The Effect of Graduated Response Anti-Piracy Laws on Music Sales:
Evidence from an Event Study in France

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not been passed. Using Google Trends, we find that public awareness of HADOPI became widespread in Spring 2009, and our difference-in-difference model suggests that HADOPI awareness caused a 22.5% increase in iTunes song unit sales in France (over and above any change in the control group), as well as a 25% increase in iTunes album unit sales (over and above the change in the control group). Closer examination reveals similar trends separately for each of the four major music labels, suggesting that our industry-wide results are not driven by one label's advertising campaign or marketing activity.

To test the validity of our results, we add another level of difference to the model. Previous research and new survey data reveal that music genres differ in their tendency to be pirated. One would expect that if the observed relative increase in French sales is caused by HADOPI, that high-piracy genres would experience a larger increase in sales than low-piracy genres do. Our results are consistent with this hypothesis: low piracy genres experienced only a 7% difference-in-difference sales increase in France after HADOPI, while high piracy genres experienced a 30% difference-in-difference increase in sales, a result that is consistent with the hypothesis that the observed increase in French sales after HADOPI is due to a reduction in Internet piracy.

2. Background on Music Industry and HADOPI

Looking at aggregate sales reports it's easy to see why the music industry might be concerned about the impact of piracy on sales. Forrester research and the Recording Industry Association of American (RIAA) have reported that music industry revenue in the United States dropped by 46% from $14.6 billion in 1999 to $7.7 billion in 2009.[4] Worldwide sales have seen a similar drop of 44% from $27 billion in 2000 to $15 billion in 2010. Studies by the IFPI have found corresponding decreases in investment in local talent in some countries. However, the economic literature is only just beginning to address the question of whether diminished music industry returns due to piracy cause a decrease in the amount of creative

[4] http://www.riaa.com/faq.php

works brought to the market.[5] Nonetheless, academic studies on the effect of piracy suggest that online file sharing can explain anywhere from one fifth to all of the decrease in music industry revenues since 2000,[6] and because of this it is important to understand what sorts of policies or strategies can act to mitigate this negative impact.

In June 2008 the HADOPI Law was first presented to the French Senate by several politicians, and in October 2008 the Senate backed the law, meaning that it would next go before the French National Assembly. (However, as we will show in more detail below, there was relatively low publicity around the

began the initial wave of second notices, and as of August 2011 no third notices had been sent out and no penalties had yet been applied.[9]

It is also important to note that while the most publicized responsibility of the HADOPI agency under the law is to send out infringement notices, as part of the HADOPI legislation the agency started an education

about its findings in recent years (see Liebowitz 2008, Liebowitz 2011). Notably, there exist some studies on the effectiveness of private sector legal responses to filesharing. Bhattacharjee et al. (2008) find that the RIAA's legal threats (in the form of highly publicized lawsuits) against file sharers had a statistically significant negative impact on the availability of pirated content, but that a substantial amount of illegal content was still available even after the lawsuits and that piracy supply eventually returned to original levels

4. Theory

Our main theory of the impact of HADOPI is closely tied to the [illegible]

However, since nearly all prior papers in the literature indicate that filesharing displaces sales of physical music, it is a limitation of this paper that we are only able to examine iTunes sales data as it is possible that HADOPI could affect physical sales in addition to digital sales. Unfortunately, physical retail sales data were not available to us at the time of this study. Our data also do not reflect revenues from newer legal music streaming platforms such as Spotify or Youtube channels, and we discuss this limitation further in the conclusion if this paper. Thus, our study asks the question of whether a law like HADOPI can stimulate sales of one form of media (music) in one channel (iTunes), and as such likely does not capture the total impact of the law.

With respect to the first question, there is no strong theoretical basis in the literature for whether HADOPI's impact will begin primarily when the public becomes aware of the law or with the actual dates of passage, legal notifications, and legal penalties. Many economic studies of policy changes focus on the date of passage of the new policy as the treatment date. However, because HADOPI went through a significant public and political debate before being passed, and because citizens may not have even been aware of the actual effective date of the law, we believe it possible that public awareness and salience of the law could drive ae zUOv-8URH4O4vX d o [3EU,eI-4ROEz5g,tI-zR335z,hI4ER54E4,aI4ERO3EU,3,gI4ERO5%4,,aI4

sales and album unit sales. The data were obtained directl

Finally, we postulate that because citizens may be confused over when the law actually became effective, we may be more likely to see an effect begin when people first became aware of the law rather than when it finally became effective in October 2009. To measure awareness, we collected Google Trends data on Google searches (from France) for the search term "HADOPI."[13] Google Trends reports the "relative search index" for a search term in a given country, meaning that for each week we observe the number of searches for that term relative to the average number of all searches in that country across each week in the date range. So, for example, if there were an average of 20,000 searches per week in our date range for the term HADOPI, then in a week where there were 100,000 searches, the Google Trends index would report "5.0" for that week. Thus, while we do not know the actual volume of searches, we know when awareness of HADOPI peaked as measured by Google searches, and the relative height of that peak. This can serve as a measure of national awareness of the law.

6. Results

Our basic strategy for determining the impact of HADOPI is to use a difference-in-difference approach, comparing the change in French sales before and after HADOPI to the average change in sales across the control group. However, we have two initial challenges to overcome. First, we need to give evidence that our control group truly can simulate the counterfactual i Ez53,cI%RE5H4O53O,eI%RE5UO,tI-zR333E5, I-5"o8%OR

1 for French observations, is a vector of country fixed effects, and is the idiosyncratic shock term. With this specification, tracks the average time trend for log sales units over time for the control group, while estimates how the French time trend differs from this average.

We estimate this model and then plot the results visually in Figure 1, with + representing the

law. Because each of these peaks is higher than the last, it seems safe to assume that this reflects growing national awareness of the HADOPI law. Thus, this graph leads us to believe that the effect of HADOPI began with rising awareness of the law and not upon its actual implementation. This seems plausible for the reasons we outlined above. We also note a very similar trend for iTunes album sales. We applied the same model as above to iTunes album unit sales and graph the results in Figure 2.

If we accept the identifying assumption that France would hav

Policy changes such as these are often difficult to study due to a lack of experimental power. Indeed, although we observe five control countries over time, we only observe one experiment: the passage of HADOPI in France. One could argue that some other French-specific factor may have coincidentally affected France's music sales levels at exactly the same time as public awareness of HADOPI. While we believe that it is unlikely that the timing of this would coincide with the passing and awareness of HADOPI, we cannot rule out this possibility based on the preceding tests.

In an attempt to partially address this concern we add an additional level of difference to the model based on priors about the popularity of piracy across various genres of music. Specifically, EMI surveys of French citizens show that that Rap and Hip Hop are the most heavily pirated genres, even relative to popularity in legal sales channels. While Rock and Pop experience average levels of piracy, the data also indicate that genres such as Classical, Christian, Folk, and

One phenomenon that might meet these criteria would be French adopti

per year for the four majors combined.[21] Under the assumption that the four majors make up 70% of the

We suggest that with regard to mitigation of sales displacement by piracy, a national anti-piracy policy combined with educational efforts may be much more effective in the longer term than are a small number of high-profile lawsuits.

As noted above, a limitation of our study is that we only observe data for one industry (music), in one channel (iTunes). However, this also means that our study likely understates the true sales impact of HADOPI. A number of other channels provide revenues to the music industry, including cd sales and legal music streaming services – these channels (such as Deezer, MusicMe, or YouTube) may also have benefitted from HADOPI.However, some of these services — such as Deezer — were adopted after the impact of HADOPI, leaving us with no pre-HADOPI period to study. As well, growth trends in these services seem to vary greatly across countries, making selection of a control group difficult at best. Thus $18.6 million per year represents a lower bound on the total effect that HADOPI had on music industry revenues. It is also quite possible that other industries such as motion pictures or television have been impacted by HADOPI.

For policy-makers, our results may have important implications in other countries that are considering passing similar graduated response laws, as well as in France where a number of parties oppose the continued existence of the law. Likewise, our results may inform industry practice in some countries, like the United States, that have seen the voluntary agreement between the music industry and Internet Service Providers on the application of a graduated response system. Though of course, generalizing our finding

in iOS device sales in Spain does not by itself present a problem for our analysis so long as overall iOS penetration in the control group countries is not significantly smaller than changes in iOS penetration in France.

However, the large increase in iOS device penetration in Spain relative to the other control group countries also presents an opportunity to test whether changes in iOS device penetration is a significant driver of changes in overall iTunes sales. To do this, in Table A2 we report estimates for (ii), except that here we compare the change in iTunes sales in Spain to the control group (not including France), before and after HADOPI.As above, we count March 30, 2009 as the beginning of HADOPI. We note that both track and album sales for the control group (UK, Italy, Belgium, Germany) were increasing during this

References:

Bertrand, M., E. Duflo, S. Mullainathan. 2004. How Much Should We Trust Differenc

Table 2: Estimate Effects of HADOPI for Tracks, Albums, and Across Genres

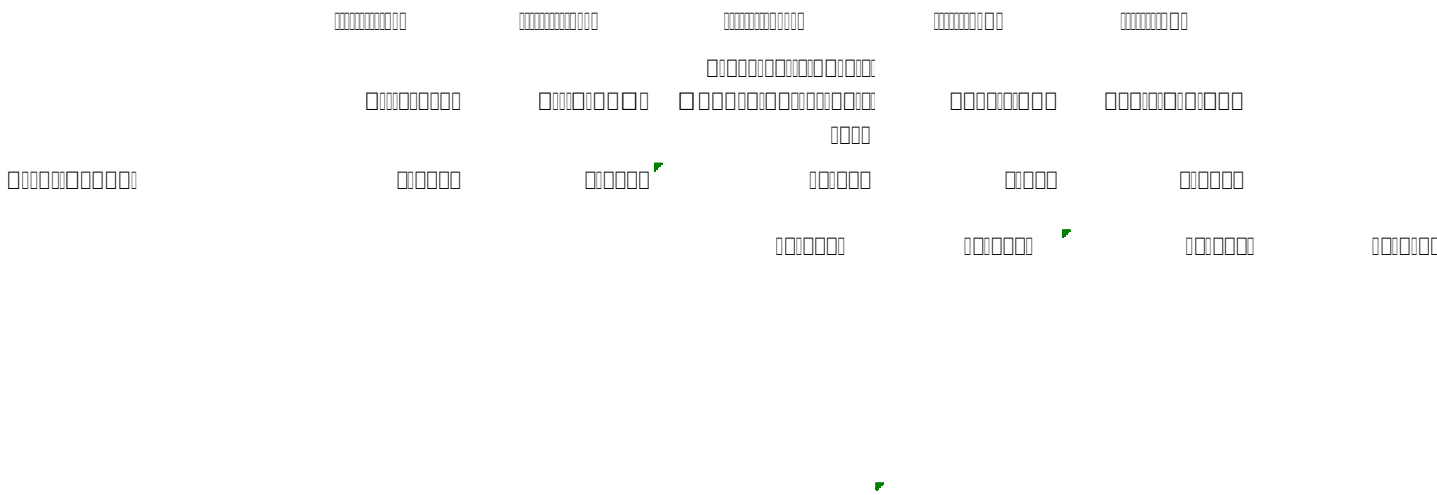

Table A2: iTunes Sales Before and After HADOPI, Spain vs. Control Group

Figure 2: iTunes Album Unit Sales Trends (4 majors combined), France vs. Control