It was Fifty Years Ago Today:

Recording Copyright Term and the Supply of Music

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This paper examines the effect of the expiry of recording copyright on the supply of music – in the form of re-releases, availability in streaming platforms, and concert performances – by artists popular in the UK in the 1960s. The term of recording copyright in the UK was extended from 50 to 70 years in 2013, implying that copyrights on recordings made in the late fifties and early sixties are no longer in force, while tracks recorded a few years later remain under copyright protection. In a sample of 13,238 tracks by 140 artists first released between 1928 and 1975, we find that the expiry of recording copyright is associated with an approximately 141-247% increase in the number of re-releases, holding constant artist, age and year fixed effects. The effect is not significantly different for the most popular artists in our sample, and is not apparent in placebo regressions on a sample of US re-releases. Results on availability on the Spotify streaming music platform tell a different story: there is no significant difference in the availability of tracks recorded before 1963 in the UK where their recording copyrights have expired, compared to the US where their recording copyrights are still in force. However, when a track's original recording copyright expires, it becomes less likely to be performed in concert, particularly by UK-focused artists, after controlling for age, year and artist fixed effects. These results suggest that copyright term extensions may lead to fewer re-releases but more live performances of popular music first recorded approximately fifty years ago. They also point towards substantial heterogeneity in the effects of copyright on availability of cultural products across different distribution channels, and raise the question of whether the platform distribution model may moderate the negative effects of long copyright terms on availability.

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Copyright law grants exclusive rights to exploit a creative work for a set time period, and is thought to promote the creation of new works by incentivizing authors and artists. Ex post changes in the duration of copyrights after the work has been created, however, have been controversial. The most prominent recent example of a copyright term extension – the Sonny Bono Copyright Term Extension Act of 1998 – extended the term of US copyrights to the life of the author plus 70 years, or 95 years after publication. Some have argued that postponing the expiry of copyright many decades in the future has a negligible impact on the present value of the stream of revenues derived from a copyrighted work, and creates little additional incentive for creation (Akerlof et al. 2003). Moreover, empirical research suggests that such extensions restrict the availability of copyrighted material (Heald 2014, Reimers 2017).[1]

This paper examines the effects of copyright on the availability of recorded music, using as identifying variation an extension that took place during the lifetimes of many of the affected artists. In 2011 the UK enacted Directive 2011/77/EU, which extended the copyright of sound recordings from 50 years to 70 years.[2] This became known as "Cliff's Law" since Cliff Richards, not the owner of his songs' recording rights, was a major advocate for the extension. We examine the effect of the expiry of sound recording copyright on the availability of affected tracks – both in terms of reissues of recordings as well as availability on the streaming platform Spotify -- by artists popular in the 1960s. In addition, because artists can use live performances to promote album sales, we also ask whether artists performed more and/or different songs

[1] The copyrights extended by the Sonny Bono act are scheduled to lapse in 2019, and a recent statement by a spokesperson for the Recording Industry Association of America (RIAA) suggests there will not be lobbying efforts to further extend terms (Lee 2018).

[2] Copyrights on the composition lasted for 70 years before and after the change.

before and after the change in the copyright extension, and whether copyright protected songs are more likely to be performed than songs of the same age for which recording copyrights have expired.

Results suggest a substantial increase in the number of releases of tracks once recording copyright expires, relative to tracks of the same age and approximate vintage remaining under copyright protection. This finding is consistent with prior findings for books (Heald 2014, Reimers 2017). In contrast to results on sound recordings, we find a negative effect of public domain status on live performances of songs (after controlling for year, age and artist fixed effects). The effect is largest for UK-focused artists. This result is consistent with the idea that artists use performances to promote sales of recordings. Overall, we obtain mixed results on the effect of copyright term on supply. Our findings suggest that the UK copyright term extension may lead to substantially fewer re-releases of physical albums of popular music first recorded approximately fifty years ago. In contrast, we find no effect of copyright status on availability on the Spotify streaming platform. However, the term extension is associated with more live performances of affected tracks, consistent with the idea that artists may prefer to perform copyrighted tracks as a means of promoting sales of tracks with higher royalty revenues.

These results point towards the importance of differences in distribution models and licensing arrangements in determining how copyright status affects availability. This may imply that the ongoing transformation of the distribution of recorded music away from physical instantiations like CDs and towards internet content platforms like Spotify may curtail the negative effects of copyright term extensions on the availability of music.

I. Prior Literature

Prior research on copyright in books has found an association between copyright status and the availability of creative works. Heald (2008) frames the question of whether copyright expiry leads works to be under-exploited or over-exploited and finds that, in a sample of books published between 1913 and 1932, titles first published before 1923 (and therefore in the public domain) were available from a larger number of publishers and were more likely to be in print than books published in the subsequent decade (which are protected by copyright). Figures in Heald (2014) display a discrete drop in availability on Amazon for titles first published in the 1920s, relative to titles published earlier. Reimers (2017) examines the contemporary prices, availability, and sales ranks on Amazon for 249 book titles originally published between 1910 and 1936, and finds that titles published before 1923 are available in 26.5 more editions than titles published after 1923. The effect is largest for paperback editions, and is only marginally significant for e-books (copyrighted titles are available 2.9 fewer e-book editions, with a standard error of 1.5).

The expansion in supply as a result of copyright expiry has been found to be associated with price declines. Reimers (2017) finds that titles in the public domain have prices that are up to 35% lower on average. Examining an extension of copyright terms that unintentionally extended terms differentially for titles by dead authors but not for those by living authors, Li, MacGarvie and Moser (2017) show that prices of books decline as copyright expiry approaches, and increase substantially for titles affected by an increase in the term of copyright in 1814 relative to unaffected titles with similar characteristics. Pollock, Stepan and Valimaki (2010) find that the UK prices of recordings on CD whose recording copyrights had expired were significantly lower than the prices of recordings of approximately the same age still protected by copyright. For example, using data on CDs from early 2009, they find that recordings originally

released in 1954-1958 (and therefore with expired recording copyright) were approximately 30p less expensive on average than recordings originally released in 1960-1964 (with valid recording copyrights), though the median prices are the same. In a broader comparison of pre-1959 recordings with post-1959 recordings, both average and median price differences are larger, possibly due to declines in price as copyright expiry approaches (as seen in Li, MacGarvie and Moser 2017 and St. Clair 2004).

Other work has focused on the effects of copyright on reuse of copyrighted material. Heald (2008) finds no effect of copyright vs. public domain status on the probability a popular song from the years 1913-32 is used in a movie released between 1968 and 2007, after controlling for time period effects. Heald (2014a) examines a sample of songs that appear in high-grossing movies listed on imdb.com and boxofficemojo.com and finds a statistically significant increase in the rate of inclusion in movies when songs are in the public domain. Heald (2104b) examines the availability on YouTube of 385 popular U.S. songs recorded between 1919 and 1926, and finds similar rates of availability for public domain and copyrighted songs (70% for songs in the public domain and 77% for songs protected by copyright). Nagaraj (2017) finds that digitized material from *Baseball Digest* protected by copyright is significantly less likely to be reused in Wikipedia pages than material from earlier issues not protected by copyright. This effect is more pronounced for the less popular players. Biasi and Moser (2017) study the US book republication program during World War II, which abrogated the copyrights of German authors, and find an increase in citations to scientific works made available through the program. Watson (2017) estimates the impact of broadened copyright policy on re-use in music, showing that strengthening the scope of copyright reduces the extent of downstream re-use along the intensive margin, without affecting the propensity of new works to re-use prior work, but also

finds that this negatively impacted the creativity of re-use through less diversity in re-purposed works.

While several of the aforementioned works show that extending copyright terms increases prices and reduces availability of affected works, relatively little research has focused on the impact of extensions on incentives to create new work. MacGarvie and Moser (2015) study payments to authors by publishers around the time of the copyright term extension of 1814 and find that payments increased substantially after the extension, particularly for superstar novelists like Sir Walter Scott. Giorcelli and Moser (2015) show that Italian states that adopted copyright laws as a result of annexation by Napoleon in 1801 saw a five-fold increase in the creation of historically significant operas and a ten-fold increase in the creation of operas still available in recordings today.

The literature on patent expiry and generic entry in pharmaceuticals has suggested that, when intellectual property rights are threatened by competition from generics (Ellison and Ellison 2011) or parallel trade (Kyle 2008), producers of patented drugs may engage in strategies to deter entry. Ellison and Ellison (2011) examine drug companies' advertising, product offerings, and pricing in the years prior to patent expiry for a panel of drugs whose patents expired between 1986 and 1992. They find that levels of some forms of advertising are lower than expected in intermediate-sized markets, consistent with theoretical predictions of investing less in advertising in such markets to deter entry. To the extent that live performances are used to promote sales of recordings, this paper contributes to our understanding of strategic responses by holders of intellectual property (IP) to the threat of entry as the expiry of IP rights approaches.

II. Music Copyright and "Cliff's Law"

In UK copyright law, a piece of recorded music protected by three separate copyrights. The first is the *musical composition* which is the musical score, or the pattern of notes, for the song. The rights to the musical composition are typically owned by the composer. The second aspect of copyright is the right to the lyrics to the song, which are treated as a literary work and typically owned by the lyricist. The third aspect is the *sound recording* which is the right to a specific fixation or recording of a song. Performers typically enter into contracts which assign the recording copyright to the record producer in exchange for a royalty.[3] The sound recording can be thought of as the specific way that the song is performed and recorded. There can be multiple different sound recordings copyrighted separately for the same song performed in different ways or by different artists.[4]

These aspects of copyright law affect various artists and songs in different ways. Artists who chiefly write and compose their own songs will receive revenues from both the musical composition and sound recording rights to their music while others may only receive copyright royalties from the sound recording.

In the UK, the copyright on the musical composition lasts for the author's lifetime plus 70 years. However, artists who have others compose and write their music for them depend on sound recording rights for copyright income. Regardless of the nature of the benefits to the artist, a third party must pay for recording as well as composition rights when reissuing music. Labels

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[3] Directive 2011/77/EU, section (9). Non-featured performers (i.e. session musicians who play in the background), who typically received lump-sum payments rather than a royalty, became entitled to receive royalties 50 years after the recording when the directive came into being.

[4] "Cover versions" are a common example of sound recordings that are distinct from the original version's recording copyright.

wishing to reissue and distribute (e.g. on CD) a recording still on copyright must obtain a license to reproduce the recording from the label holding the copyright on the "master" recording. Streaming platforms like Spotify must also obtain licenses from the labels holding recording copyrights.

Copyright in sound recordings -- or "records, perforated rolls, and other contrivances by means of which sound may be mechanically reproduced" -- was established in the UK by the Copyright Act of 1911, which limited the term to fifty years from the making of the recording (Copyright Act, 16/12/1911, Article 19, section 1). In 2011 the UK enacted Directive 2011/77/EU, which extends the copyright of sound recordings from 50 years to 70 years. This extension is a step towards what advocates were pushing for but it is still a very short term compared to the United States, which protects the copyright of sound recordings for the artist's life plus 70 years. Cliff's Law extends protection on songs first published in November 1963 or later.[5] Songs published before that date entered the public domain after 50 years.[6]

The text of the directive states that the motivation for the copyright term extension is to benefit artists facing an "income gap" at the end of their lifetimes. However, according to

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[5] EU member states were required to comply with the Directive by November 1, 2013 (Article 2, section 1, Directive 2011/77/EU).

[6] The directive notes that the "rights in the fixation of the performance should revert to the performer if a phonogram producer refrains from offering for sale in sufficient quantity… copies of a phonogram which, but for the term extension, would be in the public domain, or refrains from making such a phonogram available to the public" (section (8), Directive 2011/77/EU). As a result of this provision, some labels issued recordings for the first time around the time of the copyright term extension. For example, in 2012 Sony released in Europe a four-CD set of Bob Dylan's recordings titled "The 50th Anniversary Collection: The Copyright Extension Collection, Volume 1." A representative of Sony told Rolling Stone that the album was released to ensure copyright protection on songs recorded before 1963 that had not previously been released: "[t]he whole point of copyrighting this stuff is that we intend to do something with it at some point in the future" (Greene 2013).

Theofilos (2013), "[m]ost artists who were young and just starting their careers were systematically forced by powerful record companies into signing deals that paid only low royalty rates and effectively forced those artists to relinquish all other rights to their music." Theofilos notes that Kretschmer (2011) finds that approximately 72% of the monetary benefits of term extension will go to record labels, with only 28% going to artists (and only 4% to artists facing an income gap).

In addition to providing artists with revenue from ticket sales, concert performances are also a form of advertising for record releases.[7] If artists derive a significant amount of royalty revenue from sales of recordings, and concert performances are used to promote sales of these recordings, artists may prefer to perform copyright-protected songs and rather than public domain songs, as the former generate more recording sales for the artist. However, if they do not derive significant royalties, we may not see differences in the rate of performance of the two types of songs. Note that tracks recorded before and after 1963 have the same status with respect to the composition copyright, since the term on compositions was already 70 years before Directive 2011/77/EU. Thus our effects are not caused by differences in the right to perform the musical composition in public.

Another possibility is that artists whose works fall into the public domain increase their propensity to tour as a substitute for the lost income from recordings. We thus look at whether artists perform in concert at all. However, it seems most likely that concert revenue dominates royalties from recordings.

[7] Though distribution of recorded music can also increase demand for live performances: Mortimer, Nosko and Sorensen (2012) find that digital file-sharing over the internet increases concert revenues for less well-known artists.

Consistent with the theory of Ellison and Ellison (2011), the threat of entry may also reduce incentives to promote tracks as copyright expiry approaches. If this effect is substantial, we can expect to see a relative decline in performances of tracks approaching age 50 under the old copyright regime, with this effect disappearing after "Cliff's Law" goes into effect.

III. Data

In order to identify a set of songs affected by the copyright term extension, we collected all Top 10/20 UK Album charts from 1960 through the end of 1965 from Officialcharts.com. OfficialCharts provides a top 10 list of UK albums for the first 11 weeks of 1960, whereas for the remainder of 1960-1965 it provides weekly top 20 lists. These charts were then carefully hand-matched to the MusicBrainz database (musicbrainz.org) to link the artists in the OfficialCharts data to the unique artist identifiers in the MusicBrainz database.[8] There are 140 artists from OfficialCharts that match to the MusicBrainz data, and 44 artists that did not appear in the database or had no relevant releases. Soundtrack albums appearing on OfficialCharts were excluded, including albums credited to "Original Soundtrack." "Original Cast Recordings," "Original Broadway Cast," etc.

Using the sample of artists gathered from OfficialCharts, we then collect all tracks released by these artists in the MusicBrainz database. We collect: artist name, release name (e.g., the name of the album/EP), the country of release, the date of release, the track name (normalized to lowercase and stripping accent marks), the release type (album/single/ep), whether the track is part of a re-release, and the year of original release. A track is considered a

[8] Other recent papers that use the MusicBrainz database include Mauskapf and Askin (2016) and Chang (2016).

re-release if there is an exact match for the artist and song title with a prior date in the database. We retain bootleg releases in some specifications and drop them in others.

The resulting dataset contains information on 13,363 tracks by 140 artists from 1960 up to and including the beginning of 2017. Year of original recording of these tracks runs from 1928 to 1975.[9] We create a final dataset in which the unit of observation is at the track-year level, and the key dependent variable is the number of re-releases of that track *i* in year *t*.

Note we are imputing the original release year from the first observed year of the recording in our dataset. In order to ensure an accurate observed original year of release, original release dates were taken from the earliest observed release date in MusicBrainz data as well as earliest release obtained from the Discogs music database (discogs.com). Artists in our MusicBrainz data were carefully hand-matched to artists appearing in the Discogs data, and song names were standardized using the aforementioned method to merge the two databases. According to the directive, the copyright term starts with "the fixation of the phonogram or its lawful publication" (section (3), Directive 2011/77/EU).

Information on the record label is available for 85% of the recordings in our dataset. There are 753 unique record label names in the data, which makes it somewhat difficult to identify and track the ownership of recordings, particularly in cases in which the label is an imprint of or is owned by another major label (e.g., Island Records, a division of Universal). As a rough estimate, however, we define a "major label" recording in the following way. If the "label type" field on MusicBrainz classifies the release as production, original production, imprint, or holding, we classify the label as a major label. "Reissue Production" labels are the second most

[9] The releases from the 1920s and 1930s are by Louis Armstrong, Bing Crosby, Judy Garland, Glenn Miller and Frank Sinatra.

common label type in our database, with 25.2% of releases overall and 61.7% of public domain releases. The final two types are bootleg productions (0.5% of observations overall, and 0% of public domain 3.6) and "other" productions (1.2% overall, 3.6% of public domain tracks), the latter of which includes releases by distributors, publishers, and rights societies.

There are clear patterns of specialization by label and copyright status of tracks. The major labels comprise 60.8% of the recordings of songs under copyright protection, but only 22.9% of the songs in the public domain. The four of these with the largest shares in the on-copyright sample (Columbia, EMI, Parlophone and Virgin) issue 23.1% of the on-copyright recordings, but the same four firms issue only 3.2% of the public-domain recordings in our sample. In the public domain sample, the four largest labels (Real Gone Jazz/Real Gone Music, Not Now Music, GO Entertain and 100 Hits) represent 33.4% of tracks in our dataset. The latter four firms release only 1.1% of copyright-protected tracks.

Most of the tracks in the dataset are in CD format. In our final analysis dataset, 74.33% are CDs, 18.52% are released on vinyl, 0.69% are released on digital media, and 6.46% are released in other formats such as DVD, cassette, etc.

Data are missing on the original release year of the track for 7,796 of 427,786 total observed track releases, and 5,528 of 369,224 observations when the sample is restricted to official releases. These observations are dropped from the sample. Country of release is missing for 94,489 of these observations, or 63,066 of 369,224 for official releases. Observations with missing data on country of release and year of release are dropped from the dataset.

Artist popularity data come from the British Magazine NME's list of the top 500 albums of all time, as well as Recording Industry Association of American (RIAA) certifications data for any artists with more than 1 million certified units.[10]

Table 1A lists summary statistics on the release regression dataset. Figure 1 displays the mean reissue count by age and type of release, before and after the copyright term extension. This shows an unambiguous increase in the number of re-releases of a track after age 50, except for years after 2013, when the extended copyright term was in effect. The increase appears to come almost entirely from non-major labels. Interestingly,

i. Set List Data

We obtain data on songs performed in concert from www.setlist.fm, a wiki service on which users post lists of songs performed in concert. We queried this site's API for tracks of artists by MusicBrainz ID for all the artists in our reissue database. We then matched track names listed in MusicBrainz to the performed tracks listed on setlist.fm. We created a crosswalk of standardized names by parsing out extraneous characters and standardizing case to match songs between the two datasets. We were able to collect and match set lists for 92 artists and 256,290 performances of 5,651 tracks.

Table 1B reports summary statistics on the set list data. We restrict this data to songs with original release years between 1930 and 1975 for our analysis. We create one observation per year that the song could have been performed since 1960 through 2016. We create a count variable containing the number of times the artist performed the song in that year. The typical

[10] The NME data were obtained from http://www.nme.com/photos/the-500-greatest-albums-of-all-time-100-1-1426116 (accessed May 2017), and RIAA data come from https://www.riaa.com/gold-platinum/?tab_active=awards_by_artist (accessed May 2017)

song is performed in 15.8% of potential song-years. We also restrict the data to performances in years before the artist's last active year, according to MusicBrainz. After these limitations we have 170,136 song performances across 81 artists and 2,630 tracks. We flag years where the artist was on tour according to our set list data so that we are able to run analysis conditioned on touring as well.

IV. Estimation and Results

i. Empirical Model

In order to estimate the effect of copyright protection on the reissues of a song, we use the following model:

$$Y_{ijtA} = \alpha_0 + \alpha_1 PD_{ijtA} + \sum_{t=1961}^{2017} \beta_t year_t + \sum_{A=2}^{89} \gamma_A age_A + \sum_{j=2}^{140} \delta_j artist_j + \varepsilon_{ijtA}$$

In which the dependent variable is the count of releases of track *i* by artist *j* in year *t* with track age *A*. Because the dependent variable is a count, we use Poisson regression. PD_{ijtA} is a binary variable equal to one if the song's recording copyright has expired in year *t* and equal to zero if it is still under copyright protection in year *t*.[11] $year_t$ is a dummy for release year *t* and age_A captures the fixed effect of track age. $artist_j$ is the artist fixed effect, representing the separate effect for each of the 140 artists in the data. In contrast to prior studies of copyright term extensions that performed before-after analyses, the 2013 term extension allows us to control for a full set of age and year effects.

[11] Following Pollock, Stepan and Valimaki (2010), we refer to these recordings as being in the "public domain," although the composition is still protected by copyright.

ii. Results on re-releases: quantity

Table 2 displays the baseline results from regressions in which the dependent variable is the number of UK re-releases of track *i* in year *t*. Standard errors are clustered by artist. Column (1) includes no controls, and the incidence rate ratio (IRR) on the PD dummy variable is 2.939 with a standard error of (0.465), which implies a highly statistically significant increase of 194% in the number of re-releases after recording copyright expires. Controlling for the age of the track (number of years since original release) in column (2) increases the estimated IRR to 9.965 (standard error of 2.494), and adding controls for year of reissue in column (3) reduces the estimate to 2.405 (standard error 0.593, percentage change of 141%). As an alternative to controlling for age and year, the regression in column (4) controls for original release year and year of re-release, and results are very similar. Column (6) controls for year of re-release, age, and an artist fixed effect, and implies a statistically significant increase of 247%.[12] Columns (7) and (8) show that the effect appears to be comparable for labels designated as major vs. non-major labels, corresponding to a 216% increase for non-majors, compared to majors with a 233% increase.[13]

Equivalent regressions were estimated using OLS and Logit, with very similar results, always implying a large and significant increase in the number of re-releases after the expiry of recording copyright. OLS results are found in column (9) of Table 2, and imply a 249% increase when songs enter the public domain (relative to the mean annual number of UK releases of 0.055 displayed in Table 1A).

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[12] It is not possible to control for age, year, original release year and artist fixed effects because the artist fixed effect is collinear with the original year effects.

[13] This includes tracks for which no information on label type is available.

Table 3 contains several robustness checks on the main result. Columns (1) and (2) drop bootleg recordings, causing only a slight decrease in the coefficient and associated IRR for PD. To address potential concerns that the results are driven by a handful of extremely successful artists, in columns (3) and (4) we exclude the top 5 artists in the sample in terms of number of releases (The Kinks, the Beatles, Eddie Cochran, Gerry and the Pacemakers, and Four Pennies). Results are once again very similar to the equivalent columns in Table 2. Breaking down releases by format, we see in columns (5) and (6) that releases on digital format (e.g. MP3) do not experience the same significant increase at the end of recording copyright as CD releases, with the IRR for the former implying a positive and large but statistically insignificant change in releases.

There is a clear and consistent increase in the number of UK re-releases after the expiry of recording rights. Our controls for age ensure this is not something specific about tracks older than 50 years (for example, an increase in re-releases due to the 50th anniversary of an album).[14] Columns (7) and (8) of Table 3 the dependent variable is the number of re-releases of track *i* in year *t* in the US market. Because recording copyrights did not expire at age 50 in the United States, we would not expect to see any significant effect of the PD variable on US re-releases, consistent with the estimates.

Table 4 examines how the effect varies with type of artist. Columns (1)-(3) includes a dummy for artists with more than 50% of their releases in the UK market, as well as an interaction with the PD dummy. Although the effect of being in the public domain appears

[14] The Beatles' *Sgt. Pepper's Lonely Heart's Club Band: Anniversary Edition* is a re-release to commemorate the recent 50th anniversary of this album (the opening line of which lends this paper its title).

smaller for UK artists (at the 5% level of significance) in Column (2) when age and year controls are excluded, once these controls are added in Column (3) the difference in the effect of copyright expiry for artists with a UK focus when compared to more global artists is significant only at the 10% level.

We also explore the effect of artist prominence, using two measures: (a) An artist's appearance on the NME Top 500 Albums list and (b) having at least 1 million certified units according to RIAA.[15] Column (4) includes the variable NME, equal to one if the artist appears in the NME Top 500 albums list, with Column (5) interacting this measure with the public domain variable. Columns (6) adds controls for year and age. No significant difference in the effect of copyright is apparent for artists on the NME list. Column (7) includes the RIAA variable, equal to one if the artist has >=1 million certified units. Column (8) interacts this effect with the public domain measure, while Column (9) adds year and age controls. Once again, the differential effect of artist popularity on the increase in reissues post-copyright is positive but not statistically significant.

iii. Availability on Spotify

An important caveat to the above results is that the data do not include information on availability of tracks on digital platforms such as Spotify or iTunes, currently the dominant providers of recorded music. While prior work has quantified the effect of public domain status in availability in formats with physical distribution formats, less is known about how copyright affects access to products distributed primarily through internet platforms. One exception to this

[15] The NME list comes from http://www.nme.com/photos/the-500-greatest-albums-of-all-time-100-1-1426116 (accessed June 2017).

is Reimers (2017), who finds that the negative effects of copyright on availability for e-books are comparable in percentage terms to the effects for hardcover and paperback, though only statistically significant at the 10% level (perhaps due to the relatively small number of e-books in Reimer's sample). Another is Heald (2014b), who finds that the availability of copyrighted songs from the 1920s on YouTube is actually somewhat higher than for slightly older songs in the public domain. This conflicting evidence suggests the need for further investigation of the effects of copyright status on availability on online platforms.

Why might we expect to see any difference in availability for public domain recordings compared to copyrighted recordings? One possibility is that there may be uncertainty about whether an artist's original contract with the record label gives the label the right to distribute it on the internet. While major labels presumably have little difficulty finding and interpreting their contracts with major artists, agreements made 50 years in the past between small independent labels and more obscure artists may be harder to locate and interpret. Knowing that a recording is in the public domain in the UK because its date of original recording is prior to 1963 eliminates this uncertainty for Spotify, and may make it more likely to be available on the platform, since rights need not be cleared with a label. If it is true that public domain status increases the likelihood of a track being available on Spotify due to reductions in uncertainty about the ownership of rights, we would expect this effect to be primarily observed among the relatively obscure artists.

We investigate whether tracks in our MusicBrainz samples are available on Spotify, and if they are, whether there are differences in availability between US and UK geographic markets. Because there may be differences in demand for tracks pre- and post-1963, and because we may not have 100% coverage in our match between Spotify and MusicBrainz, we also compare

availability in the UK market on Spotify for songs first recorded pre- and post-1963 with availability of the same song in the US market on Spotify. Of the 5,419 tracks in our sample recorded between 1928 and 1962, 72.6% are available in the US market on Spotify, and 79.5% are available in the UK. For the 10,934 tracks recorded between 1963 and 1975, 67.8% are available in the US and 71.4% are available in the UK. For the median artist in our sample, 83.33% of the artist's tracks are available either in the US or in the UK.[16]

Figure 3 displays the pattern over original release years of the percentage of tracks available in both the US and UK (on the right y-axis), as well the percentage of tracks available in the UK but not the US and vice versa. While the percentage of tracks available in the US but not the UK is relatively constant at around 3% during this period, the percentage of tracks available in the UK but not the US falls from 11% prior to 1963 to 6% in 1963 and after. However, in contrast to our results on re-releases, there does not appear to be a discrete change in 1963, but rather a gradual decline from 1962 to 1970.

In order to quantify this effect with controls for year and artist effects, we estimate the following regression model:

$$Y_{ijTk} = \alpha_0 + \alpha_1 Pre63_T + \alpha_2 D_k + \alpha_3 Pre63_T * D_k + \sum_{j=2}^{140} \delta_j artist_j + \varepsilon_{ijtk}$$

In which the dependent variable is equal to 1 if track *i* by artist *j* recorded in year T is available on Spotify in market *k* (either the UK or the US) in 2017. The dummy variable $Pre63_T$

[16] The artists with availability rates below the 5th percentile of 21% are The Big Ben Banjo Band, Harry Secombe, Paddy Roberts, The Dave Clark Five, The George Shearing Quintet, and Wayne Fontana and the Mindbenders.

equals 1 if the track was recorded before 1963 (and in some specifications is substituted for by recording year dummies). To control for overall differences in availability across markets, we include D_k, a dummy equal to 1 if the market is the UK. To capture the effects of being in the public domain, we include the interaction of these two variables, $Pre63_T*D_k$ which is equal to 1 for tracks in the UK market released prior to 1963. Because we only observe these tracks in a single year, we no longer control separately for age and year effects, and instead include in some specifications dummies for year of original release. We control for artist fixed effects and cluster standard errors by artist.

We find that sound recordings that have entered the public domain are no more likely to be available on Spotify than recordings still protected by copyright. Table 5 compares the availability in the UK geographic market for songs originally released before 1963 with the availability of the same songs in the US geographic market. Our results suggest that sound recordings released before 1963, (and hence in the UK public domain), are approximately 3% more likely to be available for streaming in the UK than in the US (where the sound recording has not fallen into the public domain) but that this difference is statistically insignificant at the 5% level.[17] This small and statistically insignificant difference is of limited economic significance when compared to our results covering copyright's impact on physical releases. The contrast between this and previously discussed findings may reflect variation in the way licenses to copyrighted recordings are obtained in different distribution formats. When, for example, reissue labels seek to license a copyrighted recording for a CD release, the reissue label has relatively little bargaining power in contrast to Spotify, currently one of a small number of

[17] Recordings made before 1972 are not covered by federal copyright law, but rather by state law, which according to Brooks (2005b) implies that these recordings will enter the public domain in 2067.

dominant providers of digital music. Spotify's business model is based on offering access to vast catalogues of tracks, and to enable this has entered into deals which gave record labels large advances on royalty payments and an 18% equity stake in the company in exchange for clearing the labels' recording copyrights (Cohen et al., 2015). These advances can be recouped by Spotify against usage/streams, with royalty payments subtracted from the total advance. [18]

A possible caveat to this finding is that we have restricted our analysis to artists that appeared on "top twenty" lists in the early sixties. It may be that tracks by artists that are more obscure than the ones in our sample benefit substantially by entering the public domain due to a reduction in uncertainty over licensing rights. This could imply a significant increase in availability for these artists. However, examining obscurity within our sample in Columns (5) and (6) of Table 5, we do not find any impact of recording copyright expiry on the digital availability of the songs of more obscure artists.

It may also be possible that while availability is relatively unaffected by public domain status, actual consumption of tracks is affected. Since Spotify does not have to pay royalties for the recording copyright for public domain tracks, they may have an incentive to promote consumption of them over copyrighted tracks. If Spotify privileges tracks with expired recording copyrights on suggested playlists, we may see higher consumption of these tracks than would otherwise be observed.

[18] A 2011 contact between Spotify and Sony specified a $25 million advance for the first two years of the agreement, with a $17.5 million advance should Sony agree to a third year. (https://www.rollingstone.com/music/news/leaked-sony-spotify-contract-reveals-inner-workings-of-streaming-music-20150521 accessed 2/7/2018)

iv. Set list results

Results on public performances of songs are found in Table 6. Data are restricted to years in which the artist was active, to tracks with an original release year in 1975 or earlier, and to performances in 1960 or later. In some columns we estimate effects separately for UK and non-UK artists. Our hypothesis is that performances by UK artists will be more affected by changes in copyright, because demand for their recordings is affected more than demand for recordings by artists with a more global focus.

We see a negative but insignificant effect of a track being in the public domain when age and year controls are excluded in Column (1), but once we control for year and age in Column (2), we see an IRR of 0.140 on the Public Domain dummy, significant at the 1% level, which implies a reduction of 86.0% in the number of performances.[19] Adding artist fixed effects in column (3) slightly changes the IRR to 0.477, still significant at the 1% level. When we include the UK artist dummy and the UK artist * Public Domain interaction and exclude artist fixed effects in Column (4) we find no significant difference in the effect of Public Domain status on performances for UK artists. However, after including artist fixed effects in Column (5), we estimate a significantly bigger negative effect of copyright on performances for UK artists. The regression in Column (5) implies that songs by UK artists with recording copyrights in the public domain are performed 77.3% less often than songs under copyright, whereas songs by non-UK artists in the public domain are played 47.1% less often.

To ensure the results are not driven by the performance decisions of the most popular artists, Columns (6) - (7) exclude the top 5 artists measured in terms of the number of

[19] Results are similar when only controlling for age or for year effects individually.

performances (The Beach Boys, Bob Dylan, Frank Sinatra, The Who, and The Rolling Stones). Results are comparable to the equivalent regressions in columns (4) and (5).

If the expiry of copyright has an effect on the artist's decision to tour, the results in Columns (1)-(5) combine this effect with any potential effect on the decision of which songs to perform. Columns (8) and (9) are conditioned on the artist touring in year t, and therefore isolate the choice of songs. Results are similar to those in Columns (1)-(5). In column (8) we include performance year, age and artist controls and estimate an IRR of 0.538, significant at the 5% level, which corresponds to a 46.2% reduction in the number of performances of tracks in the public domain. When we estimate the effect separately for UK and non-UK artists by incorporating the interaction in Column (9), the effect for UK artists is larger, implying an 82% reduction in performances when the song is in the public domain compared to a 39.4% reduction for non-UK artists (though the difference in the effect of copyright expiry for UK artists implied by the interaction term is only significant at the 10% level).

Figure 2 displays the average annual number of performances by age and year. There is a drop-off after age 50 before 2014, and much higher rates of performance after age 50 once copyright terms are extended.

v. Qualitative results on re-releases

In addition to its effects on the quantity of re-releases, public domain status may also have effects on which tracks are combined together into compilations, as well as on the number of tracks and artists on compilations. Since issuers of a re-release no longer need to transact with the label holding the recording copyright once a track is in the public domain, we may expect to see more novel combinations of tracks, that is, the pairing of artists or tracks on a release that have not previously been paired together. Alternatively, since the publishing copyright continues

to remain in force, we may not see a significant change in novelty. Lower licensing costs for public-domain tracks may also make it possible for labels to include a larger number of tracks on a given release.

In order to capture this, we compute two alternative measures of novelty based upon the Jaccard similarity index. The Jaccard index is calculated by dividing the size of the intersection of two sample sets by the union of the sample sets. First, for a given release *i*, we calculate the Jaccard similarity between the set of artists appearing on release *i* with the set of artists on each individual release that precedes release *i.* We then take the maximum of these values to create our first similarity measure, *Jaccard (artist).* A more novel release will have a lower Jaccard index than a less novel release, and the variable ranges between 0 and 1 with an average value in our estimation sample of 0.6331, or 0.2944 when solo releases are excluded. Solo releases always have a Jaccard index of 1, and we set this variable to 1 for an artist's first release. Our second measure of novelty computes the Jaccard index across tracks instead of artists, measuring whether or not the tracks combined on a particular album have been observed together in the past. We also look at the number of tracks included on a release as an alternative measure of quality or diversity.

Regression results are found in Table 7. The unit of observation is the release (AKA album), and the dependent variable in columns (1)-(6) is the Jaccard index for that release, at the artist-combination level for columns (1)-(3), and the song-combination level for columns (4)-(6). The key independent variable is the fraction of tracks on the release that are in the public domain at the time of the release. Fixed effects for the average age of tracks on the release (rounded to the nearest integer) and year of release are included. We also include controls for the type of label (reissue or non-reissue) and whether or not a release is a solo release or a compilation.

For the artist-combination Jaccard measure, we find that increases in the fraction of tracks in the public domain are significantly associated with less novel releases, after controlling for year and age effects. These regressions continue to indicate less novel combinations of artists for releases with a higher fraction of tracks in the public domain, even after adding controls for solo releases and reissue labels.

However, when we compute the Jaccard index across tracks rather than across artists, we observe a different pattern. There is no relationship between public domain status and originality on average (column 4). However, in the full specification including the solo dummy and the interaction with the dummy for reissue labels (column 6), we observe a negative and significant relationship between the fraction of tracks in the public domain and the Jaccard measure for reissue labels. This implies that the compilations released by reissue labels are more original when a higher fraction of tracks on the release have recording rights in the public domain.

Columns (7) and (8) also reveal differences in the effect of public domain status for major labels and reissue labels, when the number of tracks on a release is the dependent variable. Column (8) shows that reissue labels include more tracks on a release when a higher fraction of the tracks are in the public domain, but the same is not true for major labels.

V. Conclusion

In this paper, we use the extension of recording copyrights in the UK in 2013 to examine the effect of copyright status on reissues of recordings, availability on Spotify, and the number of live performances by artists popular in the 1960s. We obtain mixed results on the effect of recording copyright term on the supply of music: when a song enters the public domain, there are more reissues of that song, and there is some evidence that shorter recording copyright terms

may be associated with more releases of novel compilations. At the same time, recordings in the public domain are performed less often in concert. This suggests that, when artists are living at the time of a copyright term extension, the negative supply effects of the extension on re-releases may be counteracted by a positive supply response in live performances. However, given that the artists popular in the 1960s are now in their seventies or older, this increase in the supply of performances is a temporary phenomenon.

The results about the supply of re-releases are consistent with prior findings about copyright and the availability of books (Heald 2008, Reimers 2017). The welfare implications of the effect of copyright on the supply of recordings may be even more noteworthy because the technology used to consume recorded music when the albums of the early 1960s were first released is essentially obsolete today. If music is not reissued in new formats, it may not be heard by typical listeners.[20] However, the shift away from CDs and towards online platforms like Spotify may work in favor of availability, since we observe no difference in availability between public-domain recordings and those remaining under copyright. Digital platforms may thus help moderate the effects of copyright term extensions on the availability of music from this period.

[20] In a random sample of 1,500 American recordings released between 1890 and 1962, Brooks (2005a) finds that 65% of historic recordings are not available to listeners because they are not reissued by rights holders and because "the physical barriers created by recording technologies change often and have rendered most such recordings accessible only through obsolescent technologies usually found only in special institutions." (p. 14)

References

Directive 2011/77/EU of the European Parliament and of the council of 27 September 2011, *Official Journal of the European Union*

Brief of George A. Akerlof et al. as Amici Curiae in Support of Petitioners at 12, Eldred v. Ashcroft, 537 U.S. 186 (2003) (No. 01-618).

Biasi, Barbara and Petra Moser. 2017. "Effects of Copyrights on Science: Evidence from the US Book Republication Program." *Available at SSRN 2542879*

Brooks, Tim. 2005a. "Survey of Reissues of U.S. Recordings," Council on Library and Information Resources and Library of Congress Washington, D.C.

Brooks, Tim. 2005b. "How Copyright Law Affects Reissues of Historic Recordings: A New Study," *ARSC Journal* XXXVI / ii 2005, pp. 183-203.

Chang, Sungyong. 2016. "Digitalization and Creativity: Does Unbundling Facilitate Experimentation and the Discovery of New Talent?", working paper.

Cohen, Julie E., Lydia Pallas Loren, Ruth L. Okediji, Maureen A. O'Rourke, 2015. *Copyright in a Global Information Economy,* Wolters Kluwer Law & Business.

Ellison, Glenn and Sara Fisher Ellison. 2011. "Strategic Entry Deterrence and the Behavior of Pharmaceutical Incumbents Prior to Patent Expiration." *American Economic Journal: Microeconomics* 3 (February): 1–36

Giorcelli, Michela, and Petra Moser. 2016. "Copyright and Creativity: Evidence from Italian Operas." *Available at SSRN 2505776*

Greene, Andy. 2013. "Sony Releases Limited Edition, 86-Track Bob Dylan Outtakes Collection in Europe", January 7, 2013. http://www.rollingstone.com/music/news/sony-releases-limited-edition-86-track-bob-dylan-outtakes-collection-in-europe-20130107?print=true (accessed 5/25/2017)

Halliday, Josh. 2011. "Musicians Win Copyright Extension to 70 Years," *The Guardian*, September 12, 2011.

Heald, Paul J.. 2008."Testing the Over- and Under-Exploitation Hypotheses: Bestselling Musical Compositions (1913-32) and Their Use in Cinema (1968-2007)". U of Chicago, Public Law Working Paper No. 234

Heald, Paul J. 2008. "Property Rights and the Efficient Exploitation of Copyrighted Works: An Empirical Analysis of Public Domain and Copyrighted Fiction Bestsellers," *Minnesota Law Review* 2007-2008 (4): 1031 – 1063.

Heald, Paul. 2014a. "How Copyright Keeps Works Disappeared," *Journal of Empirical Legal Studies*, Volume 11, Issue 4, December 2014, pages 829–866.

Heald, Paul. 2014b. "How Notice-and-Takedown Regimes Create Markets for Music on YouTube: An Empirical Study," UMKC Law Review . Winter2014, Vol. 83 Issue 2, p313-328

Lee, Timothy B. 2018. "Why Mickey Mouse's 1998 copyright extension probably won't happen again," *arstechnica.com* (https://arstechnica.com/tech-policy/2018/01/hollywood-says-its-not-planning-another-copyright-extension-push/?mbid=synd_digg, accessed 1/28/2018)

Knopper, Steve. 2015. "Leaked Sony-Spotify Contract Reveals Inner Workings of Streaming Music," *Rolling Stone*, May 21, 2015 (https://www.rollingstone.com/music/news/leaked-sony-spotify-contract-reveals-inner-workings-of-streaming-music-20150521 accessed 2/7/2018)

Kyle, Margaret. 2011. "Strategic Responses to Parallel Trade," *B.E. Journal of Economic Analysis and Policy: Advances*, Vol. 11 : Iss. 2 (Advances), Article 2.

Michael Mauskapf and Noah Askin. 2016. "What Makes Popular Culture Popular?: Cultural Networks and Optimal Differentiation in Music." Working paper.

MacGarvie, Megan and Petra Moser. 2015. "Copyright and the Profitability of Authorship: Evidence from Payments to Writers in the Romantic Period," in Shane M. Greenstein, Avi Goldfarb, and Catherine Tucker (eds.) *The Economics of Digitization*, University of Chicago Press.

Mortimer, Julie Holland, Chris Nosko, and Alan Sorensen. 2012. "Supply responses to digital distribution: Recorded music and live performances*," Information Economics and Policy*. Volume 24, Issue 1, March 2012, Pages 3–14

Pollock, R., Stepan, P., & Välimäki, M. (2010). "The Value of the EU Public Domain," https://doi.org/10.17863/CAM.5539

Nagaraj, Abishek. forthcoming. "Does Copyright Affect Reuse? Evidence from the Google Books Digitization Project." *Management Science*.

Reimers, Imke. 2017. "Copyright and Generic Entry in Book Publishing," Working Paper.

Scherer, Frederic M. 2004. *Quarter Notes and Bank Notes: The Economics of Music Composition in the Eighteenth and Nineteenth Centuries*, Princeton University Press.

St. Clair, William. 2004. *The Reading Nation in the Romantic Period*, Cambridge University Press.

Theofilos, Stefanie. 2013. "A Copyright Extension for EU Recordings," *Music Business Journal*, December 2013. http://www.thembj.org/2013/12/copyright-extension-for-european-sound-recordings/ (accessed 5/23/2017).

Watson, Jeremy. 2017. “Copyright and the Production of Hip-Hop Music,” Working Paper.

Data Appendix

OfficialCharts/Musicbrainz Data:

Weekly top 20[21] album charts were collected from the Official Charts Company (OCC) between 1960 and 1965 to create a sample of 184 relevant artists. These artist and group names were then hand-matched to the unique database identifiers in the MusicBrainz database, with 143 artists successfully matched between the datasets.

A local Musicbrainz Virtual Machine[22] was then used for generating the data-sets via SQL queries. All recordings and the releases of such recordings by the sample artists were collected – thus we pick up not only albums/singles released by the artists, but also compilation albums featuring various artists. For the purposes of our data-set, an artist was considered to be a "UK Artist" if more than 50% of their albums/singles were released within the UK vs elsewhere. Data was also collected on the country of release, the format of release (e.g., CD, SACD, Digital), and the release label.

A song's 'original release year' was measured by observing the first occurrence of a song's standardized track name. Song titles were standardized by: a) converting titles to lowercase, b) stripping accent marks, and c) removing punctuation marks. To ensure a reliable year of release, we measured the original year of release as the first occurrence between both our MusicBrainz data and data from the Discogs music database (data.discogs.com). Artists in our MusicBrainz data were carefully hand-matched to the corresponding artists in the Discogs database, and song

21 Official Charts tracked just the Top 10 albums during the first two months of 1960

22 https://musicbrainz.org/doc/MusicBrainz_Server/Setup

titles in the Discogs data were standardized via the aforementioned method. For any song in our MusicBrainz sample, we measured the original release year as the earliest release (from the same artist) in either the MusicBrainz or Discogs data.

Set List Data

Musician set list data was collected from setlist.fm using their REST API documented at https://api.setlist.fm/docs/index.html. Setlist.fm's database tracks artists using the Musicbrainz GID, the same unique identifier used by the MusicBrainz database. Of the artists in our sample, 99 appeared in the Setlist.FM data, as matched by MusicBrainz GID's. All set lists were collected via the web API for these 99 artists, resulting in 16,847 total concert set lists encompassing 295,232 total performances. Tracks in this data were manually standardized by stripping extraneous characters and standardizing case. They were then matched to equivalently standardized track/ artist combinations in the re-release data and matches were kept for analysis. This match resulted in 256,290 total performances across 92 artists and 16,605 concert set lists.

Spotify Data

Artists in our MusicBrainz data were hand matched to Spotify's artist unique identifiers (URIs). Catalog information, including geographic availability, was then downloaded from Spotify's API for all of the artists in our MusicBrainz dataset, see https://developer.spotify.com/web-api/get-track/ for fields obtained. Song titles in the Spotify dataset were matched to the MusicBrainz data by standardizing the Spotify track titles to match our standardized MusicBrainz titles: titles were converted to lowercase, punctuation was stripped, and the word "remaster" was stripped.[23] Remaining unmatched titles between our Spotify and MusicBrainz data were then manually matched in order to properly match titles with alternative spellings.

[23] Copyrights for remastered sound recording cover only those elements of the new fixation that differ from the original, see guidance from PPL in the UK, http://www.ppluk.com/Documents/Distribution/Guidance%20to%20PPL%20Members%20on%20Remasters.pdf

Figure 1

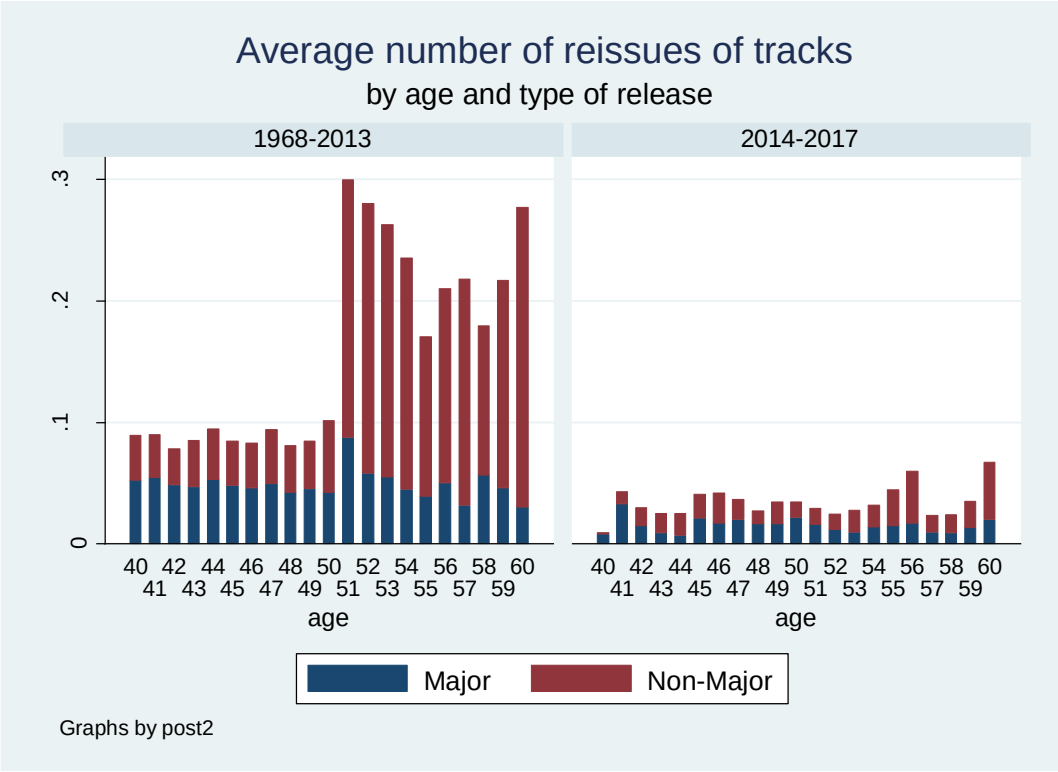

Average number of reissues of tracks
by age and type of release
1968-2013
2014-2017
0
.1
.2
.3
40 42 44 46 48 50 52 54 56 58 60
41 43 45 47 49 51 53 55 57 59
age
Major
Non-Major
Graphs by post2

Figure 2

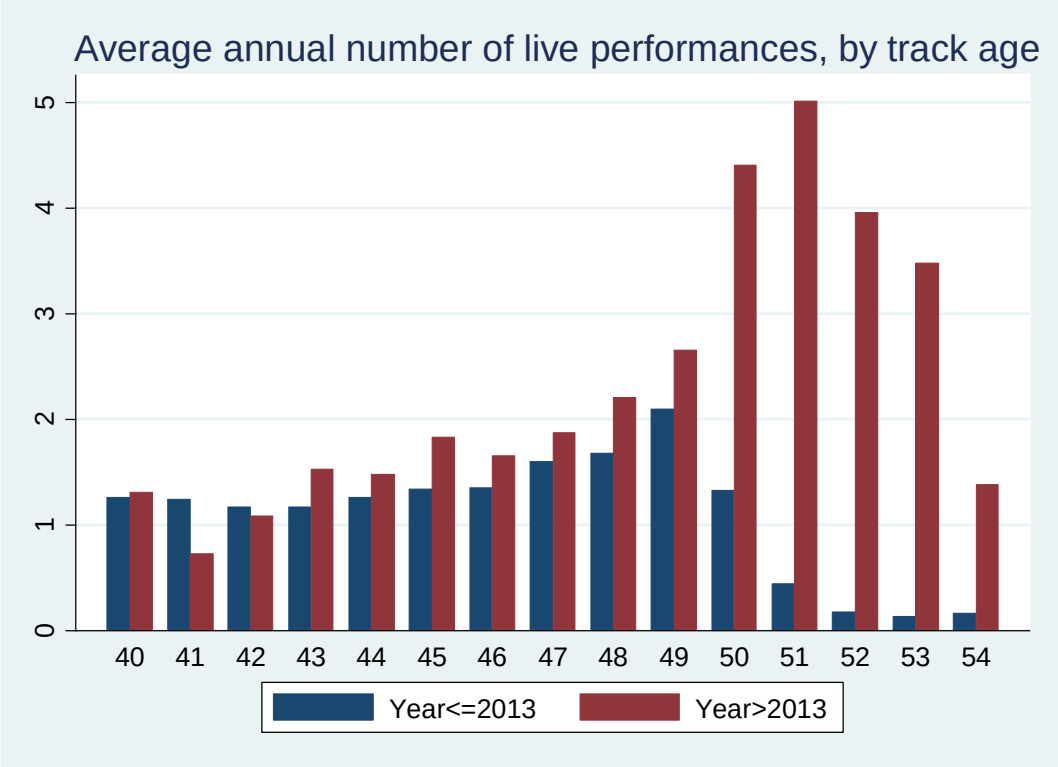

Average annual number of live performances, by track age
0
1
2
3
4
5
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
Year<=2013
Year>2013

Figure 3

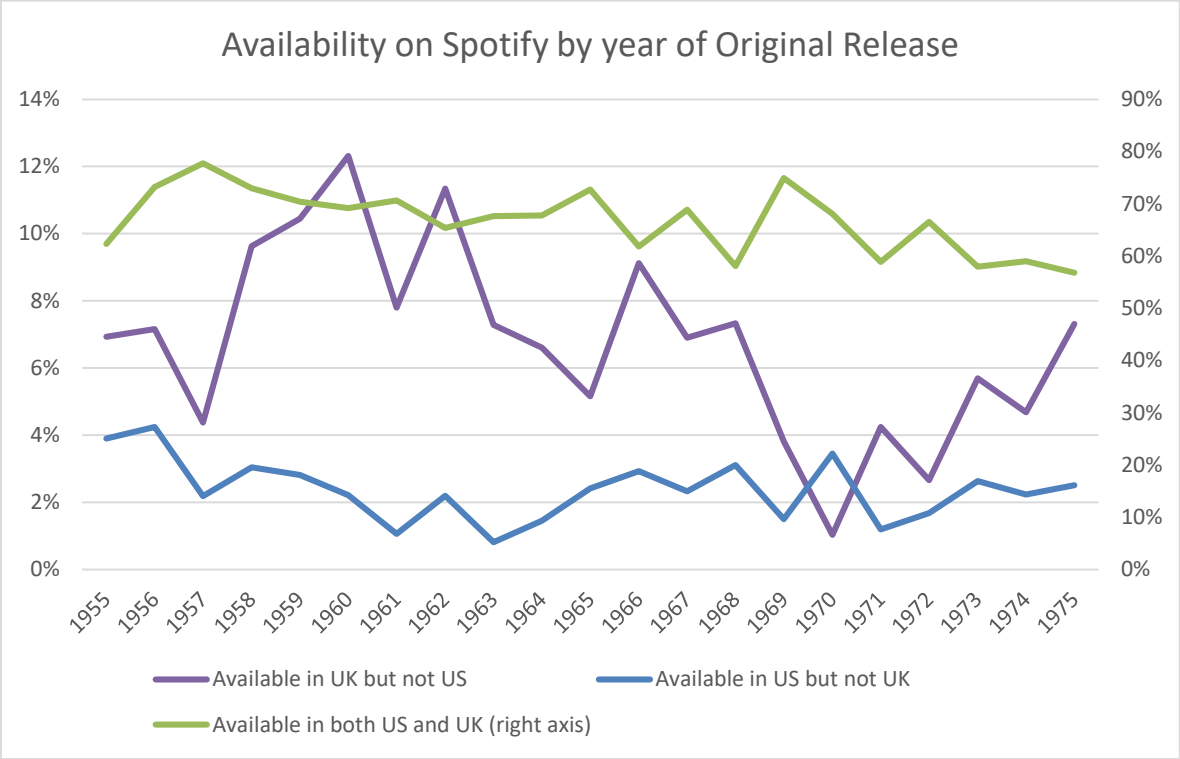

Availability on Spotify by year of Original Release
14%
12%
10%
8%
6%
4%
2%
0%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
1955
1956
1957
1958
1959
1960
1961
1962
1963
1964
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
Available in UK but not US
Available in US but not UK
Available in both US and UK (right axis)

Table 1A: Summary Statistics on Releases

	(1)	(2)	(3)	(4)
	Mean	SD	Min	Max
Original release year	193.922	6.358	1928	1975
UK artist	0.120	0.325	0	1
Year of release	1991.386	15.328	1960	2017
Age of track	27.465	15.725	0	89
Global releases	0.229	0.933	0	87
UK releases	0.055	0.317	0	24
European releases	0.017	0.164	0	12
US releases	0.069	0.389	0	42
Public Domain	0.062	0.241	0	1
UK Major Labels Releases	0.028	0.204	0	13
UK Non-major Label Releases	0.027	0.210	0	24
UK CD Releases	0.045	0.285	0	24
UK Digital Releases	0.0004	0.021	0	2

N. observations: 1,001,480

Table 1B: Summary Statistics on Set Lists

	(1)	(2)	(3)	(4)
	Mean	SD	Min	Max
Original Year	1964.490	5.715	1930	1975
Performance Year	1990.640	15.140	1960	2016
Yearly Performance Count	1.257	7.171	0	178
Tour Dummy	0.495	0.500	0	1
Public Dummy	0.045	0.207	0	1
Age	26.150	15.445	0	86

N. observations: 135,514

Table 2: Baseline Results on Releases

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	UK Releases						Major Labels	Non-Major Labels	UK releases, OLS
Public Domain	2.939***	9.965***	2.405***	2.935***	2.983***	3.468***	3.328***	3.157***	0.146***
	(0.465)	(2.494)	(0.593)	(0.292)	(0.754)	(0.858)	(1.152)	(0.688)	(0.034)
Age	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Year	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Orig	No	No	No	Yes	Yes	No	No	No	No
Artist	No	No	No	No	No	Yes	Yes	Yes	Yes

N. obs: 1,001,480. Artist clustered standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01

Note: This table displays incidence rate ratios (IRR) from regressions in which the dependent variable is the number of UK releases of track *i* in year *t*. Columns (1)-(8) are Poisson regressions, Column (9) is Ordinary Least Squares, and displays the un-transformed regression coefficients instead of IRR. Robust standard errors clustered by artist. Column (1) includes no controls. Column (2) includes a dummy for the age of the track (number of years since original release). Column (3) controls for year of release and age. Column (4) controls for original year of release and year of release. Column (5) controls for year of release, age, and original release year. Column (6) and (7) controls for year of release, age, and an artist fixed effect. Column (7) uses a dependent variable *Original Labels*, with a count of UK reissues released by original production labels, with Column (8) uses a dependent variable *Non-original Labels* counting only those releases not labeled as original.

Table 3: Robustness of Results on Releases

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Dropping bootlegs		Dropping Top 5 Artists		CD Releases	Digital Releases	Placebo: US releases	
Public Domain	2.366***	3.409***	2.519***	3.205***	3.455***	2.330	0.719	0.902
	(0.585)	(0.850)	(0.600)	(0.757)	(0.855)	(1.728)	(0.188)	(0.179)
Year Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Artist	No	Yes	No	Yes	Yes	Yes	No	Yes
N	991,993	991,993	966,522	966,522	1,001,480	1,001,480	1,001,480	1,001,480

Artist clustered standard errors in parentheses * p<0.10, ** p<0.05, *** p<0.01

Note: This table displays incidence rate ratios from a Poisson regression. In columns (1)-(6) the dependent variable is the number of UK releases of track *i* in year *t*. In columns (7) and (8), the dependent variable is the number of US releases of track *i* in year *j*. All columns include year and age fixed effects. Columns (1) and (2) exclude bootleg recordings. Columns (3) and (4) exclude the top 5 artists in the sample in terms of total releases (The Kinks, the Beatles, Eddie Cochran, Gerry and the Pacemakers, and Four Pennies). Column (5) counts only UK releases packaged as physical CDs, while Column (6) counts digital releases in the UK.

Table 4: Artist Heterogeneity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Public Domain	2.432***	3.105***	2.574***	3.083***	2.919***	2.520***	2.915***	2.451***	2.192***
	(0.601)	(0.512)	(0.664)	(0.391)	(0.323)	(0.489)	(0.454)	(0.381)	(0.457)
UK Artist	1.179	1.231	1.224						
	(0.250)	(0.258)	(0.260)						
UK *PD		0.462**	0.558*						
		(0.146)	(0.190)						
NME Top 500				2.496***	2.424***	2.459***			
				(0.482)	(0.538)	(0.557)			
NME*PD					1.212	1.102			
					(0.418)	(0.437)			
RIAA							1.178	1.110	1.122
							(0.219)	(0.222)	(0.224)
RIAA*PD								1.426	1.303
								(0.420)	(0.418)
Year Controls	No	No	Yes	No	No	Yes	No	No	Yes
Age Controls	No	No	Yes	No	No	Yes	No	No	Yes
N. obs.	1,001,480								

Artist clustered standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01

Note: This table displays incidence rate ratios from a Poisson regression in which the dependent variable is the number of UK releases of track *i* in year *t*. Artist prominence is explored using two measures: (a) An artist's appearance on the NME Top 500 Albums list (http://www.nme.com/photos/the-500-greatest-albums-of-all-time-100-1-1426116) and (b) having at least 1 million certified units according to RIAA (https://www.riaa.com/gold-platinum/?tab_active=awards_by_artist). Column (1) includes the variable UK artist, =1 if the artist had over 50% of their releases in the UK. Column (2) interacts this measure with the publicdomain variable, while Column (3) includes the interaction and controls for year and age. Column (4) in introduces the variable NME, equal to one if the artist appears in the NME Top 500 albums list, with Column (5) interacting this measure with publicdomain, and Column (6) fully controlling for year and age. Column (7) includes the RIAA variable, equal to one if the artist has >=1 million certified units. Column (8) interacts this effect with the publicdomain measure, while Column (9) controls for year and age.

Table 5: Availability on Spotify

	(1)	(2)	(3)	(4)	(5)	(6)
	Available in Market					
UK	0.0474***	0.0474***	0.0367***	0.0367***	0.0474***	0.0367***
	(0.010)	(0.010)	(0.012)	(0.012)	(0.010)	(0.012)
Pre-1963		0.0911***	0.0749**		0.0631**	
		(0.032)	(0.031)		(0.029)	
Pre-1963*UK			0.0323	0.0323		-0.0538
			(0.021)	(0.021)		(0.076)
Obscure					-0.0713***	
					(0.014)	
Obscure*pre-1963*UK						0.0216
						(0.020)
Release Year FE	No	No	No	Yes	No	Yes
Artist FE	Yes	Yes	Yes	Yes	No	Yes
N	32,704					

Artist-clustered robust standard errors in parentheses * p<0.10, ** p<0.05, *** p<0.01
Note: This table displays coefficients from a linear probability model regression. In all specifications, the dependent variable is a binary variable that equals 1 if song *i* is available in geographic market *m* on the digital music streaming platform Spotify as of September 2017. The estimation sample is restricted to songs with an original release year before 1975. The independent variable UK equals 1 for observations in the UK geographic market. Pre-1963 equals 1 for songs with an original release year prior to 1963. The independent variable Obscure ranges from 0 to 10, with 10 measuring the most obscure (least popular) artists. Columns (1)-(4) and (6) include artist fixed effects. Columns (4) and (6) include original year of release fixed effects.

Table 6: Set List Results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
			All years			Exclude Top 5 Artists		Touring Years	
Public Dummy	0.792	0.140***	0.477***	0.123***	0.529**	0.350***	0.457**	0.537***	0.606*
	(0.270)	(0.0423)	(0.119)	(0.0383)	(0.142)	(0.177)	(0.175)	(0.129)	(0.156)
UK Artist * Public				1.044	0.265***		0.282***		0.286*
				(0.491)	(0.125)		(0.099)		(0.195)
UK Artist				0.418*					
				(0.193)					
Year Controls	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age Controls	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Artist FE	No	No	Yes	No	Yes	Yes	Yes	Yes	Yes
Observations	103,792	103,792	103,792	103,792	103,792	74,802	74,802	66,461	66,461

Artist clustered standard errors in parenthesis ***p<0.01, **p<0.05, *p<0.1

Note: This table displays incidence rate ratios from a Poisson regression where the dependent variable is the number of times a track *t* was performed in year *i*. Column (1) has no controls. Column (2) adds in fixed effects for age, and year, and Column (3) controls for age, year and artist fixed effects. In column (4) we control for an interaction of a UK artist flag with the public domain dummy, as well as the UK artist dummy. Column (5) adds artist fixed effects and includes the UK artist interaction. Columns (6) - (7) exclude the Top 5 artists by public performances: The Beach Boys, Bob Dylan, Frank Sinatra, The Who, and The Rolling Stones. In Columns (8) - (9), our sample is restricted to years that the artist was on tour (i.e. the artist has at least one set list in our data during that year)

Table 7: Novelty of Releases

	(1) Jaccard (Artist)	(2) Jaccard (Artist)	(3) Jaccard (Artist)	(4) Jaccad (Song)	(5) Jaccad (Song)	(6) Jaccard (Song)	(7) # Tracks	(8) # Tracks
Mean(PublicDomain)	0.144***	0.124**	0.0663***	0.0069	0.0139	-0.0153	3.340	-1.852
	(0.048)	(0.049)	(0.022)	(0.036)	(0.037)	(0.028)	(5.027)	(4.845)
Reissue		0.0531***	0.0071		0.0210	-0.0023		7.974***
		(0.016)	(0.006)		(0.013)	(0.010)		(1.450)
Mean(PublicDomain) * Reissue		0.0483	0.0167		-0.0376	-0.0537**		20.105***
		(0.046)	(0.019)		(0.031)	(0.025)		(4.920)
Solo			0.701***			0.356***		-11.621***
			(0.005)			(0.008)		(0.881)
Age Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

N. obs: 5,769. Robust standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01

Note: This table displays coefficients from linear regressions. In Columns (1)-(3), the dependent variable, *Jaccard (artist)*, is a continuous variable between 0 and 1 that measures the maximum similarity between the observed combination of artists on release *i*, with the combination of artists on each past release, *j*. The Jaccard variable decreases towards 0 with novelty, and equals 1 if the exact combination of artists on release *i* has been previously observed. Columns (4)-(6) use the *Jaccard (song)* dependent variable, which decreases towards 0 with novelty, and equals 1 if the exact combination of songs on release *i* has been previously observed. Columns (7) and (8) use the number of tracks appearing on release *i* as the dependent variable, while Columns (12) and (13) use as a dependent variable the number of unique artists appearing on the observed release. All columns include age and year fixed effects