Protecting Copyrighted Content: The Impact of Anti-Piracy Notice Sending on Consumer Behavior in the UK

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Introduction

Growth of widespread online piracy has content industry and policy makers consider variety of anti-piracy strategies. Sending anti-piracy notices to consumers is one of the most prominent such strategy. Content owners, in collaboration with ISPs, send notices to end users when they find them infringing. The notice can include variety of potential consequences. The goal is to encourage users to stop infringing and convert to legal purchasing. These efforts are costly to content owners and tend to be controversial to end users (see discussion on HADOPI law in France). Unfortunately, we know very little about how effective these efforts are.

In fact, estimating the effectiveness of many anti-piracy efforts is quite challenging and there is little consensus on what works and what does not. Several papers in the academic literature have analyzed the impact of anti-piracy initiatives on consumer behavior.[1]

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[1] See, for example, Bhattacharjee et al. (2006) in the context of the lawsuits against music pirates; Danaher et al. (2014) in the context of notice sending programs; Danaher and Smith (2014), Peukert, Claussen, and Kretschmer (2017) in the context of site shutdowns; Aguiar, Peukert, and

However, in each case, the intervention was not conducted randomly, and thus the study must rely on a natural or quasi-experiment to overcome endogeneity concerns (Danaher et al. 2015). Natural or quasi-experiments are useful and appropriate in many settings, but they suffer from variety of limitations depending on the context and do not provide conclusive answers to the many of the controversial policies like the notice sending policies.

This research seeks to overcome this limitation by partnering with Creative Content UK (CCUK) to conduct a Randomized Controlled Trial to measure the impact of anti-piracy notices on consumer behavior in the UK. To do this we used the existing UK postcode districts structure to divide the country into about 2900 postcode districts, where each district has approximately 21,000 residents. We then randomly assigned these districts to either a control or treatment condition (with stratification based on geographic and demographic characteristics). 20% of the district fall in Treatment group where the notices are not sent while the remaining 80% fall in Control group where users continue to receive notices. The program started in January 2017, when the CCUK started receiving copyright complaints from rightsholders and forwarding these complaints on to individual ISP subscribers, notices were only sent to individuals in the treated postcodes. This randomization allows us to directly measure the impact of notices (alerts) on consumer behavior in treated postcodes relative to control postcodes.

At present we have analyzed the impact of overall alerts (without distinguishing between the alert number) sending on levels of piracy observed in treated postcodes. Our

Claussen (2016), Poorst et al. (2014), and Danaher, Smith, and Telang (2017) in the context of ISP-level site blocking.

preliminary results suggest that there was a 5% decrease in piracy in treated postcodes relative to control group postcodes. On a per-notice basis, our results suggest that 1 additional email notice causes on average a 2.2 reduction in observed infringements.

In addition to measuring the impact of notices on piracy, we plan to analyze the impact of notices on legal consumption through both digital sales and digital streaming channels. In the past two weeks, we obtained legal sales data from two major studios and a major and consumption data from a major streaming platform (and have requested data from the remaining four studios). While we have not analyzed these sales data yet, we will do so in the coming two months and will be able to present results for these data, along with a full paper, in time for a potential presentation at the June NBER Summer Institute.

Setting and Empirical Approach

Creative Content UK was announced in July 2014 as a partnership between major entertainment industry rightsholders and Internet Service Providers (ISPs) in the UK to reduce piracy. The partnership consists of two parts. In November 2015 the CCUK began an educational campaign designed to make citizens aware of the risks of piracy and the availability of legal alternatives. Starting in January 2017, CCUK began a second phase where they received reports from rightholders of UK-based IP addresses engaging in piracy, and worked with UK ISPs to forward these reports to the relevant account holder.[2]

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[2] Since the educational campaign was applied to the whole country and did not include a randomized component, our analysis seeks to measure the marginal effectiveness of the notices on changing consumer behavior over and above any impact of the educational component.

The alerts were sent in 3 different hierarchy. First alert simply informed users that they were infringing (they were given details on infringement) and encourage them to secure their networks. In the second alert (if users continue to infringe), they were again reminded that they are still infringing and they were encouraged to get the content from legal services (some of those options were presented to them). Finally, in the third alert, they were informed that they are in violation of their ISP contract and that in many other countries ISP take actions against such act reducing the bandwidth or blocking their access to filesharing sites. They are also told that content owners routinely take users to the court.

Our empirical method relies on randomly treating some UK citizens with notices while maintaining a control group of untreated citizens. To conduct this randomization we used the existing UK postcode system to divide the country into about 2900 regions based on postcode districts. In the UK, a postcode district code begins with 1-2 letters representing the postcode area (nominally a city) followed by 1-2 digits identifying the region within that area. For example, AB22 is one of the 11 postcode districts in the city of Aberdeen. The average postcode district in our data has 21,300 residents.

We then randomly divide these postcode districts into control and treatment conditions with stratification to ensure that the control and treatment groups are balanced on demographic and geographic characteristics. A map of our resulting control and treated postcodes is presented in Figure 1 below.

When the CCUK started sending notices in January 2017, notices were only sent to users living in treated postcode regions, allowing us to experimentally identify the impact of notices on consumer behavior.
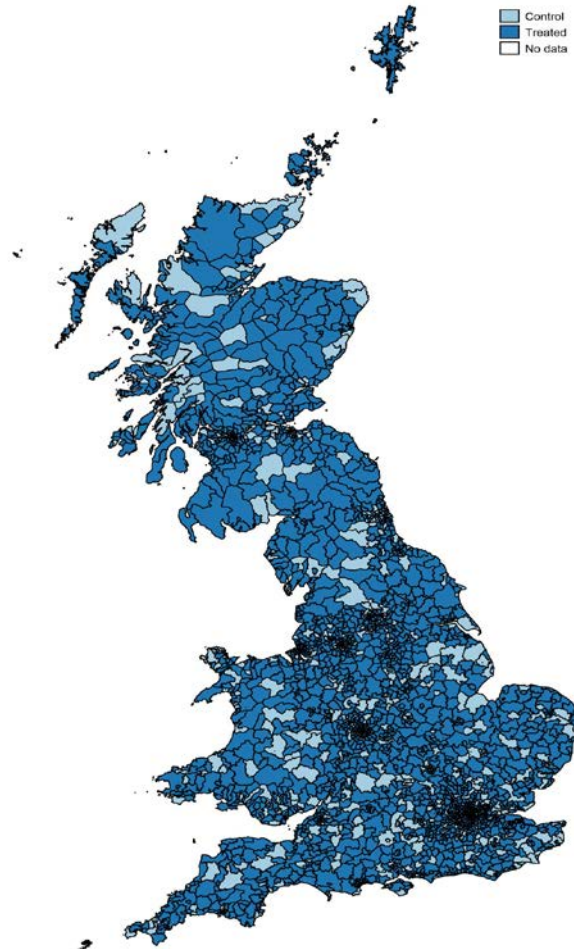

Figure 1: Control and Treated Postcodes

Data

Our data consist of the piracy and notice sending levels registered in each UK postcode district in each week from January 2016 to the present. Our piracy data exist at three levels. First, the total number of copyright infringements observed in each week and in each postcode districts. Second, the total number of copyright infringement reports (CIRs) generated from these infringements in each week and in each postcode district.

CIRs essentially focused on only certain titles that content owners focused on. So CIRs are a fraction of total infringement at a given time. Out of these CIRs, a fraction of alerts were sent to end users. The alerts were sent to the users in the form of an email. Currently, we are in process of acquiring data on emails at the postcode district level.

Summary on Infringement and CIRs

Variable	Mean	Std. dev.	Min	Max
Infringements	3681	10761	0	276893
CIRs	**153**	**61.6**	**8.1**	**191**

On average, we record more than 3600 units of infringement per postcode per month. It must be noted that this is not total number of users but the total amount of infringement. As expected, there is a large heterogeneity in infringement rate. CIRs in turn are only a fraction of total infringement.

Preliminary Results

To analyze the impact of notice sending on piracy, we start by simply visualizing the data in Figure 2. This figure displays the monthly number of infringements from the start of our data through the start of the notice sending program in month 13.
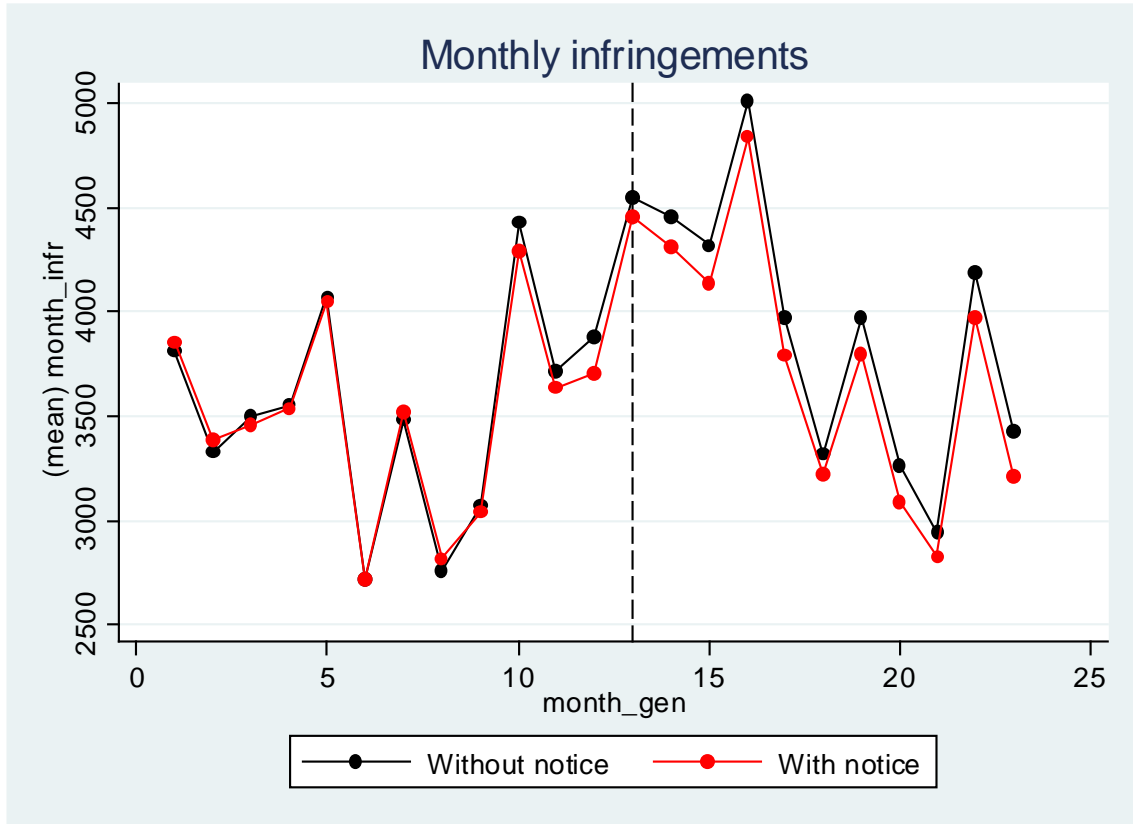
Figure 2: Monthly Infringements Over Time (Control vs. Treatment)

As can be seen in this figure, the number of infringements is relatively equal in the pre-treatment period between the treated ("with notice") and control ("without notice") postcode regions. However, starting in month 13, the number of infringements in treated postcodes appears to decline relative to the control postcodes.

To explore the magnitude and statistical significance of this change in piracy, we run a regression of the number of infringements observed in each postcode region as a function time (aggregated by quarter) and whether the postcode was treated or not. Quarterly level aggregation allows us to explore the idea that the effect of alerts sending will take some time to materialize and show up in the data. Our results are summarized in Table 1 below.

Effect of the experiment on Infringement : Effects are broken down by Quarter

VARIABLES	month_infr
Quarter1	-77.09
	(162.9)
Quarter2	-111.9
	(108.7)
Quarter3	**-147.4***
	(80.57)
Quarter4	**-192.3****
	(88.39)
Constant	3,825***
	(47.06)
Observations	57,911
Number of post_id	2,520
R-squared	0.049

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 1: Impact of Treatment on Infringements by Quarter

This table shows that the number of infringements observed in treated postcodes was lower than the number observed in control postcodes and that this difference became statistically significant in the third and fourth quarters of 2017. To put these differences in perspective, a reduction of 147 and 192 infringements in treated zip codes in the third and fourth quarters (respectively) represents a 4% and 5% decline relative to the baseline levels of 3,437 and 3,851 infringements per month in the third and fourth quarters.

We can further summarize this impact at the level of how individual emails sent lead to changes in the number of infringements observed. Specifically, our results suggest that notices caused 170 fewer infringements per month in treated postcodes in the third and fourth quarters of 2017 (where 170 is the average of 147 fewer infringements in the third

quarter and 192 fewer infringements in the fourth quarter). There were 76,705 email notices sent per month during the third and fourth quarters in our data which means that each email alert resulted in 4.3 fewer infringements (170 fewer infringements per month per postcode * 2016 treated postcodes / 76,705 emails per month). This is a pretty large and significant effect.

TBD

As noted in the introduction, we recently obtained sales data from all major studios and a major streaming platform. We are working on the analysis.

We are also in the process of collecting data on number of unique IPs (as opposed to total infringement) to examine if the alerts results in fewer users infringing.

TBD:

Discussion and Conclusion

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