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COPYRIGHT ENFORCEMENT IN THE DIGITAL AGE: EMPIRICAL ECONOMIC EVIDENCE AND CONCLUSIONS

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ABSTRACT

The digitization of media goods weakened the effective strength of copyright policy by allowing widespread sharing of media files over the Internet, forcing governments to consider how to reform copyright policy to reflect the digital era and forcing firms to consider new strategies in order to compete with online piracy. This paper reviews the economic evidence on the effectiveness of various government antipiracy interventions as well as firm strategies aimed at mitigating piracy's impact. By synthesizing the results of various studies, we provide insights on the principles that drive the degree of success or failure of various antipiracy policies. This study should be of value to policymakers and rightsholders considering copyright reform initiatives, and also to researchers looking for guidance toward what questions remain important but unanswered by current academic literature.

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^{**} The views expressed in this document are those of the authors and not necessarily those of the Secretariat or of the Member States of WIPO.

I. BACKGROUND

1. Ever since the launch of Napster in 1999, online copyright infringement has been a hotly debated topic in the media industries. While many approach the topic with strong, fundamentally philosophical viewpoints, researchers have aimed to bring robust empirical analysis to the issues surrounding illegal online filesharing in order to better inform government policies and firm strategies for protecting copyright and selling media goods. There are three primary areas of focus for these empirical studies:

- To what degree, if at all, does online filesharing displace sales and revenues in the media industries?
- Do lost revenues due to filesharing reduce the incentives for producers to create new artistic works such as music or movies?
- What firm strategies or government enforcement efforts are effective in reducing levels of piracy or mitigating its impact on legal sales?

2. As we will argue in this paper, there is a strong consensus in the academic literature as to the answer to the first question, and an emerging literature on the second question.

3. This paper will focus primarily on the third question, summarizing what we know from the current literature about the effectiveness of various firm and regulatory approaches for mitigating piracy. We will argue that the most efficient approach to protecting copyrighted works involves efforts both on the part of firms and the part of governments, and we will conclude with our opinions on the most fruitful areas for future research on these important questions.

II. PIRACY AND SALES DISPLACEMENT

4. In the ten years following the introduction of Napster in 1999, global recorded music sales decreased by 50%, despite having been on an upward trend before that (Liebowitz 2014). Likewise, although DVD/VHS sales were increasing from 2000 to 2003, after the introduction and widespread adoption of the BitTorrent filesharing protocol, these sales dropped by 27% from 2004 to 2008. For some time economists engaged in a debate over whether piracy was to blame for any part of this, or if illegal filesharing might not have any negative impact on sales. However, as of 2014, we are aware of 21 studies that attempted to determine the impact of piracy on sales and that were accepted into peer-reviewed journals. Eighteen of these studies find a negative impact of piracy on sales, with only three finding no impact.¹ If we further restrict the sample to only studies in first or second tier journals and eliminate a study that only looked at movies late in their lifecycle (during cable broadcast), only one study finds no effect of piracy on sales while twelve studies find a negative impact. In short, there is general consensus among economists who study piracy that it negatively impacts sales. This is true across various forms of media including music, television, and film.

¹ These papers include the 19 papers in the literature that had been published up to early 2014 as reviewed by Danaher, Smith, and Telang (2014) along with Adermon and Liang (2014) and Ma et al. (2014) which were published subsequently.

5. Because these various papers study different geographic regions, distribution channels, and periods of time, there is some debate over the extent of the negative impact. Interestingly though, Liebowitz (2014) notes that at least in music, there is some consistency. If one considers each paper in light of “what percent of the total decline in music sales in the regions in this study over the period in this study can be attributed to illegal filesharing?” most of the studies indicate that 100% of the losses in the music industry were caused by piracy.² To reach this finding, Liebowitz synthesized much of the music piracy literature and showed that the studies were more consistent with each other than could be revealed by just surface readings.

6. Another sign that the question of whether piracy impacts sales has been mostly settled is the fact that the direction of research on piracy has changed. Newer studies tend to focus on whether piracy is affecting supply from the creative industries or what strategies firms and governments can take to mitigate the impact of piracy on sales. Both of these questions are fundamentally important to thinking about optimal copyright policy in the digital era. The former question is largely unanswered. Waldfogel (2012) showed that following Napster and the digitization of music, there was no decrease in the supply of music albums that surpassed a certain “time invariant quality threshold”, but acknowledged that the digitization of music brought not only piracy but also large reductions in the costs associated with producing, distributing, and promoting music. Thus, that study is more about the total effect of digitization on the music industry, and it does not isolate the effect of piracy alone on creative incentives. This is particularly important in film, where piracy levels are also high but where digitization has not decreased production costs as much as in music. It remains an open empirical question whether piracy has changed the amount or type of creative works being produced. As such, the rest of this paper focuses on answering the question for which more evidence is available – how can the effect of piracy on legal demand be mitigated?

III. ENFORCEMENT

7. The digitization of media goods effectively weakened copyright laws across the globe by making it easy to illegally share media files from computer to computer. Many have called for a reform of existing copyright policy to address issues particular to digitization, and governments have tried a variety of policies to mitigate the impact that piracy has had on sales. Such efforts have had mixed results, allowing us to better understand the principles behind which policies are most effective. Antipiracy policies can be broadly characterized as either having a demand side or supply side focus.

A. DEMAND SIDE ANTIPIRACY

8. Demand side antipiracy policies are those that focus on enforcement by targeting individuals engaged in illegally downloading copyrighted works, either with penalties for said illegal behavior or with positive incentives for legal consumption.

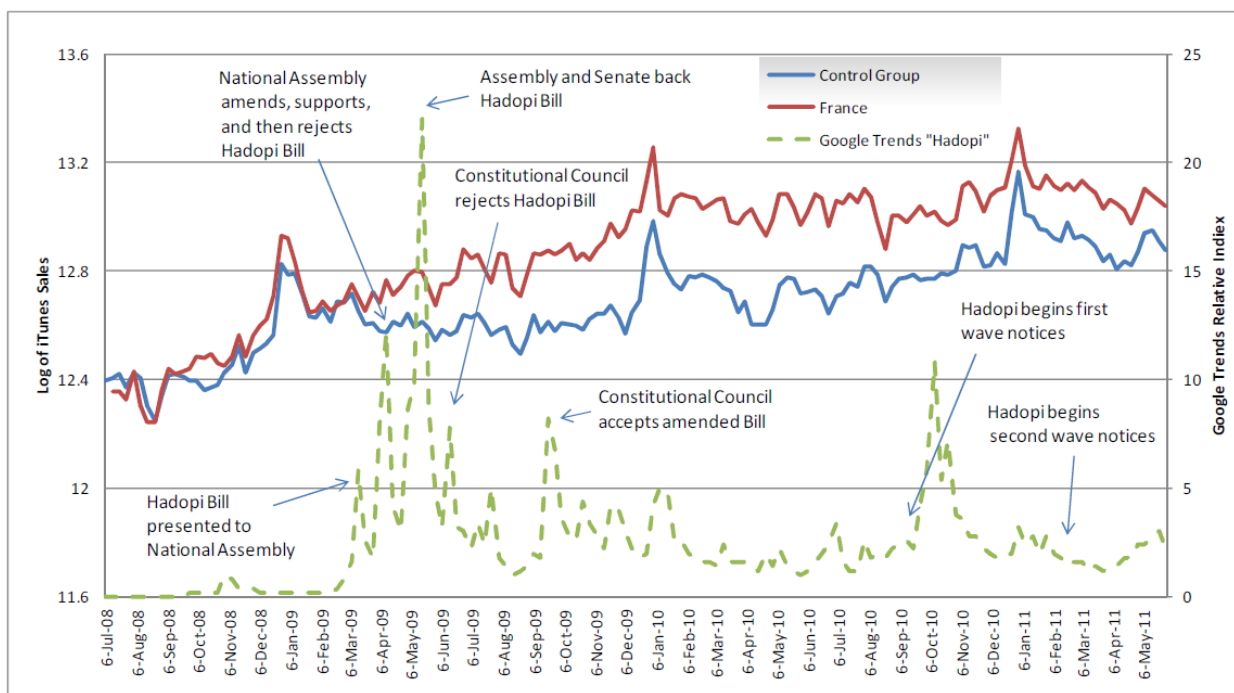
² Though other factors, such as recessions, likely slowed what had formerly been a growth industry.

a) HADOPI

9. One of the first demand side policies enacted is HADOPI, a graduated response antipiracy law passed in France in 2009. The law empowered the French HADOPI authority to send warnings to identified copyright infringers and, after repeated infringement, refer the case to court where penalties could be ordered. HADOPI also provided for a number of positive educational efforts aimed at informing consumers of and steering them towards legal options.

10. HADOPI went through a great deal of political debate from March 2009 until being passed into law in September 2009. In Danaher et al. (2014b), we used this event to evaluate the effectiveness of the law in migrating music pirates toward legal digital downloads on the iTunes music store. Specifically, we found a group of countries that had digital music sales trends similar to France’s before HADOPI,³ and we compared their sales trends before and after HADOPI to the French sales trend.

Figure 1 – iTunes Music Sales Before and After HADOPI



11. Figure 1 displays iTunes music sales trends for music sales in France (red) and for the “control group” countries (blue) and demonstrates that from July 2008 until March 2009, France’s trend was statistically indistinguishable from the control group. The green dashed line indicates French Google searches for the term HADOPI and is our measure of French awareness of the law. From March to June 2009, while the law was under political debate, public awareness of the law rose and spiked. During this period, French music sales began to rise above the control group’s, and the gap widened as awareness grew. Notably, the increase in French sales began before the law was actually in effect and before it was being enforced, but right at the same time as the public became aware of it and the potential penalties it involved. The study showed that HADOPI caused digital music sales to increase by about 25% relative to the control group, with larger increases for the most heavily pirated genres and smaller increases for the least pirated genres. This effect appears to have been maintained for

³ Italy, Germany, Spain, Belgium, and the UK – the five largest iTunes music markets in Europe at the time other than France.

over two years after initial awareness of the law, though it may have lessened slightly during the last few months of the study. The HADOPI agency sent out many infringement warnings from 2010 to 2012, which may have contributed to continued awareness of the law and its continued effectiveness.⁴

b) IPRED

12. In April 2009, Sweden implemented a copyright reform policy called the IPRED law, which effectively made it significantly easier for rightsholders to detect and identify filesharers, increasing the risk of punishment for online piracy. Adermon and Liang (2014) compared piracy levels and total music sales in Sweden before and after the law to similar countries Norway and Finland. They found that the law was heavily publicized and led to a 16% decrease in Internet traffic during the first six months, which they attribute to a 32% decrease in piracy. They also found that total music sales increased by 36% during this time relative to the control group, with a larger increase for digital sales and a smaller increase for physical. Thus they find that awareness of IPRED effectively migrated many music pirates to legal channels.

13. However, the researchers also noted that law was enforced very weakly, with only a few cases making it to courts. After the first six months, piracy levels and music sales both returned to near their original levels, and the researchers suggest that the transitory nature of the law might be attributed to waning public belief in its enforcement.

c) Summary of Demand Side Policies

14. France and Sweden are not the only countries with demand side antipiracy policies. Various forms of demand side antipiracy laws exist in countries such as the Republic of Korea, New Zealand, Ireland, and the UK (among others), but we are not yet aware of peer-reviewed empirical studies on their effectiveness. However, the two aforementioned studies do suggest a similar theme. HADOPI impacted behavior when the public became aware of its existence and before it was actually in effect, while IPRED's effect diminished after the public observed a lack of enforcement. With demand side antipiracy enforcement, awareness of the policy and belief in its enforcement appear to be necessary conditions for effectiveness. When those conditions are met, it appears as if demand side policies significantly mitigate piracy and increase legal consumption and revenues.

B. SUPPLY SIDE ANTIPIRACY

15. Supply side antipiracy policies involve targeting sites or protocols that supply access to pirated content. Sources of copyright infringing files can either be shut down entirely or blocked in a given region if Internet Service Providers (ISPs) are ordered to block access to piracy websites. Such actions also appear to have mixed degrees of effectiveness.

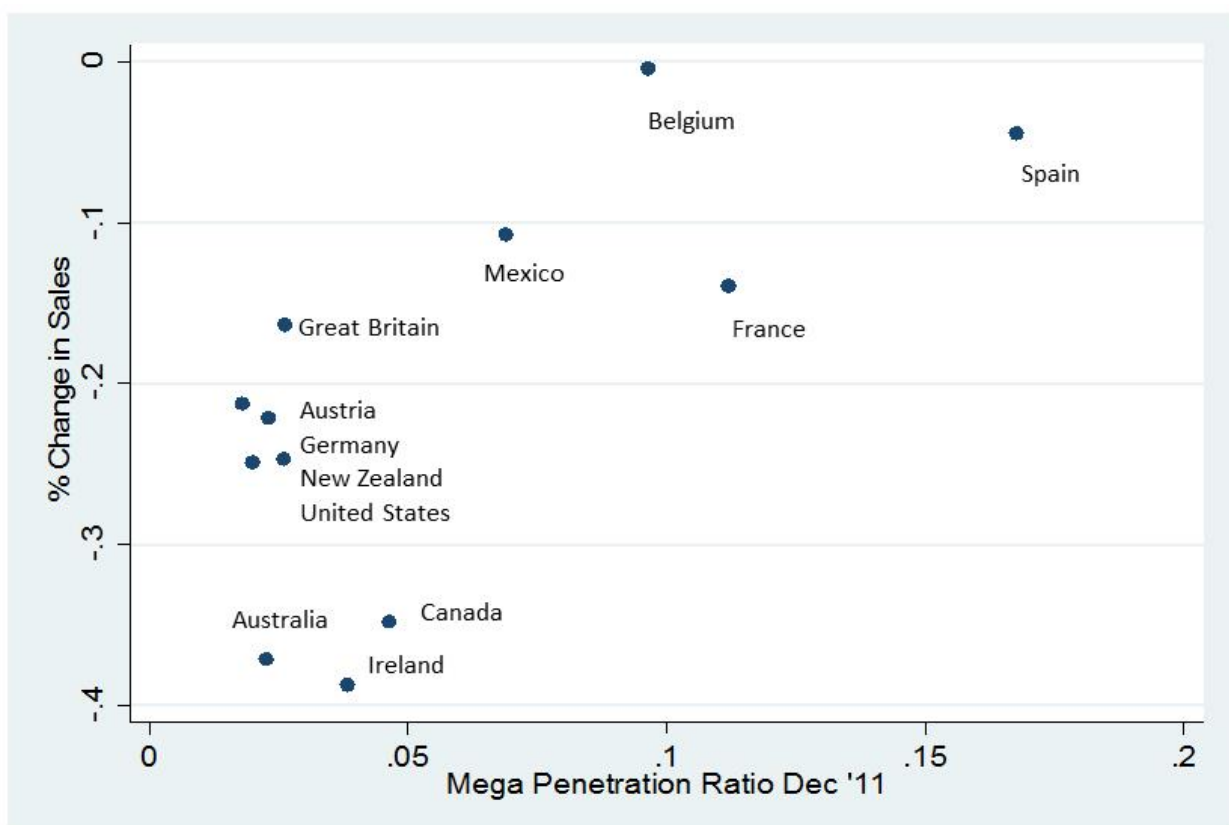
⁴ As we discuss in the paper, this effect is robust to controlling for French iOS (iPhone, iPod, iPad) sales (see pp. 550-551 of Danaher et al. 2014 and <http://infojustice.org/archives/8891> for a detailed discussion of this result).

a) Megaupload Shutdown

16. Cyberlockers are one of the primary means of sharing copyright-infringing files on the Internet. Cyberlockers are simply cloud storage space where people can house their data on remote servers, but some cyberlockers have policies that heavily promote illegal filesharing, such as a lack of passwords to protect account access or cash payments to incentivize individuals who upload popular files. In 2011, the most popular piracy cyberlocker was Megaupload.com, which housed over 25 petabytes of user uploaded (and largely copyright infringing) content and accounted for 4% of all Internet traffic (Parloff 2012). In January 2012, the U.S. Department of Justice shut down Megaupload.com and seized all of its servers and assets, effectively removing all of this content from the Internet. Importantly, many other piracy sites (including its sister streaming site, Megavideo.com) had linked to the content on this site.

17. In Danaher and Smith (2014), we asked whether this shutdown increased digital movie sales and rentals. We noted that the Megaupload Penetration Rate (MPR) – the percent of all Internet users who visited Megaupload in the months before the shutdown – varied significantly across countries. This means that the shutdown provided a larger “shock” to high MPR countries than low ones. We asked whether digital movie sales increased more after the shutdown in high MPR countries than in low ones in order to determine the causal effect of the shutdown.

Figure 2 – Post-Shutdown Change in Digital Movie Sales vs. Pre-Shutdown MPR⁵



⁵ Note that the shutdown of Megaupload took place in January 2012, so sales are naturally declining from holiday peaks. But in countries where the shutdown was a larger shock, they did not decrease by as much, and in the countries where Megaupload had been used the most sales actually increased after the holidays, despite that fact that in other years these countries experienced declines over this period.

18. Figure 2 shows that countries with high MPR – like Spain and Belgium – had larger increases in digital movie sales after the shutdown than did countries with lower MPR, like Australia and Canada. We observed a similar pattern for rentals, and we also observed that in the months before the shutdown this pattern did not exist — there was no relationship between sales trends and MPR until the shock of the shutdown. From this, we concluded that the shutdown of Megaupload caused global revenues from digital movie sales and rentals to increase by 6.5 to 8.5%. However, our data extended only 18 weeks after the shutdown, and so it is unclear how long the effect lasted after this 18 week period.

b) UK Site Blocking

19. Unlike the Megaupload shutdown, which removed the entire site worldwide, site blocking involves requiring ISPs in a given country to block access to infringing sites. As a result, the content on these sites is still available on the Internet, it just cannot be accessed through the ISP's service without some additional measure, such as accessing proxy sites dedicated to providing unblocked access, or by using Virtual Private Networks (VPNs) that make a user appear to be accessing a site from a different country.

20. In May 2012 the UK courts ordered ISPs to block access to The Pirate Bay, a major indexing site for BitTorrent tracker files. To study the effectiveness of this program, we obtained data from an Internet consumer panel tracking company on monthly visits to piracy sites and visits to paid legal video streaming sites (Danaher et. al. 2015a). We divided consumers into ten different segments, with the first segment being non-users of The Pirate Bay, the second being the lightest users of The Pirate Bay, and all the way up to the tenth segment being the heaviest users of The Pirate Bay. Presumably the block had no effect on non-users of the site (making them a control group) and an incrementally stronger effect on groups who were heavier users of the blocked site than groups who were lighter users. We asked how these groups changed their behavior relative to the control group after The Pirate Bay was blocked.

21. We found that blocking the Pirate Bay caused treated users to increase their visits to alternative piracy sites and to proxy sites for The Pirate Bay, relative to control users. We also found the same for usage of VPN sites. However, we found no causal increase in usage of paid legal streaming sites. In other words, in spite of its popularity, the UK blocking of The Pirate Bay did not appear to cause an increase in legal consumption because former users simply found other ways of accessing the same pirated content. Notably, a study using similar methods found that the shutdown of Kino.tv in Germany (which linked to content hosted on other sites, rather than hosting content) did not cause a meaningful increase in legal consumption either (Aguiar, Claussen, Peukert 2015).

22. However, this result could either mean that website blocking is ineffective, or that blocking only 1 or 2 sites is insufficient to get consumers to change their behavior. We tested whether a larger number of blocks would have a different impact on consumer behavior using an event in November 2013 where UK courts subsequently ordered the near simultaneous blocking of 28 piracy sites, 19 of which hosted video content. We applied the same methodology to study the effect of these blocks and found a different result. We found that the blocks caused treated users to increase their visits to paid streaming sites (like Netflix) by 12% relative to the control users. Moreover, the lightest users of the blocked sites only increased legal consumption by 3.5% while the heaviest users of the blocked sites increased legal consumption by almost 24%, strengthening our causal interpretation. In other words, where blocking access to one major piracy site failed to increase legal consumption, simultaneously blocking access to 19 major sites succeeded.

c) Summary of Supply Side Policies

23. These results suggest that the success of supply side actions rests on how inconvenient they make piracy. When Megaupload was shut down, it removed all of the hosted content from the Internet such that there was no way to access it from anywhere in the world, and the data show this effectively increased legal purchases. When The Pirate Bay was blocked in the UK, no content was actually removed from the Internet and pirates did not seem to experience enough inconvenience to migrate toward legal options – the same appeared to be true for blocking access to Kino.tv in Germany, which also did not involve removal of actual infringing content.

24. However, this does not mean that blocking cannot be effective. It appears that when enough sites are blocked, it creates enough inconvenience for pirates that some of them migrate their consumption toward legal channels. While full shutdowns of major sites like Megaupload appear to be rare, site blocking has been adopted in a number of other countries besides the UK, including a recent law passed in Australia that allows for piracy website blocking. Though opponents to supply side piracy interventions argue that targeting piracy websites cannot be effective as pirates will always find other sites on which to illegally acquire media, the research suggests that this view is wrong: when supply side interventions sufficiently increase the inconvenience associated with pirating media, they can cause significant increases in consumption through legal channels.

IV. BUSINESS STRATEGIES

25. In addition to these anti-piracy measures, research has shown that making content available legally can reduce the consumption of pirated content. For example, Danaher et al. (2010) shows that removing television content from the iTunes store increased piracy of that content by 11% and Danaher et al. (2015) shows that adding television content to Hulu caused a 20% decrease in piracy of that content, implying that offering content in a convenient way (digitally) can convert a significant number of pirates to legal consumption. Other studies have shown that reducing the time between the U.S. release of a film and its international release in the theaters (Danaher and Waldfogel 2012) or on DVD (Smith and Telang 2015) can decrease piracy and increase sales.

26. In addition to strategies that media firms can take, we believe that there may be opportunities to protect content through industry cooperation. One example of this on the demand side is the Copyright Alert System in the United States, in which ISPs have voluntarily agreed upon a graduated response system of warnings and penalties when they detect copyright infringement by their users. We are aware of no academic evidence as to whether this system has had any impact. On the supply side, however, we have studied search behavior in relation to piracy and we have found that demoting search results that link to piracy websites can shift user behavior toward legal consumption (Sivan et al. 2015). Interestingly, following the completion of this study and posting it on the Internet, Google announced on October 17, 2014 that they had refined their search ranks to more aggressively demote sites with a large number of valid DMCA (Digital Millennium Copyright Act) notices.⁶

27. In summary, there is strong evidence that when firms make legal content available in a more timely and convenient fashion, piracy is reduced in favor of increased legal consumption. As well, there is evidence that cooperation from firms outside the entertainment industry can help to protect copyrighted content. However, just as antipiracy enforcement can be costly to

⁶ See <http://googlepublicpolicy.blogspot.com/2014/10/continued-progress-on-fighting-piracy.html>.

governments, strategies that firms take to reduce piracy may be costly to them and the question remains as to how much of the burden of enforcing copyright should be borne by governments and how much by firms.

V. CONCLUSION

28. The research suggests that antipiracy efforts are most effective when both government and firms take action to deter piracy and promote legal content. If a government passes an antipiracy law in a country where convenient legal platforms do not exist, the law is unlikely to have much effect. Likewise, if a firm offers its content in a timely and convenient fashion but government does nothing to enforce copyright, then the firm is effectively competing against a “free” version of its product and its strategies will not have as much success as they would if piracy were harder to consume.

29. While research has given some guidance as to the principles behind effective government copyright interventions, further studies are necessary to determine the optimal amount of government enforcement. Specifically, although we understand that firms lose revenues to piracy and encounter costs when trying to combat piracy, we do not yet know the degree to which reduced revenues from weaker copyright lead to reduced incentives to create new, quality artistic works. A better understanding of the link between piracy, revenues, and the type, quality, and number of new products created would offer the ability to more robustly evaluate the value of the sorts of antipiracy interventions discussed in this paper. As countries continue to evaluate and change their copyright policy over time, we hope to see research linking this not just to industry revenues but also to creative output.

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