All key results remain the same in sign and significance, supporting our FE-NB inferences.

In columns (5) through (8) of Table 4 we observe similar results for minutes spent on the outcome sites. In Appendix C we show that these OLS results for minutes hold under the conditional FE-NB model as well.

5.2 Do Economic or Demographic Factors Dominate Piracy Decisions Post-Shutdown?

Having shown that the raid and shutdown shifted behavior on average, we next ask which user groups drove those changes. We interact treatment intensity with one demographic covariate at a time:

$$visits_{it} = \beta_0 + \beta_1 Post_t + \beta_2 \underbrace{Pre_Megavisits_i}_{Treatment\ Intensity} + \beta_3 Post_t * Pre_Megavisits_i \quad (3)$$

$$+ \underbrace{\beta_4 Demographic_Moderator_i * Post_t * Pre_Megavisits_i}_{Coefficient\ of\ Interest}$$

$$+ \beta_5 Demographic_Moderator_i + \beta_6 Post_t * Demographic_Moderator_i$$

$$+ \beta_7 Demographic_Moderator_i * Pre_Megavisits_i + \mu_i + \varepsilon_{it}$$

Where Demographic_Moderator$_i$ is a binary indicator (female=1, student=1, age_over_35=1, etc).[8] While β_3 indicates the effect of the shutdown when the indicator is set to zero, the triple interaction coefficient β_4 measures whether the post-shutdown response varies across the demographic dimension. We estimate (3) with the same conditional FE-NB specification used in section 5.1, and we repeat these analyses with ln(minutes+1) as the outcome variable using panel OLS with robust clustered standard errors. For parsimony we restrict attention to the two outcomes that exhibited mean effects: other link piracy sites, and Netflix.

Figure 5 (visits) and Figure 6 (minutes) plot β_4 with 95% confidence intervals; full tables appear in Appendix C (Tables C3-C6). Below we summarize the patterns and interpret them with appropriate caution given the limited scale of our data and our limited statistical power.

5.2.1 Gender

Female users exhibit a significantly smaller diversion to substitute link sites ($p < 0.05$) for both minutes and visits. Females are also more likely to switch to Netflix after the shutdown, but this result is not statistically significant ($p = 0.12$). This result is consistent with survey evidence that women are less willing to sustain piracy once illegality is salient (cognitive dissonance

[8] The only exception is the "children" variable, which is a count of the number of children in the household.

mechanism) while men are more likely to react to an enforcement by doubling down on piracy (antipiracy enforcement exacerbates neutralization). We refrain from claiming that women necessarily shift more to legal channels – the evidence suggests this, but it is statistically weak.

5.2.2 Student Status

The point estimates indicate that students increase visits (and minutes) to substitute link piracy sites more than non-students, but this effect is imprecisely estimated ($p > 0.1$). For Netflix, however, the student interaction is negative and marginally significant (visits $p = 0.09$, minutes $p = 0.11$). Taken together, the data weakly support the idea that students are less responsive to enforcement – either because of lower income or stronger peer norms – but the evidence is not conclusive.

5.2.3 Socio-economic Class, Employment, and Urbanity

Professional class and urban residents – proxies for both higher education and income – show a larger diversion to other link piracy sites ($p < 0.05$ and $p < 0.1$, respectively). The unemployed divert less to other piracy sites ($p < 0.01$) but they also divert fewer minutes ($p < 0.05$) to Netflix and possibly fewer visits ($p > 0.1$) as well.

These patterns suggest that search and switching costs - which fall with education and digital literacy - dominate the decision to keep pirating after a site is shut down. By contrast, income constraints dominate the decision to pay for legal services, implying that price-sensitive pirates are least likely to convert unless lower-cost tiers are available. We acknowledge that education and income are conflated in our proxies – future work with direct measures could better disentangle these two mechanisms.

5.2.4 Age, Main Earner, and Children

None of these variables moderate post-shutdown changes for either piracy or Netflix, suggesting that age-based stereotypes about piracy persistence do not hold in this context (contrary to Reis et. al. 2024).

5.2.5 Caveats

These demographic findings come with several caveats. First, we report unadjusted p-values for each test, in spite of having conducted multiple hypothesis tests. Controlling for false discovery rates might render some of these results statistically indistinguishable from zero. Generally, significance may be limited due to the sample size of 2,557 users; some sub-groups (e.g. students, unemployed) are small which necessarily widens confidence intervals. As well, while the patterns align with cognitive dissonance, search cost theories, and income constraints, we cannot directly observe rationalizations, effort, or price elasticity. In light of these caveats, we interpret the demographic heterogeneity as *consistent with* – and not *proof of* – those mechanisms.

6. Discussion

6.1 How Large Was the Shock?

MegafilmesHD was the single most-visited piracy domain in our panel—40 % of users accessed it at least once in the three months before the raid. Shutting the site down led to statistically significant increases in visits and minutes at both other link piracy sites and at Netflix. By pairing the coefficient estimates from Table 4 with each user's treatment intensity, we can calculate each user's counterfactual visits to these sites in the absence of the shutdown (i.e. if treatment intensity were zero). Thus, we can compute each user's causal change in outcome visits and minutes to aggregate an overall back-of-the-envelope effect on treated users.

We conclude that, relative to a no-shutdown counterfactual, the average treated user increased their visits to other remaining link piracy sites by 20% and minutes at these sites by 61%. These results are consistent with the German shutdown of kino.to, where Aguiar et. al. (2018) found that pirates dispersed to other sites after the shutdown.

However, we also find that the shutdown caused treated users to increase their visits to Netflix by 6% and their time spent at Netflix by 11%, on average. These results contradict the kino.to results where there was no uptick in legal, but the authors of that study note that only 17% of users visited kino.to before the shutdown, while 40% of users in our data visited MegafilmesHD. Our findings are similar to the legal increases when Megaupload was shutdown (6.5-8.5%) and during the UK's multi-site piracy blockade (7-12% increase). (Danaher and Smith 2014; Danaher et. al. 2020). In general this underscores the role of site prominence and market context in determining the expected effect of an antipiracy intervention on legal consumption.

6.2 Who Persists in Piracy and Who Converts?

The triple interaction estimates in Section 5 reveal three broad patterns.

Gender – Female users divert markedly less traffic to substitute link piracy sites than male users in both visits and minutes. Female users are also more likely to increase usage of Netflix, but this result is not statistically significant ($p=0.12$). The overall evidence is consistent with the notion that women are more likely to abandon piracy when illegality becomes salient, and it suggests that they may be more likely to migrate to paid legal consumption.

Student Status – Students are more likely to add traffic to alternative link piracy sites, although the estimates are imprecise ($p > 0.1$). Their uptake of Netflix is smaller than non-students; the interaction is negative and marginally significant for visits ($p = 0.09$) and minutes ($p = 0.11$). This

pattern is directionally consistent with lower disposable income or stronger peer norms among students, but it should be viewed as suggestive.

Socioeconomic Class, Employment, Urbanity – Users in the professional class and those living in urban centers – proxies for education and income – show a larger diversion to other link piracy sites ($p < 0.05$ and $p < 0.1$, respectively). Conversely, unemployed users divert less to link piracy sites ($p < 0.05$) and log fewer additional minutes on Netflix ($p < 0.05$). These findings may imply that search and switching costs, which fall with education and digital literacy, outweigh higher income when it comes to continuing piracy, whereas income constraints inhibit the move to paid streaming.

6.3 Implications for Enforcement and Firm Strategy

For policymakers, the Brazilian case shows that site-level shutdowns can yield measurable legal gains even when only a single domain is targeted, provided that the site is sufficiently dominant and adds enough marginal value / convenience for users compared to alternatives. For legal platforms, the demographic evidence points to the potential value of segment-based pricing or service tiers when enforcement activity is expected. Ad-supported tiering or price discrimination for certain segments of the population may capture price sensitive pirates displaced by enforcement without discounting revenue from existing customers.

6.4 Future Research

Our study uses 2015-2016 data; although Brazil's market structure has evolved, site-blocking and domain seizures remain standard tools worldwide, and so the mechanisms remain relevant today. Still, three limitations invite future research. First, income and education are proxied rather than

directly observed. Future work with direct socioeconomic data – or experimental variation in SVOD prices – could isolate which margin drives switching. The relatively small size of our panel – just 2,557 Internet users – may have limited the significance of our demographic results.

Second, our study is based in a single market, single-site context. While it adds to several prior studies based in this same context, cross-country replications or multi-site natural experiments could allow greater understanding of why some interventions increase legal update while others fail to do so.

Finally, a field experiment that varies both legal service pricing and enforcement intensity could speak directly to the optimal joint design of anti-piracy policy and platform strategy. Such an experiment could be run by a vertically integrated firm that provides both Internet access (and thus can block sites) and legal services (and thus can vary attributes of those offerings).

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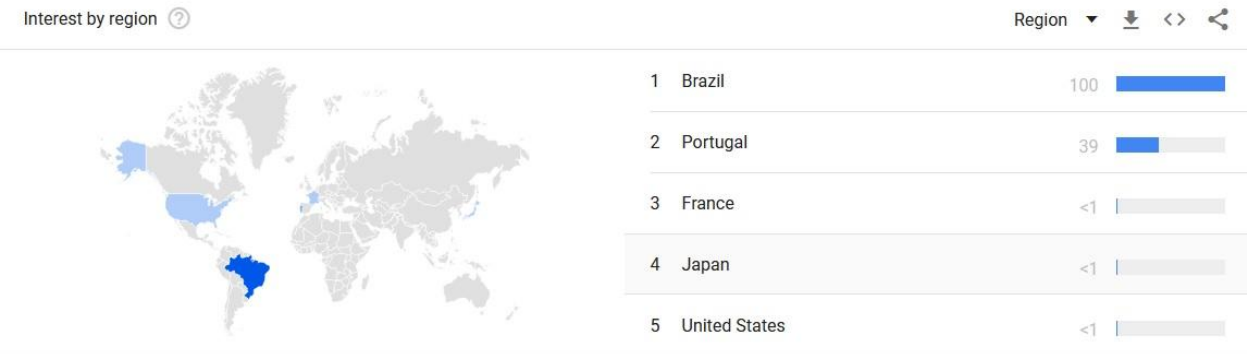
Figures

Figure 1: Google Trends Search Index for "MegafilmesHD" During 2014-2015



Notes: Note that the top country searching for MegafilmesHD was Brazil, with Portugal as a distant second (due to speaking the same language) and insignificant interest from any other countries. We use this to establish that MegafilmesHD was a piracy site catering specifically to Brazil (and to Portugal, to a lesser extent).

Figure 2: Main Search Page at MegafilmesHD Prior to Its Shutdown

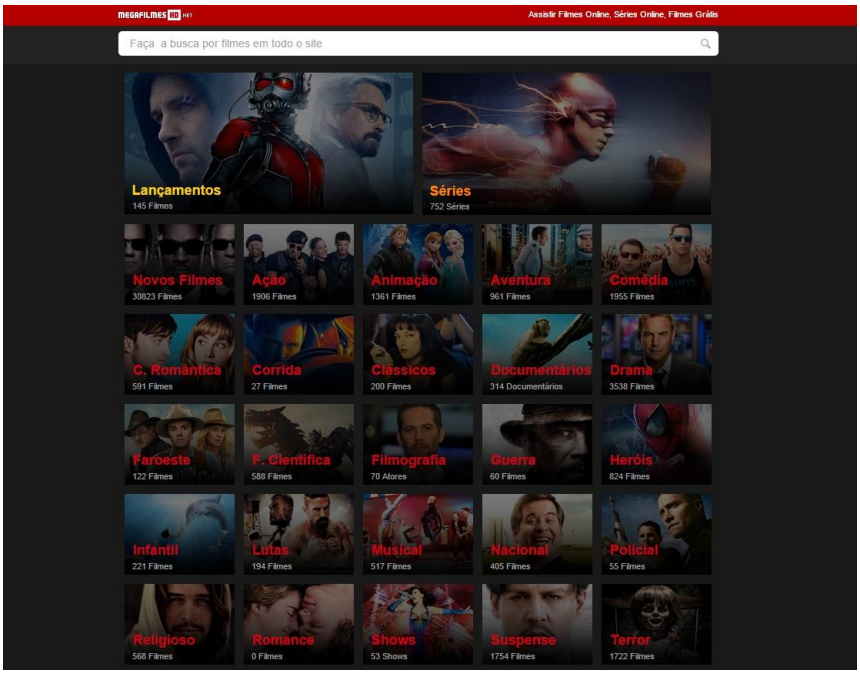


Figure 3: Monthly Coefficients From Table 5 Showing Impact of MegafilmesHD Blocking on Visits to Piracy Sites and Netflix

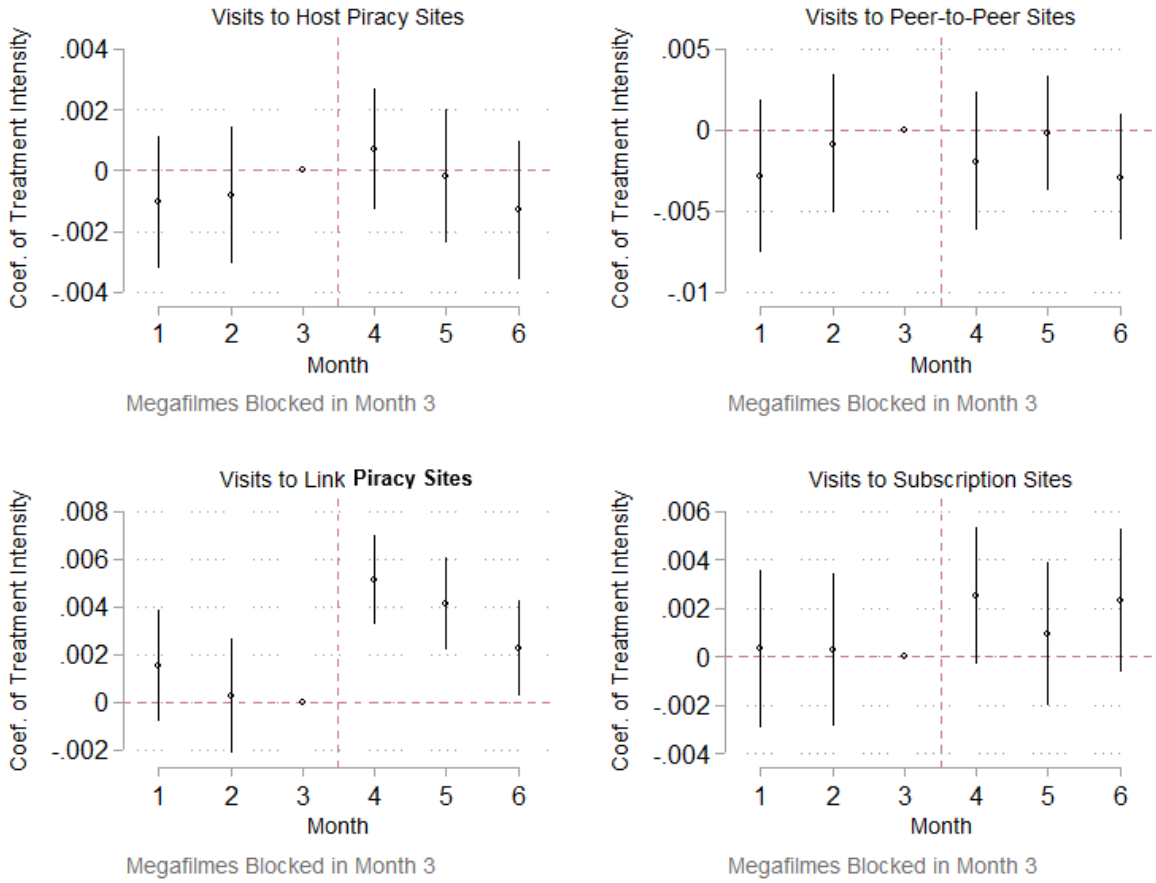


Figure 4: Monthly Coefficients From Table 5 Showing Impact of MegafilmesHD Blocking on Minutes Spent Piracy Sites and Netflix

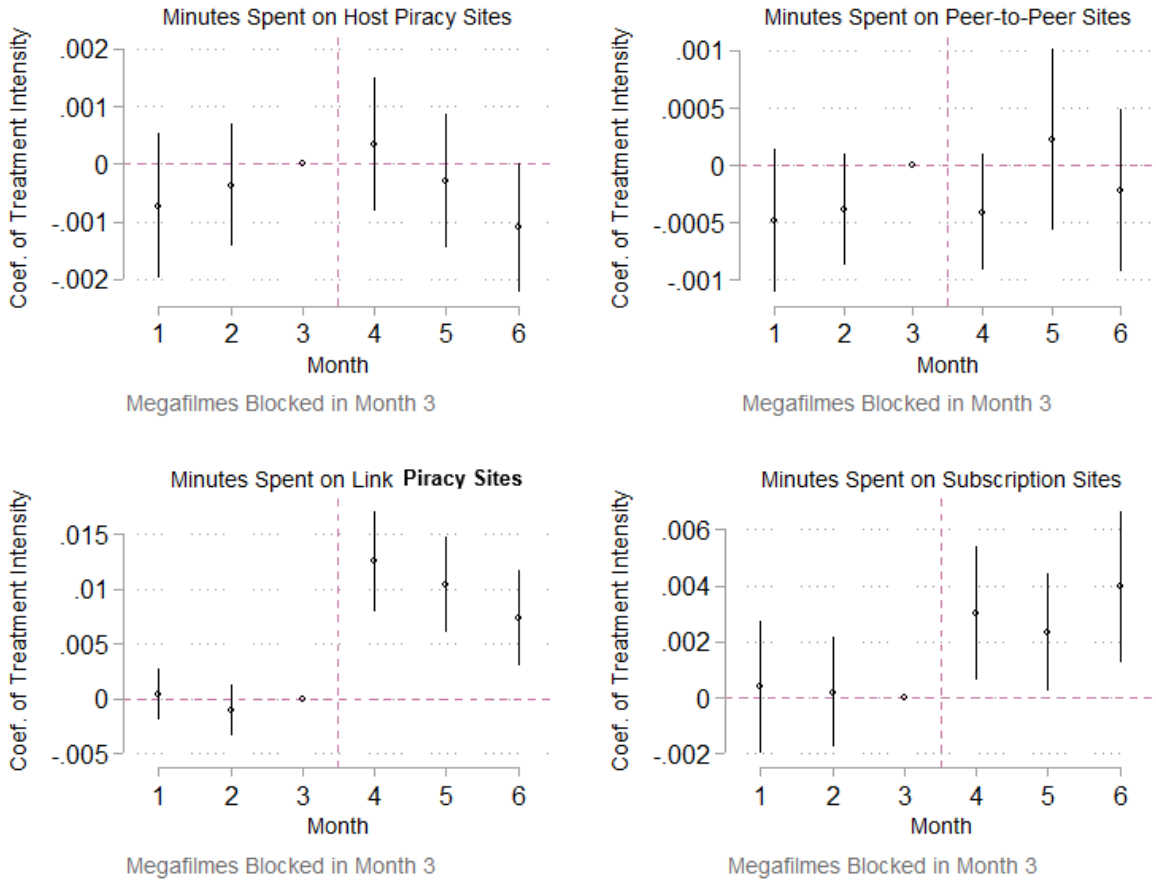
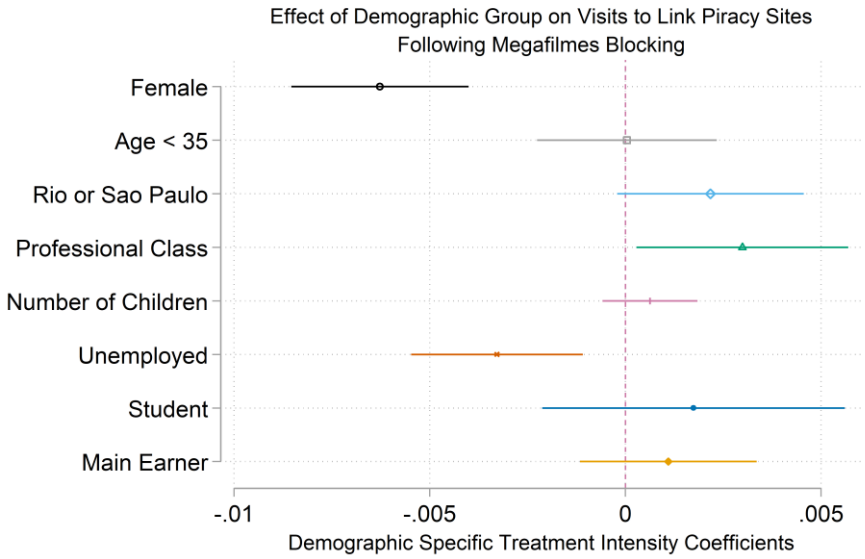


Figure 5: Regression Summary, Moderating Impact of Demographic Group on Link Piracy Sites and Netflix Visits in Response to Website Blocking



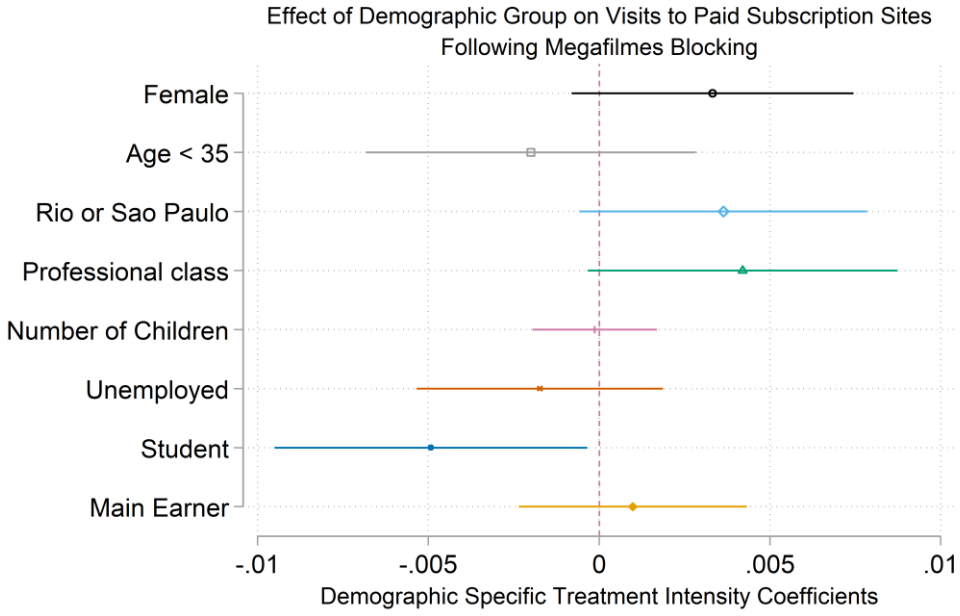
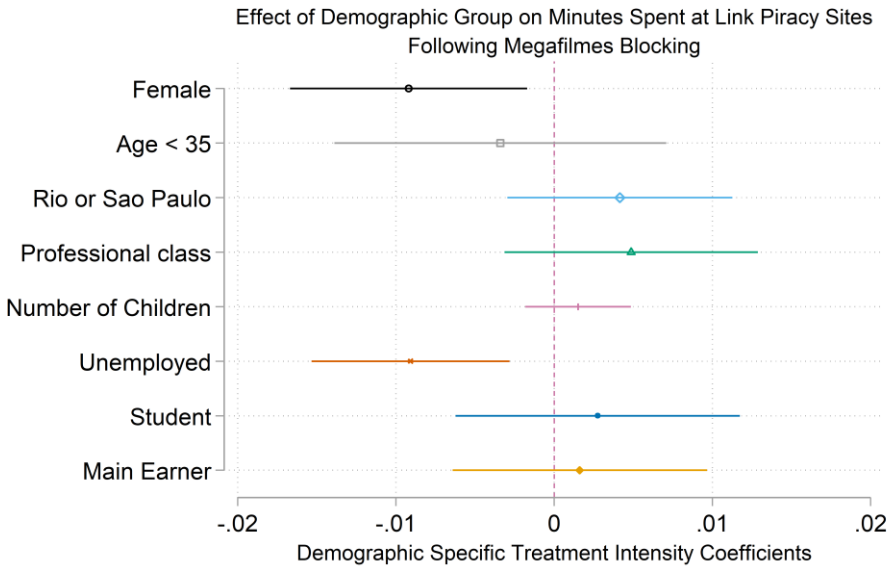
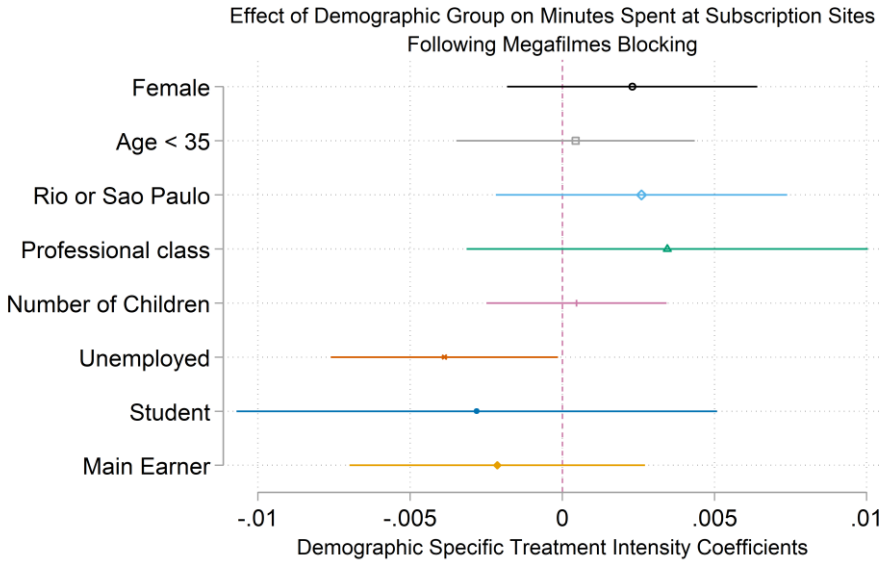


Figure 6: Regression Summary, Moderating Impact of Demographic Group on Minutes Spent on Link Piracy Sites and Netflix in Response to Website Blocking





Tables

Table 1: Summary Statistics Average Monthly Media Sites Visits Before/After Blocking

	Before Megafilmes Shutdown		After Megafilmes Shutdown	
	mean	**sd**	**mean**	**sd**
Megafilmes Visits	3.28	11.32	0.33	1.04
Minutes Spent on Megafilmes	56.77	293.36	0.82	6.11
Host Piracy Sites Visits	1.48	3.43	1.29	2.99
Peer-to-Peer Sites Visits	0.42	2.09	0.69	2.74
Link Piracy Sites Visits	2.75	9.71	4.74	13.46
Paid Subscription Sites Visits	3.56	11.28	4.56	13.80
Minutes Spent on Host Piracy Sites	4.24	17.91	3.28	11.05
Minutes Spent on Peer-to-Peer Sites	0.72	5.16	1.51	11.14
Minutes Spent on Link Piracy Sites	27.64	117.89	49.41	195.88
Minutes Spent on Paid Subscription Sites	57.55	261.78	80.44	328.34
Individuals	2557		2557	

Table 2: Frequency Distribution for Pre-Shutdown Visits to MegaFilmesHD

Pre-Shutdown Visits to MegafilmesHD	Frequency
0	1549
1-4	455
5-9	122
10-24	166
25-49	113
50-99	99
100+	53

Table 3: Summary Statistics, Demographic Characteristics of Consumer Panel

	mean	sd
Female = 1	0.54	0.50
Age < 35	0.52	0.50
Lives in Rio or Sao Paulo	0.47	0.50
Professional Class (NRS Social Class A or B1)	0.28	0.45
Number of Children	0.93	1.12
Unemployed = 1	0.10	0.30
Student	0.08	0.27
Main Household Earner	0.71	0.45
Months	6	
Individuals	2557	

Table 4: Effect of MegafilmesHD Website Blocking on Substitution To Legal and Illegal Channels, Generalized Difference-in-Differences

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Site Type	**Host Piracy**	**Peer-to-Peer**	**Link Piracy**	**Paid Subscription**	**Host Piracy**	**Peer-to-Peer**	**Link Piracy**	**Paid Subscription**
Dependent Variable	*Visits*	*Visits*	*Visits*	*Visits*	*Log of Minutes*	*Log of Minutes*	*Log of Minutes*	*Log of Minutes*
Post = 1 if after MegafilmesHD blocked	-0.151***	0.581***	0.471***	0.315***	-0.0572***	0.0919***	0.236***	0.174***
	(0.0265)	(0.0485)	(0.0303)	(0.0344)	(0.0141)	(0.00887)	(0.0263)	(0.0250)
Treat Intensity: Pre-Period Visits to Megafilmes	-0.000574	0.000619	0.0000849	-0.00310***				
	(0.000875)	(0.00172)	(0.000618)	(0.000817)				
Pre-Period Visits to Megafilmes x Post	0.000401	-0.000369	0.00333***	0.00170*	0.00000796	0.000155	0.0102***	0.00289**
	(0.000657)	(0.00121)	(0.000556)	(0.000847)	(0.000308)	(0.000229)	(0.00208)	(0.00112)
Constant	0.0396	-0.744***	-0.900***	-0.812***	0.536***	0.115***	0.740***	0.710***
	(0.0374)	(0.0616)	(0.0341)	(0.0373)	(0.00681)	(0.00437)	(0.0123)	(0.0125)
N	10440	4212	9408	7344	15342	15342	15342	15342
Individuals	1740	702	1568	1224	2557	2557	2557	2557
Log-Likelihood	-11338.92	-4130.59	-13404.34	-10112.65				
Within-R2					0.002	0.014	0.049	0.012
Between-R2					0.001	0.001	0.153	0.015
Individual FEs	Y	Y	Y	Y	Y	Y	Y	Y
Estimator	Negative Binomial Count	Negative Binomial Count	Negative Binomial Count	Negative Binomial Count	Panel OLS	Panel OLS	Panel OLS	Panel OLS

Standard errors in parentheses, clustered at individual level for Panel OLS models.
*** p < 0.001 ** p < 0.01 * p < 0.05

Table 5: Impact of MegafilmesHD Blocking on Legal and Illegal Website Visits

Site Type	Pre-Post Blocking	**Host Piracy**	**Peer-to-Peer**	**Link Piracy**	**Paid Subscription**
Dependent Variable		*Visits*	*Visits*	*Visits*	*Visits*
month=1		-0.0152	0.0207	-0.149*	-0.101
		(0.0441)	(0.0935)	(0.0579)	(0.0633)
month=2		-0.0287	0.00420	-0.103+	-0.0307
		(0.0446)	(0.0924)	(0.0576)	(0.0624)
month=3		*Omitted base case*			
month=4		-0.158***	0.153+	0.398***	0.136*
		(0.0454)	(0.0908)	(0.0511)	(0.0600)
month=5		-0.188***	0.733***	0.419***	0.372***
		(0.0459)	(0.0812)	(0.0513)	(0.0583)
month=6		-0.149**	0.826***	0.356***	0.305***
		(0.0455)	(0.0809)	(0.0523)	(0.0594)
Treat Intensity: Pre-Period Visits to Megafilmes		0.000146	0.00231	-0.000211	-0.00333**
		(0.00107)	(0.00220)	(0.000963)	(0.00126)
month=1 # Treat Intensity: Pre-Period Visits to Megafilmes	Pre	-0.00104	-0.00284	0.00149	0.000324
		(0.00111)	(0.00240)	(0.00119)	(0.00165)
month=2 # Treat Intensity: Pre-Period Visits to Megafilmes	Pre	-0.000799	-0.000869	0.000246	0.000285
		(0.00114)	(0.00219)	(0.00124)	(0.00159)
month=3 # Treat Intensity: Pre-	Pre	*Omitted base case*			
month=4 # Treat Intensity: Pre-Period Visits to Megafilmes	Post	0.000720	-0.00193	0.00511***	0.00250+
		(0.00102)	(0.00220)	(0.000948)	(0.00142)
month=5 # Treat Intensity: Pre-Period Visits to Megafilmes	Post	-0.000203	-0.000234	0.00411***	0.000933
		(0.00112)	(0.00181)	(0.000969)	(0.00149)
month=6 # Treat Intensity: Pre-Period Visits to Megafilmes	Post	-0.00130	-0.00291	0.00225*	0.00230
		(0.00115)	(0.00198)	(0.00103)	(0.00150)
Constant		0.0524	-0.703***	-0.819***	-0.761***
		(0.0450)	(0.0828)	(0.0473)	(0.0523)
N		10440	4212	9408	7344
Individuals		1740	702	1568	1224
Log-Likelihood		-11335.85	-4077.75	-13383.43	-10101.15
Month FEs		Y	Y	Y	Y
Individual FEs		Y	Y	Y	Y
Estimator		Negative Binomial Count	Negative Binomial Count	Negative Binomial Count	Negative Binomial Count

Standard errors in parentheses
*** p < 0.001 ** p < 0.01 * p < 0.05 + p < 0.1

Table 6: Impact of MegafilmesHD Blocking on Minutes Spent at Legal and Illegal Media Websites

Site Type	Pre-Post Blocking	(1) **Host Piracy**	(2) **Peer-to-Peer**	(3) **Link Piracy**	(4) **Paid Subscription**
Dependent Variable		*Log of Minutes*	*Log of Minutes*	*Log of Minutes*	*Log of Minutes*
month=1		-0.0116	0.00297	-0.0449	-0.0626*
		(0.0231)	(0.0106)	(0.0290)	(0.0295)
month=2		-0.0221	-0.00873	-0.0381	-0.0349
		(0.0215)	(0.00884)	(0.0269)	(0.0241)
month=3		*Omitted base case*			
month=4		-0.0585**	0.0141	0.188***	0.0603*
		(0.0206)	(0.00972)	(0.0321)	(0.0271)
month=5		-0.0750***	0.121***	0.261***	0.209***
		(0.0221)	(0.0135)	(0.0352)	(0.0334)
month=6		-0.0719**	0.135***	0.177***	0.155***
		(0.0226)	(0.0142)	(0.0358)	(0.0358)
month=1 # Treat Intensity: Pre-Period Visits to Megafilmes	Pre	-0.000728	-0.000479	0.000441	0.000399
		(0.000642)	(0.000318)	(0.00118)	(0.00120)
month=2 # Treat Intensity: Pre-Period Visits to Megafilmes	Pre	-0.000367	-0.000385	-0.000995	0.000195
		(0.000547)	(0.000250)	(0.00118)	(0.000990)
month=3 # Treat Intensity: Pre-Period Visits to Megafilmes	Pre	*Omitted base case*			
month=4 # Treat Intensity: Pre-Period Visits to Megafilmes	Post	0.000329	-0.000409	0.0125***	0.00300*
		(0.000592)	(0.000258)	(0.00234)	(0.00122)
month=5 # Treat Intensity: Pre-Period Visits to Megafilmes	Post	-0.000299	0.000226	0.0104***	0.00231*
		(0.000590)	(0.000402)	(0.00220)	(0.00107)
month=6 # Treat Intensity: Pre-Period Visits to Megafilmes	Post	-0.00110+	-0.000217	0.00732***	0.00396**
		(0.000573)	(0.000358)	(0.00221)	(0.00138)
Constant		0.551***	0.120***	0.770***	0.740***
		(0.0137)	(0.00700)	(0.0193)	(0.0182)
N		15342	15342	15342	15342
Individuals		2557	2557	2557	2557
Within-R2		0.002	0.025	0.052	0.014
Between-R2		0.001	0.001	0.153	0.015
Estimator		Panel OLS	Panel OLS	Panel OLS	Panel OLS

Standard errors in parentheses, clustered at individual level.
*** p < 0.001 ** p < 0.01 * p < 0.05 + p < 0.1