

Effects of Governance, Piracy, and Investment on OTT Subscription Numbers

Undergraduate Research Thesis

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Abstract

This paper evaluates the incentives for consumers to pirate video content on OTT streaming services. With rising exclusive content provided by each service, consumers have the incentive to subscribe to multiple services. The hypothesis is that as investment increases and a country's laws are perceived to be better enforced, the number of subscriptions increases. Survey data on piracy from Herz, Kiljanski's (2018) paper gives us a propensity to pirate variable, and data from the WGI report by the World Bank gives us indicators of consumer perception of governance. This is analysed against data on original content investment and subscription numbers to draw conclusions about confounding factors that affect consumers' incentives to pirate.

Introduction

As high-speed broadband internet has become pervasive in countries across the world, there has been an increase in the availability of the different over-the-top (OTT) platforms across the world. With the rise of Netflix, Prime Video, Hulu, and others over there last 5 years, the OTT industry has become increasingly competitive with the industry leaders investing heavily on creating original content. In 2018, Netflix invested \$8 billion on content, Amazon Prime invested \$5-6 billion. However, more exclusive content is made available there is, simultaneously, an incentive to pirate that content that is created.

A pirate's perception of the government's ability to identify him or her as a pirate, and to act against them, has an effect on the costs associated with distributing illegal content online. This paper studies the effect of the investment original content, the propensity of consumers to pirate, and the Worldwide Governance Indicators published by the World Bank on the number of subscribers to each platform. Exclusive content not only refers to the content created by OTT platforms' studios but also references premium content that the firms license to stream exclusively on their platform. Some examples of this are Netflix buying the *exclusive* streaming rights to "*Friends*," Hulu buying the *exclusive* streaming rights to "*Seinfeld*" and so on.

The FBI often takes down websites that host pirated copies of video content; however, once a site is taken down, multiple proxies for the website pop up. Essentially, authorities end up playing a game of whack-a-mole with pirates. This was first seen with the rise of Napster which provided free access to music in the mp3 format. Napster was sued by Record companies, who eventually won the case and shut down Napster. While music piracy did still persist for a number of years over peer-to-peer sharing torrent

clients, years later Spotify, Apple Music, Tidal etc. have largely been able to eradicate the incentive to pirate songs. This has not been done by only shutting down Napster, as other proxies still showed up, but rather by providing a service that gives the consumer instant and unlimited access to millions of songs. The libraries of content available on each service are virtually the same. While there are some artists that have most of their content available only on one platform, this is a negligible amount. That is to say, there is essentially no exclusive content on any of the platforms. So, these firms have been able to eradicate the incentive for consumers to consume pirated copies of albums.

I assert that this is not as straightforward when it comes to video content. The way music and video content are consumed, and the structure of the industries are markedly different. If a consumer likes a song or album, they will listen to it more often in the short run, than they will watch a movie or tv show. Furthermore, the total number of different songs or albums listened to in the short run is vastly greater than the number of movies or tv show episodes watched in the same period. The cost of pirating music is significantly more than the cost of pirating video content because the music is consumed more often in the same time period. Here the cost is the effort required to pirate content. In fact, movies and tv shows can often be streamed from websites that upload pirated copies of the shows, thereby completely eliminating the need to download content.

Moreover, none of the streaming platforms in the music industry create their own content. While it could be said that Spotify has unparalleled personalised playlists, most of the songs on the playlists can still be found on all the other platforms. In the movie industry, on the other hand, if a show or movie has been created by the platform's studio, then streaming rights to said show or movie lie exclusively with the platform.

Additionally, authorities only prosecute pirates—the individuals who upload illegal copies of copyright content. If a country's government is known to function more effectively, then the country is more likely going to be able to identify pirates and punish copyright infringement. In order to protect film studios and filmmakers from incurring losses of up to \$1.34 billion per year (Smith et al., 2016, p.36) there might be some government intervention that is required to increase the costs of uploading pirated content.

Literature Review

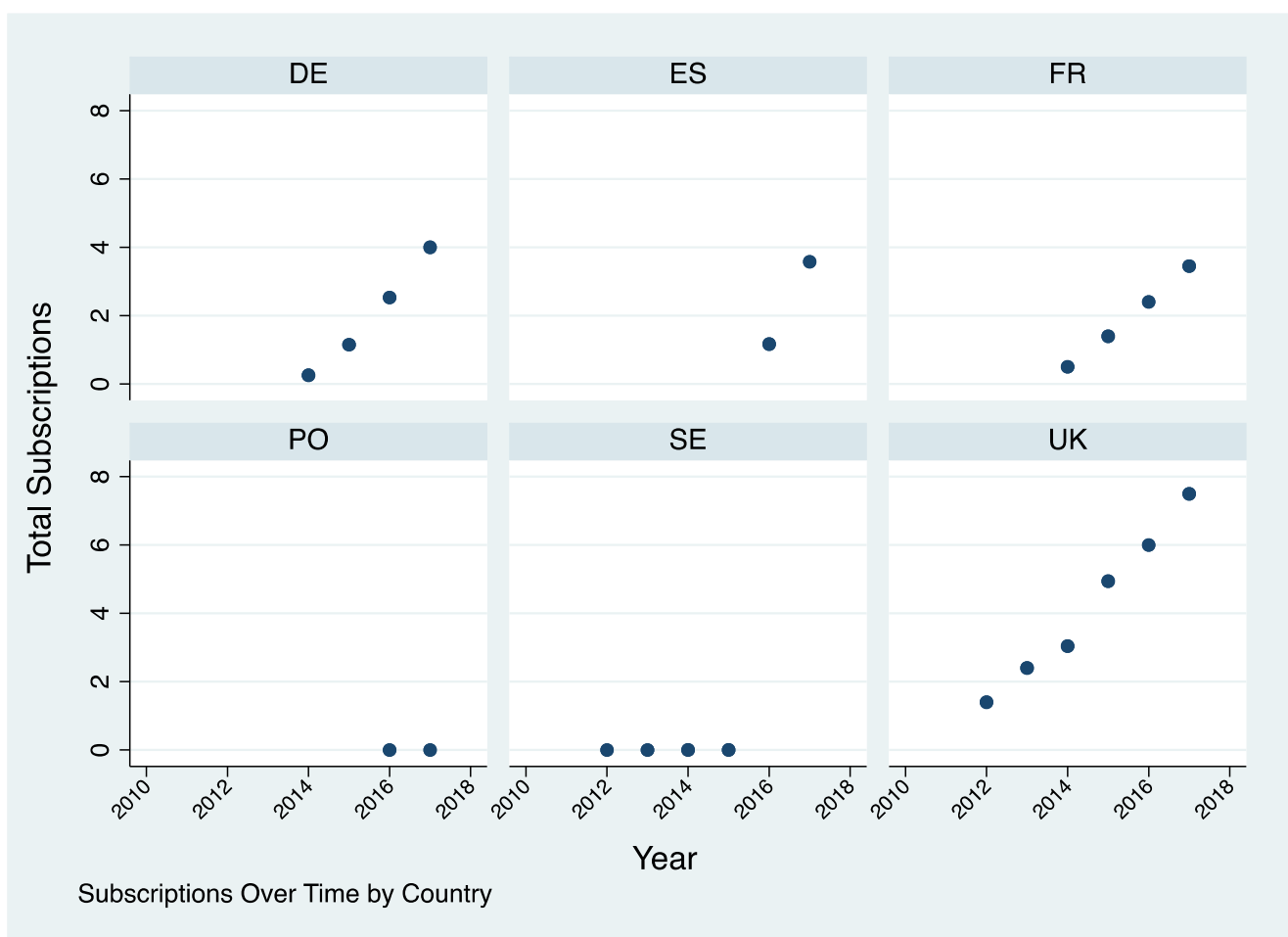
Since the turn of the century, the question of the effects of copyright infringement in the music and film industry has become more pressing. De Vany and Walls (2007) take box office revenue and the supply of pirated content for an unnamed movie. They find that if a major studio movie is pirated, then box office revenue declines by \$40 million. Smith and Telang (2009) use data on Amazon DVD sales ranks and Bit Torrent movie file downloads from 2005-2006. They find that the availability of pirated content has no effect on post-broadcast DVD sales profits. Danaher et al. (2010) used data from Bit Torrent downloads of television torrents from 2007-2008. They found that the 11.4% increase in demand for NBC piracy relative to ABC, CBS, and FOX piracy was a result of the removal of NBC content from iTunes. Bai and Waldfogel (2012) use 2008-2009 survey of Chinese university student's movie behaviour, and find that only a fourth of their movie consumption was paid and "each instance of piracy displaces 0.14 paid consumption instances." Lastly, Danaher and Smith (2014) used data from 2011-2012

on digital movie sales for 12 countries and three major studios. They found that the shutdown of Megaupload and its associated sites caused digital revenues for three major motion picture studios to increase by 6.5%-8.5%.

While the past papers have focused on box office revenues, some of the more recent papers by Smith et al. focus on the platforms that this paper investigates. Smith et al. (2018) use data from a multinational telecommunications provider to get information on consumers visiting channels of illegal content and how they respond to better bundling packages in their SVoD (Streaming Video on Demand) packages. They find that as a stand-alone strategy, using legal SVoD to reduce the incentive to pirate requires, at the minimum, offering content much earlier and at a cheaper price than is offered in the market already. However, this scales down profits and may damage overall incentives to produce new content, only to curb piracy to a small extent. This paper, while looking at similar incentives, also accounts for the costs associated with *uploading* pirated content online that pirates may or may not consider before engaging in piracy.

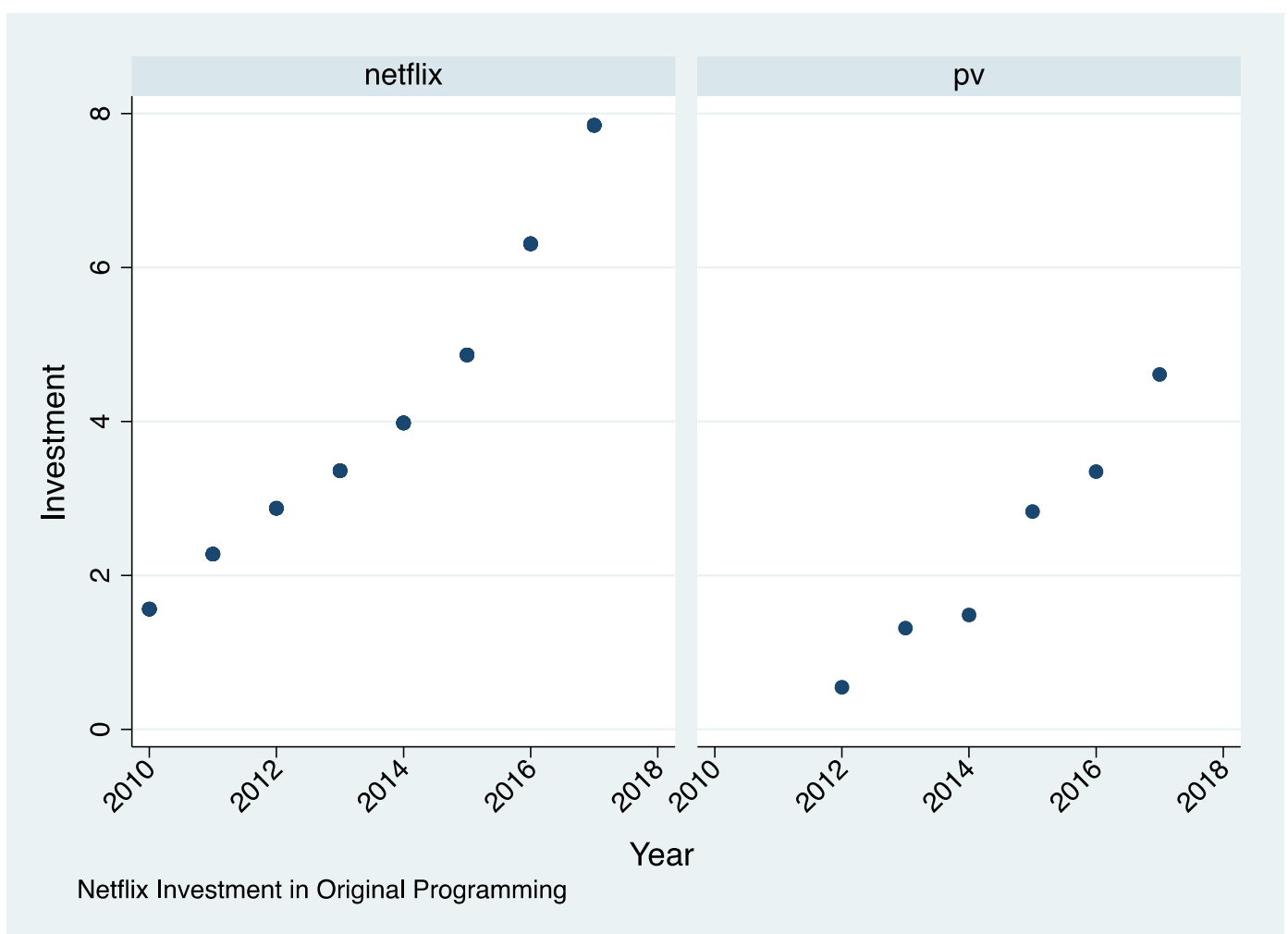
Data

I collect my panel data from four sources: The World Bank, Netflix and Amazon's annual reports, Statista, and Herz and Kiljasski (2016). The dataset consists of survey data from 30,000 individuals from Sweden, Germany, France, Poland, Spain, and the UK, on how they consumed the top 100 box office movies in 2013. Of these 100 movies 30 were released in 2011, and 35 in both 2012, and 2013. The channel of consumption was also noted, whether it was illegal or legal (legal consisting of channels such as DVD, cinema, aeroplanes, and so on). This was collected for both the first and the second time a movie was viewed. This data from the paper "Movie Piracy and Displaced Sales in Europe: Evidence from Six Countries" and was provided by Dr. Herz.



The second part of the dataset consists of subscription numbers by platform, country, and year. For Netflix, this data is available for all six countries in the survey taken for the

paper above; however, for Prime Video, this is only available for the UK. Furthermore, because of Netflix only recently expanding to European countries, the data is only for 2014-2016 in Germany, 2012-2018 for the UK, 2016-2018 for Spain, 2014-2018 for France, 2016-2018 for Poland, 2010-2018 for the USA, and 2012-2015 for Sweden. For Prime Video in the UK subscription numbers are available from 2014-2018. This data was provided by Statista, a database company. This is displayed in the graphs above.



Another part of the dataset (displayed above) consists of the investment in programming for each platform by year. I compiled this data from the annual 10-K reports both Amazon and Netflix file to the SEC. Lastly, I used data from the Worldwide

Governance Index (WGI) report that the World Bank publishes every year. This data was collected for all 7 countries and for the years 2010-2018 and is on a scale from -2.5 to 2.5. The closer a country is to 2.5 on the index the better the governance performance. Some of the indices that are more important in this paper are defined as the following:

1. **Political Stability and Absence of Violence/Terrorism** measures perceptions of the likelihood of political instability and/or politically- motivated violence, including terrorism.
2. **Rule of Law** captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.
3. **Government Effectiveness** captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.

I also collected another dataset published by the World Bank called the Corruption Perception Index. This is also for all 7 countries for the years 2011-2018, and this index is on a scale of 0-100. The closer a country is to 100 the more corrupt it's perceived to be.

Methodology

We have seen how box office revenues have been affected by piracy and how incentives change as exclusive bundles are offered to consumers at lower prices. In this section, however, we want to look at not only the effect that consumer's propensity to pirate has on total subscriptions but also the effect that the governance indicators and investment in original content by the platforms have on subscription numbers. The propensity to pirate variable was created using the data from Herz and Kiljasski (2016). I take the number of movies viewed illegally and divide it by the total number of movies viewed. This data is only from 2011-2013, so I take the given data and predict values of propensity to pirate until 2017. However, the propensity to pirate variable is continuous, so I take its natural log to be able to interpret the regression coefficient as a percentage. Since the indicators from the WGI report are also continuous variables, I take their natural logs too. Investment has been adjusted for inflation.

I develop a regression model to better understand this relationship over time in a variety of countries. I assume in this model that piracy is a close substitute to subscribing to an SVoD service. Also, I assume that the less the probability a pirate believes there is of him or her being punished, the more likely they are to upload copyrighted content online. Putting these two assumptions together, the availability of pirated content should mean fewer subscribers to OTT platforms. This is supported partially by the result in the paper by Smith et al. (2018), who found that using legal SVoD to reduce the incentive to pirate requires offering content earlier and at a cheaper price than is offered in the market already. Using this piece of theory, I develop my own model for how the different factors discussed above affect subscription numbers

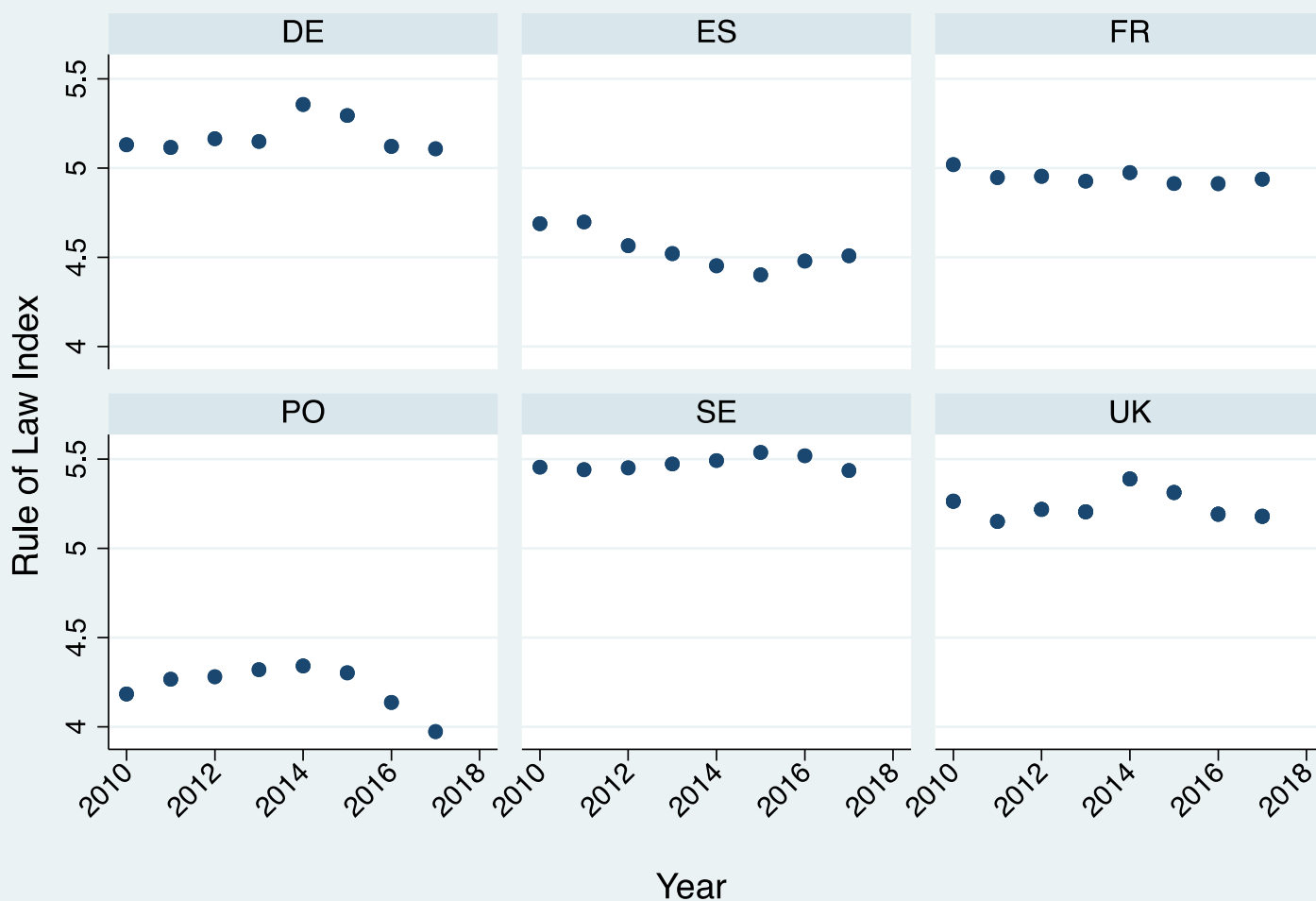
$$Subscriptions_{pct} = \beta_0 + \beta_1 Investment_{pct} + \beta_2 Pirate_{ct} + \sum_3^i \beta_i \ln X_{ict} + \eta_t + \alpha_c + \varepsilon_{pct}$$

where here α_c are country fixed effects, η_t are yearly time effects common to both platforms, and i represents each indicator used in the regression from the WGI report by the World Bank. Since there was multicollinearity between the various governance indicators in the WGI report, some were excluded. However, each represents a distinct aspect of a country's governance. So, I have 3 other models that each include different regressors, which are correlated to each other.

The equation above represents the model that looks at the effect of investment, the Rule of Law Index, and the Government Effectiveness index on the number of subscribers to a platform, in a country. Where $i = 2$. Other specifications will have $i > 2$.

I hypothesises that I will see positive coefficients on the investment coefficient, and on all the indices that I will include in the regression

$$H_0: = \beta_i > 0 \quad \text{where } i \text{ is any of the indices}$$



Rule of Law by Country

Results

In the results table below, I have controlled for fixed effects across countries and across time for all specifications. As we can see the regression result in column (2) is obtained after adding a platform dummy to the initial regression equation discussed above. When the dummy is equal to 0, we get the specification for Prime Video. We can see that for every percentage a country improves in on the Rule of Law index Prime Video gains 42.84 million subscribers, on average. Netflix, on the other hand, will have 6.675 million

fewer viewers than Prime Video. In column (3), I attempted to substitute the Government Effectiveness Index for Regulatory Quality Index; however, its correlated with the Rule of Law Index produced excessive multicollinearity.

$$\text{corr}(\ln\text{regqual}, \ln\text{rol}) > 0.3.$$

So, I substitute the Political Stability Index into the regression instead of the Government Effectiveness Index. As we can see, the Rule of Law Index still has a significant coefficient. For every per cent, a country improves in on the Rule of Law index Prime Video gains 18 million subscribers, on average. Also, Netflix will have 6.883 million subscribers fewer subscribers than Prime Video. Netflix having fewer subscribers than Prime Video might sound counter-intuitive at first, but there is a simple fact that explains this result. When a consumer signs up to Amazon Prime, they get Prime Video for free as a part of the bundle. So, it is conceivable that more consumers subscribe to Amazon Prime than to Netflix, and then it follows that there are more Prime Video subscribers than Netflix Subscribers.

Another multicollinearity issue I faced was between the propensity to pirate variable and several of the indices. This led to me having to exclude it from all of the regressions. With the inclusion of the platform dummy and substituting the Government Effectiveness Index with the Political Stability Index results in an improvement in the amount of variation explained by the model.

Subscriptions	(1)	(2)	(3)
	Platform excluded	Platform Dummy	Political Stability
In (Government Effectiveness)	-18.44 (-0.90)	-34.03 (-1.88)	
In (Rule of Law)	28.07 (1.59)	42.84** (2.76)	17.97** (3.19)
Investment	-0.705 (-1.46)	1.369 (1.41)	1.332 (1.33)
Netflix		-6.675* (-2.37)	-6.883* (-2.37)
In (Political Stability)			-9.490 (-1.42)
Constant	-3983.4*** (-3.64)	504.0 (0.25)	623.4 (0.29)
Observations	26	26	26
Fixed Effects	Yes	Yes	Yes
Time Effects	Yes	Yes	Yes
R-squared	0.6839	0.7696	0.7531
t statistics in parentheses			
* p<0.05	** p<0.01	*** p<0.001	

Discussion

The results of this paper indicate that pirates' confidence in and willingness to abide by the rules of society, in particular the quality of contract enforcement, and intellectual property rights, is an important factor in deciding whether or not they pirate copyrighted content. According to Danaher & Smith (2013), the shutdown of Megaupload lead to an increase in digital revenues of 6.5%-8.5% for the large studios.

This is an important result as it indicates that even if proxy websites did appear, they were not able to replicate the effect that Megaupload had on incentives.

Also, the result could indicate that the shutdown signaled to pirates that creating a domain that was conducive to sharing copyrighted content in a country that is higher on the Rule of Law Index is costly. In fact, the owner of Megaupload did create a proxy site that was based in New Zealand, a country which is ranked much lower on the Rule of Law Index.

The MUSO Global Piracy Report (2018) states that “Interestingly, in 2018 we have seen a ten per cent increase in people bypassing search engines and going directly to the piracy destination of their choice ... Simply focusing on takedowns is clearly a whack-a-mole approach and, while an essential part of any content protection strategy, it needs to be paired with more progressive thinking.” This aligns with the result of this paper: simple site takedowns are an ineffective and inefficient use of public resources. Though taking down websites and controlling search engine results does make it more painstaking to find content, a more creative solution is required to curb consumers’ incentive to substitute OTT platforms for piracy.

Lastly, one of the main hinderances of this paper is the lack of publicly available data. Data on subscription numbers for each country are scarce and are often just estimates. Data on investment by the platforms on original content versus licensed content are not publicly available. This is important because only original content is available in countries outside of the USA. So, for example, *Friends* is only available in

the USA on Netflix because it is produced by NBC. Whereas, *House of Cards* is available across the world since it is produced by Netflix itself.

Another useful piece of data would be how many consumers who have subscribed to Amazon Prime actually use the Prime Video service. As mentioned earlier, consumers get Prime Video for free in the Amazon Prime bundle; however, this does not guarantee that they use the service.

Also, HBO is another significant player in the OTT market that operates across different continents. Nevertheless, since their content can often be consumed through local cable providers, subscription numbers do not exist. It is worth mentioning that HBO NOW, HBO's OTT platform has only recently been introduced to European markets. Furthermore, data on platforms local to the countries discussed would have enhanced the level of analysis and the robustness of the results.

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