RBB Economics

Value of YouTube to the music industry - Paper I - Cannibalisation

May 2017

1 Introduction

The music industry has undergone significant change over the past few years, with declining volumes of music sold through an ownership model (such as downloads) and rapid growth in usage models (such as streaming).[1] While many services provide value to the recorded music industry, in the 12 months to December 2016 one video streaming platform, YouTube, paid out over USD 1 billion to the music industry from advertising alone.[2] YouTube claims that not only does it return money directly to creators, but also that it has a promotional effect on music.[3] However, some commentators argue that YouTube has a negative impact on the music industry, paying insufficiently for content and cannibalising other services.

RBB Economics has undertaken several empirical analyses to evaluate YouTube's potential promotional or cannibalisation effects on the music industry in Europe. We analyse the results from a 1,500 person user survey, as well as data on YouTube views and streams on audio platforms of approximately 5,000 tracks in each of four European countries over a three year period.[4]

In a series of five short notes we set out a summary of our findings.

- In this first note, we consider the evidence of cannibalisation by YouTube of other legitimate music services.
- In our second note, we consider evidence on the patterns of growth of different platforms over time, namely audio streaming and video streaming platforms.
- We then consider the evidence of a potential promotional effect of YouTube on other legitimate music services.
- In our fourth note we consider the value for consumers arising from YouTube's music video offering.
- Our fifth note draws these empirical findings together and consider the direct value for the music industry.

[1] https://www.theguardian.com/music/musicblog/2016/apr/28/youtube-no-other-platform-gives-as-much-money-back-to-creators?CMP=twt_a-music_b-gdnmusic
[2] https://youtube.googleblog.com/2016/12/a-billion-reasons-to-celebrate-music-on.html
[3] https://www.theguardian.com/music/musicblog/2016/apr/28/youtube-no-other-platform-gives-as-much-money-back-to-creators?CMP=twt_a-music_b-gdnmusic
[4] Throughout the report plays of YouTube music videos will be referred to as "views" and plays of audio streams as "streams". YouTube views are sourced from YouTube. Audio streams are sourced from third parties including GfK and OCC.

2 Significant cannibalisation is unlikely

First, we consider the survey data. YouTube commissioned SurveyMonkey to conduct online surveys of music listeners in the United Kingdom, France, Germany and Italy.[5]

The survey results allow us to consider whether or not cannibalisation is likely, given the patterns of consumption observed for different groups of YouTube users.

We conclude that significant cannibalisation by YouTube of other legitimate music channels is unlikely, for two primary reasons:

- in the absence of YouTube, most time spent listening to music on YouTube would be lost or shifted to lower value music channels, and
- in the absence of YouTube, time spent listening to pirated content would increase.

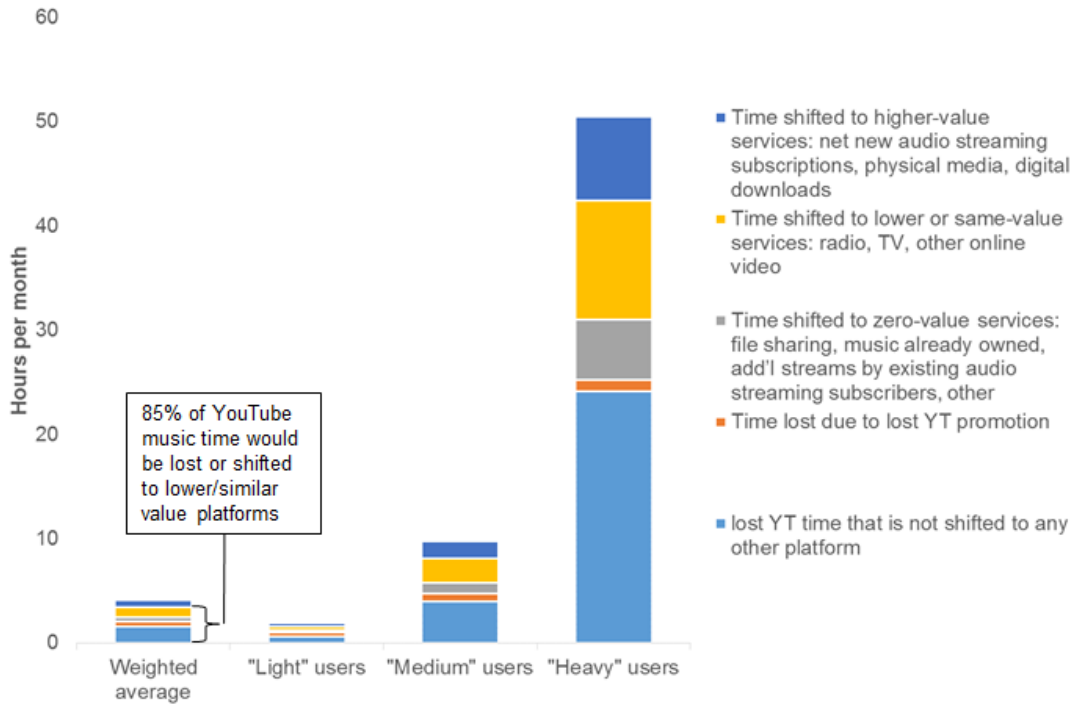
2.1 Without YouTube, 85% of time spent listening to YouTube would be lost or shifted to lower or similar value channels

The survey was conducted in order to, inter alia, infer on respondents' current music listening behaviour, particularly on YouTube, and hypothetical behaviour if YouTube were no longer able to offer music content. The results allow us to summarise users' responses as to how much time currently spent listening to music videos on YouTube would be switched to each of a number of other channels if YouTube did not exist.

Figure 2 shows survey respondents' stated shift of music listening time to other platforms, if music were no longer available on YouTube in the United Kingdom.

[5] A description of the survey collection methodology, the survey data, the limitations of the survey data as well as a description of YouTube's internal data, which was used in the analysis, can be found in section 7.1 of the full report. Section 7.1.1.4 lays out the methodology in relation to cannibalisation. Annex K of the full report contains the full set of questions as asked in the United Kingdom.

Figure 2: Shift of monthly YouTube music hours if music was removed from YouTube



Source: Survey questions Q6, Q12-16, Q42-43, Q48-57 and Q72-74. YouTube *promotion time is the 'upper limit' estimate: time s listening to newly discovered music on a platform, multiplied by the importance of* YouTube *in new music discover.*

Around half of the music listening time on YouTube would divert to non-music activities. A large portion of time would be diverted to channels that provide zero (including piracy), lower or equal value to the music industry, while a minority of time would be diverted to higher value platforms. Overall, the weighted average proportion of time diverted to zero, lower or equal value to the music industry is 85%.[6] The summary results of cannibalised time for the four countries analysed are presented in Table 1 below.[7]

[6] These results are the weighted average for the United Kingdom, France, Germany and Italy.

[7] The results depend on the likelihood of respondents to subscribe to an audio streaming service and only change by decimals when considering a range of plausible assumptions about the likelihood to subscribe to an audio streaming service. These figures are for weighted average YouTube users.

Table 1: Percentage of YouTube time shifted to different platforms if YouTube did not exist

	United Kingdom	France	Germany	Italy
Time lost	44%	53%	56%	54%
Shifted to zero value platforms	12%	11%	9%	10%
Shifted to lower or similar value	25%	25%	19%	23%
Shifted to higher value platforms	19%	12%	16%	13%

Source: Survey questions Q6, Q12-16, Q42-43, Q48-57 and Q72-74.

Across all four countries tested, around 85% of time currently spent watching music videos on YouTube would be switched to similar or lower value channels like TV, AM/FM radio, and Internet radio. This loss would be negative for the music industry and for consumers.

2.2 Without YouTube, users would switch to spend more time on piracy or file sharing

Survey respondents were asked how they would reallocate the time they spend listening to music on YouTube if YouTube was no longer able to offer music content. One of the available options was to focus more on file sharing. The results suggest that if YouTube were no longer able to offer music, time spent listening to pirated content would increase by +29%.[8] This is consistent with YouTube being a substitute for pirated content. Furthermore, if YouTube did not offer music, Heavy YouTube users would divert more listening time, in relative and absolute terms, to pirated content than Light YouTube users.[9] [10]

3 Blocking songs on YouTube does not grow streams

Second, we consider the data on YouTube views and audio streams. RBB received historical data from GfK for France, Germany and Italy, and from OCC for the United Kingdom, showing weekly volumes of audio streaming for a picklist of tracks in each country; RBB also received internal data from YouTube on video streaming volumes for the same tracks for the United Kingdom, France, Germany and Italy.

[8] Total time spent listening to pirated content would increase by +29% in each the United Kingdom and Italy, +26% in France and +51% in Germany. It should be noted that across all four countries the average YouTube user currently only spends approximately 20 minutes per month listening to pirated content. However, the possibility that respondents misreported their usage of pirated content cannot be ruled out.

[9] We understand that the music industry defines users by their monthly listening time, whereby Heavy YouTube users watch greater than 20 hours of music videos per month, Medium YouTube users watch between 3 and 20 hours per month, and Light YouTube users watch less than 3 hours per month.

[10] On average, Light YouTube users would spend 3 more minutes (+15%) listening to pirated content, whereas Heavy users would spend an additional 95 minutes (+58%) listening to pirated content.

The data on views and streams allow us to assess the effect of blocking YouTube music videos of particular songs on the volumes of audio streaming channels, such as Spotify.

We conclude that tracks that are blocked on YouTube typically do not perform better on streaming platforms than tracks that remain available on YouTube.

The blocking of some YouTube music videos in Germany provides a natural experiment that allows an analysis of the effect of blocking YouTube videos on audio streaming platforms. Blocking YouTube videos in Germany is many times directed at all videos associated with a song (rather than just one particular video), implying that a block results in the non-availability of the entire song on YouTube, allowing the assessment of a generalized block. This is because many tracks were blocked due to a dispute between the performing rights authority, GEMA, and YouTube prior to November 2016. Conversely, we understand that in the United Kingdom, France and Italy the blocking of music videos most likely stemmed from particular actions by one of the rights-holders, rather than from a generalized policy as in Germany, not allowing to study a generalized song unavailability on YouTube.

The effect of blocking tracks was studied using two approaches:

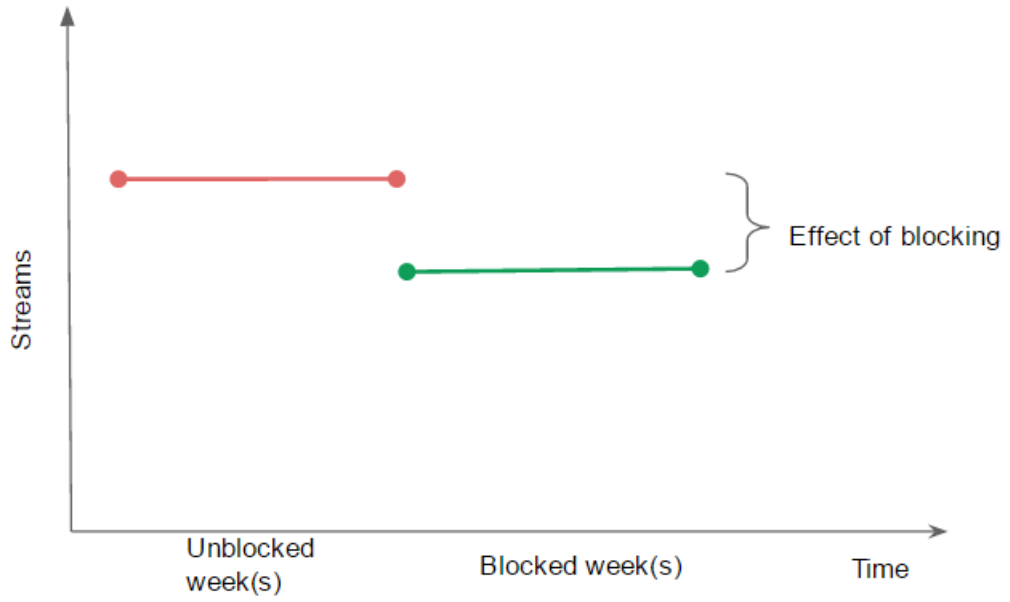
- Before-after method: compares the volume of streams before and after the same songs were blocked on Youtube. Results of this simpler approach indicate that there is no consistent effect of blocking YouTube on streams.
- Differences-in-Differences ("diff-in-diff") method: this more sophisticated approach tries to accommodate background changes that would have affected streams in any event. Results of this more sophisticated approach confirm that there is no impact of blocking YouTube on streams.

For each approach we apply statistical testing to analyse whether or not any difference in audio streams is sufficiently large or consistent to be likely due to a real effect, rather than pure chance.

3.1 Before-after analysis

A before-after analysis compares the volume of audio streams for tracks that were blocked on YouTube, both before and after the block. Figure 3 below illustrates the principle behind the before-after analysis.

Figure 3: Illustration of before-after methodology



The solid red line represents the streams for a particular track in weeks where it was not blocked on YouTube, while the solid green line represents the number of streams for the same track in weeks where it was blocked on YouTube. The difference between the two is estimated by the before-after analysis.

The before-after analysis was applied to the full sample of songs in Germany, and then to a number of sub-samples, either based on the song's age (since release date), or the song's popularity (ranking).

For sub-samples based on the song's age, the tracks in the data were divided into three groups, on the basis of their age at the reference week[11]:

- 0 – 3 months old;
- 3 – 18 months old;
- Older than 18 months.

[11] The reference week is the week in which the picklist of tracks was selected. This corresponds to the first week of March 2016.

For the sub-samples based on popularity (song rank), the tracks in the data were classified into three groups on the basis of their streaming rank in the reference week:

- Songs ranked 1 - 200;
- Songs ranked 201 – 2000;
- Songs ranked outside the top 2000.

Two different types of statistical regression model were applied to the full sample, and to each sub-sample: a Poisson model, and a Log model.

Table 2 below outlines the results of the before-after analysis in Germany. The results indicate that, in general, blocking on YouTube had no effect on a track's performance on streaming. These results hold regardless of the age of the tracks in question. Indeed, most tests suggest that blocking on YouTube had no impact on streaming, with 10 of the 14 tests showing no impact, 3 tests showing a positive impact on streaming and 1 test showing a negative impact.

Table 2: Before-after Analysis in Germany based on song age and popularity

		Model type	Interpretation of results	Coefficien	t-statisti	N Groups
All songs		Poisson Model	Non different from zero	0.115	1.5	3493
		Log Model	Statistically significant and positive - songs have more streams if blocked on YouTube	0.0509*	2.26	3497
Song age	0-3 months	Poisson Model	Non different from zero	0.305	1.5	394
	0-3 months	Log Model	Non different from zero	0.173	1.65	396
	3-18 months	Poisson Model	Non different from zero	0.125	1.07	1214
	3-18 months	Log Model	Non different from zero	0.049	1.2	1215
	18+ months	Poisson Model	Statistically significant and negative - old songs have less streams if blocked on YouTube	-0.0230*	-2.02	1885
	18+ months	Log Model	Non different from zero	0.00728	0.46	1886
Song rank	1-200	Poisson Model	Non different from zero	-0.0446	-0.54	200
	1-200	Log Model	Non different from zero	-0.00103	-0.02	200
	201-2000	Poisson Model	Statistically significant and positive - songs of medium popularity have more streams if blocked on YouTube	0.213*	2.47	1800
	201-2000	Log Model	Statistically significant and positive - songs of medium popularity have more streams if blocked on YouTube	0.0634*	2.08	1800
	2001+	Poisson Model	Non different from zero	0.0174	0.47	1493
	2001+	Log Model	Non different from zero	0.0132	0.38	1497

*Note: * indicates statistical significance with 95% confidence.*

For the general sample, using the Poisson regression model, the before-after analysis in Germany shows that blocking on YouTube does not have a statistically significant impact on streams. The results of the log regression model suggest that blocking on YouTube is associated with a 5% increase in streams.

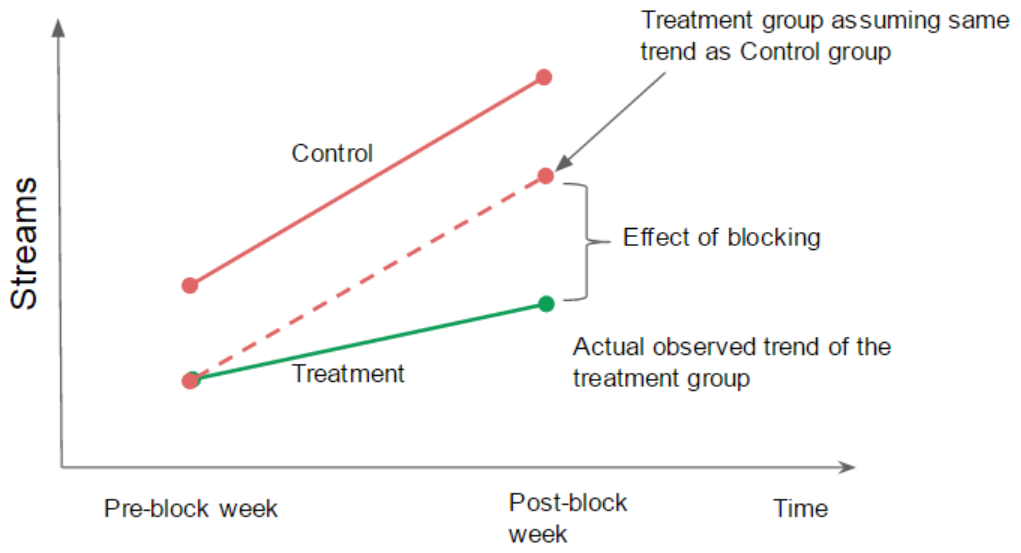
For the age subsamples, the before-after analysis shows that there is no consistent and statistically significant effect of YouTube blocking on streams in different age brackets: the Poisson model shows that YouTube blocking was associated with a decrease in streams for tracks older than 18 months, while the other results were not statistically significant.

For the popularity subsamples, the before-after analysis shows that YouTube blocking has no effect on streams of tracks with high or low popularity, but is associated with an increase in streams of tracks with medium popularity, ranging from 6% to 21%. However, these results for medium popularity tracks represent the smallest volumes, as these tracks are between the highly viewed top tracks and the long tail of songs that include the most significant volumes.

3.2 Differences-in-Differences analysis

A diff-in-diff analysis compares the evolution of streams of tracks that were blocked on YouTube in one country but not blocked in another country. The diff-in-diff comparison is more sophisticated than the before-after analysis, as in addition to comparing changes across time, it also tries to take into account background changes that would have affected streaming volumes in any event, by comparing changes across geographies. Figure 4 below illustrates the principle behind the diff-in-diff method.

Figure 4: Illustration of Differences-in-Differences methodology



The "*Control*" countries are those where the tracks are not blocked, shown by the solid red line. The "*Treatment*" country is defined as the country where the tracks are blocked, shown by the solid green line. The dotted red line shows how streams would have evolved in the treatment country if YouTube had not been blocked, and is estimated using the trend of the control countries applied on the treatment country. The effect of blocking is then estimated by taking the difference between the observed streams and the estimated streams in the Treatment country. The results of this analysis indicate that blocking YouTube has no statistically significant impact on streams.

For the diff-in-diff analysis, RBB constructed a list of tracks in Germany which were blocked during a certain period and were unblocked outside that period. These tracks were further restricted to those tracks for which data were available in at least the United Kingdom, France or Italy, and which were unblocked in these countries during the treatment period. This allowed estimating effect of blocking as illustrated in Figure 4 above.

Table 3 below describes the results of the diff-in-diff analysis for Germany using two model specifications – the Poisson model and the Log model.

Table 3: Differences-in-Differences Analysis for Germany

Model type	Interpretation of results	Coefficien	t-statisti	N Groups
Poisson Model	Non different from zero	0.0694	1.62	108
Log Model	Non different from zero	0.066	0.98	108

*Note: * indicates statistical significance with 95% confidence.*

The coefficient that measures the effect of blocking on streams is not statistically significant in either model. This indicates that blocking on YouTube has no impact on streaming volumes.

4 Conclusion

In this first note we have considered the evidence on cannibalisation by YouTube of other legitimate music services.

We first looked at the results from a 1,500 person user survey, which showed that significant cannibalisation is unlikely, and that if music videos were no longer shown on YouTube, around 85% of time currently spent listening to music videos on YouTube would be lost or shifted to lower or similar value channels like TV, AM/FM radio and Internet radio. Without music videos on YouTube, some users would switch to file sharing or piracy.

We then analysed historical data on YouTube views and streams on audio platforms for around 5,000 tracks in each of four European countries over a three year period. We specifically looked at whether the blocking of music videos of particular songs on YouTube in Germany led to any change in the streaming volumes for those same songs. We considered two different approaches and a range of statistical tests, which generally found no significant impact on streaming volumes, when songs were blocked on YouTube.

On the basis of these data, we find no evidence of significant cannibalisation by YouTube of other legitimate music services.