RBB | Economics

Value of YouTube to the music industry - Paper III - Promotion

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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 in order to evaluate YouTube's potential promotional or cannibalisation effects on the music industry in Europe. We analyse the results from 1,500 person user surveys carried out in each of four European countries, as well as data on YouTube views and streams on audio platforms of over 8,000 tracks across these countries over a three year period.[4]

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

- Looking at survey evidence we found that significant cannibalisation is unlikely: users of music on YouTube are primarily lighter users, and if music videos were no longer shown on YouTube, 85% of users' time would be lost or shifted to lower or similar value channels, and even to file sharing or piracy.
- Looking at historical data, we found that when particular songs were blocked on YouTube, in Germany, there was generally no significant increase in audio streaming volumes for those same songs.
- On the basis of these data, we find no evidence of significant cannibalisation by YouTube of other legitimate music services.

In our second note, we considered evidence on the patterns of growth of different platforms over time, primarily audio streaming and video streaming platforms. This was an introduction to the consideration of a potential promotional effect more generally.

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[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.

- Survey evidence showed that YouTube is the most important source of discovery for YouTube users, and that heavier YouTube users also more heavily consume music through other legitimate channels.
- Data on YouTube views and streams on audio platforms showed that streaming volumes have continued to grow strongly, and in most markets have grown more strongly than video streams, as shown in Figure 1, below.

Figure 1: Total platform YouTube views vs streams, United Kingdom
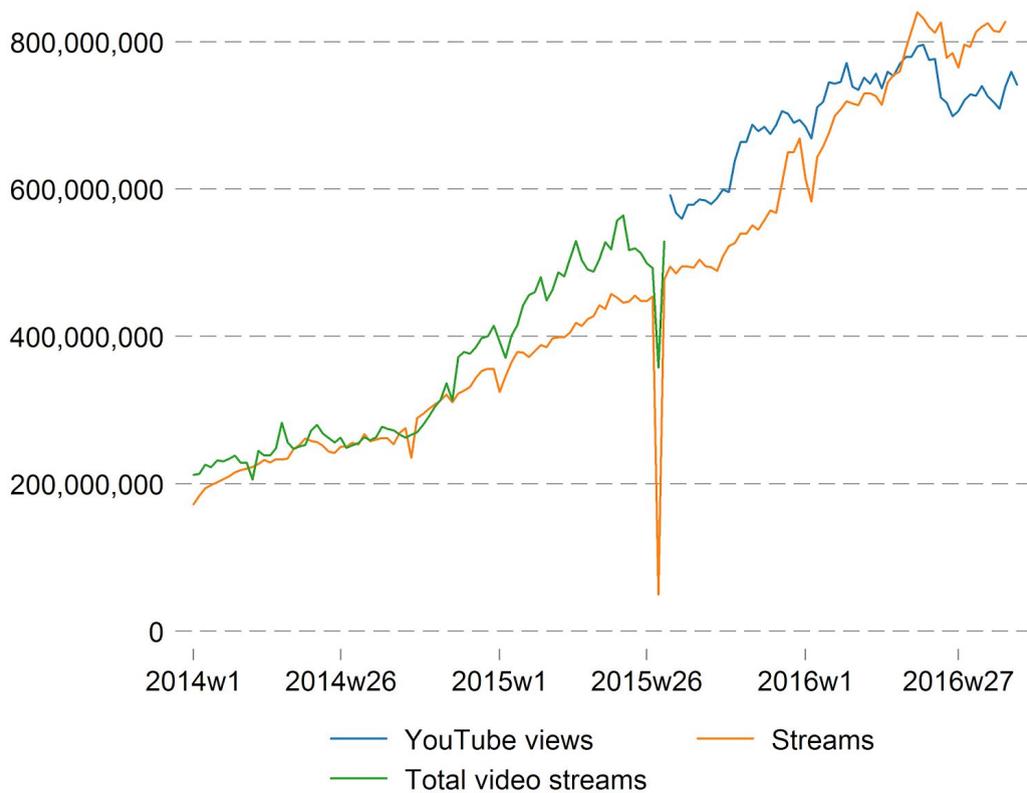
Source: RBB analysis of OCC data and YouTube internal data. Note: YouTube views data were only available from 2015w30. The data have been extended to prior years using OCC data on total video streams.

- We also found that individual songs that achieve higher video streaming volumes on YouTube achieve higher audio streaming volumes on platforms like Spotify (and vice versa), as shown in Figure 2, below.

Figure 2: Correlation between streams and YouTube views, United Kingdom
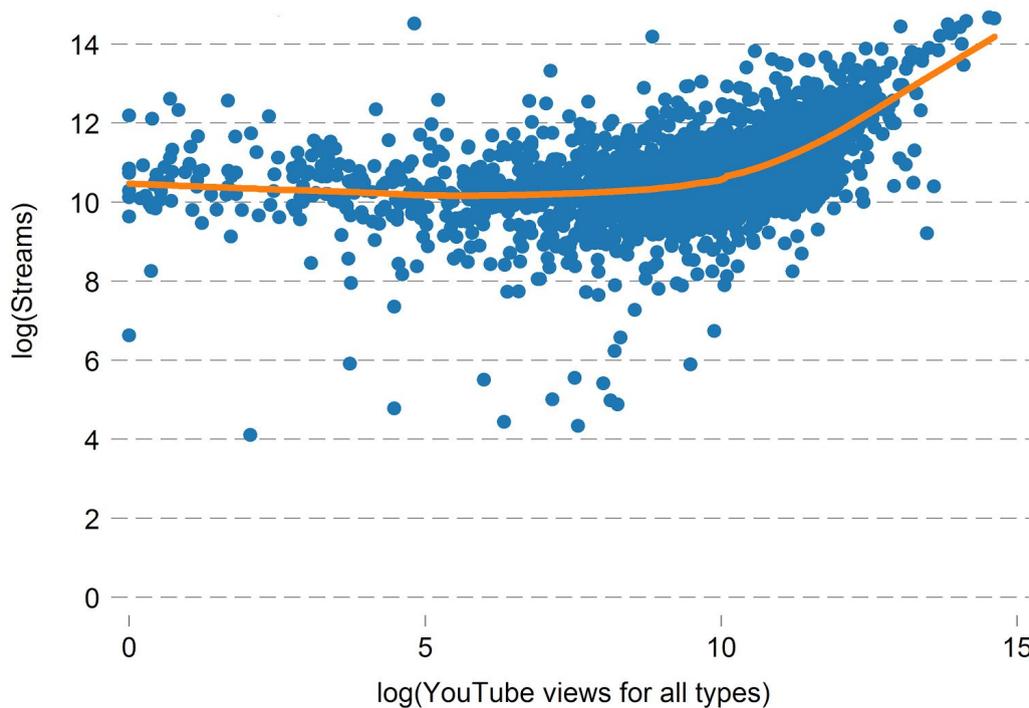
Source: RBB analysis of OCC data and YouTube internal data. Correlations are calculated across all track observations, i.e. for all the weeks in the dataset.

- These findings indicated that video and audio streaming have grown in tandem, and did not indicate significant substitutability between these two channels.

In this, our third note, we consider the evidence of a potential promotional effect of YouTube on other legitimate music services in more detail, including further empirical and statistical testing.

In our final two notes, we will consider the questions of consumer value and overall value to the music industry.

- In our fourth note we will consider the value for consumers arising from YouTube's music video offering.
- Our fifth note will consider the direct value for the music industry.

2 The relationship between YouTube views and audio streams

We consider the data on YouTube views and streams on audio platforms. RBB received historical data from GfK for France, Germany and Italy, and from OCC for the United Kingdom, showing weekly volumes of audio streaming and downloads for a picklist of over 8,000 tracks across these countries; RBB also received internal data from YouTube on video streaming volumes for the same tracks for the United Kingdom, France, Germany and Italy.

The data on views and streams allow us to further investigate the ways in which the volume of streams (e.g. on Spotify) and the volume of views (on YouTube) for a given song might change over time, after its release.

As noted above, in our previous paper we found that audio streaming volumes continued to grow rapidly over the past few years, while video streaming volumes have also grown, and moreover that when songs achieve higher video streaming volumes, they also achieve higher audio streaming volumes. In this paper we find that after the release of a new song, YouTube views and audio streams tend to grow in concert and YouTube views actually tend to peak earlier than streaming volumes. Overall YouTube views tend to "lead" streams: YouTube views tend to rise first and then streams rise; YouTube views fall and then streams fall. This is consistent with a significant promotional effect.

We also consider whether early exposure on YouTube increases or decreases later volumes on streaming platforms. We find that more exposure on YouTube helps increase streams on paid services. Tracks with higher initial exposure on YouTube achieve higher streams on paid services like Spotify, Apple Music, etc. in subsequent months, compared with new releases that had lower initial exposure on YouTube. This effect is substantial - between 12% and 142% more audio streams per month, and holds across countries, for popular and less popular tracks, for new releases and even for older tracks, over two years after release, demonstrating that exposure on YouTube provides promotional value to paid streams on other services.

3 Song life cycles

The data on views and streams allow us to investigate the ways in which the volume of streams (e.g. on Spotify) and the volume of views (on YouTube) for a given song might change over time, after its release.

We first look at simple graphs of views and streams over time. Figure 3 illustrates the life cycle of tracks over the first year of their release in the United Kingdom. YouTube views grow more rapidly in the initial weeks, relative to the growth in streams.[5]

Figure 3: Share of streams vs YouTube views over first year of tracks, United Kingdom
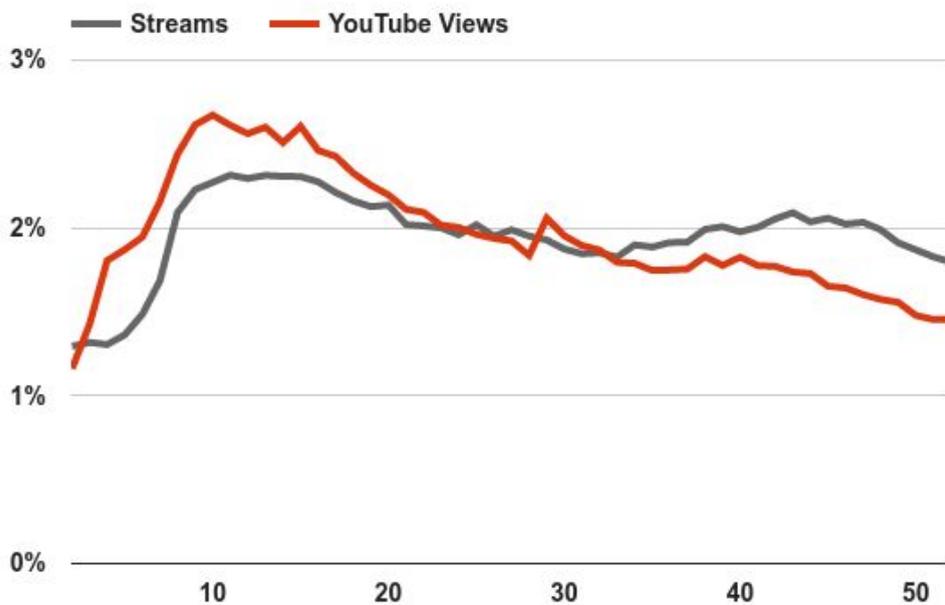
Source: RBB analysis of OCC data and YouTube internal data. The sample includes the 426 tracks for which the first year after release is observed in the data (i.e. tracks released between 2014w1 and 2015w31). The volumes have been normalised by the first year total for each platform, so that the area under both charts is equal to 100%. The first two weeks of the lifecycle are excluded since streaming data is often missing for these weeks. Tracks where further streaming data was missing have been excluded from the analysis.

We then apply some statistical testing to explore this relationship further. Granger causality allows the estimation of "statistical causality", i.e. whether YouTube views are a statistically leading indicator of streams. If one series (e.g. views) are a statistical leading indicator of another series (e.g. streams), then the number of views today will be a good predictor of the number of streams tomorrow.

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[5] Similar results are found in Germany. In France and Italy there is no clear sign of YouTube views leading streams.

The statistical analysis of Granger causality indicates that past YouTube views have explanatory power over part of the future variation of streams. Variations in YouTube views are also observed, later, to affect streaming volumes, suggesting that YouTube may have a promotional effect on streams. Table 1 below shows that YouTube views (variable "*log(YouTube views) at week-1*") have a positive and significant explanatory power over future streams in the United Kingdom.[6,7] Statistical tests such as this are not conclusive evidence of causality, as commonly understood; it is possible that other common shocks could be causing changes in both views and streams, although it is notable that any effect on YouTube views is felt first, and only later affects audio streams.

Table 1: Results of Granger causality for streams, United Kingdom

	Interpretation of results	Model specification (1) log(streams)	Interpretation of results	Model specification (2) log(streams)
log(YouTube views) at week-1	Statistically significant and positive - YouTube leads streams	0.0583^{*} (0.0252)	Statistically significant and positive - YouTube leads streams	0.0682^{*} (0.0326)
July_2014	Controls		Controls	-0.0381 (0.0609)
August_2014	Controls		Controls	-0.0404 (0.0584)
… July_2016	Controls		Controls	0.0842 (0.0647)
log(streams) at week-1	Controls	0.404^{***} (0.112)	Controls	0.362^{**} (0.136)
log(streams) at week-2	Controls	0.212^{***} (0.0288)	Controls	0.174^{**} (0.0541)
log(streams) at week-3	Controls	0.123^{***} (0.0217)	Controls	0.0709^{*} (0.0338)
log(streams) at week-4	Controls	0.0551^{*} (0.0224)	Controls	0.101 (0.0561)
log(streams) at week-5	Controls	0.0383^{*} (0.0189)	Controls	0.0692 (0.0449)
… log(streams) at week-24	Controls	0.00538^{***} (0.00122)	Controls	-0.000315 (0.00318)
Constant	Controls	0.593^{*} (0.270)	Controls	1.081^{*} (0.424)
N		265,743		265,743
N_g		3,100		3,100

*Standard errors in parentheses. Time dummies correspond to a specific month and year. Some of the coefficients for the time dummies and the lagged logarithms of streams have not been displayed for brevity. * p < 0.05, ** p < 0.01, *** p < 0.001*

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[6] The coefficient of the variable "log(YouTube views) at week-1" is positive and significant after controlling for the movement of past streams. This indicates that, in addition to the complete history of a song's streams, the song's number of YouTube views in the previous week helps predicting the contemporaneous week's number of streams for that song. Moreover, statistically, an increase in the number of YouTube views leads to an increase in the number of streams in the following week.
[7] Similar results are found in Germany, France and Italy.

4   Exposure on YouTube and its effect on streams

The data on views and streams also allow us to consider whether early exposure on YouTube increases or decreases later volumes on streaming platforms.

We investigated the different levels of exposure on YouTube in the initial months for tracks, and then considered the effects that this had on streaming volumes in subsequent months. We find that **tracks with high initial exposure on YouTube grow more on streaming platforms in subsequent months, when compared to tracks with lower initial exposure on YouTube.** This further suggests that YouTube has a promotional effect, boosting music consumption on audio streaming platforms.

The initial exposure to YouTube was calculated as the ratio of streams to YouTube views in the first month of the track's release.[8] A high ratio of streams to YouTube views indicates low exposure to YouTube, while a low ratio indicates high exposure to YouTube. This ratio also provides a measure that can be applied to popular and less popular tracks, and can also be applied to tracks released at different times. Tracks were then ranked on the basis of this ratio, with the top third of tracks classified as "high initial exposure", and the bottom third of tracks classified as "low initial exposure".[9] Figure 4 below shows the results for the United Kingdom.

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[8] A more popular track would be expected to attract many more initial views on YouTube than a less popular track. Each of streams and views grew strongly throughout this period, so a track released in 2015 would be expected to attract many more initial views on YouTube than a track released in 2014.

[9] For this exercise, the sample of tracks was restricted to those tracks for which data were available for the 6 months following the release of a track, i.e. tracks released throughout 2014 and 2015 (so that we could observe what happens to streaming volumes, after a given exposure on YouTube). Tracks were also dropped if they showed no streams or YouTube views in the first week of release, in order to avoid biases in the calculation of initial exposure to YouTube.

Figure 4: Average monthly streams in months 2–6 compared to month 1, United Kingdom
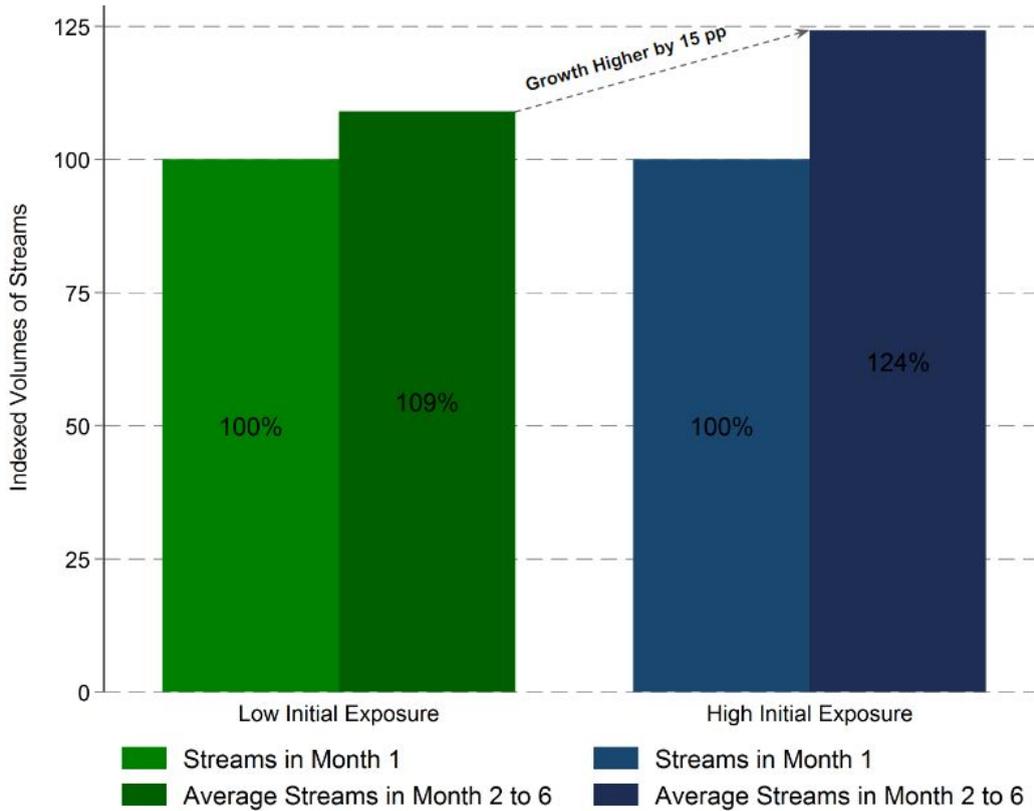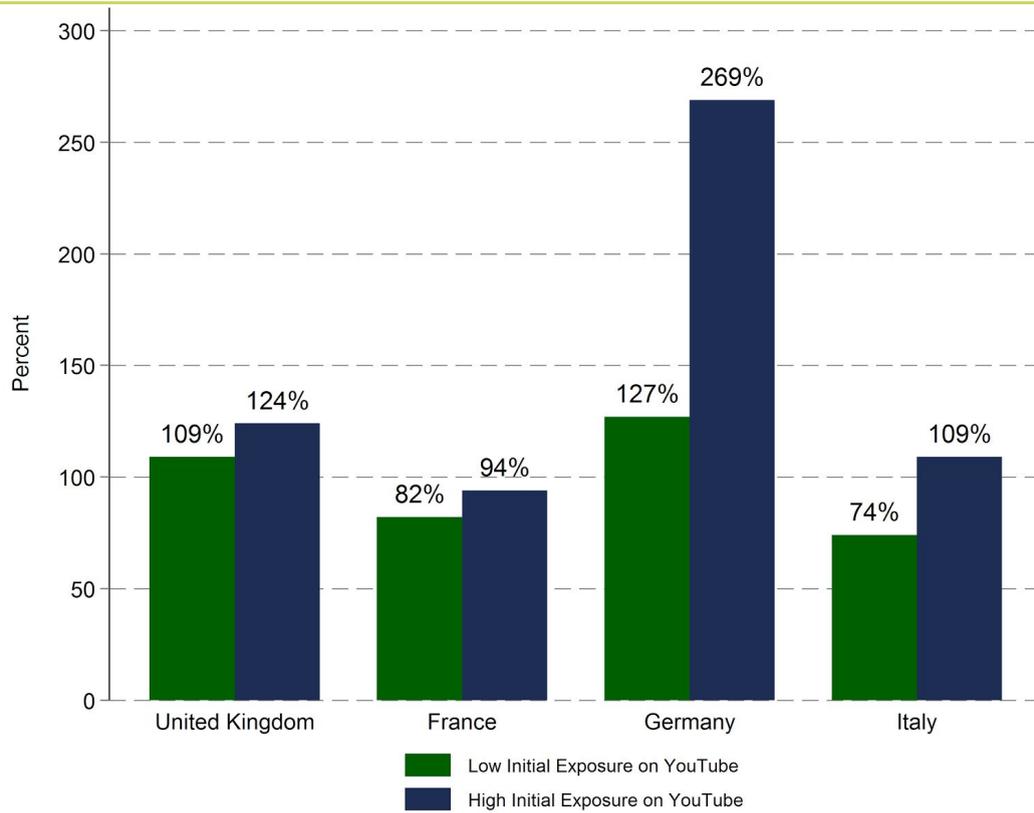

Source: RBB analysis of OCC data and YouTube internal data. Sample of 227 tracks released during 2014 and 2015.

The light green and light blue bars show the streams in the first month for low exposure and high exposure tracks respectively. These streams have been indexed to 100 in month 1. The dark green and dark blue bars show the average streams in months 2–6 for these same two groups of tracks. The tracks with high exposure in month 1 (blue) grew more in months 2–6, when compared to the tracks with low exposure. This difference in growth amounts to 15 percentage points.

In all four countries, tracks with high initial exposure to YouTube had more streams in months 2–6, compared to tracks with low initial exposure.

Figure 5 summarises the results for the other countries. The magnitude of this observed effect was the highest in Germany, with 142% higher growth for tracks with high exposure on YouTube.

Figure 5: Average monthly streams in months 2–6 after release compared to month 1, all tracks

Source: RBB analysis of GfK data, OCC data and YouTube internal data. Sample of 1,114 tracks released from 2014-2015 across the four countries. Restricted to tracks which have non-zero streams and YouTube views in the first week.

This result was further investigated on subsamples of tracks based on their popularity, and based on their age.

4.1   Exposure on YouTube, by popularity

The exposure analysis was repeated for a subsample of more popular tracks and for a subsample of less popular tracks. The results also show that higher initial exposure on YouTube is followed by higher growth in streams in subsequent months. The effect is, in general, largest for less popular tracks which are typically more represented on YouTube. Popularity of tracks was defined by their share of total streaming platform volumes in the first month following their release. The top one third of tracks in terms of platform share were classified as more popular tracks, while the bottom one third of tracks were classified as less popular tracks.

Table 3 details the results of the analysis for the two subsamples in each country.

Table 3: Average monthly streams in months 2-6 after release compared to month 1

Country	More popular tracks			Less popular tracks		
	Low month 1 YouTube exposure	High month 1 YouTube exposure	Delta	Low month 1 YouTube exposure	High month 1 YouTube exposure	Delta
United Kingdom	- 22%	- 13%	**+ 9%**	+ 227%	+ 659%	**+ 432%**
Germany	+ 2%	+ 124%	**+ 122%**	+ 120%	+ 1,231%	**+ 1,111%**
France	- 36%	- 16%	**+ 20%**	+ 10%	+ 194%	**+ 184%**
Italy	- 30%	+ 3%	**+ 33%**	+ 89%	+ 87%	**- 2%**

Source: RBB analysis of GfK data, OCC data and YouTube internal data. Sample of 1,114 tracks released from 2014-2015 across the four countries. Restricted to tracks which have non-zero streams and YouTube views in the first week.

The analysis of these subsamples gave the same result. For example, in Germany, popular tracks with low initial YouTube exposure increased their streams by 2% in the subsequent months, while those with high initial YouTube exposure increased their streams by 124%, a delta of 122% favoring higher exposure on YouTube. Likewise, for less popular tracks in Germany, tracks with low initial YouTube exposure increased streams by 120% in the subsequent months, while tracks with high initial YouTube exposure increased their streams by 1,231%. This result is consistent across all countries and all subsamples, except for less popular tracks in Italy, for which high exposure tracks experienced marginally lower growth.

4.2   Exposure on YouTube by age

This analysis was repeated to test whether YouTube exposure had any effect on streaming volumes later in the songs' life cycles. We considered a sample of tracks released in the first half of 2014,[10] and then looked at YouTube exposure in the period 12-18 months after release. We then assessed the performance of these tracks in terms of streaming volumes in the period 18–24 months after release. We analysed how different exposure levels to YouTube at this later stage (12–18 months) impacted the subsequent growth of streams. Table 4 shows the results of our analysis.

Table 4: Growth in streams, 18-24 months post release compared to 12-18 months post release

Country	Low YouTube exposure (months 12-18 post release)	High YouTube exposure (months 12-18 post release)	Delta
United Kingdom	+ 10%	+ 19%	**+ 9%**
Germany	- 12%	- 23%	**- 11%**
France	+ 8%	+ 14%	**+ 6%**
Italy	- 29%	-25%	**+ 4%**

Source: RBB analysis of GfK data, OCC data and YouTube internal data. Sample of 710 tracks released in the first half of 2014 across the four countries. Restricted to tracks which have non-zero streams and YouTube views in the first week.

We find that higher exposure to YouTube in months 12-18 of a track's lifecycle is associated with higher growth in streams in months 18-24 in all countries except in Germany.

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[10] For this exercise, the sample of tracks was restricted to those tracks that were released in the first half of 2014 (so that we could observe what happens to streaming volumes up to 24 months after release).

5 Conclusion

In this third note we have considered the evidence of a potential promotional effect of YouTube on other legitimate music services.

We have looked at historical data on YouTube views and streams on audio platforms for over 8,000 tracks across four European countries over a three year period.

These data show that not only have audio streaming volumes continued to grow rapidly over the past few years, while video streaming volumes have also grown, but that **when songs achieve higher video streaming volumes, they also achieve higher audio streaming volumes**. After the release of a new song, **YouTube views and audio streams tend to grow in concert and YouTube views actually tend to peak earlier than streaming volumes**. Overall **YouTube views tend to "lead" streams**: YouTube views tend to rise first and then streams rise; YouTube views fall and then streams fall. This is consistent with a significant promotional effect.

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