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MUSIC IN THE AIR

STAIRWAY TO HEAVEN

Streaming grows up and puts music back on path to growth after decades of disruption

The music industry is on the cusp of a new era of growth after nearly two decades of disruption. The rising popularity and sophistication of streaming platforms like Spotify and Pandora is ushering in a second digital music revolution – one that is creating value rather than destroying it like the piracy and unbundling that came before. In this first of a “double album” on the nascent industry turnaround, we lay out the converging trends that we expect to almost double global music revenues over the next 15 years to \$104bn, spreading benefits across the ecosystem.

DOUBLE
ALBUM
VOL.1

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The prices in the body of this report are based on the market close of October 3, 2016.

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MUSIC'S RETURN TO GROWTH in numbers

EASY LISTENING

630 million

Audio streams consumed per day by the US population during 1H2016—a 97% yoy jump. (p. 32)

400

The number of streaming platforms available globally. The US alone boasts 57. (p. 32)

30 million vs. 21,000

The number of tracks available on Spotify compared to the number of tracks available at a Walmart store. (p. 32)

ROOM TO GROW IN PAY-TO-PLAY

2%

Paid streaming penetration globally as a % of smartphone subscribers. (p. 9)

<50%

Percentage of the DM population that pays to listen to music. According to YouTube, only 20% of people globally have ever paid for music. (p. 31)

+60 million

The growth in paid streaming subscribers globally between 2010 and 2015, bringing the total to 68mn people. Associated revenue grew from \$0.3bn to \$2.3bn. (p. 39)

MILLENNIAL APP-ETITE

4

Of the 10 most-used apps by Millennials, the number that are music-related. (p. 47)

77%

Proportion of Spotify listeners that are Gen Z/ Millennials. (p. 47)

THE PAYMENT GAP

0

Royalty paid by traditional radio to labels and artists in the US. (p. 18)

40% / 4%

Share of music listening on YouTube compared to the share of global recorded music revenue generated by YouTube. (p. 25)

LISTENING LIVE

24 million / 40%

Average unsold concert tickets in the US per year because of lack of awareness of the events. Streaming sites like Pandora are attempting to use behavioral and geo-targeting to better match ticket supply and demand, which could help recover some of the estimated \$2bn in lost revenue. (p. 14)

EMERGING MARKETS

90%

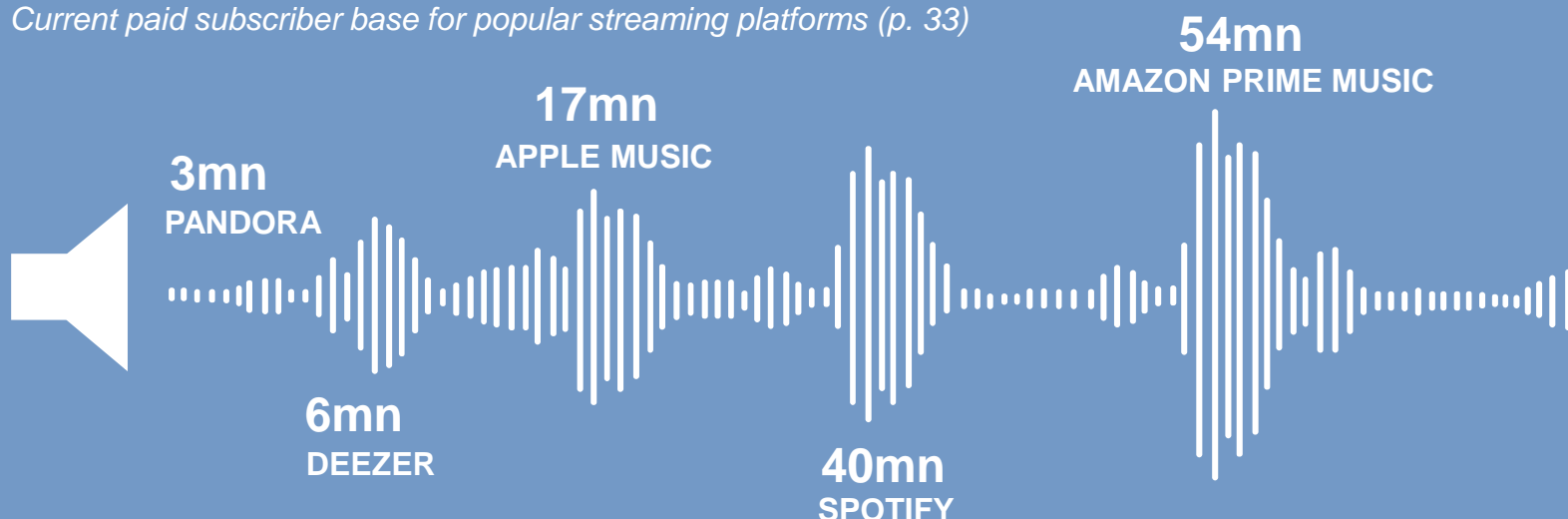
Piracy rates in China, India, Mexico, and Brazil, according to IIPA, implying a huge potential for better quality (paid/free) streaming services. (p. 43)

Additional revenue (equivalent to 10% of the global recorded music market) that can be generated with a 1% increase in paid penetration in EMs. (p. 45)

\$1.5 billion

ALL ABOUT THAT BASE

Current paid subscriber base for popular streaming platforms (p. 33)



Stairway to Heaven: Streaming drives new era of growth

We believe new technology changes such as the emergence of internet radio and music streaming are driving a new era of growth for the recorded music industry. New tech enablers such as Spotify, Apple or Pandora have disentangled music content from its delivery. The resulting convenience, accessibility and personalization has driven more consumption of legal music and greater willingness to pay for it, at a time of improving connectivity and growing consumer preference for accessing rather than owning music. Unlike its predecessor, this “second” digital revolution creates more value for rights holders (rather than destroys it), shifting revenue streams from structurally declining markets (physical, download sales) to a significantly larger new revenue pool (ad-funded and subscription streaming). This shift has enabled the recorded music market to return to growth in 2015 following almost two decades of value destruction led by piracy and unbundling.

We believe the overall music industry, including recording, publishing and live, is now set to double to over \$100 bn by 2030. In this first of a “double album”, we explore the converging trends that make this digital revolution different to and more profitable than the last.

Streaming drives greater monetization of music content...

By revolutionizing the listening experience, making it seamless and personalized, streaming improves the monetization of music content through 1) a range of **subscription streaming options** with multiple price points that address consumers willing to pay for better access and convenience, and 2) **ad-funded, free streaming** that addresses consumers not able or willing to pay (therefore reducing piracy). Moreover, streaming **improves the discoverability of catalogues and increases their value.**

... while benefitting from a growing and captive audience

We see particularly attractive forces supporting streaming growth:

- **Room to grow penetration of subscription services in DMs**, currently at 3%. We see scope to catch up with the Nordics, already at over 20% as user mix continues to evolve favourably towards paid tiers. Globally, we forecast paid streaming to grow to 9% of the smartphone population in 2030 from 2% in 2015.
- **The nascent music markets in EMs**, which stand to benefit from improving recognition of IP, new business models (ad-funded, prepaid, telecom bundles, etc.) and innovative payment capabilities. EMs accounted for just 10% of the global recorded music market in 2015 and the Chinese music market was smaller than that of Sweden.
- **Media consumption habits of Generation Z and Millennials**, who are the ideal audience for streaming given their inherent characteristics of being “digital natives” focused on experience and convenience. Millennials already spend more on music than the average person in the US driven by paid streaming and live music.
- **Further benefit from telecom and tech companies’ large marketing budgets and existing customer base** as these players increasingly leverage music content to drive greater differentiation of their services and upselling.

Further upside from regulatory changes

Convoluting rules and regulations dictate the flows of payments from platforms to rights holders, and understanding these intricacies and their evolution is essential. We believe the emergence of new digital distribution models is positive for rights holders given a more attractive royalty structure in the US and see further upside from potential regulatory changes which could reshape future flows of payments from platforms (especially YouTube and on-demand streaming services).

A rising tide lifts (almost) all boats; industry responses will be key

In addition to the structural and regulatory tailwinds highlighted above, we believe industry responses will be critical in shaping the future growth of the industry which has only started to recover. We would expect some level of coordination among labels and platforms to maximize that growth potential. As a result, we believe the split of revenue pools will remain broadly unchanged in the medium term.

- **Subscription streaming services are the enablers and the direct beneficiaries of the above-mentioned shifts.** We also believe they will increasingly leverage their promotion capabilities, user data and customer relationships to drive new revenue streams (e.g. ticketing) and improve their deals with the labels. However, the landscape is more competitive (Pandora and Amazon launch in 2H16) with risk of disruptive behaviour such as exclusivity and price competition. As a result, we believe their distributor's cut will remain at c.30%, leading to \$13 bn of additional revenue (net of royalties) by 2030. We expect the scene to be divided among pure play streaming services such as Spotify and large tech players such as Apple or Amazon.
Main beneficiaries in our coverage: Apple (Buy), Pandora (CL-Buy).
- We expect **ad-funded services to eat into terrestrial radio** given the ongoing migration to online listening and better targeting capabilities, creating \$5 bn of additional revenue by 2030. Future roll-out of connected cars and 5G will further accelerate that shift.
Main beneficiary in our coverage: Pandora (CL-Buy); main loser: iHeart (Not Covered)
- We believe **the labels have the most to gain given their royalty cut of 55%-60%.** Their position should remain solid as distribution fragments (and they will have a vested interest in keeping a minimum of competitive tension among platforms) and digital increases the complexity of the industry. The outcome of their (re)negotiations with YouTube, Spotify or Amazon in the coming months and regulatory changes will be key in this regard. However, we see disruptive forces, such as alternative labels, driving a greater redistribution of profits to artists. Overall, we forecast that streaming will increase their revenue pool by \$21 bn by 2030 and profit pool by \$7 bn.
Main beneficiaries in our coverage: Vivendi (CL-Buy), Sony (CL-Buy).
- **Publishers should see similar trends to labels but to a lesser extent** given their royalty cut of 10% (note that publishers and labels often belong to the same parent company), creating an additional revenue pool of \$3 bn and profit pool of \$1 bn.
- **Live music growth benefits ticketing and streaming players.** By using geo-specific targeting to known fans, players such as Ticketfly/Pandora and other streaming services should be able to drive down vacancy rates, increasing artist revenues, and improving relationships with artists.
Main beneficiary in our coverage: Pandora (CL-Buy).

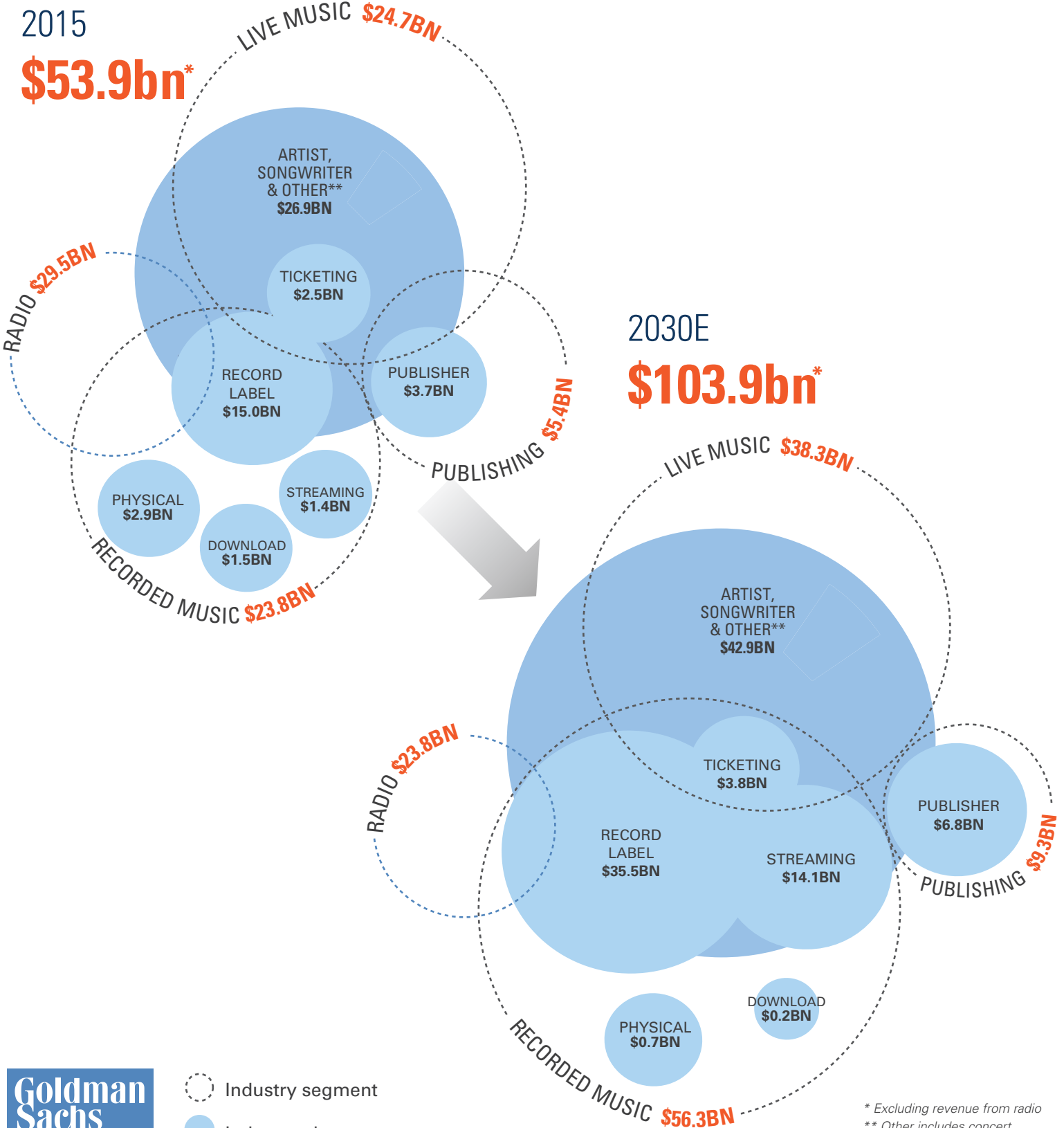
Industry risks: See the second of our double album "Paint It Black"

While a number of positive structural and regulatory shifts pave the way for better monetisation of music content, industry responses will also be critical in shaping the future growth of the industry. In this first of a "double album", we have assumed some level of coordination among labels and platforms to maximize that growth potential. In the second of our double album, "Paint It Black", we highlight potential disruptive behaviour that could derail the music recovery.

See the second of our double album: Music in the Air – Paint it Black

The Ecosystem

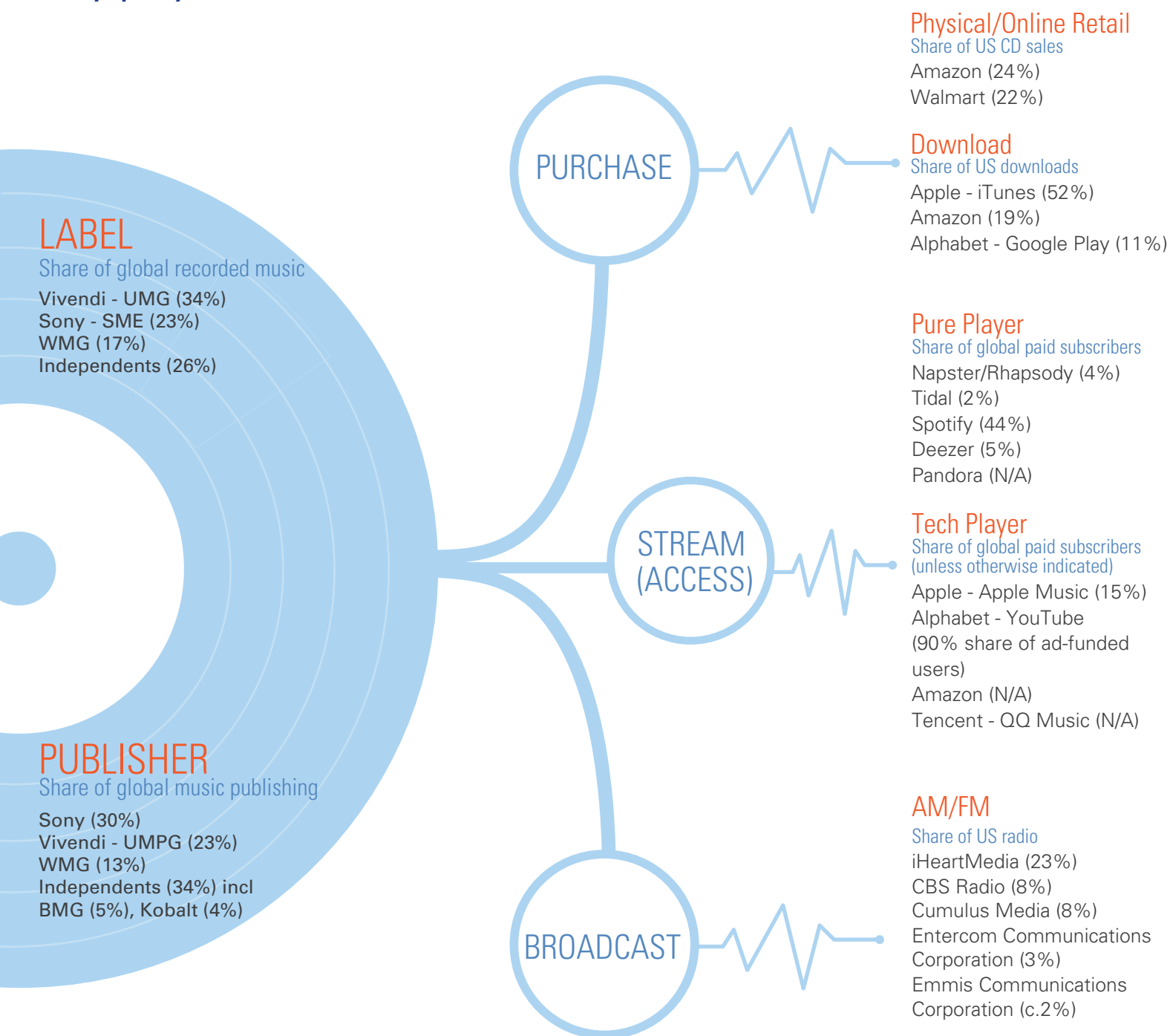
Evolution of revenues 2015-2030E



* Excluding revenue from radio
 ** Other includes concert promoters, venue operators etc.

The Ecosystem

Key players and market shares (2015)



Goldman Sachs

UMG - Universal Music Group
SME - Sony Media Entertainment
WMG - Warner Music Group
UMPG - Universal Music Publishing Group
BMG - Bertelsmann Music Group

Source: Company data, Music & Copyright, IFPI, Goldman Sachs Global Investment Research

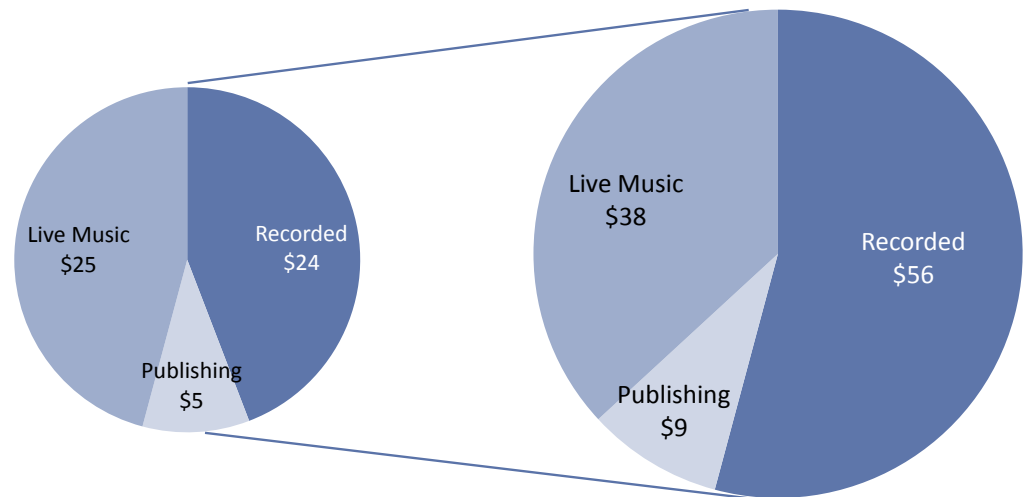
We use the following list of terms interchangeably throughout the report:

- Freemium = ad funded tier = free tier (applicable to streaming services such as Spotify or Deezer but not to Apple Music or Tidal)
- Interactive = on-demand (applicable to streaming services such as Spotify, Deezer, or Apple Music but not to Pandora's ad-supported internet radio service)
- Internet radio = non interactive streaming = webcasting (applicable to Pandora's internet radio service or iHeart but not to Sirius XM's satellite radio)
- Rights owners = labels, artists, publishers and songwriters altogether or any one of them
- Recorded music companies = record labels = labels

Stairway to \$50 bn of additional revenue opportunity

We forecast overall music industry (recorded music, music publishing and live music) revenue to almost double in size over the next 15 years to \$104 bn from \$54 bn in 2015. Of that \$50 bn revenue growth potential, we expect \$32 bn to come from the recorded music segment, which has only started to recover after almost two decades of decline, while Publishing and Live should continue to show healthy growth and add \$4 bn and \$14 bn of revenue respectively.

Exhibit 1: \$50 bn of additional revenue opportunity mainly driven by recorded
Music industry revenue split in bn, 2015 vs. 2030E

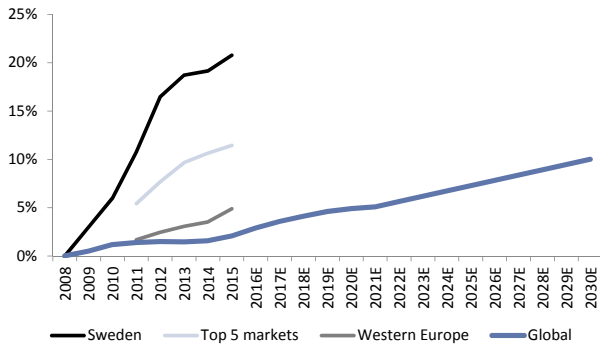


Source: IFPI, Goldman Sachs Global Investment Research.

We assess the size of the total addressable market by looking at the smartphone population, consumer spending on entertainment and the advertising market (in particular radio).

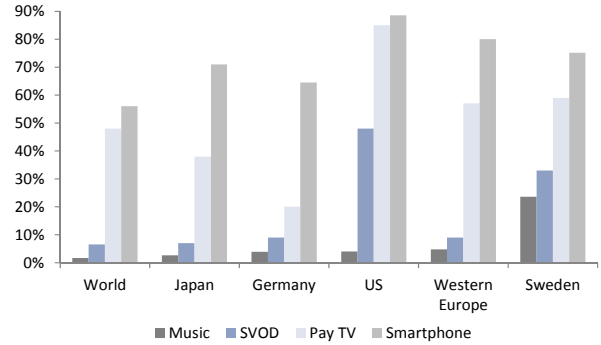
- **We forecast that paid streaming services will reach 9% of the global smartphone population in 2030** from 2% in 2015 by extrapolating the 2015 penetration growth rate of 50 bp. This level would still be below the average penetration for the top five paid streaming markets of 11% in 2015 and less than half the penetration in Sweden and Norway (over 20%), the most advanced markets. By comparison, Pay TV penetration is 48% of TV homes globally and SVOD (subscription video on demand) is 6% of broadband homes (SNL Kagan/ Digital TV Research). In the US, Pay TV and SVOD are in 85% and 48% of eligible homes compared to only 4% for music subscription.

Exhibit 2: We forecast global paid streaming penetration to reach 9% by 2030E, slightly below the top five markets today and less than half of the rate attained in Sweden today and less than half of the rate attained in Sweden
Paid streaming penetration as % of smartphone subscribers



Source: IFPI, ZenithOptimedia, Goldman Sachs Global Investment Research.

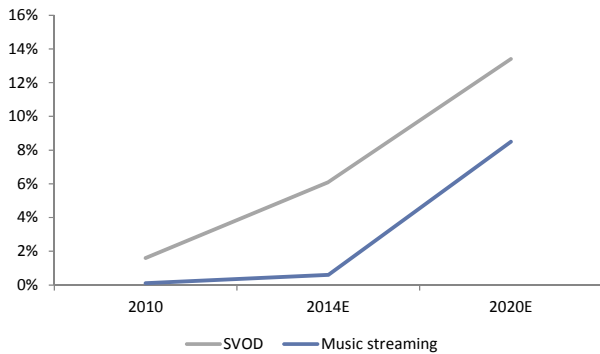
Exhibit 3: Paid streaming penetration stands at 2% globally compared to 6% for SVOD and 48% for Pay TV
Paid streaming penetration as % of smartphone subscribers, SVOD penetration as % of broadband homes, Pay TV penetration as % of TV homes, Smartphone penetration as % of total population



Source: IFPI, Digital TV Research, SNL Kagan, ZenithOptimedia, Goldman Sachs Global Investment Research.

Exhibit 4: We expect music streaming to follow the path of SVOD globally

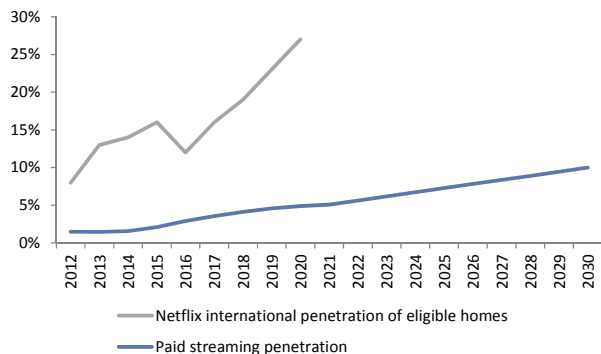
Global paid streaming penetration vs. SVOD penetration



Source: IFPI, Digital TV Research, Goldman Sachs Global Investment Research.

Exhibit 5: Netflix's penetration of eligible homes doubled over three years to 16% in 2015

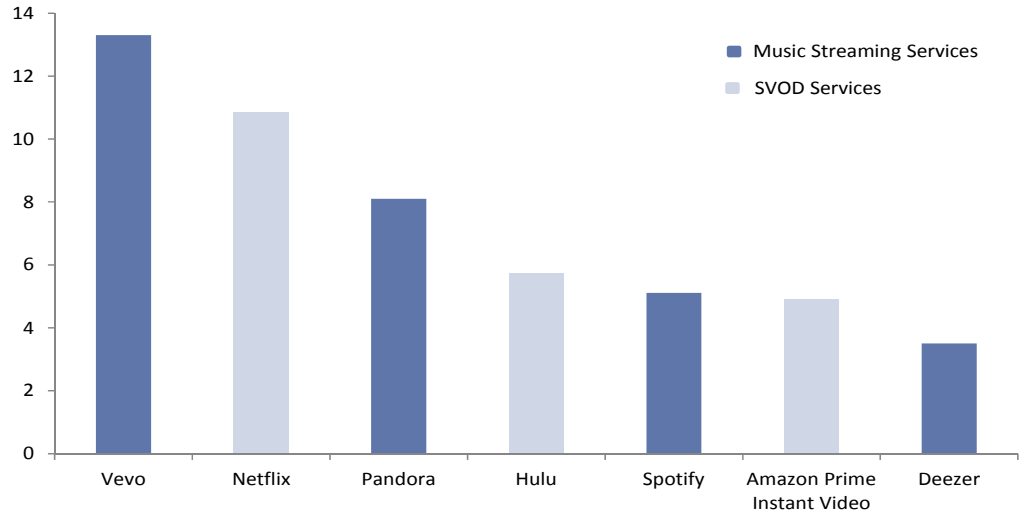
Global music paid streaming penetration vs. Netflix international penetration of eligible homes



Source: IFPI, Digital TV Research, Company data, Goldman Sachs Global Investment Research.

Exhibit 6: Consumption of music streaming services comparable to SVOD

Average weekly hours of streaming

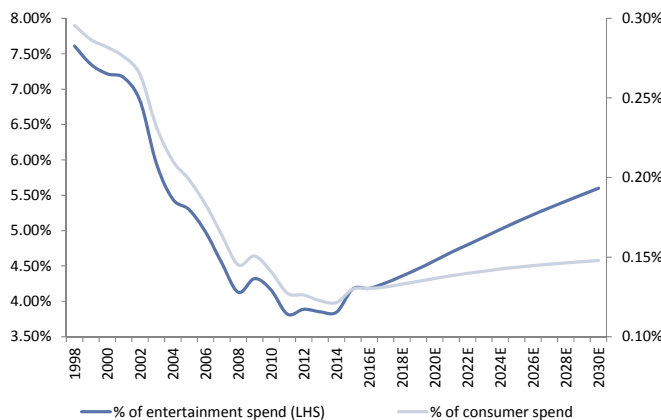


Source: Press reports, Deezer.

- Overall consumer spend on entertainment amounted to \$1.3 tn in 2015 (Euromonitor), with music accounting for 4.2% on our estimates. We forecast that share will rise to 5.6% in 2030, still well below the 7.6% attained in 1998. Based on overall consumer spend, we expect music’s share to increase from 0.13% in 2015 to 0.15% in 2030, compared to the 0.30% recorded in 1998.

Exhibit 7: Music revenue as % of entertainment spend and overall consumer spend

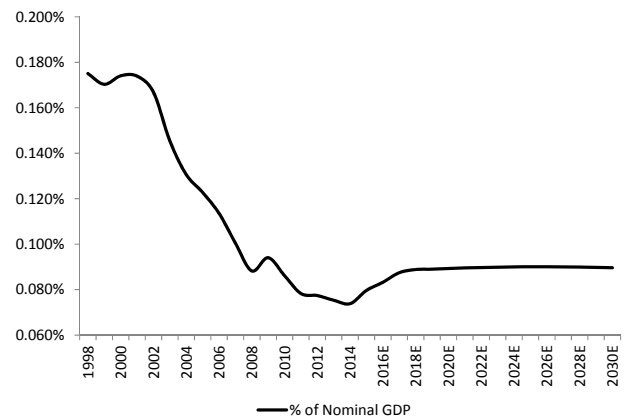
Entertainment includes: Recreational and Cultural Services, Newspapers, Magazines, Books and Stationery



Source: Euromonitor, Goldman Sachs Global Investment Research.

Exhibit 8: We forecast music revenue to remain below 1 pp of global nominal GDP by 2030, less than half the share it had in 1998

Global music revenues as % of global nominal GDP

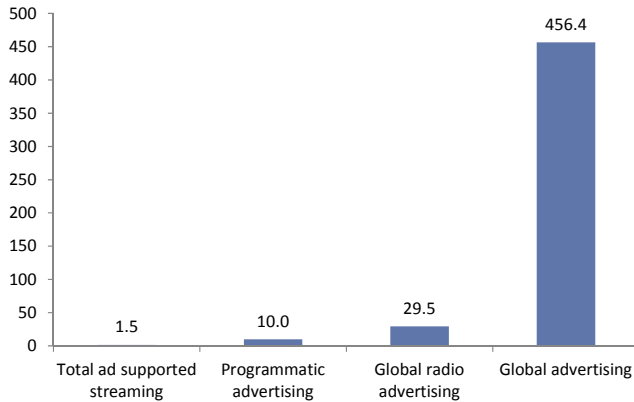


Source: World Bank, IFPI, Goldman Sachs Global Investment Research.

- We forecast the ad funded, streaming market (including payments from YouTube, Pandora, Spotify, etc.) to grow to \$7.1 bn by 2030 from \$1.5 bn currently. This compares to a global advertising market worth \$456 bn and global radio advertising market worth \$30 bn in 2015 as per MAGNA Global.

Exhibit 9: The global addressable market for advertising funded streaming is huge

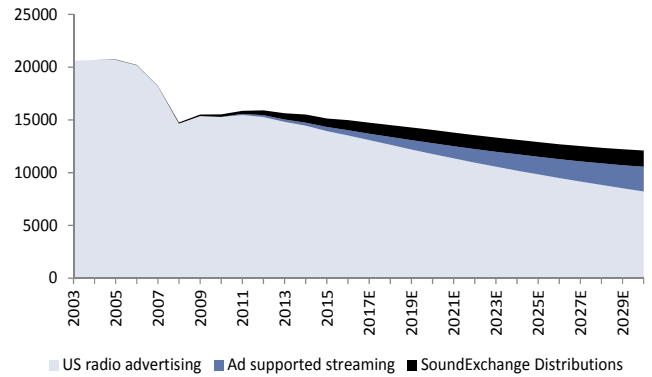
Advertising revenue by category (\$ bn)



Source: MAGNA Global, IFPI.

Exhibit 10: We expect digital radio and streaming services to eat into the radio ad market in the US

Advertising revenue by category (\$ mn)

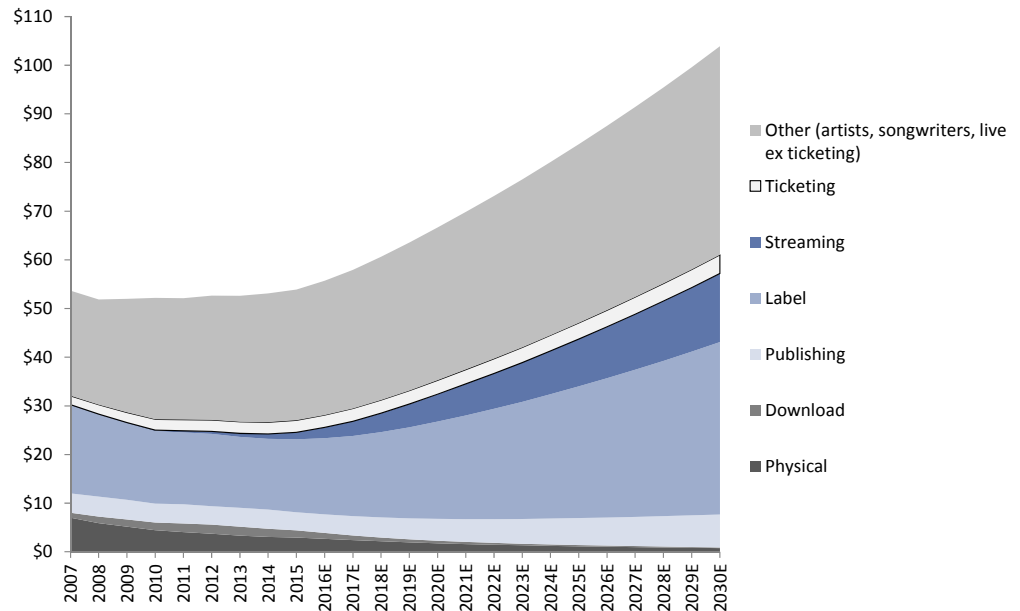


Source: MAGNA Global, IFPI, Goldman Sachs Global Investment Research.

Digging into the economics for stakeholders

Exhibit 11: Evolution of revenue pool for the different industry players

Revenues, \$ bn

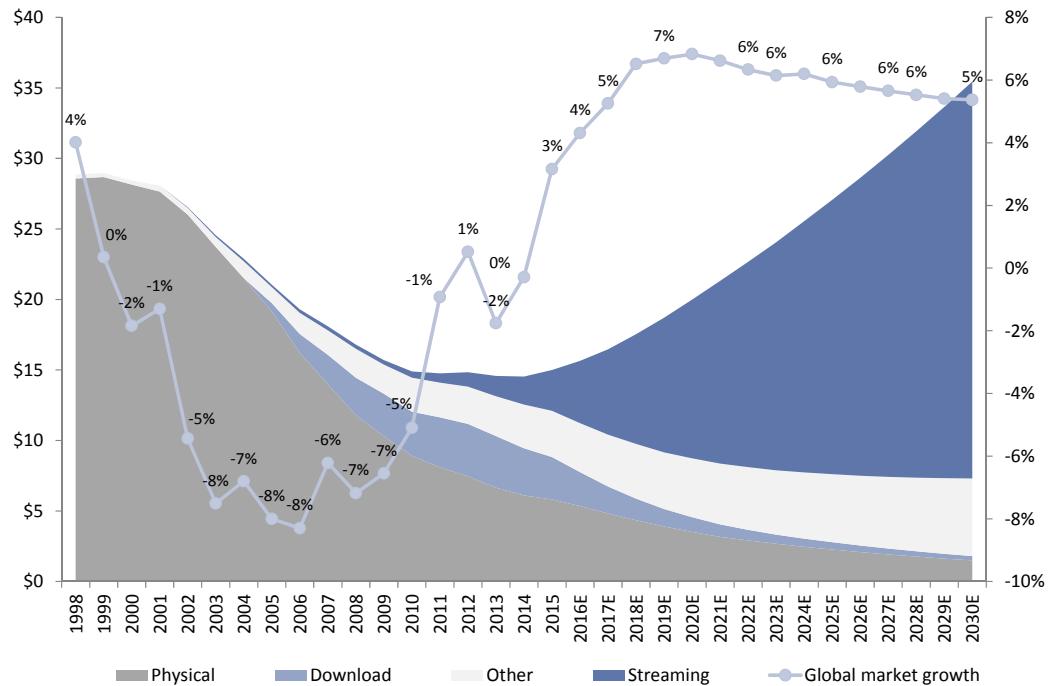


Source: IFPI, PwC, Goldman Sachs Global Investment Research.

We believe the **online innovators** (interactive streaming platforms and ad funded services) will grow to \$14 bn of net revenue in 2030 from \$1.4 bn today, assuming they retain a distributor cut of 30%. With around 70% of their revenues being redistributed to rights owners (71.5%/ 73% in the US/internationally in the case of Apple Music according to Recode) and other COGS accounting for 10%-15%, this gives a gross margin of 15%-20% or \$6-8 bn of potential gross profit. We assume that pure streaming players (Spotify, Deezer, Pandora, etc.) will account for 37% share of net subscriber additions over 2020-30E, Apple Music 26% and other large tech players (Google, Amazon, etc.) 37%.

For the **incumbent labels**, which receive around 55%-60% of the platforms' revenue as royalties, we forecast their revenue pool to grow to \$35.5 bn in 2030 from \$15 bn today mainly through streaming. This compares to the current pool at risk of \$9 bn from physical and download sales. We believe profit growth could be even more meaningful as we estimate margins are 15% in streaming and download and 8% in physical at present, with the potential for streaming to grow to 20%-25% over time. This means \$4-6 bn of additional profit from streaming alone bringing the total pool to \$9 bn, compared to the current pool of \$2 bn, of which \$1 bn is from physical and downloads.

Exhibit 12: Streaming should help drive recorded music back to its 1999 peak by 2027
 Global recorded music market breakdown (\$ bn, LHS) vs. global music market growth (% , RHS)

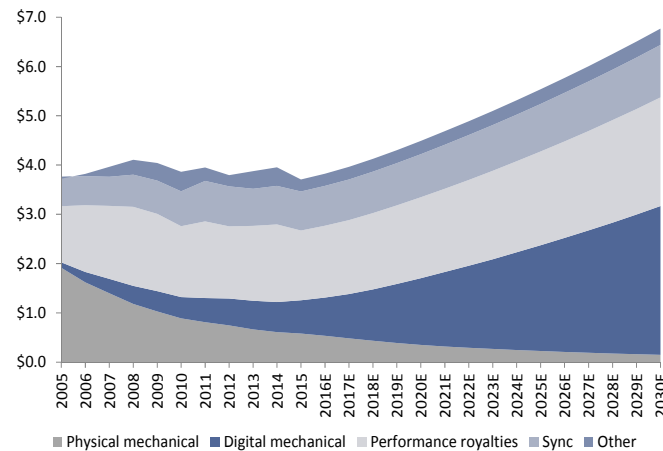


Source: IFPI, Goldman Sachs Global Investment Research.

The incumbent publishers, who so far have been more insulated from digital disruption, are also likely to gain as they receive around 10% of the platforms' revenue as mechanical and performance royalties. We forecast their revenue pool to grow to \$7 bn in 2030 from \$4 bn in 2015, with streaming alone adding \$3 bn of revenue. The main pool at risk (i.e. physical mechanical royalties) is currently worth \$0.6 bn on our estimates. Assuming margin remains broadly unchanged at 30% as publishers do not benefit from the same margin uplift in streaming as the labels, we forecast profit to double to \$2 bn in 2030.

Exhibit 13: Publishing – a \$7 bn market by 2030 driven by streaming

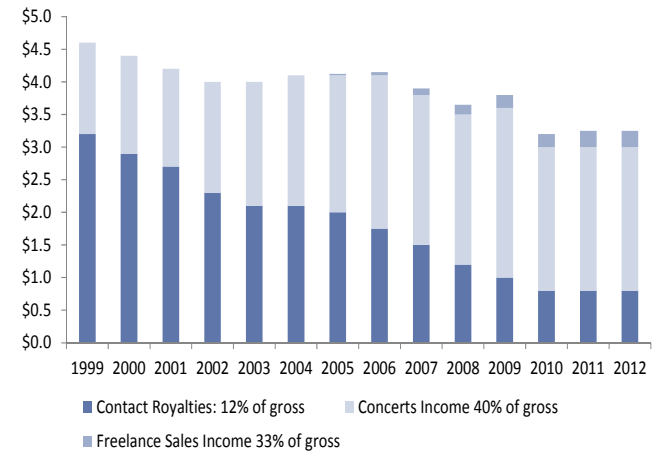
Global music publishing market breakdown (\$ bn)



Source: IFPI, Company data, Goldman Sachs Global Investment Research.

Exhibit 14: Artists have become increasingly reliant on touring

Sources of artists income (\$ bn)



Source: Digital Music News.

For the **live music** segment, which has been the fastest growing area of the music industry, streaming could also bring a significant revenue opportunity by leveraging listening data for the marketing and promotion of live events and the possibility to connect directly with fans, therefore increasing artist revenues and improving relationships with artists. We forecast the market to grow to \$38 bn by 2030 from \$25 bn of revenue in 2015 according to IFPI (International Federation of the Phonographic Industry). It is estimated that 40% of tickets are currently unsold in the US (Billboard, September 4, 2010) and our analysis of Pollstar data for over 5,000 live events in the United States over the last year shows an average vacancy of 26% (29% for events at venues with fewer than 2,500 seats). Better matching the supply and demand could save up to \$2 bn of revenues for the US live industry alone assuming 24 million tickets are unsold every year in the US at an average price of \$67.33 (WSJ, December 16, 2010).

Artists and songwriters should benefit from the recovery of the industry through the contract royalties paid by labels/publishers and ongoing growth in live music. While much of the recent focus has been on their income from royalties, we note that recorded music has become a much less important source of revenue at 16% for the top 40 earning artists compared to touring at 80% (this is not applicable to songwriters). Artists are also reported to be earning 12% of gross contract royalties compared to 40% of the gross touring revenue (Digital Music News). We believe that music creators will gain a stronger bargaining position vs. the labels/publishers and the platforms as technology and new disruptors (alternative label/publishers) will allow greater transparency and easier access to users. This will be manifested through higher royalty payments from labels/publishers and greater control over their IP over time. We estimate labels currently invest around 30%-35% of their revenue (net of the publishing cut) in artists & repertoire and this may grow to 40% or more over time. Meanwhile, we also expect publishers' pay away to songwriters to rise to c.55%-60% over time from 50% today.

Regulation sets the stage – streaming positive for rights holders

The music industry is entrenched in a convoluted regulatory environment governing copyrights and royalties and understanding its intricacies and the potential for change is key. Our main focus will be the US, where we see the most upside for rights holders. We believe the migration of listeners to online streaming is positive for labels/artists who enjoy new sources of royalty payments in streaming as opposed to terrestrial radio where they get paid nothing. Based on IFPI data, payments of nearly \$3 bn were made to labels by streaming services in 2015 and we expect that amount to increase to \$11 bn in 2020 with an average annual growth rate of 30% and to reach \$28 bn by 2030 which is double the current recorded music market size. Future regulatory reviews, notably of safe harbour rules applicable to YouTube and of songwriting royalties applicable to interactive streaming services, could drive further redistribution of revenue pools in favour of the rights holders.

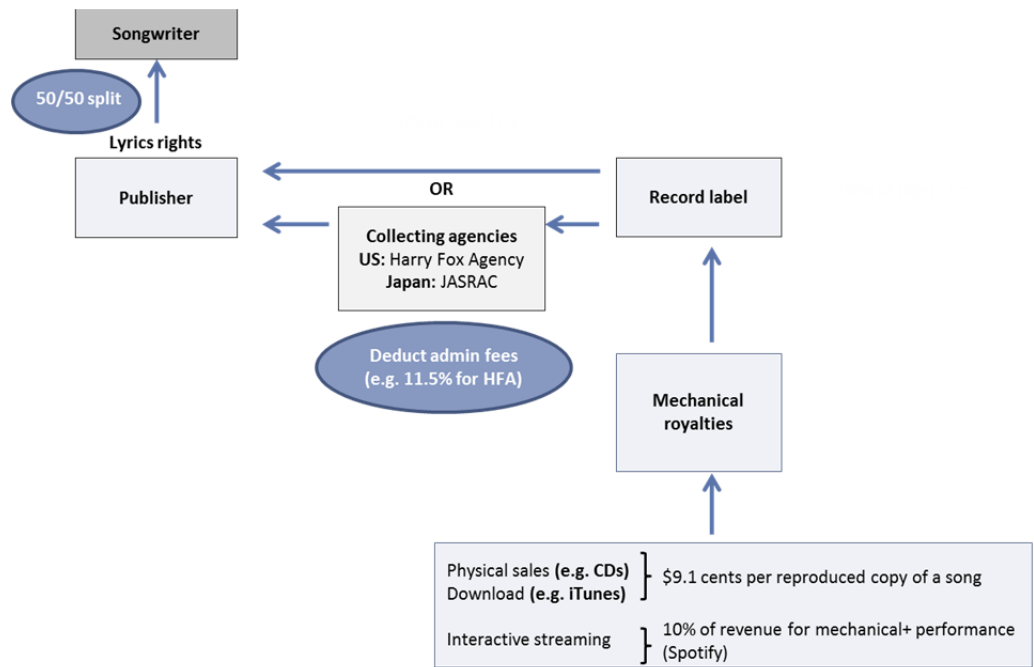
What are royalty payments?

Royalty payments are the method through which all the players involved in the production of a song make money, yet they are extremely convoluted. When thinking about royalties in the music industry, it is important to separate out the different copyrights, and so the right to royalties, owned by different players. **Songwriters** own the rights to the lyrics and melody of a piece of music, and these song copyrights are usually managed by **music publishers** (we will often refer to songwriters/publishers together). **Performance artists** own the rights to a particular recording of a song, known as the master recording, and these master recording rights are usually assigned to **record labels** for management (we will often refer to artists/labels together).

There are distinct types of royalties paid to rights owners. These royalty payments and the way royalty rates are set vary significantly depending on how the song is accessed (AM/FM vs. online radio, physical or digital purchase, streaming).

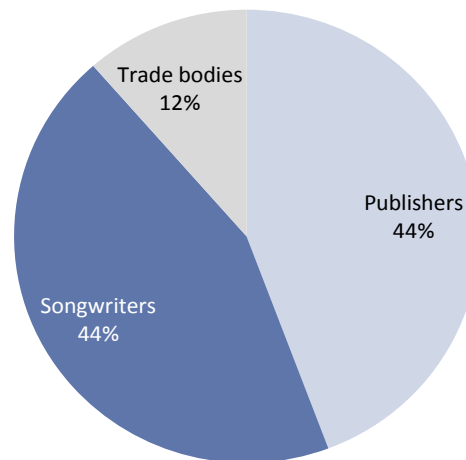
- 1. Mechanical royalties** are owed whenever a song is manufactured onto a CD, downloaded on a digital music site, or streamed through a service such as Spotify. These are paid by the record label to the publisher (either directly or through a third party organization such as Harry Fox Agency in the US). The publisher then shares 50% of its royalty with the songwriter. In the US, royalty rates are set by the government through a compulsory license and are 1) either calculated on a penny basis per song for physical/download, or 2) based on a formula for interactive streaming services. Satellite and online radio such as Pandora or Sirius do not pay mechanical royalties to publishers. In most countries outside of the US, royalties are based on percentages of wholesale/consumer prices for physical/digital products respectively and negotiated on an industry-wide basis.

Exhibit 15: How do publishing mechanical royalties work?



Source: Harry Fox Agency, Royalty Exchange, Sound on Sound, Goldman Sachs Global Investment Research.

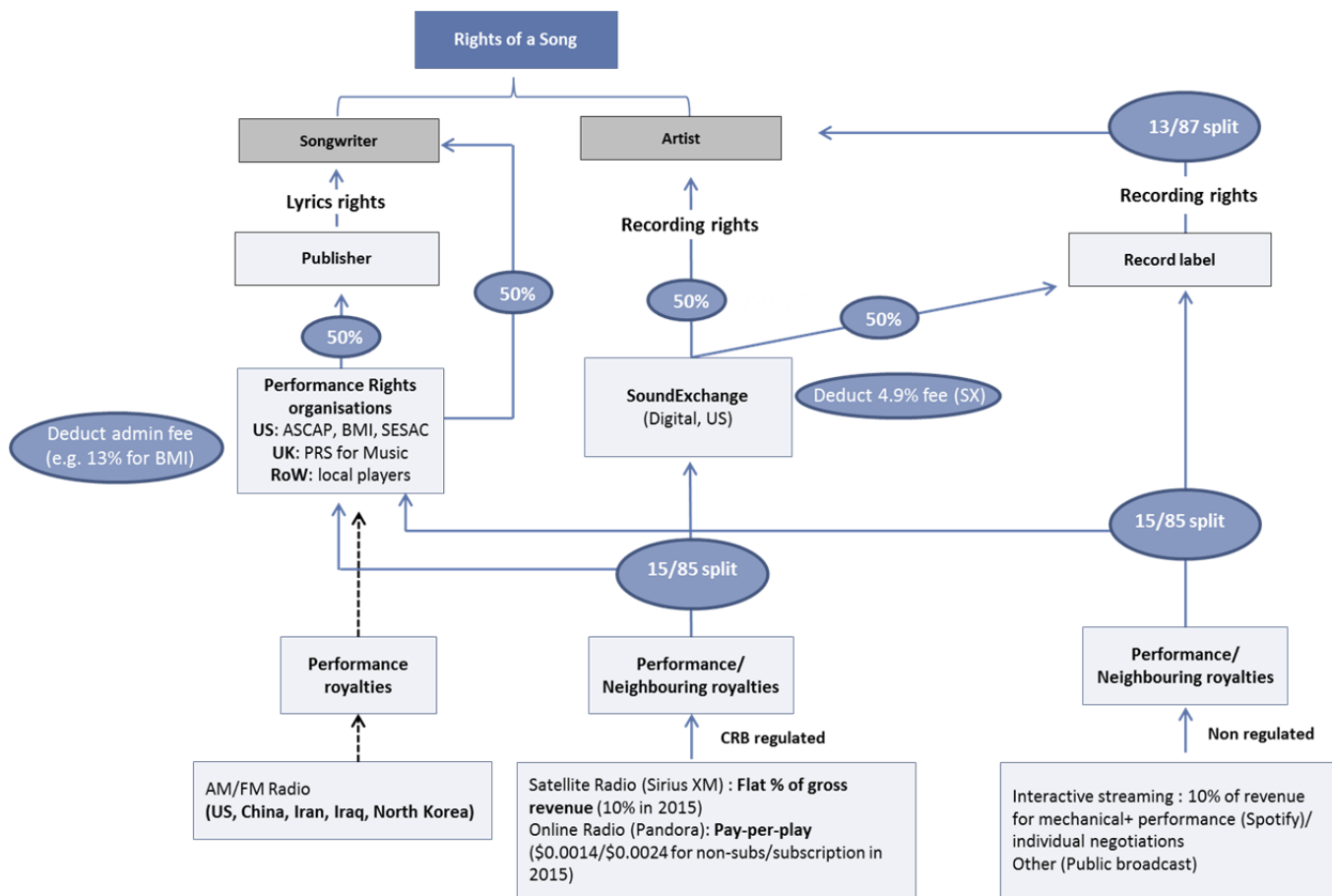
Exhibit 16: Mechanical royalties split



Source: Goldman Sachs Global Investment Research.

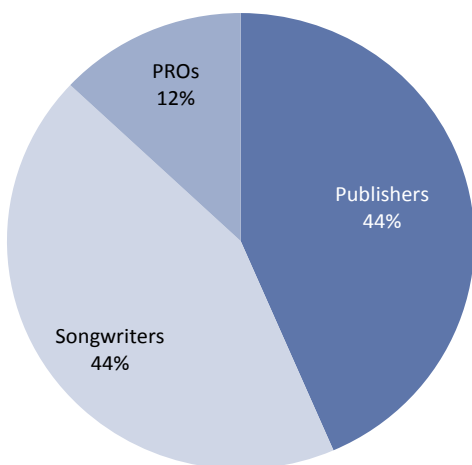
- 2. Performance royalties for publishing/ neighbouring royalties for recording** are owed whenever a song is performed (radio/TV/online streaming services/live venues).
- Songwriting performance royalties are paid to songwriters/publishers through Performance Rights Organizations (PROs) and collection societies (after a 10%-20% administrative fee).
 - Recording neighbouring royalties are paid to the recording artists and labels (either directly or through SoundExchange "SX" in the US). **In the US however, artists/labels only get paid for digital performances (i.e. satellite/online radio, interactive streaming services) and not by terrestrial radio** as antiquated US legislation exempts terrestrial broadcasters from paying royalties for the use of the master recording.

Exhibit 17: How do performance royalties work?



Source: SoundExchange, Royalty Exchange, PRS for Music, Company data, Goldman Sachs Global Investment Research.

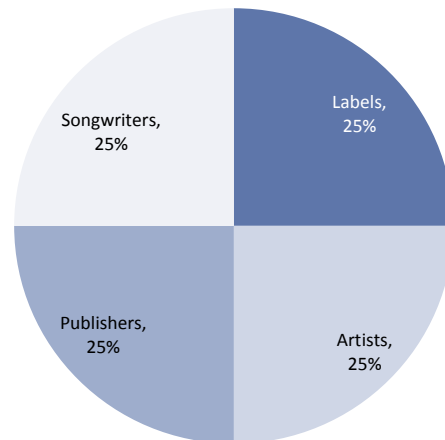
Exhibit 18: Terrestrial radio does not pay any performance royalties to labels/artists
 Estimated distribution of terrestrial radio performance royalties in the US



Source: Goldman Sachs Global Investment Research.

- 3. Synchronisation or “sync” royalties** are paid to songwriters/publishers and record labels/artists for use of a song as background music for a movie, TV programme or commercial, video game, etc. There is no explicit rate that defines the compulsory percentage of royalty that must be paid. This will mostly depend on the commercial value of the work to those who want it and on the media to be used. Sync royalties are usually equally split between labels, artists, publishers and songwriters.

Exhibit 19: Estimated distribution of sync royalties to rights holders



Source: Goldman Sachs Global Investment Research.

Artists/Labels are the main beneficiaries of the move to streaming

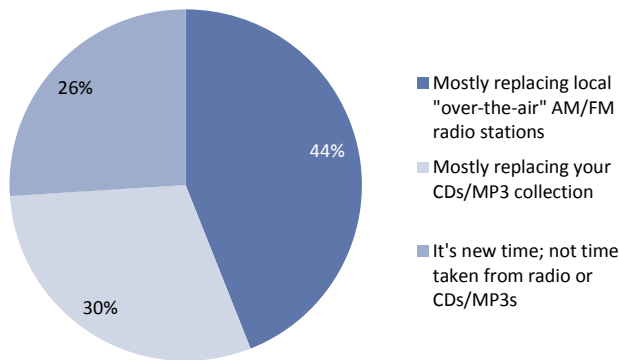
The evolution of consumption from terrestrial to digital on one hand, and from ownership to access on the other, has profound implications for the rights holders.

1. The move from analogue to satellite or internet radio services creates a new revenue stream for artists/labels who get paid nothing by terrestrial radio.

The US is one of the few countries where terrestrial radio operators are exempted from paying any performance royalties to labels and artists (although they are required to pay the publishers and songwriters). This situation is inherited from the long-standing argument that labels and artists receive important free promotion through radio play. With analogue radio's share of listening declining and other meaningful discovery platforms emerging such as YouTube, social media or streaming services' playlists, we see a strong case for this rule to change over time but, as a US music lawyer puts it, it will likely face strong lobby opposition. In the meantime, we expect to see more bilateral commercial agreements (see later section "3. Compounding this already positive picture is the move by many analogue operators to sign deals with labels to receive preferential royalty rates in order to launch their own digital services").

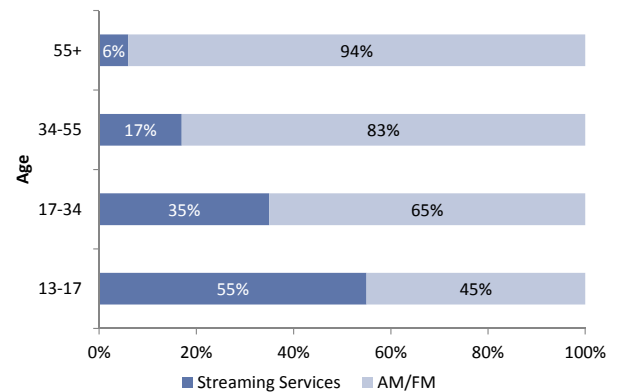
With the introduction of streaming services and online radio, US legislation evolved to create a statutory license for digital audio transmissions and require the payment of performance royalties by such services under the Digital Performance in Sound Recording Act of 1995 and the Digital Millennium Copyright Act ("DMCA") of 1998. The ongoing shift of listeners from terrestrial radio to online radio and streaming services is therefore incremental for labels and artists.

Exhibit 20: Nearly half of digital radio listening is displacing AM/FM in the US
Survey, Summer 2013



Source: Edison Research Streaming Audio Task Force, Summer 2013/ IAB.

Exhibit 21: While AM/FM consumption remains dominant overall, streaming services are increasingly popular for younger age groups
Daily listening to streaming service vs. AM/FM by age group, US, 2014



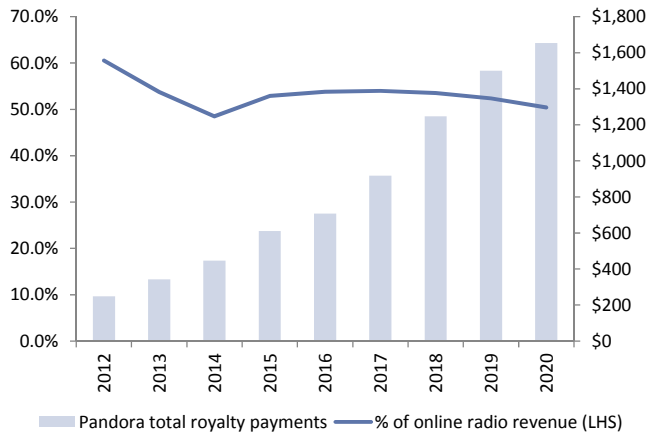
Source: Activate.

The rate paid by non-interactive services such as Sirius or Pandora is set every five years by the Copyright Royalty Board (CRB), a panel composed of three federal judges. Anyone regulated by the CRB splits performance royalties on fixed terms with 50% going to the label, 45% to the artist, and 5% to the Musicians' Union after SoundExchange fees are deducted. In contrast, on-demand streaming services such as Spotify or Tidal negotiate their rates on the free market.

Leading digital radio service Pandora has historically paid on a pay-per-play basis under CRB rules. The latest CRB ruling for 2016-2020 set these rates at \$0.17 and \$0.22 for ad-funded and subscription services respectively in 2016, and these will be adjusted annually to reflect changes in the Consumer Price Index for 2017-20. However, Pandora has just negotiated direct deals with record labels, and the terms of those deals will supersede the CRB ruling. The exception is the deal with Warner Music, under which Warner will continue to distribute the artists' share of the statutory ad-funded rates through SoundExchange. Our US Internet team expects Pandora to pay \$1.65 bn in total content acquisition costs in 2020 (50% of its online radio revenue) up from \$610 mn in 2015 (45% of its online radio revenue excluding one-offs). The increase is primarily driven by the launch of Pandora's on-demand offering in 4Q16, from which the company expects to pay 65-70% of revenue.

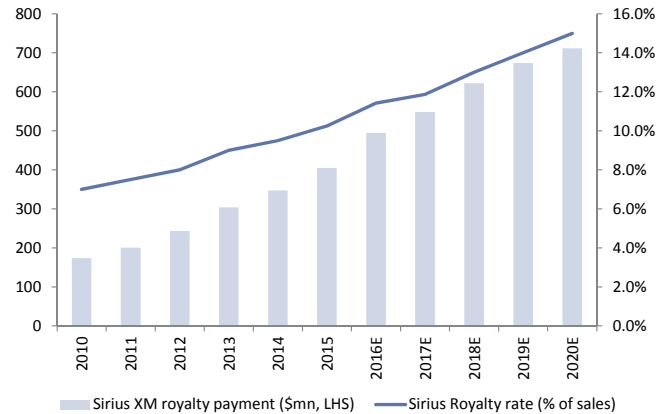
Leading satellite radio operator Sirius XM pays a flat fee out of its gross revenues. This rate has progressively increased by c.50 bp pa from 7.0% in 2010 to 10.0% in 2015 and is set to rise to 11.0% by 2017. Sirius XM paid royalty fees of \$405 mn in 2015, up from \$174 mn in 2010 – an 18.5% CAGR (vs. a 7.9% CAGR in subscriber growth). Our US Telecoms team forecasts these fees to rise to \$712 mn by 2020 at a CAGR of 12%. On January 5, 2016, CRB started a new proceeding to set music royalties for the 2018-2022 five-year period.

Exhibit 22: We forecast Pandora's royalty fees to increase to \$1.65 bn in 2020 from \$610 mn in 2015



Source: Company data, Goldman Sachs Global Investment Research.

Exhibit 23: We forecast Sirius XM's royalty fees to increase to \$712 mn in 2020 from \$405 mn in 2015



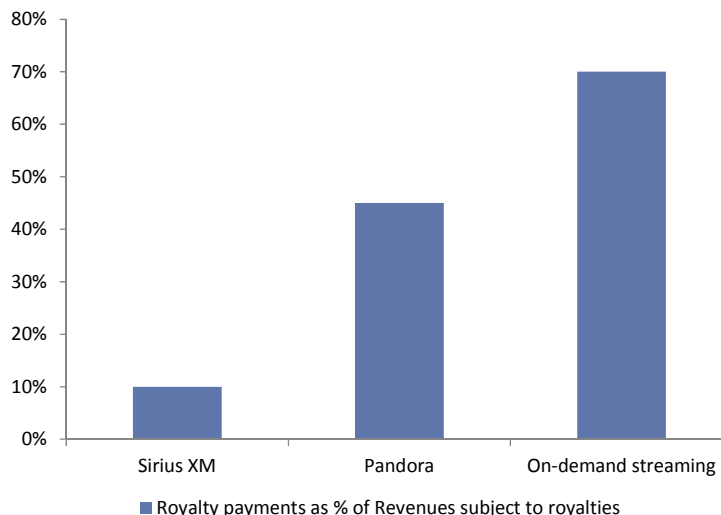
Source: Company data, Goldman Sachs Global Investment Research.

2. In our view the rise of on-demand streaming services is even more positive for rights owners as compared to satellite/internet radio

Streaming services pay away a higher share of their revenue to rights holders than satellite and online radio. As on-demand streaming royalties are negotiated on the free market, streaming services generally pay c.70% of their revenues to labels and publishers (90/10 split) similar to the levels physical and digital retailers pay. Apple Music pays a slightly higher rate of 71.5% in the US and 73% elsewhere according to Recode. Pandora has stated that its on-demand offering will pay 65-70% of associated revenue to rights holders, and overall the company pays out 54% of music revenue to rights holders. Prior to signing the direct deals with rights holders, Pandora paid c.45% of its online radio revenues royalties in 2015 (excluding one-offs). Sirius XM, by contrast, pays away around 10% of their revenue as royalties as they benefit from lower CRB-regulated rates.

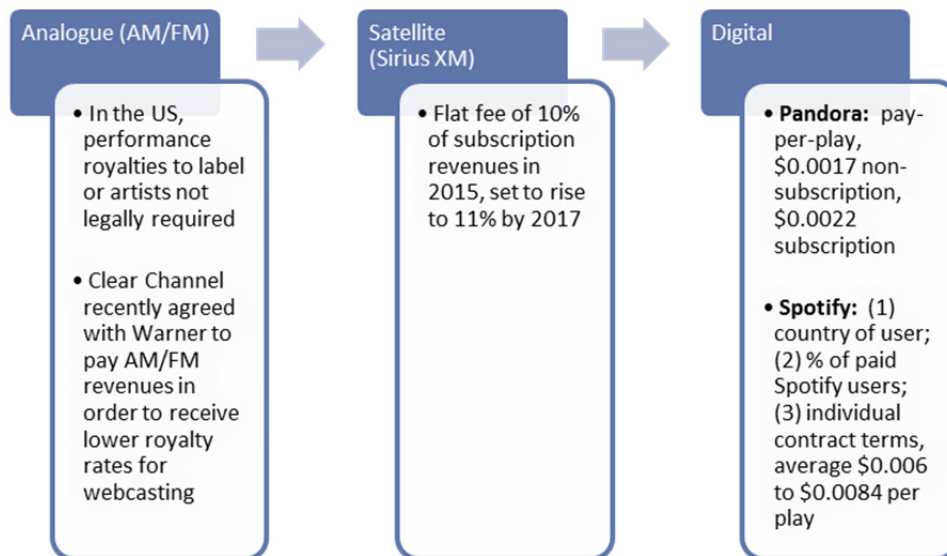
Based on reported streaming revenue of \$1.9 bn in 2015, this implies that roughly \$1.361 bn was paid as royalties to labels/publishers in 2015 alone.

Exhibit 24: On-demand streaming services pay away around 70% of the revenue compared to 10% for Sirius XM and 45% for Pandora radio in 2015



Source: Company data, Goldman Sachs Global Investment Research.

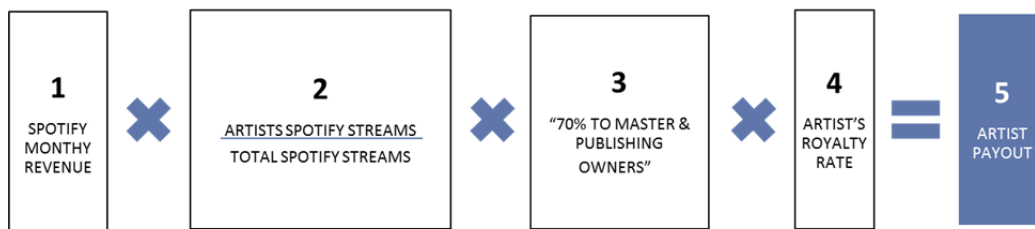
Exhibit 25: Performance royalties for labels/artists more favourable in a digital world



Source: Company data, Goldman Sachs Global Investment Research.

On-demand streaming rates however vary significantly by individual contract and market. For instance, Spotify’s royalty calculation is not a fixed pay-per-play and depends on: 1) the country in which the user is based; 2) Spotify’s number of paid users as a percentage of total users; and 3) individual contract terms with the label and/or artist. The company indicates the average per stream payout to rights holders is between \$0.60 and \$0.84 per 100 streams.

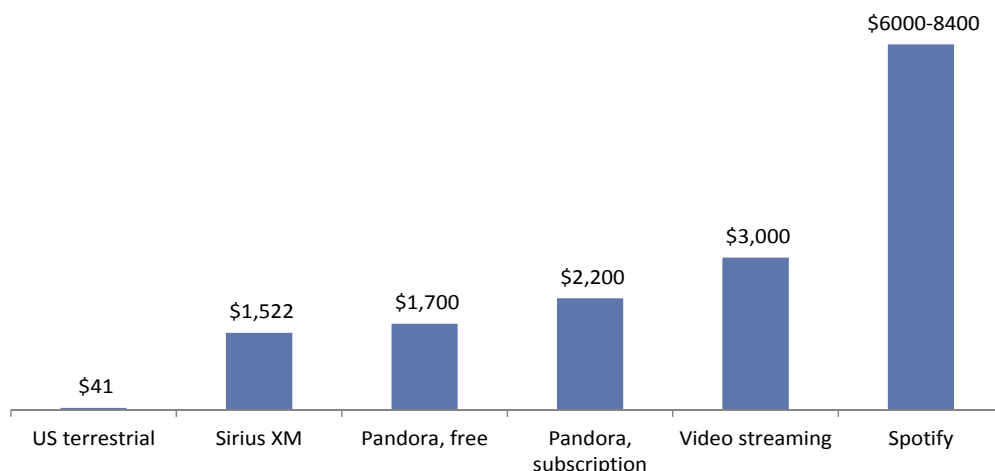
Exhibit 26: Spotify royalty system



Source: Spotify.

Streaming rates are higher on a per-user basis. Much has been made of the dilutive nature of streaming services, with artists and labels arguing they do not receive equitable compensation compared to satellite radio. Based on Sirius XM’s royalty payments of \$500mn in 2015, and an average song length of 3.5 minutes, we calculate that the implied royalty rate per play is \$33.3, compared to fractions of a penny for Spotify and Pandora. What this argument ignores, however, is that Spotify is a one-to-one service, while satellite radio is a one-to-many (Sirius has 31 mn subscribers). Controlling for the number of users listening to a song, both Pandora and Spotify pay more on a per-user basis. We estimate that a song played on Sirius is listened to by 0.07% of Sirius’ 31 mn subscribers, which would imply a cost per play per million subscribers of \$1,522, which is 10%-30% lower than Pandora’s historical per-play-per-million users rate of \$1,700-2,200 and around 75%-80% lower than Spotify’s per-million streams rate of \$6,000-8,400. As such, we see the migration to online streaming services as incremental to the market.

Exhibit 27: The shift to digital consumption drives higher royalty payments in the US
 Royalty per million streams, 2015

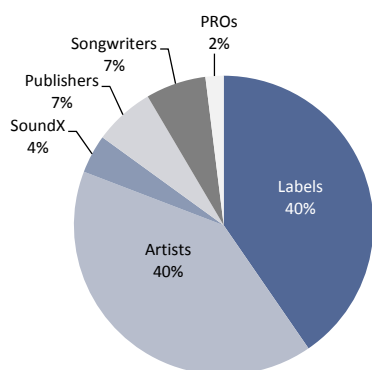


Source: Spotify, Goldman Sachs Global Investment Research.

Pandora’s move to on-demand streaming presents upside for rights holders. Pandora recently announced direct licensing agreements with record labels to launch an on-demand streaming service in the US in 2H16 alongside its existing digital radio service. Under the terms of the deal with UMG, Sony and independent labels, Pandora will pay away 65%-70% of its subscription revenue to rights holders (while the CRB arrangements led to a pay away rate in 1H16 of roughly 45% of its online radio subscription revenue). In conjunction with these direct deals, Pandora also negotiated new terms for its ad-funded online radio service and will pay away a LPM (licensing cost per 1,000 listener hours) of around \$33 from roughly \$31 previously. The terms of the deal with Warner on the subscription service are unknown, but we would expect them to be similar to the other labels.

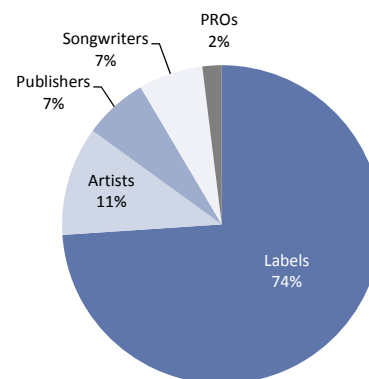
With Pandora targeting \$1.3 bn of subscription revenue by 2020 without cannibalizing its existing ad-funded radio business, this presents significant upside for the rights holders given the expansion of Pandora’s addressable market and the higher royalties in on-demand streaming as opposed to online radio. This will disproportionately benefit the labels, who typically receive 74% of the royalties from on-demand services compared to 40% from online radio, while artists’ share will move to 11% from 40% (we argue however that artists’ absolute royalties will still be higher in the on-demand world).

Exhibit 28: Estimated distribution of Pandora’s performance/neighbouring royalties



Source: Goldman Sachs Global Investment Research.

Exhibit 29: Estimated distribution of interactive streaming performance/neighbouring royalties in the US

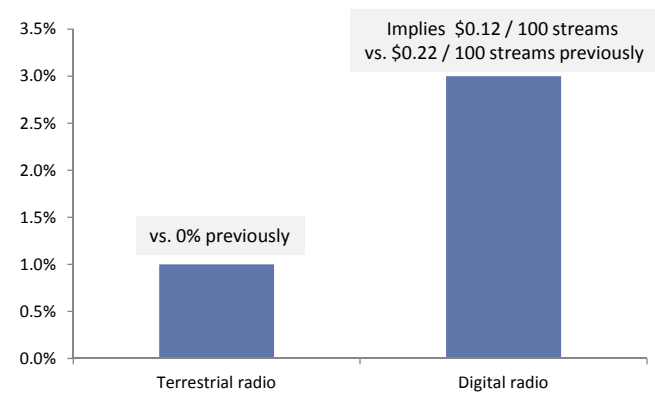


Source: Goldman Sachs Global Investment Research.

3. Compounding this already positive picture is the move by many analogue operators to sign deals with labels to receive preferential royalty rates in order to launch their own digital services.

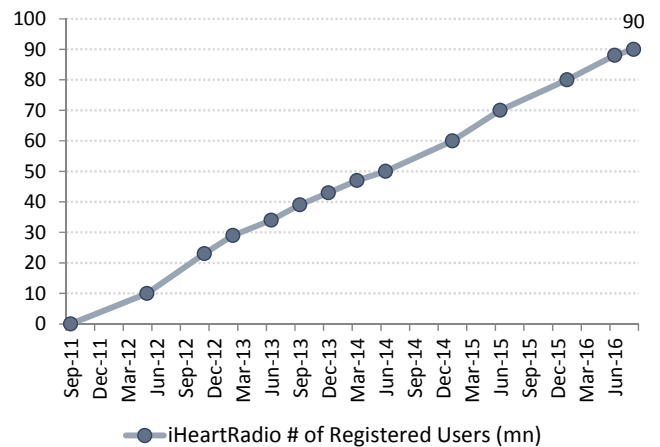
In response to the migration of listeners from analogue to digital platforms, US AM/FM radio operator iHeartMedia "IHRT" launched an online radio service iHeartRadio in 2008 under the same CRB regime as Pandora. The website garnered 90 mn of registered users as of August 2016. In 2012 IHRT's parent company Clear Channel struck an unprecedented deal with label Big Machine whereby IHRT would pay an undisclosed percentage of its advertising revenue for digital *and terrestrial* radio play, despite being legally exempt, compared to the then digital royalty per play of \$0.002. This was very favourable for rights holders, as terrestrial accounted for 98% of IHRT's ad revenue and fees were said to be split 50/50 with artists without any SoundExchange deduction of 4.9% (Billboard, June 5, 2012). In 2013, IHRT sealed another important agreement with Warner Music to pay royalties for terrestrial airplay in return for lower royalties for online streaming. Warner artists now receive extra promotion on IHRT's 850 terrestrial stations and are being paid more, as Forbes reported that Clear Channel will pay WMG 1% of advertising revenue for terrestrial broadcasts, and 3% for digital. The return for Clear Channel is a discounted rate on its digital streams of Warner artists' music, down from \$0.22 per 100 streams to \$0.12 per 100 streams (Forbes, September 16, 2013). For comparison, Pandora in 2015 paid \$0.14 per 100 streams. More recently, IHRT announced its intention to launch an interactive streaming service iHeartRadio All Access together with an ad-free radio listening service in 2017. We view this as a positive for the labels given 1) they receive 55%-60% of revenues as royalties from interactive streaming services but nothing from US terrestrial radio, and 2) this will give labels the opportunity to include a fee for terrestrial airplays in their direct deals as illustrated by the IHRT/Warner Music deal.

Exhibit 30: IHRT agreed to pay WMG 1% of its ad revenue for terrestrial airplays, despite being legally exempt, in exchange for discounted rates in digital
 % of advertising revenue paid for terrestrial and digital radio plays



Source: Forbes.

Exhibit 31: IHRT's iHeartRadio service has seen a surge in the number of users
 Number of registered iHeartRadio users (mn)



Source: iHeart.

Songwriters/publishers also benefit but to a lesser extent

- 1. Unlike artists/labels, songwriters/publishers are already getting paid by terrestrial radio for performance royalties in the US, so do not benefit to the same extent from the shift to satellite radio and online streaming.**

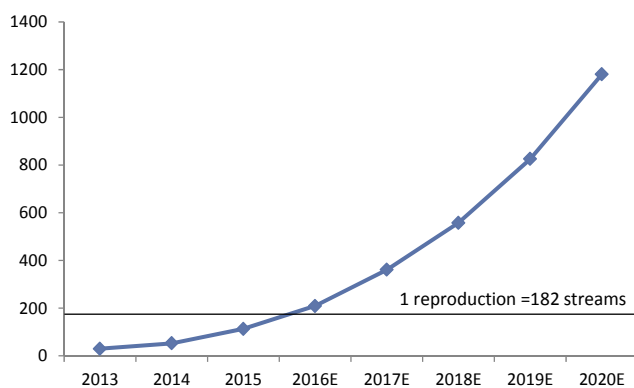
2. For mechanical royalties in the US, streaming currently offers lower royalty rates than physical/downloads. But there is upside from higher streaming consumption and the upcoming CRB review.

Publishers/songwriters currently receive a \$0.091 mandated rate per reproduced copy of a song (CD, vinyl, MP3, etc.) independently of whether that copy is sold. Outside of the US the rate typically varies in the range 8%-10% of wholesale prices for physical products/consumer prices for digital products, according to digital music distribution company TuneCore. When moving to interactive streaming services, the government-mandated rate is at least 10.5% of the gross revenue after deduction of the payments to collection societies such as ASCAP (the American Society of Composers, Authors and Publishers), BMI (Broadcast Music, Inc.) and SESAC (The Society of European Stage Authors and Composers).

This would imply average payment per 100 streams of about \$0.05 according to music royalty collection company Audiam. We calculate this implies that 182 streams of one song would be needed to equate to the mechanical royalty generated from one reproduction. Using the Recording Industry Association of America (RIAA) and Nielsen data for the number of physical and digital copies sold and the number of audio streams consumed, we calculate that there were 113 more audio streams consumed than physical/digital copies sold in 2015 meaning streaming is currently dilutive. However, we forecast that ratio to grow to 209:1 in 2016 and 1180:1 by 2020. Even though the growth in streaming value does not follow the growth in consumption (Spotify’s paid streaming ARPU does not depend on individual consumption, although ad-funded revenues do), we believe the increase in streaming consumption will be able to compensate for lower royalty rates. Warner Music’s 2015 10K form reveals that its revenue from digital mechanical royalties exceeded physical for the first time in 2015.

The upcoming CRB review of songwriting mechanical rates applicable to interactive streaming services such as Spotify or Deezer could totally change the way songwriters/publishers are getting paid (see next section).

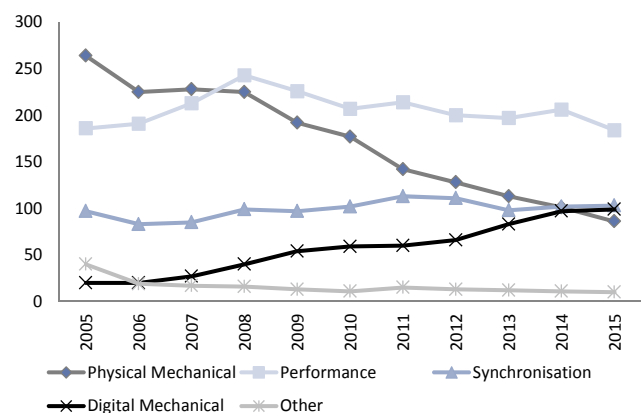
Exhibit 32: 182 streams of one song currently needed to match the revenue from one unit sale – we forecast the number of streams in comparison to unit sales to exceed 182 from 2016



Source: Goldman Sachs Global Investment Research.

Exhibit 33: Digital mechanical royalties are already exceeding physical for Warner

Warner/Chappell breakdown of publishing revenue, \$ mn



Source: Warner Music Group data.

3. In Japan, the online shift is positive for songwriters/publishers, as physical mechanical royalty rates are typically 1%-2% lower than digital to compensate for their higher manufacturing costs known as the “record cover fee”.

Future regulatory changes could present upside for rights holders

1. The US review of safe harbour rules and implications of the recent EU Copyright proposal will be important in addressing the value gap between the usage and monetization of music on platforms such as YouTube.

What are safe harbour rules? These provisions exempt passive, neutral hosting platforms from copyright infringement liability for the actions of their users. Put another way, online service providers, including YouTube and internet service providers, are not responsible for vetting whether or not the users are putting copyright cleared content on their platform. When rights holders find evidence of copyright infringement, they have to submit a formal notice to YouTube for instance to request a copyright takedown. To its credit, YouTube has a finger printing system called Content ID, which enables labels and artists to identify and manage their work and entitle them to a share of the advertising revenue (if any).

Why do they matter? Many artists and industry bodies have complained about YouTube's use of those safe harbours which give it an unfair advantage in negotiations with rights holders. For instance, a label which does not sign a licensing deal with YouTube will have to actively monitor that its content does not appear on YouTube and if so request it to be removed. YouTube also shares 55% of its music ad revenue with rights holders (according to Music Business Worldwide "MBW"), with labels receiving 45% and publishers 10%. This compares to the standard 70% payout rate from other non-regulated platforms (iTunes, Spotify, etc.), with labels receiving 60% and publishers 10%. This situation has resulted in a rising "value gap" between the amount of streams consumed on YouTube and their monetization for rights holders. YouTube accounted for 40% of overall music listening according to Apple Music's Jimmy Iovine, with c.90% of the 900 mn ad-supported music users reported by IFPI, and yet generated only 4% of global recorded music revenues (\$634 mn in 2015), which is lower than the revenues from vinyl sales. In contrast, paid streaming revenues were almost 4x higher at \$2.3 bn in 2015 and were generated by only 68 mn paying users.

What's next? The EC just came out with its highly anticipated draft Copyright Directive. The new proposals will require platforms such as YouTube to enter negotiation with rights holders in good faith and put in place "appropriate and proportionate" measures to identify and remove unlicensed copyrighted content, therefore putting greater responsibility on/demanding more proactivity from the platform owners. Previously the likes of YouTube had to wait for a formal takedown request from rights holders – this will still be the case, however, if no agreement has been reached. We believe that YouTube should be less impacted than other services as it already has effective content recognition and removal processes in place. Nonetheless, as the EC puts it, this should "reinforce the position of rights holders to negotiate and be remunerated for the online exploitation of their content on video-sharing platforms such as YouTube or Dailymotion." These proposals will still need to go to Parliament and individual member states for approval, while the effective implementation of such measures remains unclear and is likely to take time.

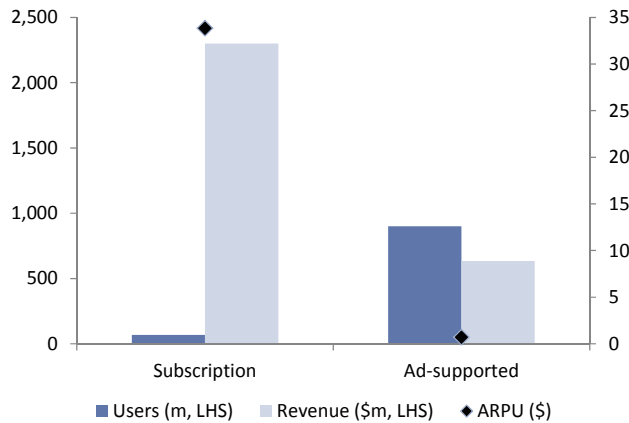
Separately, the US Copyright Office is currently reviewing copyright rules including safe harbour provisions (also called DMCA 512 in the US) with a decision expected in 2017. In April 2016, 400 artists, songwriters and music bodies sent a letter to the US Copyright Office pleading for reforms to the DMCA. They were followed by another 180 artists and songwriters (including Taylor Swift, Lady Gaga, Paul McCartney, etc.) in June.

2. The CRB is currently engaged in proceedings to set the new mechanical songwriting royalty rates applicable to interactive music services for 2018-2022, with a decision expected by end-2017.

This review will be much in focus, given Apple's recent proposal that all interactive streaming services should pay a statutory rate of \$0.091 per 100 streams. Note that this rate would not apply to Apple given that it has direct deals with publishers in place. The current rate is set as a percentage of revenue and varies depending on whether the user is

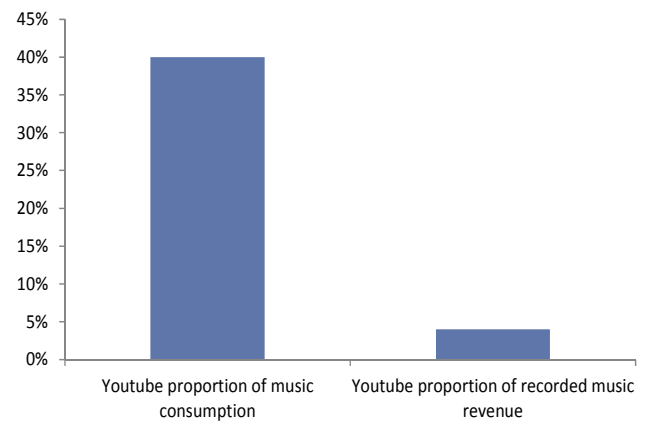
a subscriber or non-subscriber – on average it implies around \$0.05 per 100 streams according to Audiam. A move towards a higher, unified rate would be more damaging for freemium streaming services, although positive for songwriters/publishers.

Exhibit 34: Ad-funded services (mainly YouTube) generated 4x less revenue than paid streaming despite 13x more users



Source: IFPI.

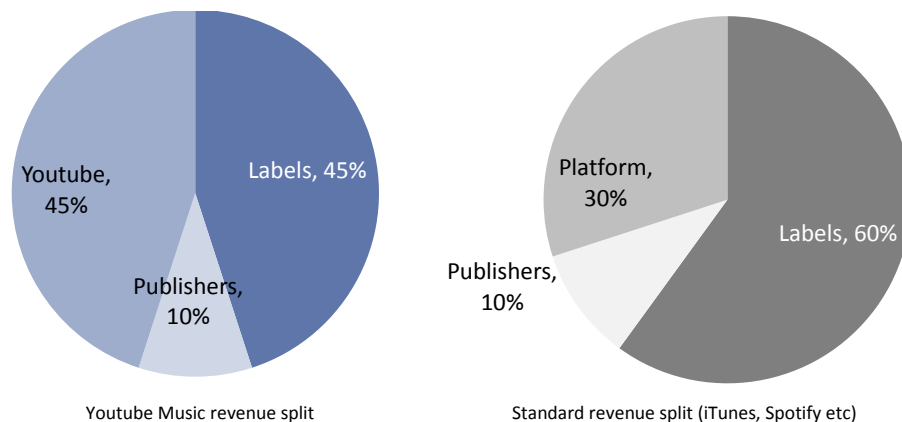
Exhibit 35: The value gap: YouTube accounts for 40% of music listening but 4% of recorded music revenue



Source: Apple, IFPI.

Exhibit 36: Labels receive a lower share of royalties from YouTube than from other digital services

Estimated split of YouTube vs. industry standard music royalties



Source: Music Business Worldwide, Press reports, Goldman Sachs Global Investment Research.

3. Potential changes to copyright protection of pre-1972 sound recordings.

Songs recorded before February 15, 1972, are currently not protected by US federal copyright law, but are protected under state law in some jurisdictions. This resulted in CRB-regulated entities such as Pandora and Sirius XM not paying royalties for their use. In 2015, Pandora and Sirius XM both agreed to settle with the major labels for \$90 mn and \$210 mn, respectively, for the use of such rights until end-2016 for Pandora and end-2017 for Sirius XM. Unless regulation evolves to include pre-1972 recordings in US federal law, the two players will need to extend their deals with labels to keep playing those songs.

4. The CRB has commenced proceedings to set new royalties for digital performance of sound recordings to be paid by satellite radio service Sirius XM for 2018-2022.

An interview on EU music regulation with...

John Enser, Head of Music and Partner, Olswang



John is Head of Music and a Partner in the Media Team at international law firm Olswang LLP. Acknowledged as an expert in all of the leading directories of lawyers, his client-base includes record companies, broadcasters, other content aggregators and distributors and mobile operators

as well as companies that invest in and lend to the sector.

What are the main regulatory intricacies in Europe?

One of the key challenges is fragmentation: whilst on the recording side you can do deals that cover the entire European landscape by doing deals with the majors and Merlin (which represents the indie labels), on the publishing side, it is exceedingly complex and an ever moving picture because of the role of the collecting societies, who control both the performing right and, often, also the copying right, both of which are needed for digital exploitation. In many countries, a collecting society is granted exclusive rights directly from the composers, so music publishers aren't in a position to aggregate rights. That leaves a pretty messy picture where, to launch a pan-European service you need to do around 30 deals on the publishing side – and realistically you can't launch a service without getting the vast majority of the repertoire. That clearly is good for the big players and gives a significant barrier to entry. This is part of the reason why Pandora packed up and went home some years ago.

How are royalties set in Europe?

Contrary to the US, in Europe it is more of a free market, but it does vary from country to country. In some countries there are tribunals, arbitration bodies, like the CRB in the US although not as powerful, that set the rates. The UK is probably the closest structure to the US. In most of continental Europe, the collecting societies often have some degree of royalty rates review by some form of government agency with various degrees of rigour and independence.

How does the safe harbour regime work and how does that benefit YouTube?

The way it works effectively is that, because YouTube doesn't have editorial control, if somebody else posts a video onto YouTube, their only obligation is to take it down once they're on notice. They don't have to do anything until

then and they don't have to stop that going back up again. So, they have the Content ID tool which enables rights holders to make their own choices based on whether the rights holder wants the material removed or is willing for it to be left in return for a revenue share. But the problem is that if you choose not to be part of the Content ID scheme, all that you can do is to have your material taken down and it keeps coming back up again. YouTube argues that they do license their rights, but, from the label perspective, it is always with one hand tied behind their back, as it is under the threat that YouTube will just use the safe harbour. Sure, they do have deals with all the majors, but the economics of those deals are different from what they would be if there was no safe harbour regime.

The safe harbour works in a similar way in respect of true pirate sites, Pirate Bay and the like, where the music industry want to make it harder for people to find those sites. For that reason, the music industry has sent billions of take down notices to Google – that's about the search engine, rather than YouTube – if you search for the newest Rihanna single, the chances are that 4 out of the top 10 research results will be pirate pages. So, the debate is partly about Google and search engines, about them taking more responsibility to get rid of links to pirate sites and to keep those links down. The YouTube issue is slightly different but it is very similar because the argument is if you don't play along with YouTube's way of doing things, the only thing you can do is send DMCA complaint notices and have the material disappear only to pop back up again. So your choices are to either get rid of it or monetize it on their terms.

The EC just released its draft copyright package - what could the implications be?

Platforms making available large amounts of copyright material which is uploaded by users will be required to enter into negotiations with rights owners in good faith and to put in place "appropriate and proportionate" measures to ensure the functioning of those agreements with rights-holders in relation to the use of their works. Some platforms, like YouTube, have these processes in place already but not all do and even those that do are subject to on-going criticism for not ensuring that infringing content stays down. The Commission believes that the fact that many platforms benefit from the safe

harbour, meaning effectively that they are not the ones responsible for communicating the copyright works to the public, makes for an uneven negotiation between platform and rights-holder. The notice and take down procedures that emanate from the E-Commerce Directive will continue to apply if no agreement is in place or the content cannot be identified using "appropriate and proportionate" measures. This will clearly impact on the Google search example mentioned above, but how far it would move the balance of power between the labels and YouTube is not very clear. Judging by the welcome the draft received from the music industry, it is seen as a move in the right direction.

The draft package now falls to be considered by the so-called Council of Ministers (the representatives of the governments of each Member State) and the European Parliament. Both processes are likely to lead to extensive amendments to the draft. The Parliament is likely to want to protect the platforms, in what they see as the consumer interest, while the Member States are more inclined to support the industry (and that mostly means the indigenous content industries who are seen to be threatened by the largely US-headquartered platform operators).

We are therefore talking about a period from 18 months to up to 3 years before these things actually become law in individual member states. It is hard to see YouTube or other intermediaries doing very much ahead of any change in the law, unless they think that by doing so, they might stave off a more onerous regime.

Can artists force transparency to be able to show the economics and flow of payments?

To some extent I think it will happen. Again, the draft proposals of the European Commission include specific obligations which will increase transparency (if they survive the legislative process). There has been a lot said by artists about this, which isn't always necessarily reflective of the way deals work. As an example, if you have a deal let's say between Spotify and a major label, there will be a pot of money that Spotify allocates to rights holders. The label will get a share of that based upon the usage and plays of that label's repertoire. The area where the artists get very excited about is the chunks of money that the labels get that are not directly allocated to plays – whether that's a marketing advance or other fees. The transparency concern is about how much of that is really money that is being paid in respect of artists' repertoire that the artists are not getting their share of.

Labels will say that they are being transparent with their artists and the artists just don't trust them. Part of it is the perception that the amount of money flowing through from streaming services is just not big enough. It is not about the labels hiding money, it is about labels trying to support the migration of their business model and recognizing that, for them in order to do that, they will not get the like-for-like amount they were getting for an iTunes sale.

How easy is it for an artist to change labels or go direct to a streaming service?

Typically artist deals don't last more than 3 or 4 albums, that's down from in the worst days 7 albums. Subject to the fact that once you've recorded the first two, you renegotiate the terms and you give the label another two so you're always 4 albums away from the end of your deal. But it also means that there is an end in sight, if you decide you don't like your label, you don't want to renegotiate after two years, you let it run and then you go away. The difficulty with that is that your old label gets to keep the existing material. So the challenge you then get is that your new material is going out with a different label, but the old label is sitting on the stuff that made you successful in the first place. What also tends to happen is that you'll put out your new album and then 6 months later your old label puts out your greatest hits.

What have been the mistakes that the industry made in the past?

Some of the mistakes of the past have been overstated. There has been a lot of criticism about labels not moving fast enough to licensed download services. It is slightly unfair because part of the problem was that they didn't have the rights in place. Piracy got out of the bag at the same time. You could argue that the biggest mistake was the introduction of the CD format without robust rights protection mechanisms. I do think that allowing Apple to become virtually the single major download retailer was a mistake that they have learned from and they will make sure that choice remains in the streaming market. There are still things that they can learn from – the reluctance to explore different business models – one example would be that there are people who won't pay \$9.99 a month for access to 40m tracks; but would they pay for access to a more limited, more curated service at a different price point? Will the labels be flexible enough to allow a service to introduce that?

An interview on US music regulation with...

Leslie Jose Zigel, Chair of Entertainment Practice, Greenspoon Marder



Leslie José Zigel is a shareholder and Chair of Greenspoon Marder's Entertainment Practice, focusing on both the creative and business sides of the entertainment industries in the music, TV, film and new technology sectors. Mr. Zigel is known for representing Pitbull and other Latin stars including Colombia's Carlos Vives and urban hitmaker Wisin.

Do you think there is potential for broader music regulatory reform globally, including intervention on radio's right to free plays in certain markets?

There is an opportunity, but it will depend on a lot of factors. I don't think anything will happen before the presidential election in the US. There are very strong lobbying and interest groups that will drive the legislative discussion. Take the example of US terrestrial radio that, unlike its European counterparts, has managed to avoid paying neighbouring rights royalties. In 1995 when the Copyright Act was amended, digital transmission neighbouring rights were introduced (and later further codified under the Digital Millennium Copyright Act when Sound Exchange was set up), and webcasting services like Internet radio stations (and more recently, Pandora), along with Sirius and XM satellite radio (the two later merged into what is now known as Sirius XM) became obligated to pay the US equivalent of neighbouring rights royalties. I do think there is potential for legislative action, but in what direction it will go is anybody's guess.

How does streaming change the way royalty rates are being set? How does that affect the various parties?

Economically, streaming pays a percentage of revenues versus a per unit royalty as is the case with physical and digital sales. I like to look at this revenue stream from a business perspective. It is easy to say that streaming services like Spotify pay very little per stream, but to be intellectually honest, one needs to look at the overall business model. Of the 100% revenue pie, Spotify keeps 30% and pays 70% to rights owners. Within that 70%, labels and publishers have to split the amount among them. Labels generally take a higher percentage of that pie than

publishers, as is the case with physical and digital sales. This harkens back to the industry perspective that labels invest much more to sell the "single" than publishers so they are entitled to more. In terms of impact, there is a constant fight for publishers to receive more money and the labels want to maintain their larger share. It is a complex proposition. How we get there is a question for the future – one should take a step back and think about the right split and value proposition of each party. Having too many entrenched lobbyists doesn't help either.

What is the debate around the "safe harbour" rules?

The safe harbour provision says that the ISPs and platforms like YouTube are not responsible for vetting whether or not the users are putting copyright cleared content on their platforms. Their only obligation is to take down content if they receive a notice from the content owner that something on their site is a copyright violation. To give you an example, in 2007 Viacom sent a take-down notice to YouTube claiming that over 150,000 Viacom clips were illegally being hosted on YouTube. YouTube promptly took the clips down and claimed safe harbour protection. This still occurs today and the copyright owners have to notify YouTube each time they see a new clip of their content. It's like a game of Whack-a-mole where they take down one infringer only for 5 more to pop up. So content owners feel the safe harbour rules don't go far enough to impose an obligation on YouTube and others to vet the content uploaded to their sites. By contrast, on television, TV networks and show producers have to clear all musical content before it is aired – there is no safe harbour and as a result networks and producers are very vigilant about clearing music cues and rights owners make significant amounts in licensing fees as a result. To its credit, YouTube has a finger printing system that identifies music on user generated content and helps labels and publishers receive a share of the advertising on the videos that YouTube identifies on the YouTube platform. One effective change could be to enact a "take down and stay down" approach whereby the ISP could add the digital fingerprint of non-licensed content they are told to take down into a database which would then be used to prevent the same user (or another) from re-uploading the work to the service.

What could be done to improve music monetization?

My view is we should look at music as a utility. If you look at all the traffic on internet service providers (ISPs) – music drives a significant percentage of their traffic and thus their income. However, it is difficult to ascribe precisely how music fits into each user interaction on these sites. These sites work on subscription-based business models and collect advertising dollars based on eye balls and not a one-for-one commercial exchange of music to listener for a fee. If 40% of these sites' traffic is related to music in some tangential way, why not create a pool of a few percentage points of their gross revenues to be paid to the rights owners much like radio stations pay into BMI and ASCAP? Of course there will be a fight between labels and publishers as to how to carve up the pie, but this scenario would provide a much needed cash infusion to rights owners who help ultimately drive significant traffic (and value) to these sites.

What is your view on the global state of piracy regulation/ enforcement?

Global piracy regulation can be better. What will change piracy is the advent of services that pay artists. Take the example of Sweden that saw a dramatic decline in piracy in early 2000s with the launch of Spotify from 90% piracy to approximately 5% piracy today. I think people will ultimately pay if you give them a service where they can watch/listen to what they want, when they want, on a device/medium of their choosing at a reasonable price. If the service and the experience are good, people will pay. Government regulation can only go so far to combat piracy.

We've recently seen Pandora and Sirius settling with labels on pre-1972 recordings – do you see scope for these recordings to be included in federal copyright law?

These recordings should be part of what these services pay for in the future. The law says they don't have to, but players like Sirius or Pandora make revenues on those rights so it is only fair that they should pay for it. I think the law should change, but there are strong lobbyists against this proposition. From an artist's point of view, if they have enough leverage they can renegotiate. Otherwise, it doesn't really happen. As a general principal, if the copyright in the recordings is still valid, those recordings should receive the same protection as their brethren recorded post-1972.

What are the implications from a royalty's point of view of Pandora's recent move into paid streaming?

Pandora accounted for around 60% of Sound Exchange's total royalty collections of about \$1bn in 2015 for what is known as non-interactive streaming. The change in Pandora's business model to now include interactive streaming (like Spotify and Apple Music where you can select the songs you want to hear on-demand) has a massive impact from an artist's perspective. Artists enjoy getting their money from SoundExchange rather than through a label. The fear is Pandora will now pay the labels directly (like Spotify and Apple Music) meaning artists will be subject to their record royalty of 15% that could be cross-collateralized against their royalty account instead of being paid 45% of each dollar of Pandora's overall recording-related royalties directly each month. As the new Pandora on-demand interactive streaming model siphons off users from its non-interactive streaming platform, SoundExchange royalties could go down significantly.

How do you think of exclusivity and windowing in terms of its impact on the industry as a whole?

I'm not in favor of exclusives. I believe ubiquity is best for an artist. Why would an artist want to alienate their fan base and not allow them to listen to their songs from week one? Artists should not be in the business of forcing consumers to adopt one platform or another.

To put this into perspective, this would be akin to artists saying you can only play your album on a Panasonic turntable instead of a Sony turntable so buy a Panasonic to listen to my music! This only benefits Panasonic, or in today's world Apple, Tidal or Spotify. I think the windowing will be good in the short term for the streaming services but bad ultimately for artists and worst of all for consumers.

Streaming drives greater monetization for music owners

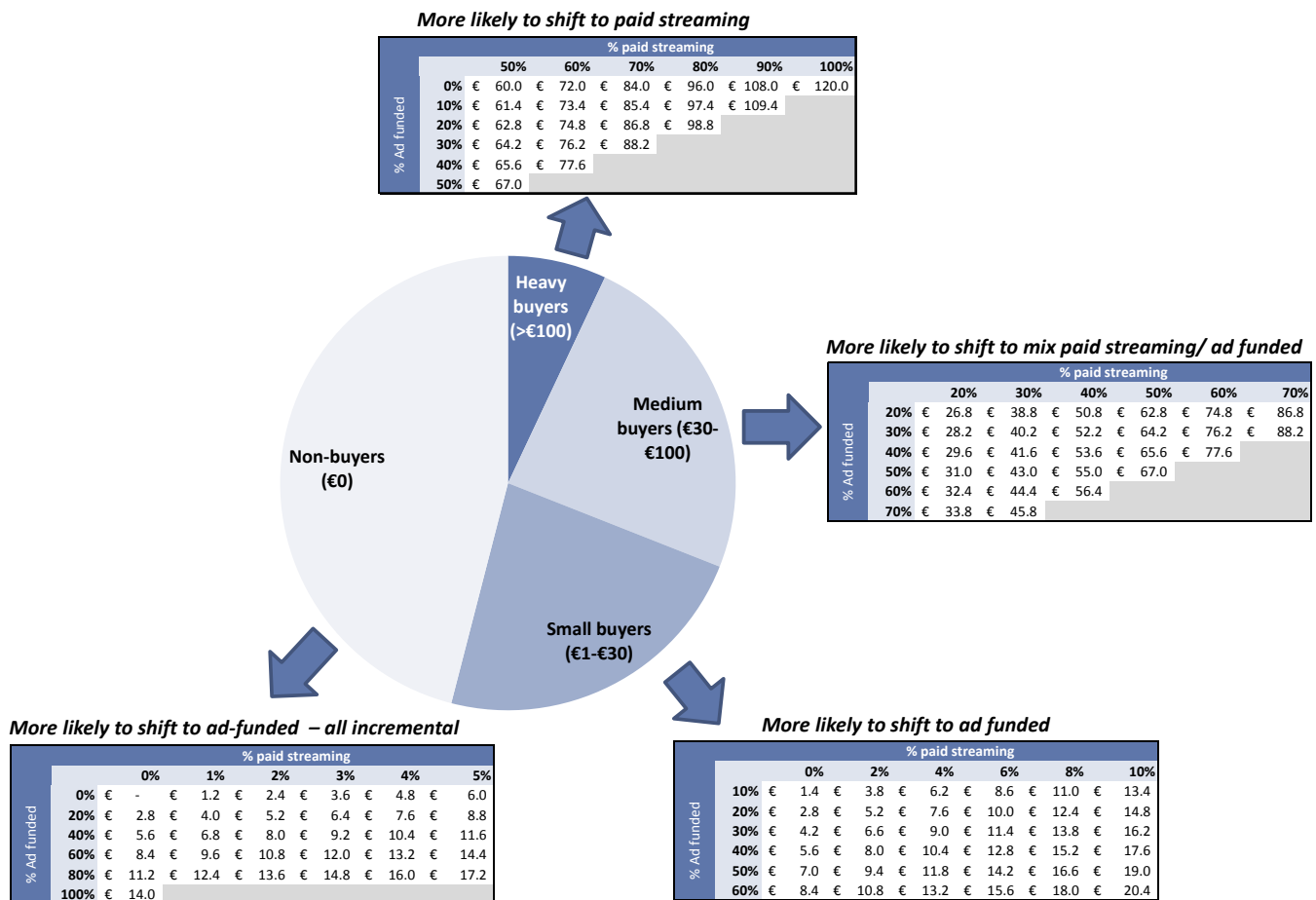
The music industry faces the paradox of an ever growing demand for music consumption and a low propensity to pay for it. Some 93% of the US population listens to music and spends more than 25 hours a week doing so according to Nielsen. Yet, less than half of the population in developed markets pays for music – YouTube even estimates only 20% of the global population has been a buyer of music. Moreover, the average spend per person on recorded music is only around \$15 in developed markets and \$1 in EM in 2015, based on IFPI data. This compares to an average spend per person on entertainment of around \$1,095 in developed markets based on Euromonitor data.

The monetization potential for the music industry is therefore huge we believe, but much of this potential is still being hindered by piracy and cultural factors. How and why could consumer propensity to pay for music change?

We see two distinct types of consumers and ways to address them: a) paid streaming addresses the portion of consumers who are willing to pay for better access and convenience, and b) ad-funded streaming helps address those who are not willing to pay (partly because of piracy) or cannot afford it by shifting illegal streaming to legal, better quality, more convenient streaming services which are equally free for the user. This could have significant implications in EM where up to 90% of music content is pirated according to IIPA (International Intellectual Property Alliance).

Exhibit 37: The shift to legal streaming has the potential to improve monetization for all types of music users

Breakdown of average spend and type of users based on French data – four scenarios



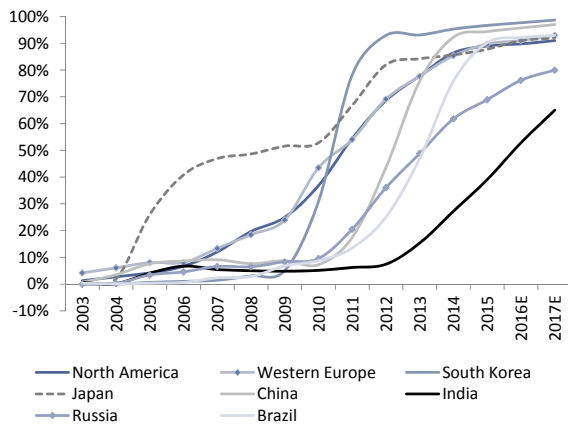
Source: SNEP, Goldman Sachs Global Investment Research.

1. Greater consumer willingness to pay for convenience and access

Streaming has totally revolutionized the way people listen to music, offering seamless access to a near-infinite library of songs (compare Walmart’s estimated 21,000 tracks on shelves to Spotify’s 30 mn), anywhere and anytime, and enabling greater personalization through curated playlists and more interactivity. This has led to a strong surge in consumption of online music and, in particular, on mobile devices. The US population alone consumed c.114 bn audio streams during 1H16, representing a 97% yoy jump according to Nielsen, which implies around 630 mn streams per day. This trend is likely to grow from here, driven by:

- Further improvement of fixed and mobile broadband infrastructure, especially roll out of 4G (and later 5G) enabling 6x more data consumption as compared to non 4G connection.
- The proliferation of connected devices, especially smartphones, and the growing share of time spent on mobile devices. A March 2016 study from Parks Associates found that 68% of smartphone owners listen to streaming music at least once a day in the US and that average time spent is 45 minutes.
- The proliferation of streaming services – IFPI counted c.400 platforms globally and 57 interactive streaming services in the US alone.

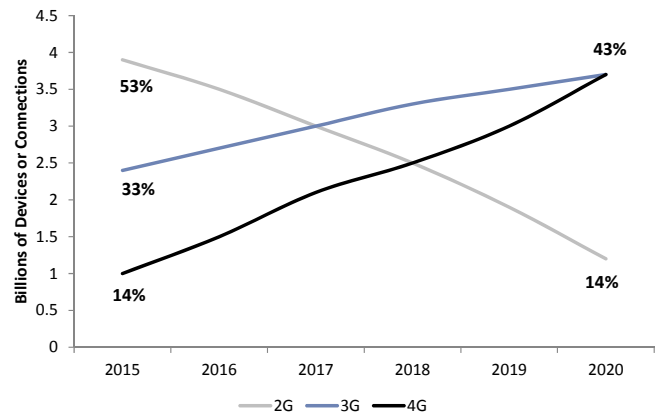
Exhibit 38: Smartphone penetration continues to rise
Smartphone subscribers, % of total handsets



Source: Gartner, Goldman Sachs Global Investment Research.

Exhibit 39: 4G is expected to reach 43% device share by 2020...

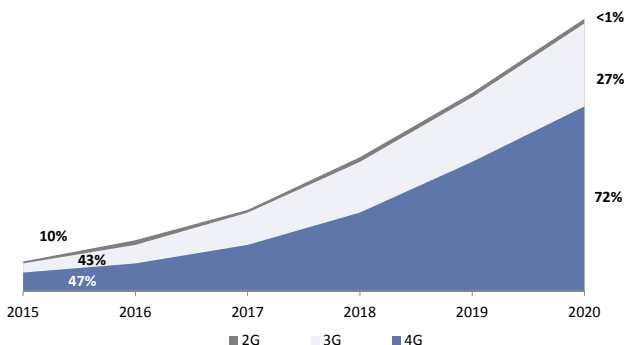
Global mobile devices by 2G, 3G, 4G



Source: Cisco VNI Mobile.

Exhibit 40: ...driving 6x more traffic than a non-4G connection

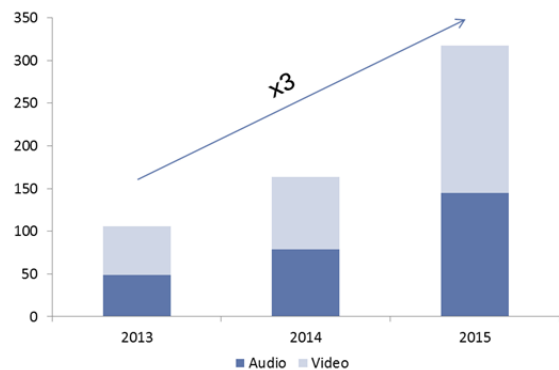
Global mobile traffic by connection type



Source: Cisco VNI Mobile.

Exhibit 41: US on-demand music streams have risen 3x over the last two years

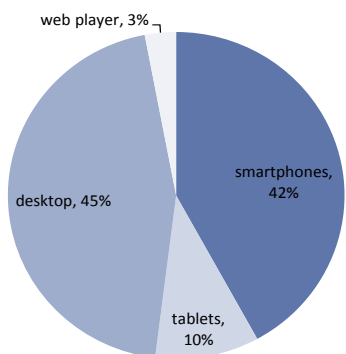
US audio and video streams (bn)



Source: Cisco VNI Mobile.

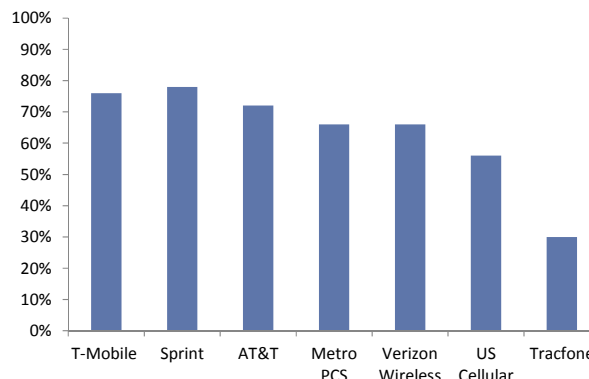
Exhibit 42: Over 50% of music consumption on Spotify now on smartphones and tablets

Share of Spotify listening by device type (2014)



Source: Activate.

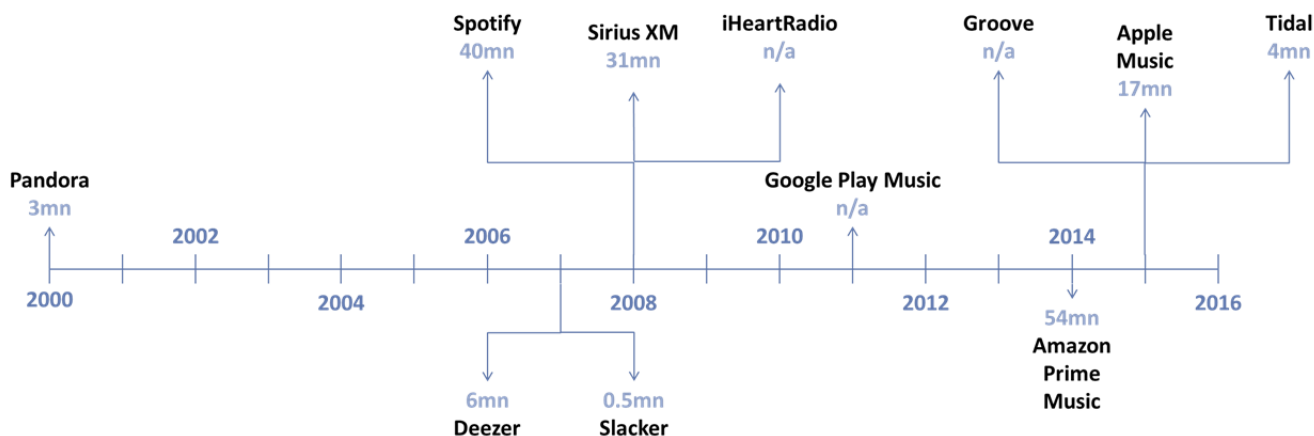
Exhibit 43: Proportion of consumers who listen to streaming music on a smartphone at least once per day US broadband households with mobile phone service from specified providers (2016)



Source: Parks Associates.

Exhibit 44: There has been a proliferation of streaming music platforms over the last 10 years

Using the latest number of paying subscribers available



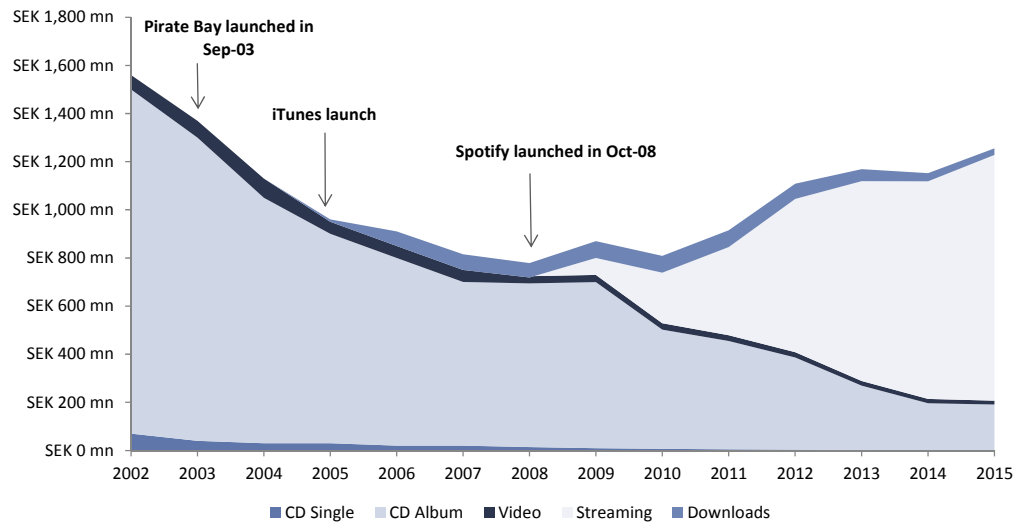
Source: Press reports, Goldman Sachs Global Investment Research.

This surge in consumption, combined with better convenience and accessibility, should make consumers more willing to pay for music streaming in our view. While the Swedish context is rather specific, as Spotify benefitted from a combination of favourable factors such as good broadband infrastructure, tech-savvy population and stringent laws against piracy, it still shows that the introduction of paid streaming services has helped drive a significant recovery for the industry back to its 2004 highs. We have also seen examples of customer propensity to pay more in other fields such as TV content as a result of increased convenience and enhanced quality (HD, Personal Video Recorders or Online streaming services in addition to traditional TV packages).

According to a survey from BPI, the main reasons for paying are the removal of adverts, and the on-demand and the on-the-go functionality.

Exhibit 45: Streaming helped the Swedish recorded market recover in seven years the value it had lost in five years

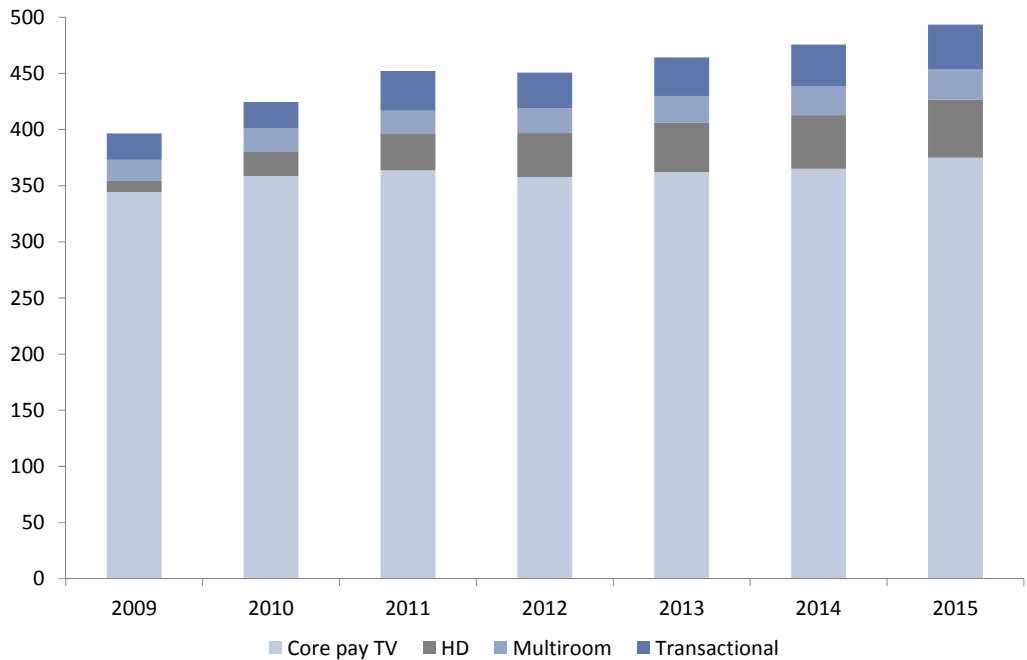
Sweden music sales revenues (Skr mn)



Source: IFPI.

Exhibit 46: Sky customers have been paying more for add-on products and services

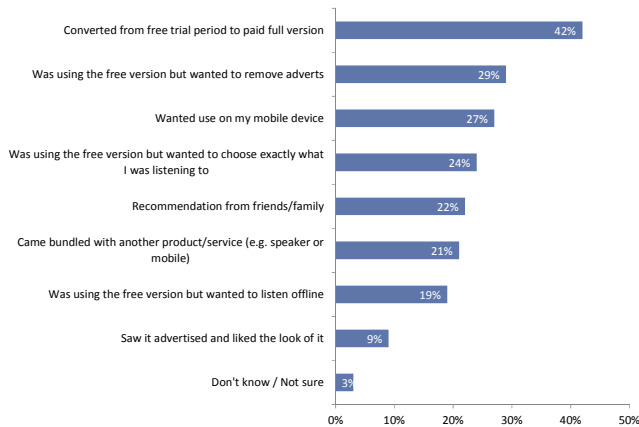
Estimated Sky UK Pay TV ARPU breakdown



Source: Company data, Goldman Sachs Global Investment Research.

Exhibit 47: Users are willing to pay for greater convenience and accessibility

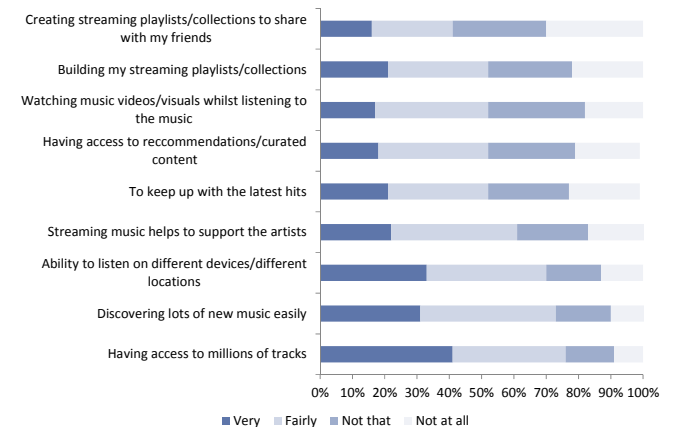
Reasons for Paying for Music Streaming



Source: BPI.

Exhibit 48: Streaming users value the vast library, discoverability and seamless experience the most

How important are the following to you?



Source: BPI.

A lot of questions have been raised about the propensity of consumers to move to a 120 per annum price point (local currency) subscription, given the annual average spend of a music buyer is on average €36.8 in France and £52.42 in the UK, with a wide dispersion of spend per person. In France, 7% of the overall population spends more than €100, 24% spends €30-€100 and 23% less than €30, with 46% not paying anything. In the UK, we calculate that 8% of the population spends £170, 8% spends £49, and 24% spends between £4 and £25 on average, with 60% of the population not spending anything. We see opportunities to address these different needs and budgets through more segmented offerings and price points.

- The full, “all you can eat” on-demand service typically has a monthly 9.99 price point (in local currency) in DM. We believe this will be appealing for the c.10% of the population who are already heavy buyers (>€120 in France, £170 in the UK), but also to a portion of the 15%-20% of medium buyers who spend on average €30-100 in France and £25-49 in the UK.
- For the light to medium buyers, we believe lower price points could be attractive including telecom bundles, student plans (50% discount to standard price) and also family plans (Apple Music has a \$14.99 plan which can be shared by up to six family members). We believe more price points will be introduced with varying degrees of functionality and content availability in the future to better segment customers. Amazon is reportedly planning to launch a \$4-5 monthly on-demand service that would be streamed solely on Echo, its voice-controlled speaker and digital assistant. Pandora is also reportedly introducing multiple price tiers for its new on demand service, including one at \$5 which allows users to soft-download a limited number of tracks.
- In Emerging Markets, most “all you can eat” services have a price point of c.\$4 for the likes of Apple Music or Spotify.

2. Ad-funded streaming helps address users who do not want or cannot afford to pay for music

We believe people currently not paying anything for music (including many piracy users) could be attracted to streaming services via: 1) free, ad-funded tiers (which have lower functionality than the paid tier), 2) free trials (e.g., Apple Music’s 3-month free trial), and 3) subsidies (student plans, telecom bundles or family plans). We believe these are powerful marketing tactics that would give the opportunity to discover the service, appreciate the

convenience and curation capabilities and ultimately hook the consumer and drive conversion to paid streaming. Recent data have been encouraging in this regard, with Spotify's proportion of paid users rising from 7% in 2010 to c.25%-30% in 2012-15 and more recently to 33% following the introduction of a \$0.99 promotion for three months subscription in several territories. We examine in a later section how streaming could have an even bigger impact in emerging markets where piracy usage is as high as 90%.

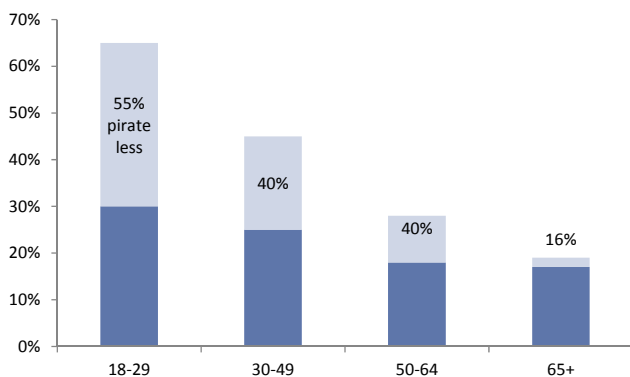
Streaming has proven to reduce illegal downloads...

Piracy has long been one of the major challenges in the music industry either in its digital or physical form, and the principal driver of the collapse of the recording music industry in the 2000s. IFPI estimates that there were tens of billions of files downloaded illegally in 2014. The Social Science Research Council estimates that piracy costs the US music industry alone \$12 bn compared to the actual \$7 bn US retail recorded music market (RIAA).

A number of actions have been taken in the last decade either technological (e.g. automating large-scale takedowns of infringing links and mobile applications), educational (e.g. adverts) or legal (lawsuits, anti-piracy legislation). While these efforts will continue to be important, we believe the proliferation of online streaming services could be a more potent incentive to curb piracy. Multiple studies have demonstrated the positive impact of legal streaming:

- The proportion of internet users worldwide regularly accessing unlicensed services on desktop-based devices went down to 20% in 2015 from 30% in 2012 (IFPI/ComScore/Nielsen).
- An IPSOS MMI report found that the number of illegally copied songs in Norway plummeted to 210 mn in 2012 from 1.2 bn in 2008 (the year of Spotify's launch in the country), while in the meantime legal streaming penetration increased to 10.3% in 2012 from 4.5% in 2011.
- A study from the European Commission in 2015 revealed that the number of illegal downloads decreases by one for every 47 Spotify streams.
- A Spotify study showed that overall music piracy volume fell by over 20% between December 2012 and December 2013, with casual pirates being converted to legal services but hard core pirates persisting.

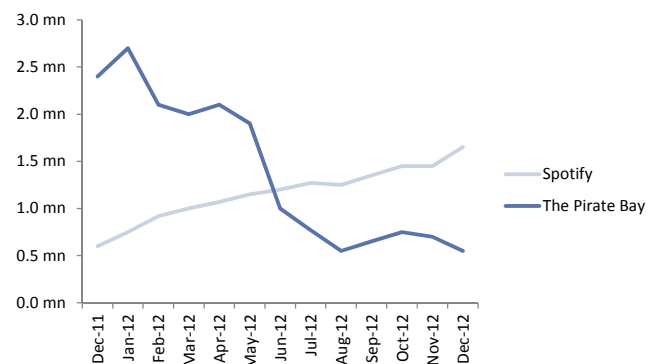
Exhibit 49: 55% of 18-29 year olds in Spotify's markets are pirating less now that they have a free alternative
 Respondents choosing to "pirate less" when given a free and legal alternative



Source: Columbia University 'Copyright Infringement and Enforcement in the US'.

Exhibit 50: Spotify's growth has coincided with declines in peer-to-peer download sites following recent tougher regulation

Online use of Spotify vs. The Pirate Bay in the Netherlands



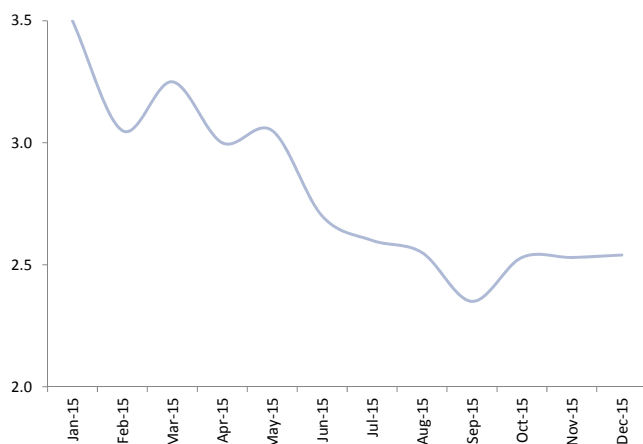
Source: ComScore.

... but many challenges remain, putting YouTube at the center of the debate

With YouTube being the most accessed platform for free online and mobile music consumption, there has unsurprisingly been a growing debate and scrutiny over YouTube’s role in fighting piracy. An IPSOS survey in 13 key markets revealed that 82% of YouTube’s 1.3 bn users listen to music, and that 57% of internet users have accessed music through video sites such as YouTube in the past six months, compared to 38% for streaming services such as Spotify and 26% for digital stores such as iTunes.

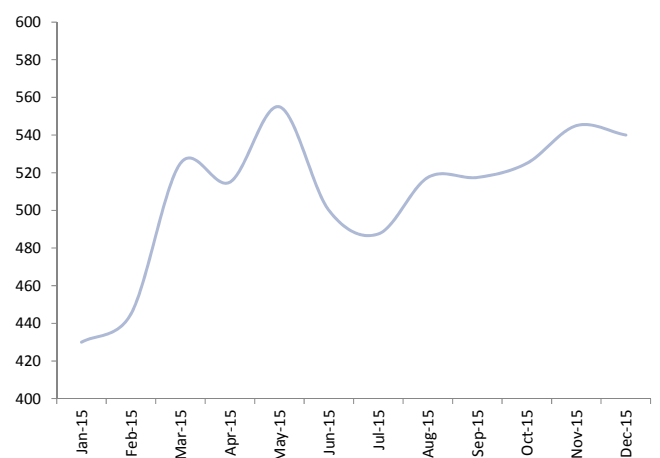
- YouTube-based stream ripping the new form of music piracy replacing torrent sites.** Stream-ripping essentially means illegally converting legal streams into downloads through ripper sites. IFPI reckons stream-ripping has become the most popular form of piracy, with almost half of 16-24 year olds engaging in such activities. Anti-piracy tech company Muso also found that stream-ripping makes up 18% of all visits to piracy sites for music content and that torrent sites have been partly displaced by YouTube ripper sites. We believe this will remain a challenge for the future monetization of music.

Exhibit 51: There are fewer people using torrent sites...
Global monthly visits to public torrent sites (bn)



Source: Muso.

Exhibit 52: ...as more people are directly downloading music videos from YouTube
Global monthly visits to YouTube ripper sites (mn)



Source: Muso.

- The debate about efficiency of YouTube’s Content ID.** As a passive and neutral hosting service under EU and US copyright laws, YouTube is not liable for copyright infringement taking place on its platform. It is up to the rights holders to submit takedown notice claims and manage their content through Content ID, a copyright-management system that allows them to track and then choose to block or monetise user-generated content that uses their IP. This creates a disconnect between the amount of copyrighted content being consumed and its monetization (see section *Regulation sets the stage*). Music rights holders argue that Content ID is not efficient enough in preventing copyright infringement and fails to identify 20%-40% of their recordings (IFPI). YouTube responded that it solves 98% of copyright issues and that music rights holders choose to monetise more than 95% of their Content ID claims rather than get the videos removed from YouTube.

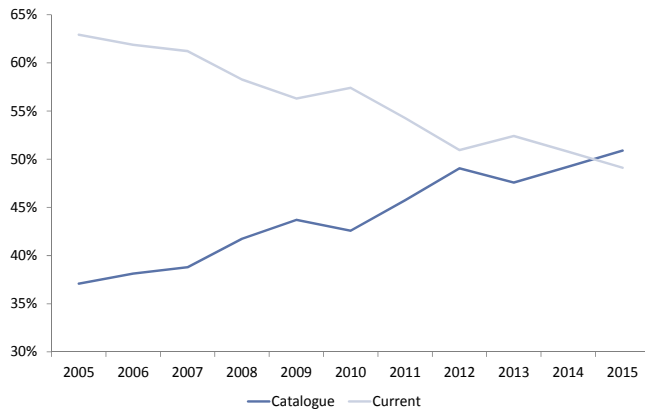
3. Streaming increases the value of catalogues

Streaming improves discoverability and monetization of back catalogues, thus turning a one-off transaction into an annuity of cash flows. Catalogue songs (i.e., older than 18 months) accounted for 70% of all streaming volume in 2015, compared to 50% of overall physical and digital album sales (Nielsen). This comes at a time when physical sales of

current albums have come under significant pressure, which led the overall share of current album sales (physical + downloads) to decrease from 63% in 2005 to less than 50% today (Nielsen). Warner Music in its 2015 10K report said that it sees greater monetization of its catalogue songs in streaming and higher margins (given lower marketing cost).

Exhibit 53: Catalogue sales now account for over half of total sales from 37% in 2005...

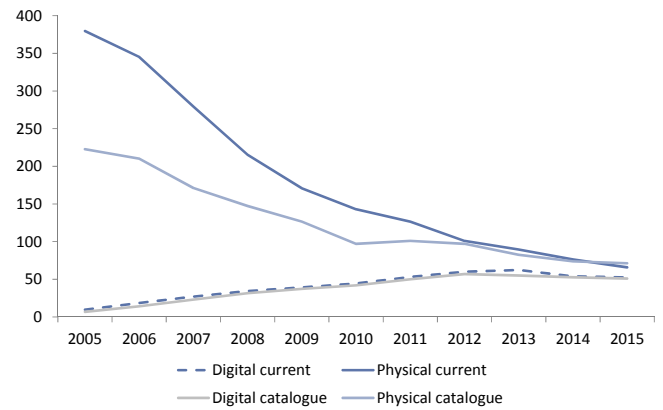
Share of current album sales physical vs. digital in the US, 2005-2015



Source: Nielsen, Goldman Sachs Global Investment Research.

Exhibit 54: ... although this was mainly driven by the fall in physical current sales

Current vs. catalogue album sales, physical vs. digital in the US, 2005-2015 (mn)



Source: Nielsen, Goldman Sachs Global Investment Research.

Streaming benefits from a growing and captive audience

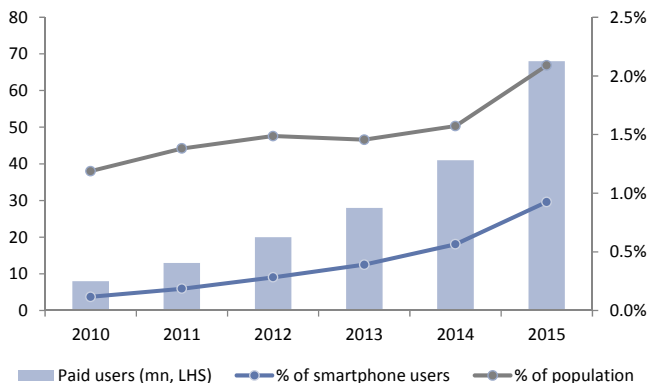
1. Growing penetration of paid subscription services led by DMs

With 90% of the recorded music revenue globally being concentrated in DMs, and an average ARPU of \$120 in subscription streaming compared to around \$50 for the average music buyer, the future take-up of paid streaming services in those markets will be a key driver of the overall recovery of the music industry. We see plenty of room to improve the penetration rate (currently at 3% on average) in DMs and catch up with the most advanced markets (the Nordics) which are already over 20%.

Paid streaming penetration growth has been accelerating

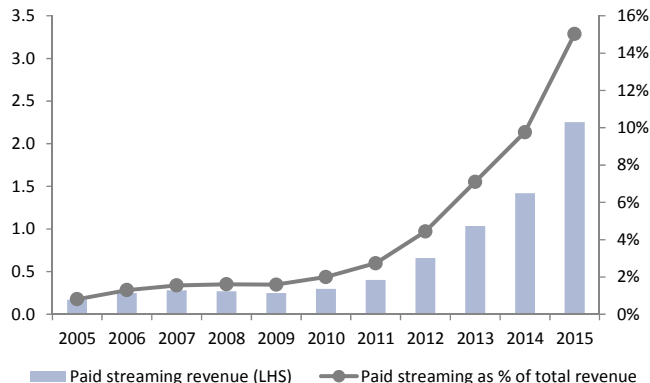
Streaming services have been available over the past 10 years, but we have observed a material acceleration in adoption over the past four years. The number of paying users grew to 68 mn in 2015 from 8 mn in 2010 (virtually all in DMs), driving a revenue increase to \$2.3 bn in 2015 (15% of recorded music revenue) from \$0.3 bn in 2010 based on IFPI data. We still see plenty of room for growth, with total population penetration only at 0.9% in 2015 or 2% of smartphone users.

Exhibit 55: The number of paying users increased to 68 mn in 2015 (2% of smartphone users) from 8 mn in 2010
Paid interactive streaming users (mn) worldwide and penetration of smartphone/ total population



Source: IFPI, Goldman Sachs Global Investment Research.

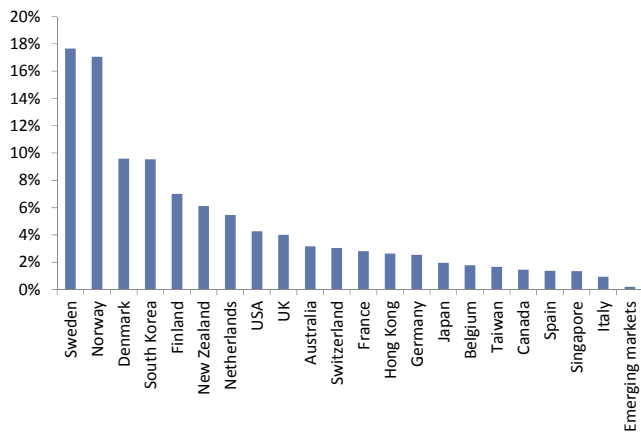
Exhibit 56: Paid streaming now accounts for 15% of total music revenue
Paid streaming revenue (\$ bn, LHS) vs. % share of recorded music revenues (RHS)



Source: IFPI.

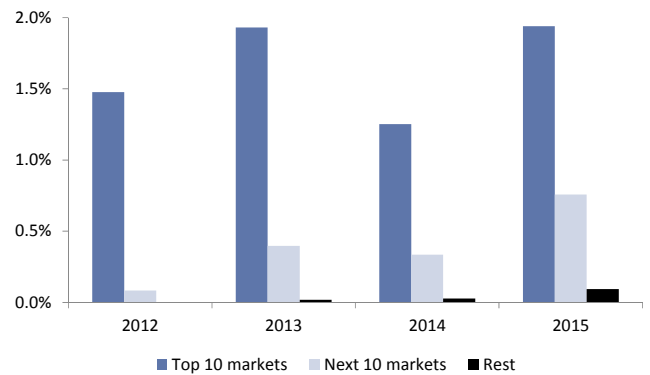
We calculate that the top 10 streaming markets were already at 8% of the population in 2015, with Sweden and Norway the most advanced markets at over 20% in 2015 (Deezer reckons that Sweden was close to 30% as of September 2016). The next 10 markets were still at 2% and the rest of the world only 0.2%. Encouragingly, penetration growth has been accelerating, up 36 bp globally in 2015 vs. +16 bp pa over 2011-14. This was also the case in the 10 most advanced markets, up 190 bp in 2015 vs. 160 bp pa over 2011-14. The next 10 markets grew 80 bp in 2015 vs. 30 bp and the rest of the world 10 bp vs. 2 bp.

Exhibit 57: A wide disparity of paid streaming adoption
Paid streaming penetration, 2015



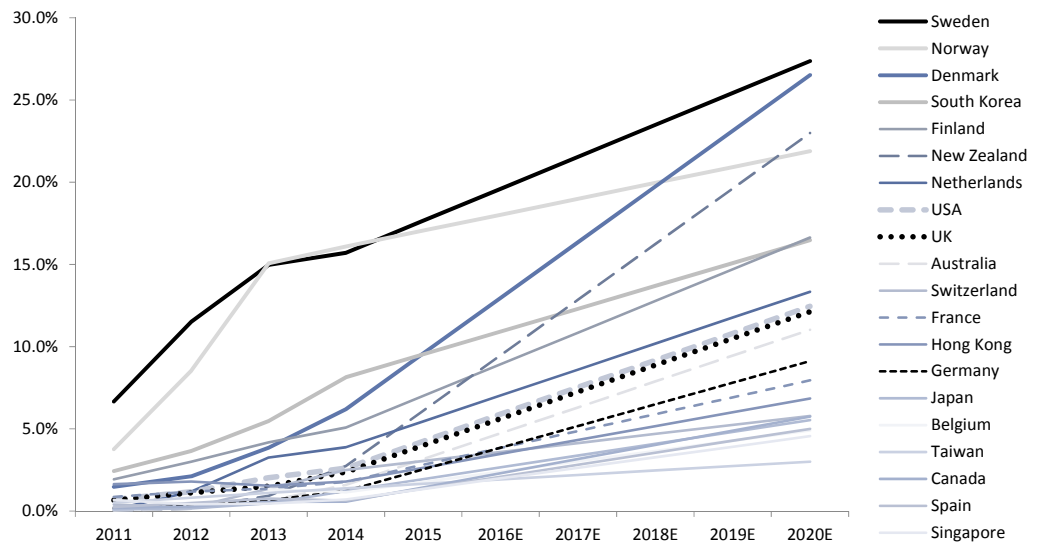
Source: IFPI, Goldman Sachs Global Investment Research.

Exhibit 58: Growth in penetration has been accelerating
Paid streaming penetration growth (absolute)



Source: IFPI, Goldman Sachs Global Investment Research.

Exhibit 59: Extrapolating 2015 penetration growth rates would result in 18% penetration on average in the top 10 markets vs. 8% today, 6% in the next 10 vs. 2% today
Top 20 markets in terms of subscription streaming penetration



Source: IFPI, Goldman Sachs Global Investment Research.

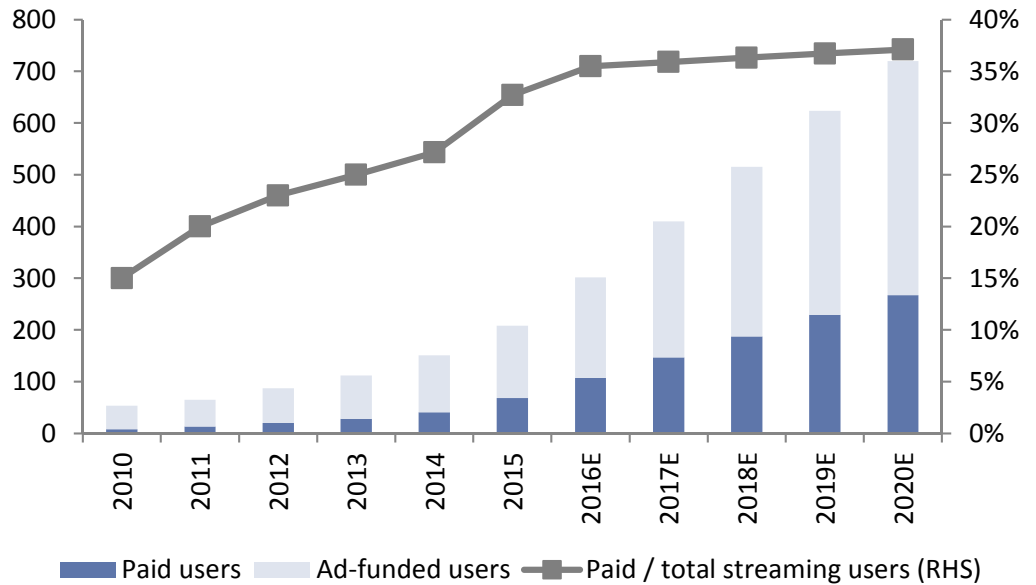
Improving free-to-paid conversion rates

Underpinning this is the improved free-to-paid conversion rates seen across the industry in the past few years, with the ratio of paid users vs. total users rising from 15% in 2010 to 33% in 2015, based on IFPI data and our estimates. For instance, the proportion of paid users at Spotify increased from 7% in 2010 to 28% at the end of 2015 and 33% as of August 2016 following the introduction of a \$0.99 promotion for three months in several territories. Although not a direct comparison, Apple reported that its streaming service had 15 mn users of which 6.5 mn were paying and the remainder on the free trial as of October 2015, implying a conversion rate of 43%. Since then, Apple has not given any split, but commented that it has not changed much. Eddie Cue: "We're not giving out any numbers, but we've been very happy with the results we've seen. And it's stayed very consistent - it hasn't really changed at all, which I thought was interesting." (Billboard, June 15, 2016).

We expect that ratio to continue to rise and reach 37% by 2020 as consumers increasingly value the convenience of the service and streaming players focus more on the paid model (note all recent launches have been paid only such as Apple Music, Deezer in the US, YouTube Red, with Amazon, Pandora and iHeartRadio also entering the space).

Exhibit 60: The proportion of paid as % of total streaming users increased to 33% in 2015 from 15% in 2010 across all services

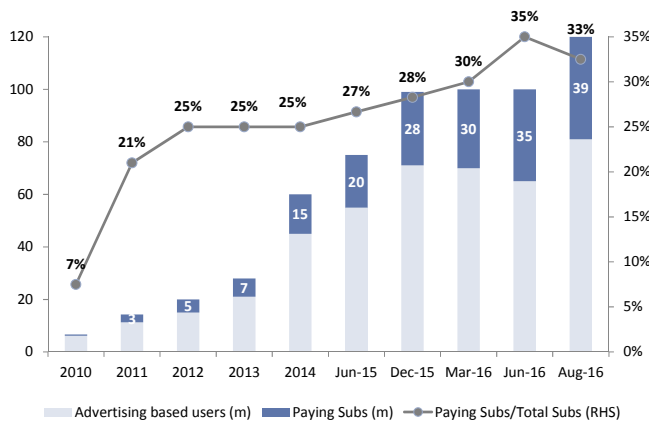
Total streaming users: paid vs. ad supported (mn, LHS)



Source: IFPI, Goldman Sachs Global Investment Research.

Exhibit 61: Conversion rates have improved for Spotify

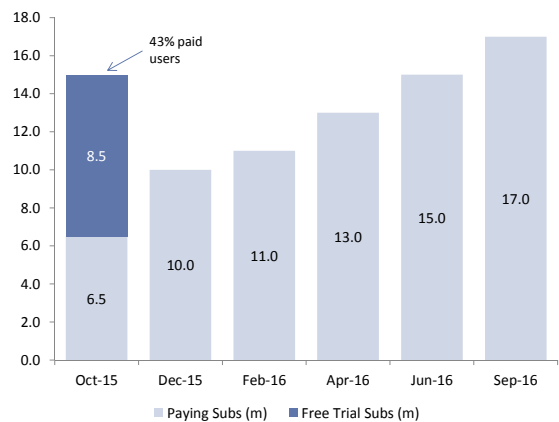
Spotify total subscribers: ad-based and paying (mn, LHS) vs. paying subs as % of total subscribers (% , RHS)



Source: Spotify, Press reports.

Exhibit 62: 43% of Apple Music users were paying as of October 2015

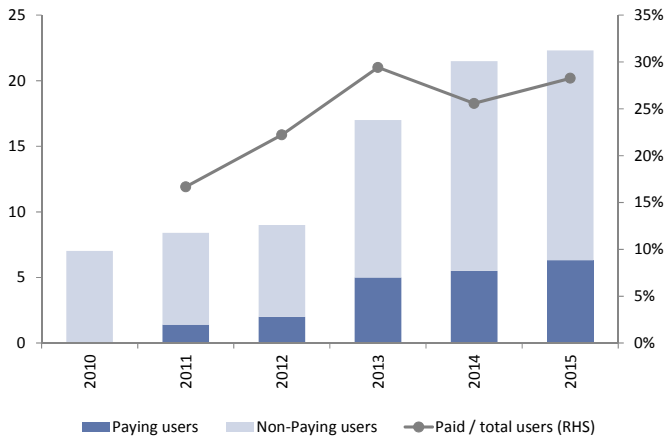
Apple Music total subscribers: free trial and paying (mn)



Source: Apple, Press reports.

Exhibit 63: Deezer's paid penetration has been more or less stable since 2013

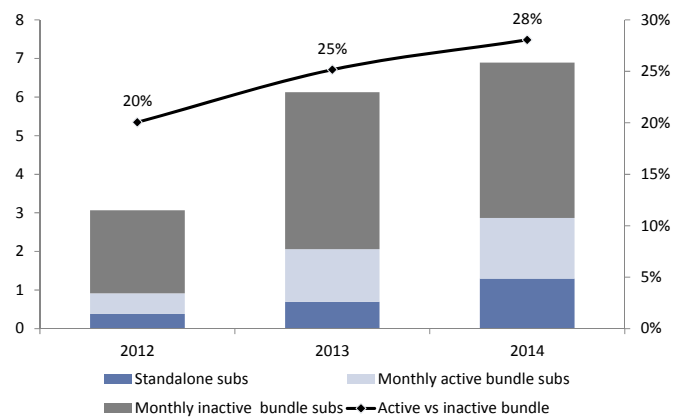
Deezer users (mn, LHS) and ratio of paying users as % of total users (% , RHS)



Source: Deezer, Press reports, Goldman Sachs Global Investment Research.

Exhibit 64: The proportion of active vs. inactive mobile phone bundle subscribers increased over 2012-14 to 28% for Deezer

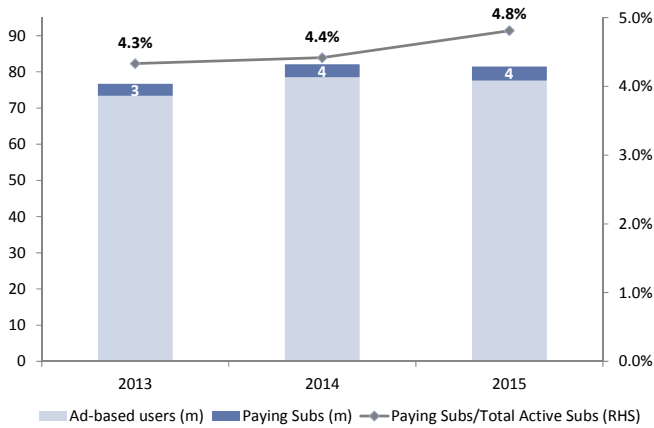
Deezer subscribers (mn, LHS) and active bundle subscribers as % of total subscribers (% , RHS)



Source: Deezer, Press reports, Goldman Sachs Global Investment Research.

Exhibit 65: Pandora's paid penetration has increased slightly but remains heavily reliant on advertising

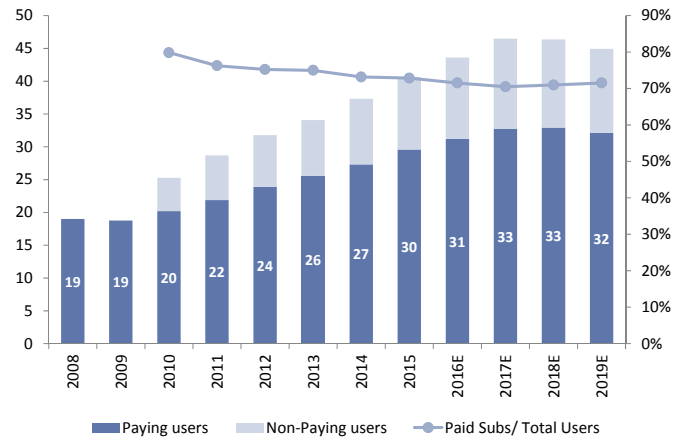
Pandora users (mn, LHS) and ratio of paying subscribers as % of total active subscribers (% , RHS)



Source: Company data.

Exhibit 66: Sirius' paid penetration has decreased slightly but remains heavily reliant on paid users

Sirius XM users (mn, LHS) and ratio of paying users as % of total users (% , RHS)



Source: Apple, Press reports.

Our base case is 9% penetration of smartphone population globally by 2030

We forecast that total paid streaming penetration will reach 9% of the total smartphone population globally by 2030 from 2% in 2015, by extrapolating 2015 growth trends. This level will still be below the average penetration for the top five paid streaming markets of 11% in 2015 and less than half the penetration in Sweden and Norway (over 20%), the most advanced markets. We assume that ARPU stays flat as the growth of lower ARPU streaming services in EM (\$4 monthly average price currently) will likely offset the improving mix towards higher ARPU services in DM and the underlying inflation. This brings the total paid streaming market alone to \$23 bn in 2030 from \$2.3 bn in 2015, well above the total recorded music market of \$15 bn in 2015.

Our sensitivity analysis shows that any 1% of additional penetration would lift the overall market by c.\$2.5 bn and any 1% change to ARPU would have a \$3 bn impact.

Exhibit 67: Paid streaming market forecasts

	2010	2011	2012	2013	2014	2015	2016E	2017E	2018E	2019E	2020E	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E	
Paid and freemium streaming revenue (\$bn)	0.3	0.4	0.7	1.0	1.4	2.3	3.6	5.1	6.6	8.1	9.5	10.9	12.3	13.5	14.8	16.1	17.4	18.8	20.1	21.5	22.9	
% growth		36%	63%	57%	37%	59%	59%	43%	29%	22%	18%	15%	12%	10%	9%	8%	8%	8%	7%	7%	6%	
% of total recorded music		2%	3%	4%	7%	10%	15%	23%	31%	38%	43%	48%	52%	54%	57%	59%	60%	61%	63%	63%	64%	65%
Paid users (m)	8	13	20	28	41	68	107	147	187	230	270	310	348	386	424	462	500	538	576	614	652	
% growth		63%	54%	40%	46%	66%	57%	37%	27%	23%	17%	15%	12%	11%	10%	9%	8%	8%	7%	7%	6%	
% of smartphone users		1.2%	1.4%	1.5%	1.5%	1.6%	2.1%	2.9%	3.6%	4.1%	4.6%	4.9%	5.1%	5.7%	6.2%	6.6%	7.1%	7.5%	7.9%	8.3%	8.7%	9.1%
% of total streaming users ex YouTube		15.0%	20.0%	23.0%	25.0%	27.2%	32.7%	35.5%	35.9%	36.3%	36.7%	37.1%	37.5%	37.9%	38.3%	38.7%	39.0%	39.4%	39.8%	40.1%	40.5%	40.8%
% of total population		0.1%	0.2%	0.3%	0.4%	0.6%	0.9%	1.4%	2.0%	2.5%	3.0%	3.5%	4.0%	4.4%	4.8%	5.3%	5.7%	6.1%	6.5%	6.9%	7.3%	7.7%
Average revenue per paying subs	37.2	38.5	40.0	43.1	41.1	41.4	40.9	40.4	39.6	38.8	38.0	37.6	37.2	36.9	36.5	36.3	36.1	36.1	36.1	36.1	36.1	36.1
% growth		3%	4%	8%	-5%	1%	-1%	-1%	-2%	-2%	-2%	-1%	-1%	-1%	-1%	-1%	-1%	0%	0%	0%	0%	
Apple Music						10	24	38	52	66	78	90	100	110	120	130	140	150	160	170	180	
Net adds						10	14	14	14	14	12	12	10	10	10	10	10	10	10	10	10	
Share of net adds						37%	36%	35%	35%	33%	30%	30%	26%	26%	26%	26%	26%	26%	26%	26%	26%	
Penetration of iPhones						2.0%	3.9%	5.3%	6.6%	7.6%	8.3%	8.9%	9.8%	10.6%	11.5%	12.3%	13.1%	13.9%	14.7%	15.5%	16.2%	
Global internet players (AMZ, FB, GGL)						2	8	16	28	40	52	64	76	90	104	118	132	146	160	174		
Net adds						2	6	8	12	12	12	12	12	14	14	14	14	14	14	14		
Share of net adds						5%	15%	20%	28%	30%	30%	32%	32%	37%	37%	37%	37%	37%	37%	37%		
Pure streaming players	8	13	20	28	41	58	81	101	119	136	152	168	184	200	214	228	242	256	270	284	298	
Net adds			7	8	13	17	23	20	18	17	16	16	16	16	14	14	14	14	14	14	14	
Share of net adds						63%	59%	50%	45%	40%	40%	40%	42%	42%	37%	37%	37%	37%	37%	37%	37%	

Source: IFPI, Goldman Sachs Global Investment Research.

Exhibit 68: Our base case is 9% total paid streaming penetration by 2030 with a flat ARPU

		PAID STREAMING PENETRATION 2030								
		3.0%	5.0%	7.0%	9.0%	11.0%	13.0%	15.0%	17.0%	19.0%
ARPU CAGR 2020-30	-2.0%	6.0	10.0	13.9	17.9	21.9	25.9	29.9	33.8	37.8
	-1.5%	6.3	10.6	14.8	19.0	23.3	27.5	31.7	36.0	40.2
	-1.0%	6.7	11.2	15.7	20.2	24.7	29.2	33.7	38.2	42.7
	-0.5%	7.2	11.9	16.7	21.5	26.3	31.1	35.8	40.6	45.4
	0.0%	7.6	12.7	17.8	22.8	27.9	33.0	38.1	43.1	48.2
	0.5%	8.1	13.5	18.9	24.2	29.6	35.0	40.4	45.8	51.2
	1.0%	8.6	14.3	20.0	25.7	31.4	37.2	42.9	48.6	54.3
	1.5%	9.1	15.2	21.2	27.3	33.4	39.4	45.5	51.6	57.6
	2.0%	9.7	16.1	22.5	29.0	35.4	41.8	48.3	54.7	61.1

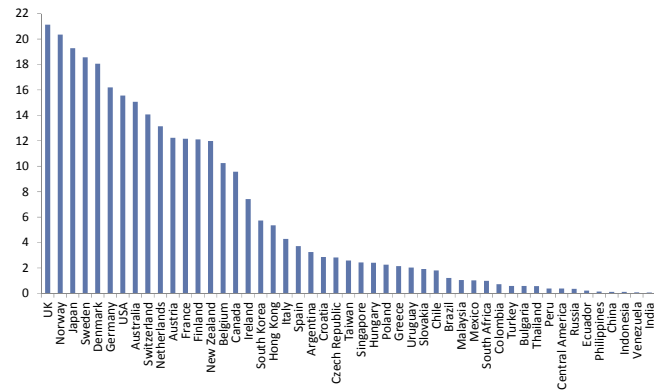
Source: Goldman Sachs Global Investment Research.

2. The emerging market opportunity

We believe emerging economies represent one of the biggest opportunities for the streaming industry, driven by a growing recognition of the value of IP, new business models (ad-funded, prepaid, telecom bundles etc.) and payment capabilities, while smartphone penetration is already at levels close to DMs. Average annual spend on recorded music per capita in EM stood at less than \$1 in 2015 compared to around \$15 in DM (IFPI). EM accounted for just c.10% of the global recorded music market in 2015. The entire Chinese music market was smaller than that of Sweden (while nominal GDP is 22x bigger) and the Indian market was smaller than that of Norway (while nominal GDP is 5x). This under-representation is mainly the result of widespread counterfeiting and piracy and under-developed physical retail infrastructure. The International Intellectual Property Alliance (IIPA) estimates music piracy rates are in excess of 90% in China, India, Mexico and Brazil.

Exhibit 69: Music spend per capita shows a clear divide between DM and EM

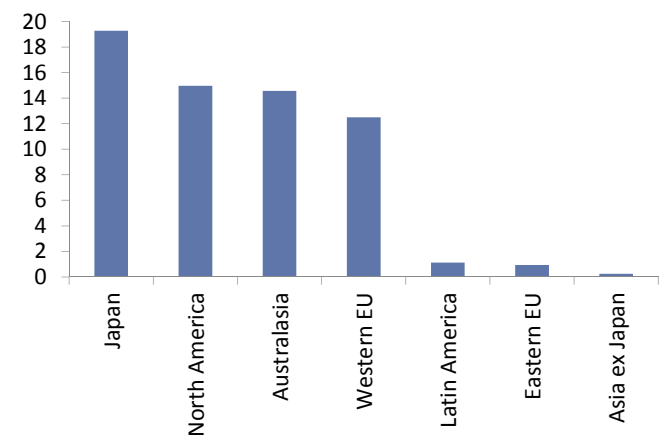
Music spend per capita (\$, 2015)



Source: IFPI.

Exhibit 70: Music spend per capita is around \$1 in EM vs. \$15 in DM

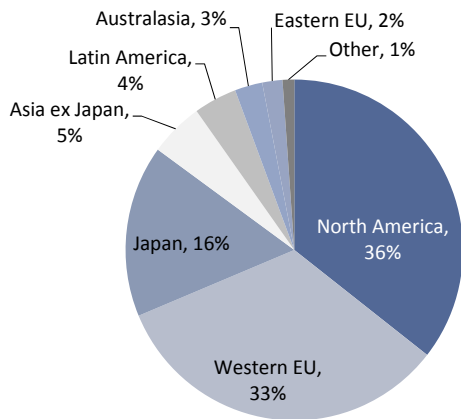
Music spend per capita (\$, 2015)



Source: IFPI, Goldman Sachs Global Investment Research.

Exhibit 71: EMs accounted for just 10% of the global recorded music market in 2015

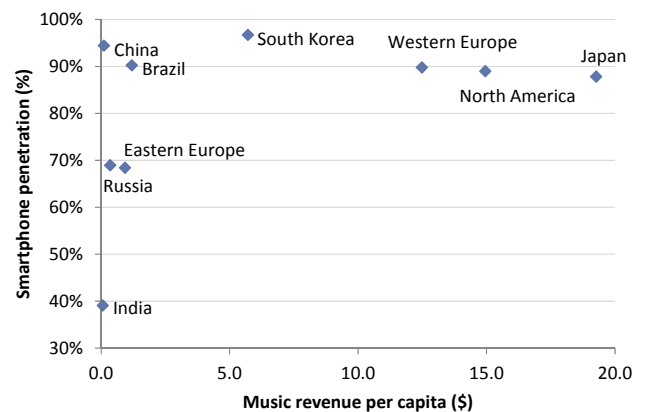
Music revenues – market share by geography



Source: IFPI, Goldman Sachs Global Investment Research.

Exhibit 72: BRICs show significant revenue growth potential with smartphone penetration close to DMs

Music spend per capita (\$) vs. smartphone penetration

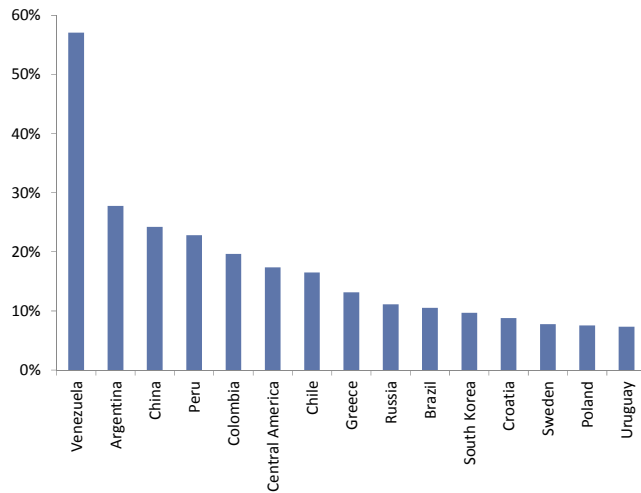


Source: IFPI, Goldman Sachs Global Investment Research.

We believe the launch of convenient, better quality, legal streaming alternatives with a free tier could reduce piracy rates and therefore generate new revenue streams for the music industry. This transition should also be supported by the high level of digital penetration already present in many EM music markets and a growing recognition of the value of IP. Many emerging markets, which historically have not been big spenders on music, have seen a resurgence of their music industry thanks to the launch of streaming services and more innovative payment capabilities (paying for music using the phone number/email address instead of credit card details for example); nine of the top 10 fastest growing markets in 2015 were EMs.

Exhibit 73: Nine of the top 10 fastest growing markets in 2015 were EMs

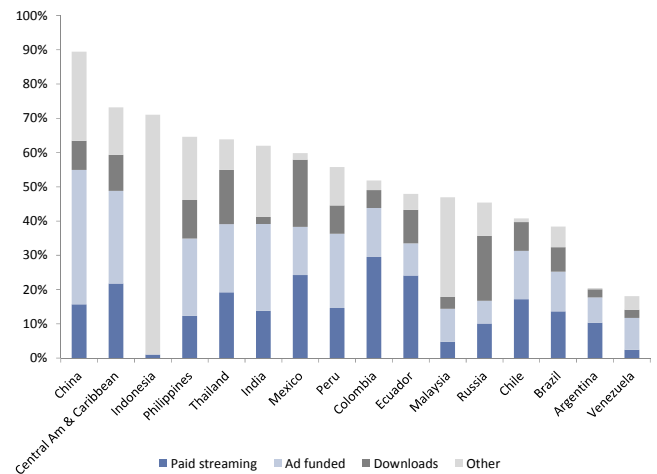
Average music revenues growth, 2012-2015



Source: IFPI, Goldman Sachs Global Investment Research.

Exhibit 74: Many EM music markets are already highly digital

Digital music share of total recorded music (broken down by genres)



Source: IFPI, Goldman Sachs Global Investment Research.

We see various routes available to tap into the EM opportunity such as pre-paid models, low ARPU subscriptions, ad-funded models or telecom bundles. The importance of local content also paves the way for the emergence of indigenous companies, such as QQ Music (China), KKBOX (Taiwan), MelOn (South Korea) and Saavn (India). In China for instance, local repertoire accounts for 80% of music consumption, Korean and Japanese pop another 10% and international only 10%, according to IFPI.

We calculate that a 1% increase in paid penetration assuming a monthly price of \$4 (the current average price of an Apple Music or Spotify subscription in EM) would generate \$1.5 bn of additional revenue or a 10% uplift to the current global recorded market.

Exhibit 75: A 1% increase in paid streaming penetration could bring an incremental c.\$360 mn revenue assuming \$1 ARPU and \$1.5 bn revenue assuming \$4 ARPU

Global paid streaming penetration vs. ARPU – scenario analysis

EM		Paid streaming penetration						
		0.20%	0.5%	1.0%	2.0%	3.0%	4.0%	5.0%
Monthly price	1.0	0.073	0.181	0.363	0.726	1.089	1.452	1.814
	2.0	0.145	0.363	0.726	1.452	2.177	2.903	3.629
	3.0	0.218	0.544	1.089	2.177	3.266	4.355	5.443
	4.0	0.290	0.726	1.452	2.903	4.355	5.806	7.258
	5.0	0.363	0.907	1.814	3.629	5.443	7.258	9.072
	6.0	0.435	1.089	2.177	4.355	6.532	8.709	10.886

Source: Goldman Sachs Global Investment Research.

China case study: Local tech giants drive greater monetization of music content

China offers a useful case study of a large, under-monetised music market plagued by piracy where streaming is opening up sizeable new monetization avenues at a time when the value of IP is being increasingly recognized. Streaming drove a 64% yoy increase in the Chinese recorded music market in 2015. However, at \$169.7 mn, it remains the 14th largest market globally behind Sweden (despite boasting a GDP that is 22x larger).

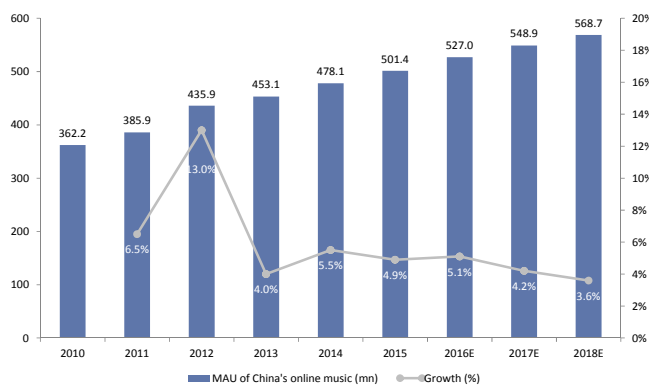
We see significant growth potential with the Chinese online music industry already counting 501 mn users in 2015 according to iResearch, which is the largest user base in the world and more than the entire population of the US. The market is estimated to be worth RMB9.6 bn in 2016 (China Economic Net). The three major local internet players or BAT (Baidu, Alibaba, Tencent) play a crucial role in driving music growth by:

- **Signing licensing deals with various international and regional record labels therefore helping enforce IP protection.** Baidu paved the way for monetization of digital music in China in 2011, when it signed an agreement with One-Stop China, a JV between UMG, Warner Music and Sony. Since then, Alibaba has signed deals with Universal Music Group and BMG, and Tencent sealed exclusive agreements with Sony, Warner Music and South Korea's YG Entertainment. Meanwhile, government regulation has been tighter against piracy with China's National Copyright Administration (NCA) last year ruling that all unlicensed content be removed from music platforms.
- **Leveraging their massive reach to attract customers.** Baidu Music had 150 mn monthly active users (both free and paid) as of December 2015. Tencent's QQ Music has nearly 100 mn daily active users and 400 mn monthly active users. Following the merger with China Music Corporation (CMC)'s music streaming services Kugou and Kuwo, iResearch estimates that QQ Music now has 800 mn users, 56% of the Chinese mobile-music market and 60% of all available music rights in China.
- **Offering users an easy way to pay for music subscriptions** through their own wallets (e.g. Alipay, WeChat wallet). While the main route to monetization will remain ad supported streaming in our view, we see encouraging evidence of greater consumer willingness to pay for music: 10 mn of Tencent's 400 mn monthly active users are paying (source: Mashable). In December 2015, Singaporean artist JJ Lin sold 610,000 copies of his single 'Twilight' on QQ Music in just one week for as little as RMB2 per download. A survey from iResearch found that nearly 57% of QQ Music's users in China would have paid for something on their music apps this year while a further fifth are open to paying in the future.

Interestingly, QQ Music is reportedly profitable (Digital Music News, August 2) which could be credited to Tencent's capacity to cross sell various products such as concert tickets as well as more favourable licensing deals with labels (according to Mashable).

Exhibit 76: Chinese online music users expected to reach c.569 mn by 2018

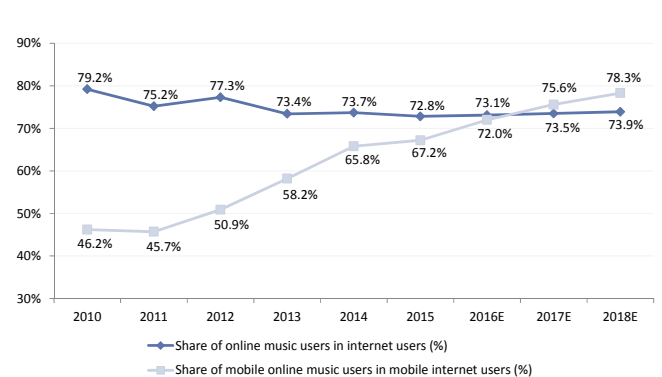
China's online music users 2010-2018



Source: iResearch, CNNIC.

Exhibit 77: A large proportion of users listen to music on mobile in China

Penetration of China's online & mobile Music 2010-2018



Source: iResearch, CNNIC.

Exhibit 78: Comparison of China music streaming services

China music streaming services

Music service	Parent company	Ad-funded offering	Paid Model	Pricing	Number of users	Paid Subscribers	Catalogue size	Deals with record labels	Comments
QQ Music	Tencent	Yes	Monthly subscription/download package	RMB 10 per month / RMB 8 for 300 songs	400 mn MAU, 100 mn DAU	10mn paying users	15 mn	200 deals incl. exclusive rights to Sony Music and Warner Music in China	Also sells concert tickets and offers live streaming of concerts
Kugou	Tencent	Yes	Monthly subscription/download package	RMB 10 per month / RMB 8 for 300 songs	222 mn mobile MAU	10mn paying users		40 labels including Sony/ATV, UMG	Merged with Kuwo and Omusic in 2015. Can also live stream concerts
Xiami	Alibaba		Monthly subscription	RMB 10 per month	20 mn MAU		2.5 mn	Various including Universal Records, Rock Records and HIM International Music	
Alibaba Planet (previously TPOD)	Alibaba		Monthly subscription	RMB 12 per month	300 mn (2012)		2.5 mn	BMG Records, Rock Records and HIM Records	Also acts as a music marketplace for artists, producers to connect
Baidu Music	Baidu	Yes	Monthly subscription	Premium Service - RMB 10 per month	150 mn			UMG, BMG, various Chinese labels	
Apple Music	Apple	No	Monthly subscription	RMB 10 per month			30 mn		
Migu Music	China Mobile		Monthly subscription	RMB 10 per month	> 100 mn		4.2mn		Limited download music service
NetEase Music	NetEase	Yes	Monthly subscription/download	RMB 8 per month	> 100 mn		5 mn		
Duomi Music	A8 New Media Group		Monthly subscription/download	RMB 8 per month / RMB 3 for 100 songs					

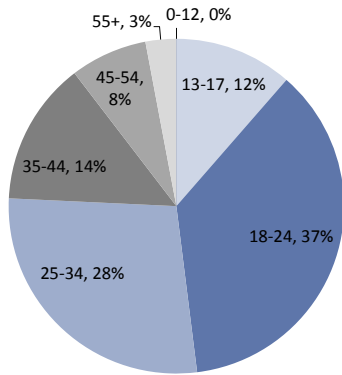
Source: Company data, Trade Press, Goldman Sachs Global Investment Research.

3. Gen Z and Millennials: The ideal audience for streaming

The changing media consumption habits of Millennials and Generation Z (more mobile, cross-platform and connected than their Millennial predecessors) are particularly beneficial to the music industry as a greater share of their spare time is being spent on music (along with social media), as opposed to watching TV and reading. Mobile music streaming is particularly suited to younger age groups with a study from ComScore showing that 4 out of the top 10 mobile apps used by Millennials are music related.

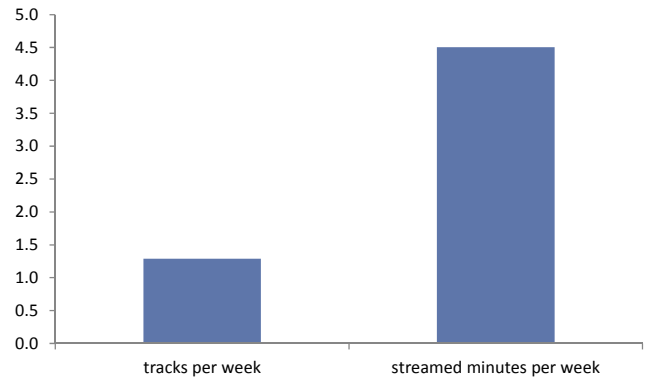
Their inherent characteristics of being “digital natives”, focused on experience and convenience, make them the ideal targets of music streaming services which can be tailored for any taste, different budgets (ad-supported, student plans, family plans) and most importantly for any device. Millennials already spend a higher absolute amount of money on music than the average population in the US, which is mainly attributable to live music and paid streaming. The 13-17 year old age group, while having a smaller budget than the average population, already spends as much on paid streaming than the average American on an absolute basis. Spotify reports that Gen Z and Millennials (13-34) account for 77% of users across its markets. In the US, Millennials alone (18-34) account for 72% and spend 4.5 bn minutes streaming listening to 1.3 bn tracks every week (143 minutes per day on average for those accessing Spotify on multiple screens).

Exhibit 79: 77% of Spotify' customers are Gen Z & Millennials



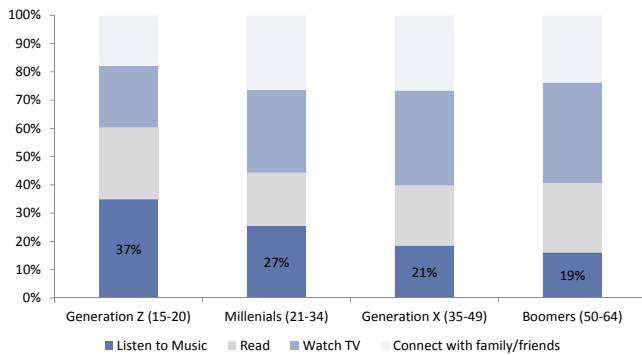
Source: Spotify

Exhibit 80: Millennials spend 4.5 bn minutes listening to 1.3 bn tracks every week on Spotify in the US



Source: Spotify/ AdWeek.

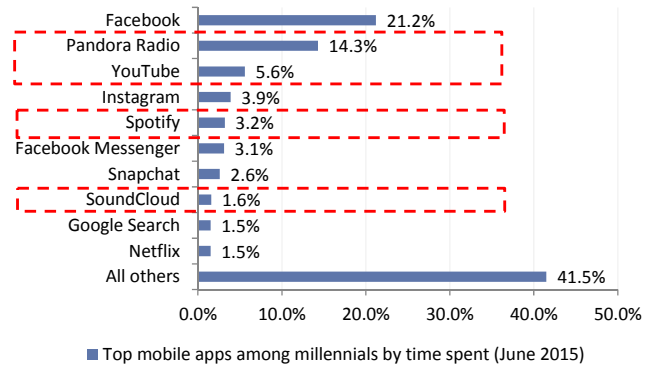
Exhibit 81: Gen Z and Millennials spend a higher proportion of their spare time listening to music
Top 5 spare-time activities, by generation (percentage selecting each as one of their top 3)



Source: Deloitte.

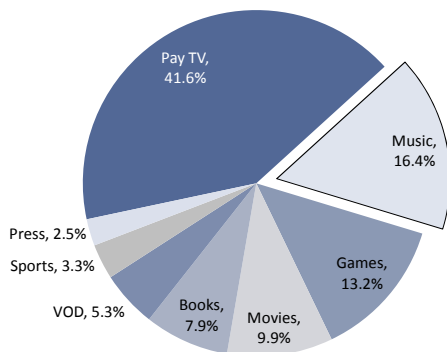
Exhibit 82: 4 out of top 10 mobile apps used by Millennials are music-related

Top mobile apps among Millennials (18-34) by time spent (US, June 2015 – before Apple Music launch)



Source: ComScore.

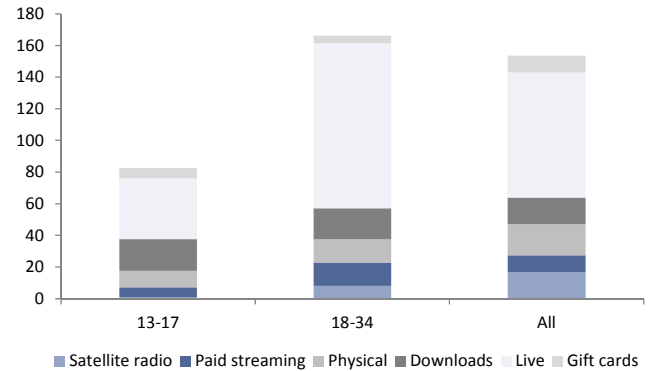
Exhibit 83: Millennials spend 16% of their entertainment budget on music in North America
Breakdown of entertainment spend



Source: Deloitte.

Exhibit 84: In the US, Millennials spend more money on music than the average person and more on live music and paid streaming

Breakdown of music spend by genre



Source: Nielsen.

4. Telecom and tech companies leveraging music content

With the proliferation of premium data plans and smartphones, mobile carriers are now increasingly seeking out streaming music and video services as a means of driving upgrading and upselling opportunities as well as differentiation. Almost non-existent in 2011, there are now 11.5 mn telco bundled music subscribers globally according to MIDiA.

Telecom operators' large marketing budgets and sizeable existing billing relationships make them ideal partners to (1) enter a new market at little cost, especially in EM where subscription ARPUs are lower and credit card penetration remains low, and (2) reach younger demographics (whose bills are paid by parents). While such deals are dilutive from an ARPU perspective (27% according to Deezer), we believe that margins are broadly similar given lower marketing and customer acquisition/retention costs.

In parallel, large tech companies have also made a major foray into music streaming over the last three years as a way to better lock users into their ecosystem and sell more advertising (Google), devices (Apple) and products (Amazon).

- Google launched a dedicated music streaming service in 2011, Google Play Music, which includes a \$9.99 "all you can eat" subscription option (since 2013) and an ad-supported free tier (since 2015). It presents a number of additional features such as free online music storage (up to 50,000 songs), a self-publishing platform Artist Hub for artists and music sharing via Google +. In 2015, it launched YouTube Red, which enables users to access all YouTube content free of ads and includes the premium version of Google Play Music for \$9.99 a month (\$12.99 for iOS users).
- Apple bought headphone maker and music streaming service Beats for \$3 bn in May 2014 and launched a paid only subscription service Apple Music in June 2015 in a move to compensate declining digital music sales at iTunes.
- Amazon launched a free music streaming service in 2014 with over one million songs for Prime customers ("Prime Music") and is reported to be launching soon a paid music subscription service that would cost \$10 pm for unlimited access on any device and \$4-5 for unlimited access exclusively on Amazon's Echo Player (MBW, September 2, 2016).

Exhibit 85: Selected streaming services/ telecoms partnerships

Telecoms Company	Country	Partnership	Launch date	Price	Package details	Firm Rationale	Additional Details
EE	UK	Apple Music	Aug 2016	6 months free, £9.99 thereafter	- Offered both to new EE customers, and those renewing their contracts	- Increase the amount of music streamed over its network	
Bouygues	France	Spotify	Jan 2015	Free	- Bonus for subscribers to Sensation 3GB plans and above	- Enhance customer experience by expanding services and content	- Unlimited smartphone, tablet or computer access to Premium offer of <30m titles, with offline listening.
Orange	France	Deezer	Dec 2014	€2.99/month for 3 months (or €1/month for 6 months if you are a Play or Jet customer); €9.99 thereafter	- Standalone offering through Orange platform	- Importance of new digital services to attract customers	- Unlimited music listening, ad-free - On your mobile, tablet, PC or TV - Listen without network (offline)
Sprint (SoftBank)	US	Spotify	May 2014	Free trial of Spotify	- Sprint subscribers on its tiered "family plan" will get discounts to Spotify subscriptions once the trial period ends - Family (1-5 people): 6 months free; \$7.99/month onwards - Family (6-10 people): 6 months free; \$4.99/month onwards - All other customers: 3 months free; \$9.99/month onwards	- Sprint gets cachet with the cool kids from an association with the market-leading music streaming service – and, assuming its customers appreciate access to a large library of music, a valuable tool to reduce customer churn.	- Coincide with the Spotify partnership, Sprint also unveiled a special version of HTC'S One M8 handset featuring HD audio technology supplied by Harmon Kardon.
Globe Telecom	Philippines	Spotify	Apr 2014	Free for prepaid subscribers	- Globe Telecom customers to get Spotify Premium with new GoSURF mobile plan - mobile internet access and Spotify for P10/ day Spotify premium P129/ month	- Strengthens its vision to provide an enriched online experience and access to free online content.	- Exclusive partnership with Globe Telecom, the best free music experience in the history of the smartphone - available now Instant access to over 30m songs
Telefónica	Spain, Germany, LatAm	Napster	Oct 2013	\$4.90/month	- Speedy fixed broadband and Movistar mobile broadband products - Available as Napster Web & Napster Premium	- Increase attractiveness of mobile packages to operators in Europe and Latin America - Bolster the launch of 4G networks globally	- First carrier to release Firefox OS-based smartphone
SFR	France	Napster	Sep 2013	Free add-on for 4G SFR customers	- "Napster Decouverte" package: 2 hours of calls, unlimited SMS/MMS & 2 GB of mobile data/ month - Premium music service offered for €9.95/ month as an Extra service	- Add innovative content to provide a better experience of 4G	- Five Napster options on monthly basis & access <20 million songs – online and offline – using smartphones and tablets. - Available for iPhone, iPad and iPod Touch & smartphones using Android operating system
Vodafone	UK	Spotify	Aug 2013	Free for 6 months, £4.99/ month thereafter	- Red 4G plan priced at £26 or more/ month - Spotify unlimited: £4.99/ month - Spotify Premium: £9.99/ month	- Emphasize worth of 4G offering	- Spotify can be chosen as content option - Available on multiple compatible devices
Telenor	Norway, Thailand, Hungary	Deezer	Oct 2012	Free for three months, HUF 1390/ month thereafter	- Content add-on for customers with existing packages - Five different 'Hipernet' price plans: Start, Active, Medium, Heavy & Pro offering download speeds of 5/1-60/10 Mbps, data allowance of 3-30GB & extra service allowance.	- Capitalize on their position as a provider of a legal alternative to pirated music	- Access to 18m tracks on phones, PCs or tablets at any time.
Deutsche Telekom	Germany	Spotify	Aug 2012	£4.99/month: Spotify Unlimited £9.99/month: Spotify Premium	- Special Complete Mobile Music Tariff: €29.95 (£23.95)/month - Add Spotify Premium for €9.95 (£7.95)/month - €39.95/month with new Smartphone	- Claiming the platform's integration with Facebook and other social networks was a major driver behind the deal and indicative of where the industry is heading. - Gives operator exposure to new audiences	- Consumers able to listen to more than 19m songs on their smartphone, tablets, or PCS, both online and offline without impact on their data limits. - All tariff bundles include call flat, data flat and SMS allnet flat besides the Spotify Premium.
Virgin Media UK		Spotify	Jul 2011	Spotify Premium free for three months with Premiere & VIP collections	- Premiere: unlimited broadband, 60Mb download speeds, free wireless Super Hub, free connection, 200 channels (43 HD) 2x 500GB Tivo boxes: £25/month for 6 months & £52/month thereafter - VIP: 225 channels, 2x 1TB Tivo boxes, anywhere Virgin TV access: £50/ month for 6 months, rising to £104.45/ month thereafter - Catch Up TV services & Virgin TV On Demand	- Boost appeal of Virgin Media's bundled TV, broadband and telephone services.	- Access millions of tracks from thousands of artists, online, on mobile or through exclusive Spotify app on Virgin Media's Tivo-powered digital TV service
KPN	Netherlands	Spotify			- Streaming service comes free as part of a bundle package		
Mobilcom-Debitel	Germany	Juke			- The streaming service will now come bundled on the telecom's mobile platforms		- New customers of mobilcom-debitel will have access to different tiers of the service, incl. a subscription service with unlimited access to Juke's library of more than 20m songs or access to the library for a fee added to their service contract.

Source: Press reports.

A rising tide lifts (almost) all boats

In addition to the structural and regulatory tailwinds highlighted above, we believe industry responses will be critical in shaping the future growth of the industry which only started to recover in 2015 after almost two decades of decline. We would expect some level of coordination among labels and platforms to maximize that growth potential. As a result, we believe the split of revenue pools will remain broadly unchanged in the near to medium term.

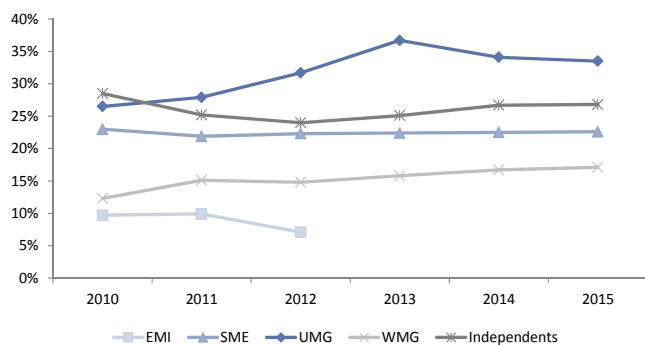
Labels have the most to gain from the growth of streaming and growing competition among distributors

Recorded music companies or labels perform a vast array of functions from the discovery and development of artists to the marketing, sale and licensing of their recorded music in various formats. Labels also increasingly engage in ancillary activities such as merchandising, sponsorship, live performance, artist management, etc., which are often referred to as “artist services and expanded rights” agreed as part of “expanded rights deals” or “360° deals.”

The recorded music industry is dominated by three companies (Universal Music, Sony Music, Warner Music) which commanded 73% market share in 2015 according to Music & Copyright. The industry has experienced a wave of consolidation over the past few decades, the most recent sizeable deal being the acquisition of EMI Recorded Music by UMG in 2012 for €1.4 bn. The remaining 27% of the market is extremely fragmented, made up of thousands of independent labels. This concentration helps the labels maintain a strong negotiating power with the platforms – note that the distributors’ cut of c.30% has hardly moved over the past 15 years despite the launch of downloads and streaming services by large players including Apple.

Exhibit 86: The recorded market is dominated by three majors

Global recorded music market revenues, % market share



Source: Music & Copyright.

Exhibit 87: Major three labels compared

	Universal Music Group (UMG)	Sony Music Entertainment (SME)	Warner Music Group (WMG)
Presence	>60 countries	30 countries	>50 countries
Employees	6,967	c.3,000	c. 4,200
Labels	>100	>20	>200
Record labels	Interscope Geffen Capitol Music Group Republic Records Def Jam Recordings Polydor Island Records	Columbia Records Warner Bros. Records Epic Records RCA Records Arista Nashville Legacy Recordings	Atlantic Records Asylum Big Beat East West Electra Erato
Publishers	UMPG	Sony/ATV	Warner/Chappell
Copyrights managed	3.2m copyrights	4m copyrights	> 1.2m copyrights
Top artists 2015	Taylor Swift Justin Bieber Sam Smith The Weeknd Drake	Adele One Direction David Bowie Meghan Trainor Sia	Ed Sheeran Coldplay Wiz Khalifa Mark Ronson Jason Derulo
Other major artists	ABBA Louis Armstrong The Beatles Andrea Bocelli Elton John	Beyonce Mariah Carey Celine Dion The Fray Michael Jackson	Linkin Park Michael Buble Bruno Mars David Guetta Prince

Source: Company data, Goldman Sachs Global Investment Research.

As highlighted earlier, we see greatest value growth potential in the recorded segment as streaming improves the monetization of music content (reduction in piracy rates, more favourable royalty structure notably in the US, higher ARPU when migrating customers onto the paying tier) and creates new revenue streams.

The recorded music industry has recently turned a corner, with the proliferation of subscription streaming driving an improvement in global recorded music revenues from a 6% pa decline over 2007-2010 to a 1% pa decline over 2011-14, and 3% yoy growth in 2015, the fastest growth recorded since 1998. We expect growth to accelerate further from here, as confirmed by 1H16 trends. Three of the top 5 markets that have reported so far (the US, Germany, France) posted c.6% revenue growth on average in 1H16, following flat performance in FY15. Even the most advanced markets in terms of paid streaming penetration such as Sweden and Norway (over 20% penetration - Deezer even estimates Sweden is close to 30% as of September 2016) saw an acceleration to c.8% in 1H16 after +5% growth in FY15. We forecast the recorded music market to grow 4% in 2016, 5% in 2017 and pick up to 6% pa after 2018. Overall, we believe the recorded music segment should return to its 1999 peak of \$29 bn by 2027, from \$15 bn today.

Exhibit 88: Recent music data points confirm the recorded music industry turnaround

Recorded music revenue growth by market, % yoy change

Recorded music	FY 14	1H 15	2H 15	FY 15	1H 16
TOP 5 Markets					
US	-0.7%	-0.5%	2.4%	0.9%	8.1%
UK	-2.8%	-5.0%	6.1%	0.6%	
Japan	-2.6%	1.1%	4.9%	3.0%	
Germany	1.8%	4.4%	4.8%	4.6%	3.6%
France	-5.3%	-7.0%	-2.4%	-4.7%	6.0%
Nordics					
Sweden	0.0%	4.2%	11.1%	7.6%	8.6%
Finland	-9.0%	0.5%	5.0%	2.7%	
Denmark	3.8%	0.4%	2.6%	1.5%	
Norway	-2.5%	7.0%	-1.8%	2.6%	7.8%
Southern Europe					
Spain	5.4%	10.9%	9.0%	10.0%	4.0%
Italy	1.5%	22.3%	27.9%	25.1%	

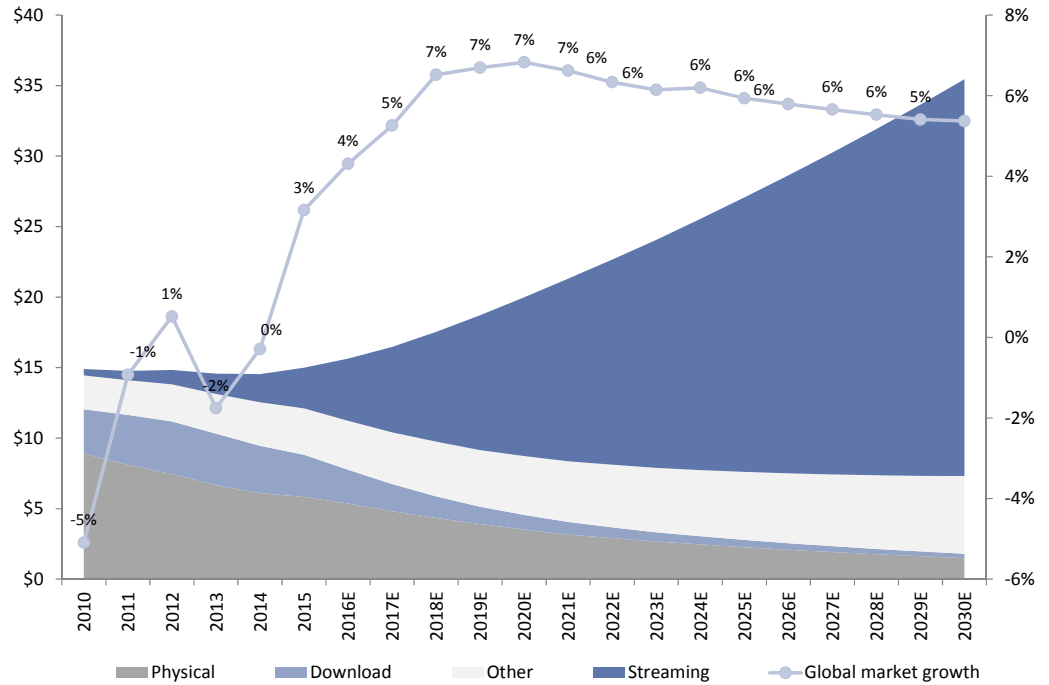
Source: RIAA (US), IFPI, unless local data available.

We believe labels have the most to gain within the value chain, given they receive 55%-60% of a platforms' revenue as royalties which is the same across streaming, physical or downloads. We do not foresee a major change in this share in the near term as distribution fragments and digital increases the complexity of the industry. Labels will have a vested interest in keeping a minimum level of competitive tension among platforms, assuming they have learnt from past mistakes such as allowing the formation of a monopoly in distribution. The outcome of their (re)negotiations with YouTube, Spotify or Amazon in the coming months and regulatory changes will be key in this regard. That said, we believe streaming platforms will be able to increasingly leverage the vast amount of user data to cut better deals with labels over time.

As such, we estimate that streaming will represent a \$28 bn market by 2030 and will enable the overall revenue pie for labels (i.e., recorded music market) to return to its 1999 peak of \$29 bn by 2027 and reach \$36 bn in 2030. This compares to the current revenue pool of \$15 bn, of which \$9 bn is at risk (physical and download sales).

Exhibit 89: Streaming: A \$28 bn market opportunity by 2030

Global recorded music market revenues (\$ bn, LHS) vs. global revenues growth (% , RHS)

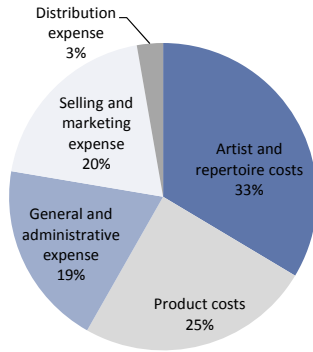


Source: IFPI, Goldman Sachs Global Investment Research.

The potential expansion of the profit pool is even more meaningful as labels generate higher margins in digital where the cost of manufacturing, distribution, inventory and returns is removed. We estimate that labels currently generate around 15% EBITA margins in both streaming and download compared to 8% in physical. Over time, we believe streaming margin could grow to 20%-25% given (1) more cost-effective marketing, (2) higher profitability of catalogue sales where development and marketing costs are lower than new releases, and (3) ongoing adaptation of the cost structure to a streaming world (conversion of fixed to variable costs, IT systems upgrade enabling greater efficiencies etc.). We expect however, disruptive forces such as the emergence of alternative labels to lead to a greater redistribution of profits to artists (artists and repertoire costs currently account for 30%-35% of labels' revenue netted of payments to publishers). Based on a streaming EBITA range of 15%-25%, we forecast \$2-3 bn of additional profit to be unlocked from streaming, compared to current profit pool of \$1 bn generated from physical and downloads.

Exhibit 90: Warner Music breakdown of recorded music costs

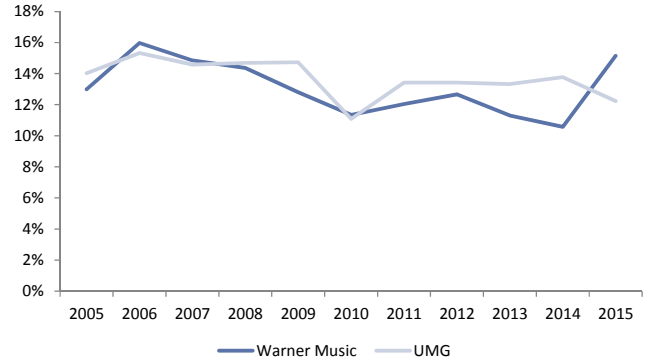
Warner Music breakdown of recorded music costs



Source: Company data.

Exhibit 91: Warner Music and UMG generate around 14% recorded EBITDA margin

Warner Music and UMG Recorded EBITDA margin



Source: Company data, Goldman Sachs Global Investment Research

Exhibit 92: We estimate labels generate 15% EBITA margins in digital compared to 8% in physical; paid streaming is particularly attractive, commanding a profit per person that is 2-3x higher than other formats

Note: The publishers/songwriters receive their royalties via the labels in physical and downloads, but directly from the streaming services

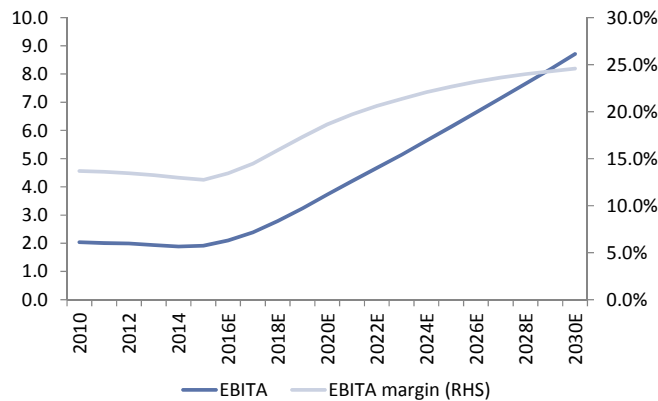
Physical			Downloads			Streaming - ad funded + subscription			Streaming - subscription		
Average spend per person	\$ 55.0	% of gross revenue	Average spend per person	\$ 48.0	% of gross revenue	Average revenue per user	\$ 41.0	% of gross revenue	Average spend per person	\$ 120.0	% of gross revenue
VAT	\$ 11.0	20%	VAT	\$ 9.6	20%	VAT	\$ 8.2	20%	VAT	\$ 24.0	20%
Net revenue	\$ 44.0		Net revenue	\$ 38.4		Net revenue	\$ 32.8		Net revenue	\$ 96.0	
Split: % of net revenue			Split: % of net revenue			Split: % of net revenue			Split: % of net revenue		
Distributor revenue	\$ 13.2	30%	Distributor revenue	\$ 11.5	30%	Distributor revenue	\$ 9.8	30%	Distributor revenue	\$ 28.8	30%
Record company revenue	\$ 30.8	70%	Record company revenue	\$ 26.9	70%	Content pool	\$ 23.0	70%	Content pool	\$ 67.2	70%
Record company costs % of record revenue			Record company costs % of record revenue			Record company costs % of record revenue			Record company costs % of record revenue		
Pay away to publishers	\$ 4.4	14%	Pay away to publishers	\$ 3.5	13%	Artists & Repertoire	\$ 7.5	38%	Artists & Repertoire	\$ 21.9	38%
Artists & Repertoire	\$ 5.5	18%	Artists & Repertoire	\$ 5.9	22%	Production & Distribution	\$ -	0%	Production & Distribution	\$ -	0%
Production & Distribution	\$ 4.3	14%	Production & Distribution	\$ -	0%	Other Product Costs	\$ 4.6	20%	Other Product Costs	\$ 13.4	20%
Other Product Costs	\$ 1.5	5%	Other Product Costs	\$ 2.7	10%	Gross margin	\$ 10.9	55%	Gross margin	\$ 31.9	55%
Gross margin	\$ 15.0	49%	Gross margin	\$ 14.8	55%	Selling & Marketing	\$ 4.5	23%	Selling & Marketing	\$ 13.2	23%
Selling & Marketing	\$ 7.1	23%	Selling & Marketing	\$ 6.2	23%	G&A	\$ 3.0	15%	G&A	\$ 8.6	15%
G&A	\$ 4.7	15%	G&A	\$ 4.0	15%	EBITDA Margin	\$ 3.4	17%	EBITDA Margin	\$ 10.0	17%
EBITDA Margin	\$ 3.2	10%	EBITDA Margin	\$ 4.6	17%	Depreciation	\$ 0.49	3%	Depreciation	\$ 1.44	3%
Depreciation	\$ 0.77	3%	Depreciation	\$ 0.67	3%	EBITA margin	\$ 2.9	15%	EBITA margin	\$ 8.5	15%
EBITA Margin	\$ 2.4	8%	EBITA margin	\$ 3.9	15%						

+63%
+21%
-26%
+118%

Source: Goldman Sachs Global Investment Research.

Exhibit 93: The recorded music profit pool growth is even more substantial

Recorded music profit pool (\$ bn, LHS) vs. EBITA margin (% , RHS)



Source: Goldman Sachs Global Investment Research.

Quotes from WMG CFO on the outlook for the music industry and the impact of streaming

Eric Levin is Executive Vice President and Chief Financial Officer, Warner Music Group, a role in which he is responsible for the company's worldwide financial operations. He joined the company in 2014, having held a number of senior executive posts in the US and Greater China.

It seems like we've reached a tipping point for the recorded music industry – how do you see the growth path from here?

"We are optimistic about the long-term growth potential of the music business and for Warner in particular. Recent industry data is improving with real growth worldwide, led by subscription streaming. This is more than offsetting declines in physical and downloads."

How do you see the role of the labels in shaping this future recovery?

"We are laser focused on executing against our strategic priorities, which include having a steady stream of great new music, expanding our global presence, and embracing commercial innovation, including the shift to streaming. Every region around the world is at a different stage of transition to digital formats. It is our job as an industry leader to help our artists and songwriters navigate the complexity across countries to maximize potential globally."

How do you think the streaming distribution landscape will evolve?

"We are seeing heightened commitment to streaming from a myriad of large players, which is aiding consumer awareness and yielding higher adoption. Having many players is good for us as it creates competition for consumers' share of wallet which in turn benefits the entire industry. "

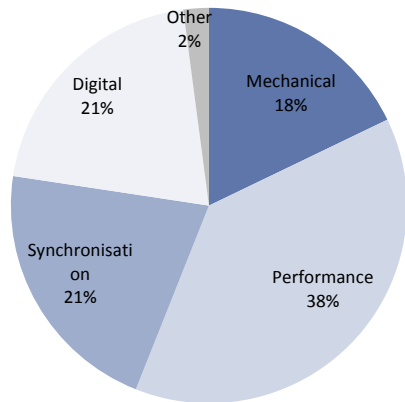
A lot more music is being consumed yet only a small portion of people pay for it – how can we address the issue of music monetization?

"It is imperative that monetization continues to improve and that artists, songwriters, labels and publishers are all fully and fairly compensated for their work. We have seen some encouraging signs from the EU but there is still a long way to go, as the value of music is still not being fully recognized."

Music publishers should benefit from streaming growth but to a lesser extent than labels

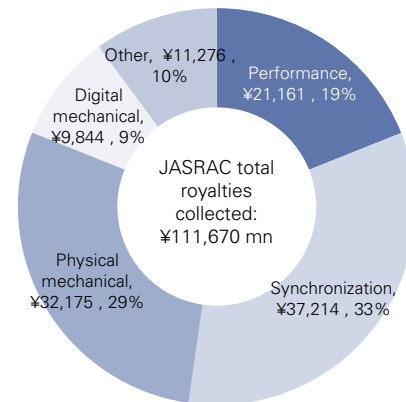
Music Publishing companies work for songwriters – they exploit and market musical compositions (of which they own/share the rights with songwriters) and receive royalties or fees for their use. Publishers derive royalty income (mechanical, public performance, synchronization royalties and other licenses) which they generally share 50/50 with the songwriters.

Exhibit 94: Mechanical (digital & physical) and Performance royalties each account for c.40% of revenue
Warner/Chappell breakdown of revenue



Source: Warner Music Group company data.

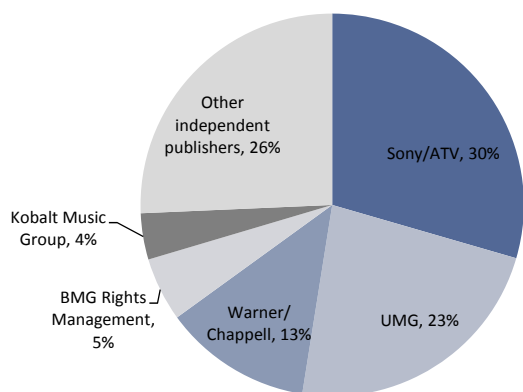
Exhibit 95: Publishing in Japan is dominated by Mechanical (38%) and synchronisation (33%) royalties
JASRAC 2015 royalties collected



Source: JASRAC.

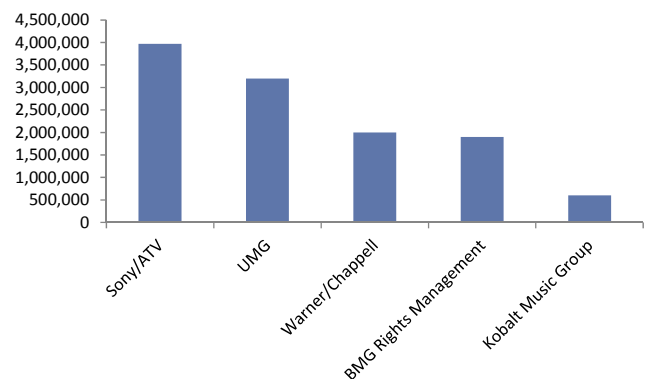
Similarly to recording, the publishing market is highly concentrated with the three majors commanding 66% market share and the top five companies commanding 75%. The industry has also seen a lot of M&A activity, the most recent being the Sony/MJ deal (approved in 2016) and the acquisition of EMI Publishing by Sony in 2012.

Exhibit 96: The publishing market is dominated by 5 players
Publishing market share, 2014



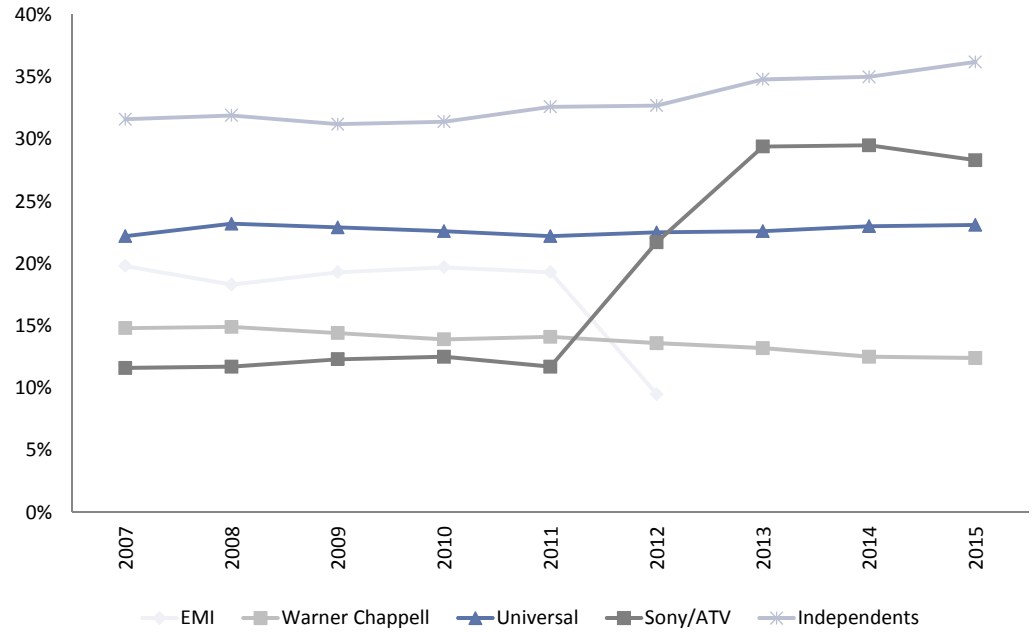
Source: Music Business Research.

Exhibit 97: ... who control/ administer a large number of copyrights
Number of administered music copyrights



Source: Music Business Research.

Exhibit 98: Independents have gained market share (although this was partly boosted by the sale of assets by Sony/ATV to BMG)



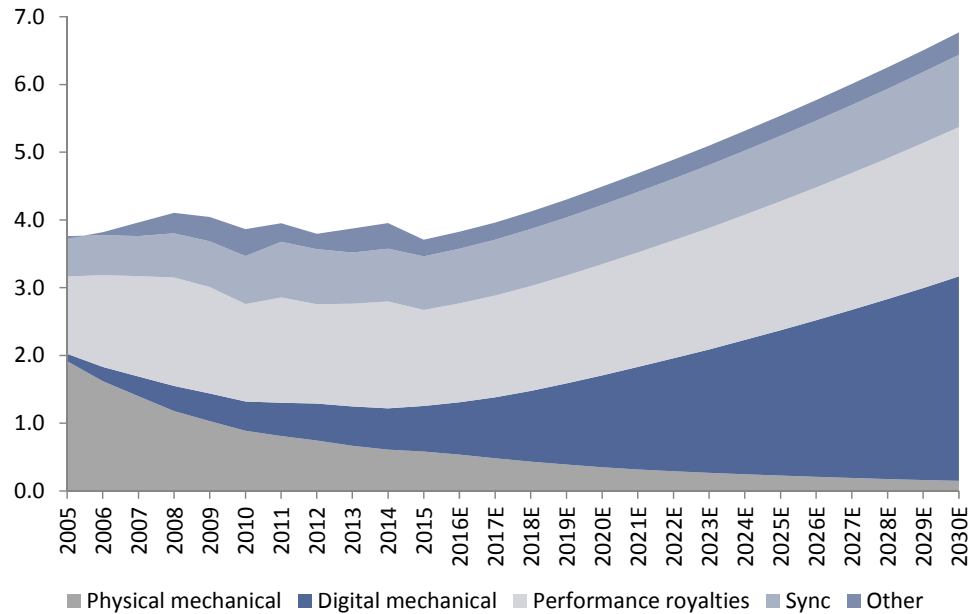
Note: Sony bought EMI Publishing in 2012 and had to divest some assets that were then acquired by BMG

Source: Statista.

The incumbent publishers, who so far have been more insulated from the digital disruption, also benefit from streaming growth although to a lesser extent than labels, as they receive a 10% cut of gross revenue as mechanical/performance royalties. We forecast an additional \$3.5 bn of revenue potential from streaming, while the main revenue pool at risk (physical mechanical royalties) is currently worth \$0.6 bn. Publishers also generate another \$1 bn of revenue from synchronization rights which should continue to benefit from growing demand for music.

Exhibit 99: Publishing – a \$7 bn market by 2030, partly driven by streaming

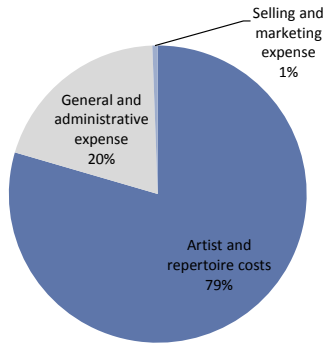
Global music publishing revenues, \$ bn



Source: Company data, Goldman Sachs Global Investment Research.

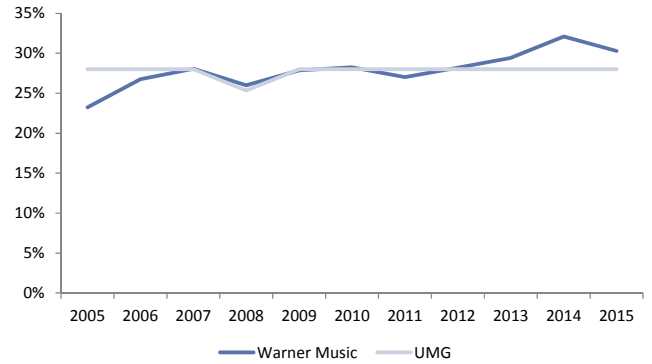
We estimate EBITA margins to be broadly stable at 26%-28%, implying c.\$1 bn of additional profit to be generated over the next 15 years. The upside to margins could however come from a better leveraging of new digital technologies that can improve the monitoring and tracking of copyrighted music, and collection and onward payment of royalties. A shift towards more direct deals, thus circumventing the fragmented landscape of collection societies, could also present further upside. Against this, we expect publishers to redistribute a greater share of their profits to songwriters (to 55%-60% from 50% today) as a result of the pressure from alternative publishers.

Exhibit 100: Author royalties and repertoire account for the bulk of publishers' expenses
Warner/Chappell breakdown of costs



Source: WMG company data.

Exhibit 101: Major publishers generate around 28%-30% EBITDA margins (pre-corporate costs)
Warner/Chappell vs. UMG Publisher EBITDA margin



Source: Company data, Goldman Sachs Global Investment Research.

Exhibit 102: We estimate publishers generate 26% EBITA margins across all formats

Physical			Downloads			Streaming - ad funded + subscription			Streaming - subscription		
Average spend per person	\$ 55.0	% of gross revenue	Average spend per person	\$ 48.0	% of gross revenue	Average revenue per user	\$ 41.0	% of gross revenue	Average spend per person	\$ 120.0	% of gross revenue
VAT	\$ 11.0	20%	VAT	\$ 9.6	20%	VAT	\$ 8.2	20%	VAT	\$ 24.0	20%
Net revenue	\$ 44.0		Net revenue	\$ 38.4		Net revenue	\$ 32.8		Net revenue	\$ 96.0	
Split:		% of net revenue	Split:		% of net revenue	Split:		% of net revenue	Split:		% of net revenue
Distributor revenue	\$ 13.2	30%	Distributor revenue	\$ 11.5	30%	Distributor revenue	\$ 9.8	30%	Distributor revenue	\$ 28.8	30%
Record company revenue	\$ 30.8	70%	Record company revenue	\$ 26.9	70%	Content pool	\$ 23.0	70%	Content pool	\$ 67.2	70%
Publisher revenue (paid by labels)	\$ 4.4	10%	Publisher revenue (paid by labels)	\$ 3.5	9%	Split Record company	\$ 19.7	60%	Split Record company	\$ 57.6	60%
						Split Publishing	\$ 3.3	10%	Split Publishing	\$ 9.6	10%
		% of publisher revenue			% of publisher revenue			% of publisher revenue			% of publisher revenue
Songwriters & Repertoire	\$ 2.4	55%	Songwriters & Repertoire	\$ 1.9	55%	Songwriters & Repertoire	\$ 1.8	55%	Songwriters & Repertoire	\$ 5.3	55%
Gross margin	\$ 2.0	45%	Gross margin	\$ 1.6	45%	Gross margin	\$ 1.5	45%	Gross margin	\$ 4.3	45%
Admin and other	\$ 0.7	17%	Admin and other	\$ 0.6	17%	Admin and other	\$ 0.6	17%	Admin and other	\$ 1.6	17%
EBITDA Margin	\$ 1.2	28%	EBITDA Margin	\$ 1.0	28%	EBITDA Margin	\$ 0.9	28%	EBITDA Margin	\$ 2.7	28%
Depreciation	\$ 0.09	2%	Depreciation	\$ 0.07	2%	Depreciation	\$ 0.07	2%	Depreciation	\$ 0.19	2%
EBITA margin	\$ 1.1	26%	EBITA margin	\$ 0.9	26%	EBITA margin	\$ 0.9	26%	EBITA margin	\$ 2.5	26%

Source: Goldman Sachs Global Investment Research.

An interview on music publishing with...

Jane Dyball, CEO of UK Music Publishing Association



After spending 6 years at indie publisher Virgin Music in international copyright and licensing, Jane Dyball joined Warner/Chappell Music's Business Affairs Department. She eventually became SVP International Legal & Business

Affairs in 2005 assuming responsibility for all WCM's business affairs worldwide ex US & Canada, alongside strategic issues such as collective rights management and digital rights. In October 2015, Jane was appointed CEO of the MPA Group of companies.

What is the role of a collection society?

The music publishers association that I run has a collection society called MCPS and that is collecting money on behalf of its publisher members. From a commercial point of view, almost all publishers use MCPS for broadcast licensing and for collecting monies from record sales, but not all publishers use MCPS for online licensing as this tends to be licensed on a multi-territory basis. The main sources of income at MCPS are therefore record sales, online and broadcast. Online income is increasing, album sales seem to have stabilised and broadcast is stable as well. MCPS is a mechanical right society that is administering reproduction rights as opposed to PRS in the UK, or ASCAP and BMI in the US, which are performing rights societies. In the UK, if you are a writer or a publisher you need to be a member of the performing rights society and you give PRS exclusive rights across all pretty much all types of performance income.

How does streaming impact the music publishers...?

Firstly, it is important to separate the paid subscription from the ad-supported streaming model. I think the ad supported model is a challenge to music publishers while the subscription model is an opportunity. As with any new business models, it is difficult to tell what your revenues are going to be. Under the traditional model, publishers are used to think in terms of record sales. They know that they would generate about 50p per album sold and they can therefore estimate how many albums they need to sell in order to recoup their advances. We are still struggling with the technology required to be able to easily process trillions of lines of data (vs. millions of lines before) that come with streaming. So there is a technical challenge, the flow is not

yet real time, making it much more difficult for a publisher to know what a song that is streamed on Spotify is going to pay out.

... and songwriters?

You can look at that in a number of ways. Songwriting is a career you can pursue whether or not you are an artist. If you are an artist you have got access to other revenue streams like touring fees and endorsements. If you are a songwriter it is hard because you have a very speculative career based around having to pay for yourself, going to studio sessions not knowing whether you've got a song or a cut and that applies whether you are an unheard of songwriter or whether you are the most successful songwriter in the world. So if your income is dependent on ad supported streaming services it is very hard to get proper compensation for your revenues - that's one issue. The next issue is the amount of time it is taking to get the money through the pipes as it gives current songwriters a false impression of how much money they are earning from services. So there is a delay, there is the processing time, there are all sorts of problems with how ad-funded services want to account and how the societies want the latter to account. It is very likely that the money songwriters are seeing on their royalty statements is less than it should be. So what does a steady state look like? Once all that money is getting through, will they still be making enough money from streaming services? We are currently in a market where you cannot take any figures with any accuracy. However, another way to look at it is to say, overall, is the business growing or in decline? And overall the business is growing slightly.

What do you think could be done to address these inefficiencies?

To work properly the system requires invoicing protocols to be agreed between collection societies, and for societies to have the ability, preferably working together, to develop systems which can process and distribute many billions of lines of data in a timely and accurate manner.

Do you think the recent EC copyright draft directive could have any impact on the monetization of music content?

It is draft legislation at this stage so it's a step in the right direction, but could change significantly one way or another before it comes out. It doesn't put much

requirement on YouTube to do anything other than behave commercially which I expect YouTube would say they are doing anyway. I think it's too early to tell really but it is certainly a step in the right direction.

How are royalties set for publishers?

Subscription services are paying a share of the monthly subscription as royalties, but you don't know what your share of that is going to be as royalties are paid out on a basis of all of that money going into a big pot and being divided by the number of plays. So you don't know in advance the amount that will be paid out per play. If more people listen to the service during a particular accounting period then the per-play payment is going to reduce because it is a finite pot of money. So it is not going to be a straight line increase against the number of plays and the royalties that come out. In the case of an ad-funded service, the only source of income is advertising and therefore it is completely dependent on the strength of the advertising business.

What is your view on Apple's proposal to change the way songwriters are getting paid in the US for digital services? Any read across for Europe?

Things work very differently in Europe and all of the negotiations in Europe are happening individually with different companies behaving differently in the market. It would be great if there was a sensible per stream rate paid by all services. Certainly it is our hope that over time we will be able to drive up the rates so they properly reward the creative endeavors of those whose content it is, but that will be a slow process.

Do you expect the publishers' role to evolve to a more administrative role over time?

If you are a publisher, you are not in the business of setting up an administration office, you are in it to discover talent and invest in talent and see that talent become successful. However, it is essential that you have strong administration in order to properly collect all monies due.

How do the 3 major publishers differentiate from one another?

All three companies are run differently because they have different requirements at the executive level, but they largely perform the same job.

Will writers still need publishers and how easy is it for songwriters to change publishers?

If you are a kid and you put your songs on YouTube and your songs are successful you will start to earn money from YouTube and you won't necessarily think about getting a publisher because you'll be getting some money from YouTube. However sooner or later you will think you are not getting any money from the BBC or television or someone has asked to use your song in a film and you don't know what to do... So sooner or later you will go looking for a publisher. How easy is it to change publisher? There have been lots of law suits over the years - Elton John was one of the first writers in the 70's who filed lawsuits because they'd been tied to publishing agreements for their whole career and those agreements started to be overturned. But now, it would be standard to do a deal that has 4 contract periods. The first contract period could last anything from 1 to 3 years and there is an option after that for the publisher to continue. Then usually when they exercise the option then money is paid out and maybe the deal terms improve slightly and that's all agreed at the beginning when you do your agreement and all publishers usually insist that writer have proper representation in that early negotiation. Usually, if they have been successful songwriters are not tied to a publisher for more than around 12 years.

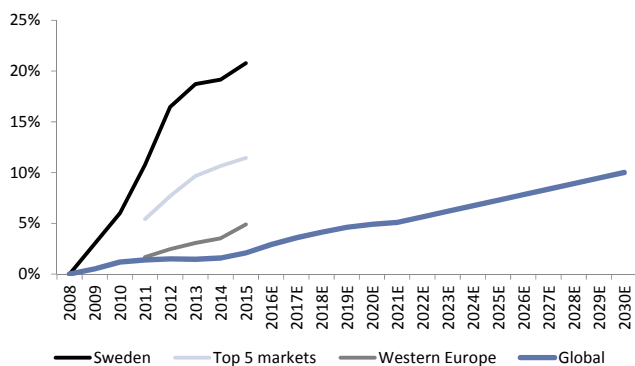
Subscription streaming platforms have significant growth potential but also face growing competition

We see strong growth prospects for streaming services with the growth in smartphone penetration and improvement in connectivity enabling greater convenience and access on the one hand, the proliferation of online music services and bundles driving greater awareness and adoption on the other. We identify the main growth drivers below:

- 1) Market penetration is currently low**, with 2% of smartphone owners subscribing to a paid streaming service globally and another 4% using a freemium, ad funded service excluding YouTube (140 mn). As discussed earlier, we forecast the subscription and non-subscription base to grow to 9% and 13% of smartphone users respectively by 2030.

Exhibit 103: We forecast global paid streaming penetration to reach 9% by 2030, slightly below the top five markets today and half the rate attained in Sweden

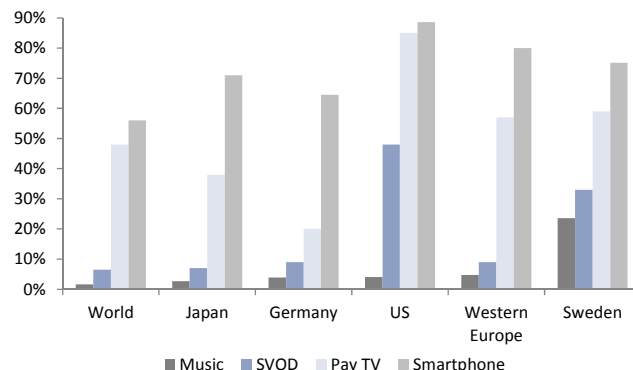
Paid streaming penetration as % of smartphone subscribers



Source: IFPI, ZenithOptimedia, Goldman Sachs Global Investment Research.

Exhibit 104: Streaming penetration stands at 2% globally compared to 6% for SVOD and 48% for Pay TV

Paid streaming penetration as % of smartphone subscribers, SVOD penetration as % of broadband homes, Pay TV penetration as % of TV homes, Smartphone penetration as % of total population



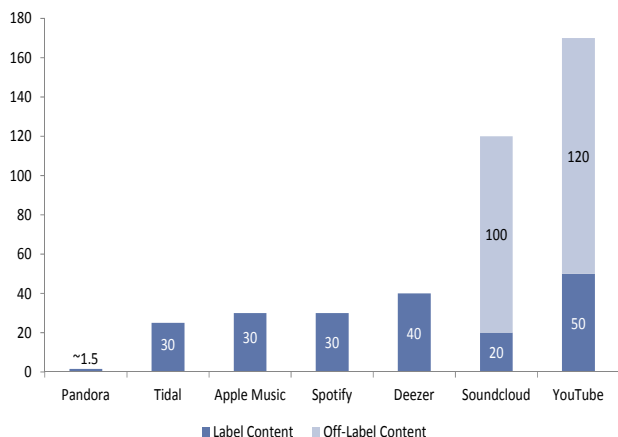
Source: IFPI, Digital TV Research, ZenithOptimedia, Goldman Sachs Global Investment Research.

- 2) The opportunity to segment the market** to tailor to different tastes (local vs. global content, genres, etc.) and financial conditions (family vs. student plans, EM vs. DM), means that multiple players can co-exist and grow in our view.

- Spotify** is the incumbent and leading music streaming service in the world with around 80 mn ad-funded users and 40 mn paid users across 58 countries (source: The Verge/Spotify). Relative to other streaming services, Spotify appears more mainstream and has a greater emphasis on younger demographics given the availability of discounted student plans and telecom bundled deals (Spotify reported that 77% of its users are Gen Z/ Millennials). Spotify’s ad-funded freemium tier helps it reach a wider audience (basically anyone with a broadband/ mobile access and a connected device) which it then aims to switch onto its paid subscription service. The proportion of paid users increased from 7% in 2010 to 33% as of August 2016. Despite being the incumbent player, Spotify has hardly been affected by the launch of other streaming services, including Apple Music in June 2015. Spotify added 15 mn paid customers between June 2015 and June 2016, as many as the number of paid users it added between 2012 and June 2015 or even more than the number of paid subscribers it had cumulated since inception in 2008 until the end of 2014. This is an encouraging sign that multiple streaming services (with different market segmentations) can co-exist, and that the proliferation of new services contributes to awareness of such services and growth of the overall market.

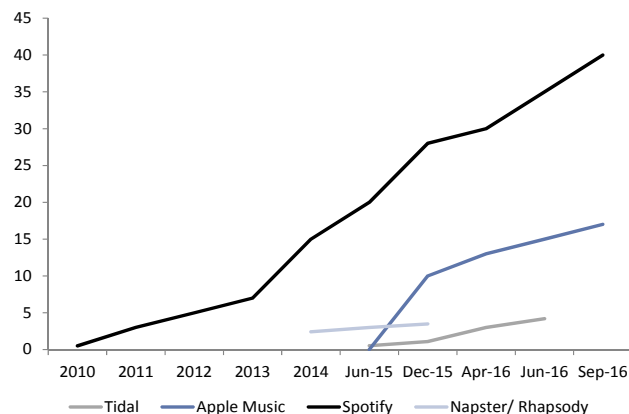
- Like Spotify, **Deezer** offers a freemium and a paid tier, but with the particularity of deriving a large portion of its subscribers from telecom partnerships (50% in 2016 from 80% in 2014 although 60% were then inactive bundled users). Deezer recently launched a paid only streaming service in the US.
- **Apple Music** operates a paid only service with no ad-funded free tier. It has a greater bias towards families (with its \$14.99 family plans) and iTunes accounts giving it an enviable access to 800 mn credit cards on file. Apple has also made its service available to Android smartphones. Launched in June 2015, the service counted 17 mn paid subscribers as of September 2016.
- **Tidal** operates a more niche, high end paid-only service with a greater focus on exclusivity (nine exclusive album releases) and high sound quality. As of March 2016, 45% of subscribers were on the \$19.99 hi-fidelity, lossless audio/video tier, despite costing twice as much as the standard tier (source: Billboard). Unlike other platforms it is also backed by a number of renowned artists, counting 16 artist-owners at launch who each received a 3% stake in the company (incl. Jay Z, Beyonce, Rihanna, Madonna, Kanye West, etc.). The launch of exclusives has had a clearly favourable impact with the number of subscribers jumping to 2.5 mn from 1 mn after the exclusive release of 'The Life of Pablo' by Kanye West in February 2016 (source: TMZ). Tidal said it added another 1.2 mn subscribers after the release of Beyonce's 'Lemonade' in April 2016 (NYT, May 13, 2016).
- **YouTube Red** is a paid-only service launched in October 2015 that gives access to all YouTube video content free of ads as well as Google Play Music. It also includes exclusive access to YouTube Red Originals which are new, original shows produced by some of YouTube's biggest creators. The service is so far only available in the US, Australia and New Zealand, with no subscriber figures having been made available as yet.
- **Amazon** offers over one million songs for free for its Prime customers ("Prime Music") and is reported to be soon launching a paid music subscription service that would cost the usual \$9.99 pm for unlimited access on any device and \$4-5 for unlimited access exclusively on Amazon's Echo Player (MBW, September 2, 2016). Amazon currently counts over 300 mn active customer accounts.
- **Pandora** recently signed a direct licensing agreement with the major labels to launch an on-demand paid service with multiple price tiers in the US later this year, alongside its existing internet radio service (which has a base of 78 mn active users). MBW (September 19, 2016) suggested that Pandora will launch three tiers including a \$5 on-demand service with more limited functionality (which only allows users to soft-download a limited number of tracks) and an \$9.99 unlimited on-demand service.
- **iHeartRadio** recently announced plans to enter the on-demand market in January 2017 with two new packages - iHeartRadio All Access, a \$10 per month full on-demand music subscription similar to Spotify Premium or Apple Music, and iHeartRadio Plus, a \$5 per month ad-free radio listening offer according to MBW. iHeartRadio already signed all three major labels ahead of the planned launch. IHRT digital radio service, iHeartRadio, currently counts c.90 mn users.
- **Local services** such as Saavn in India or QQ Music in China are more focused on local repertoire and have their own specific features.

Exhibit 105: Streaming platforms libraries compared
 Number of tracks available on digital streaming services (mn)



Source: Activate, press reports.

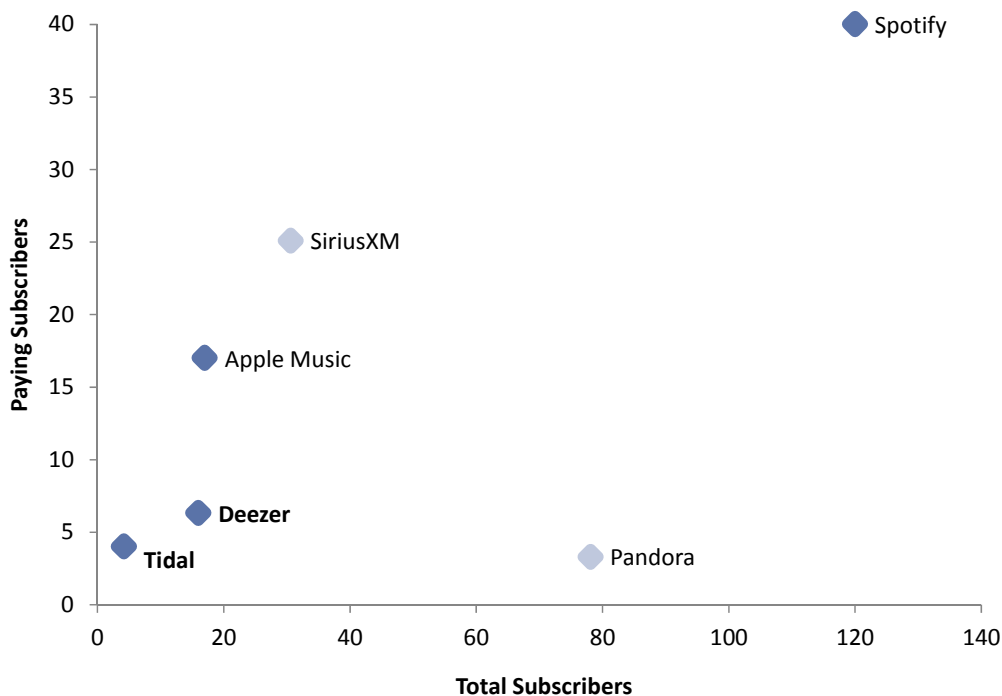
Exhibit 106: The launch of new streaming services has not had any major cannibalisation effect
 Number of paid subscribers (mn)



Source: Spotify, Billboard, Napster.

Exhibit 107: Spotify leads among streaming services both in terms of paying and total subscribers

* Dark blue: interactive streaming services; paying and total subscribers (m)



Source: Company data, press reports.

Exhibit 108: Key platforms and their differentiating features

Streaming Service	Total Users	Paying Subs	Type of Streaming	Free Version?	Paid Version	Exclusives	Defining Features	Target Audience
Apple Music	17 mn	17 mn	Interactive	Yes: 3 month trial	\$9.99/month \$14.99/month: family plan (up to 6 people, each with their own account)	Taylor Swift Drake Frank Ocean Chance the Rapper	Simple interactive streaming Curated playlists Beats 1 radio Music available offline	Higher-end and users of Apple Products (focus on families)
Spotify	120 mn	40 mn	Interactive	Yes: ads, limited listening time	\$4.99/month for desktop & laptop, no ads. \$9.99/month lets you use all devices, no ads (1-month free trial)	-	Simple interactive streaming Curated playlists Music available offline	Main-stream (especially Students)
Tidal	4.2 mn	4 mn	Interactive	Yes: free for 30 days	Tidal Premium (standard sound quality) - \$9.99 standard plan/ \$8.49 value plan. Tidal HiFi (hifi sound) - \$19.99 standard plan/ \$16.99 value plan Family Plan: Gives other members (up to 4) their own logins for 50% of normal fee	Kayne West Beyonce Prince Jay-Z Rihanna	Simple interactive streaming Ability to import playlists from other streaming devices through Soundiiz.com	Music enthusiasts (through high quality sound & exclusives)
Deezer	16 mn	6.3 mn	Interactive	Yes: ads, unlimited music on computer & tablet	\$9.99/month (ad-free, 1-month free trial) \$20/month , high quality audio experience Deezer Elite (CD quality audio): £14.99/ month for 12 months & £9.99/ month for a year (£120 paid upfront), £9.99/ month for 2 years (£240 paid upfront)	-	Simple interactive streaming Curated playlists Music available offline	Main-stream & use in telco bundles
Sirius XM	30.6 mn	25.1 mn	Non-Interactive (Satellite Radio)	Yes: 7 day trial	Sirius Select: \$14.99/month for over 140 channels. Sirius All Access: \$19.99/month for 150+ channels and online listening. Sirius Mostly Music: \$10.99/month 80+ channels (\$4 extra to listen online)	-	Satellite Radio	Main-stream & use in cars
Pandora	78.1 mn	3.3 mn	Non-Interactive (Webcasting) Interactive service launching soon	Yes: limited skips, ads, reduced quality	PandoraOne: \$4.99/month for new subscribers (from May '14); \$3.99/month for existing subscribers Pandora Plus: \$5/month update of PandoraOne , unlimited skips, no ads, replays, offline listening (4Q16 launch) \$10/month full on-demand streaming service (4Q16 launch)	-	Users create their own radio station The Music Genome project generates recommendations	Main-stream
iHeartRadio	90 mn		Non-Interactive (Webcasting) Interactive service launching soon	Yes: limited skips, ads	iHeartRadio Plus \$5/month ad-free offering (Jan 2017 launch) iHeartRadio All Access \$10/month full on demand service (Jan 2017 launch)	-	Users create their own radio station or listen to live radio	Main-stream
Amazon			Interactive	No	\$9.99/ month \$4/\$5/month for streaming on Echo	-	Standalone from Prime	Main-stream
YouTube Red			Interactive	Yes: YouTube	\$9.99/month \$12.99/month for iOS users	-	Watch videos ad free Offline viewing Listen to videos with the screen off	Users of YouTube

Source: Company websites, press reports.

3) Opportunity to better leverage their promotion capabilities (e.g. playlists), user data and customer relationships to (1) help in their future negotiations with labels, (2) drive more advertising revenue on the freemium tier (cf Spotify partnership with the Rubicon Project), and (3) create new adjacent revenues such as ticketing sales (cf Pandora's purchase of TicketFly). In particular, streaming services are becoming a much more important partner for labels and artists as their data analytics fundamentally change the way music consumption is measured and promoted and how new artists are being discovered:

- **Promotion capabilities:** we believe playlists will become an increasingly important promotion tool for artists with one in five plays on Spotify now occurring inside a playlist. Algorithms would even amplify the loudest voices as the highest trending artists will be brought forward in the suggested lists. Spotify's Discovery Weekly playlist of 30 tracks generated over half of the monthly streams for 8,000 artists in June 2016 according to the company and 40% of Spotify users listen to it.
- **User engagement:** while labels have never had control over the distribution and direct access to consumers, it has become much easier for artists to directly engage with their fans on streaming and social media platforms. Apple Music's Connect platform, for example, allows artists to directly reach their fans offering them the ability to post music, videos, photos and status updates in real time.
- **User data informs better decisions:** Labels can use the data to track digital sales and streams on different platforms. Artists can leverage social network statistics and listener data to adapt to their fans' ever changing tastes and even inform their tour

decisions. Social media in particular has become a critical tool for artists to ensure they stay relevant.

- **Artists are more easily discovered:** Labels are increasingly following the trending artists on SoundCloud or YouTube and the number of followers they have on social media platforms to sign up new artists.

4) Execution and innovation will become increasingly important. As having a comprehensive music library becomes a prerequisite, **differentiation through data analytics and curation capabilities** among the streaming platforms will become increasingly important to drive customer growth. This puts incumbent streaming platforms such as Pandora or Spotify at somewhat of an advantage as they have already accumulated a vast database.

- **The importance of personalized curation:** Consumers have never had it better in terms of convenience, discoverability and personalization of their music thanks to technology that is powering selection algorithms and integrating social network relationships. Spotify's "Discover Weekly" introduced in July 2015, which automatically generates a tailored two-hour playlist every week, is internet-scale curation demonstrating that algorithms can tailor a playlist to someone's tastes. It now has 40 mn users among the more than 100 mn Spotify subscribers (IEEE Spectrum, September 2016). Apple Music, on the other hand, has chosen a more human approach whereby leading music experts curate the music. Apple's Jimmy Iovine stated that "Algorithms alone can't do that emotional task. You need a human touch." Reports suggest that both Spotify and Apple Music hired radio veterans to help with their programming and curation capabilities (MBW, July 16, 2016), proving that a mix of the two approaches might bring the best results.
- **Platforms build brand loyalty:** The fact that the streaming services allow subscribers to create their own playlists, follow friends and engage with a community of followers ensures customers are committed to a service with little incentive to switch as song libraries are not typically transferrable from one service to another (exc. Apple Music allowing the transfer of the iTunes library).

Spotify's "Discover Weekly" – who said algorithm driven playlists can't read your mind?

"Discover Weekly" defined... It is a Spotify feature that generates a personalized 30-song playlist for each of the more than 100 mn users every Monday based on their listening habits and other playlists using algorithms.

First steps... Spotify introduced the "Discover Weekly" playlists in July 2015. The idea behind it came from the team that was working on Spotify's Discover page that did not take off with consumers. Once powered with – at that time – an algorithm prototype aimed at putting recommendations in a playlist, it gave birth to the "Discover Weekly" feature.

Becoming a major success... The personalization and curation capabilities have been a major success with consumers as witnessed by Spotify's search for feedback on Twitter: "At this point @Spotify's Discover Weekly knows me so well that if it proposed I'd say yes". Because of high demand, Spotify even suffered a service outage in September 2015. As of August 2016, the playlists are listened to by more than 40 mn people with more than 6-7 bn tracks having been streamed (AdWeek, August 28, 2016). In May 2016, Spotify reported that more than half of Discover Weekly's listeners streamed at least 10 tracks from their personalized playlist, while more than half of listeners came back again the following week.

A competitive advantage... We argue that as major streaming services have similar catalogues, knowing the customer base and offering them the most convenient service becomes a source of differentiation. This gives Spotify an advantage over the services that are still to launch in our view.

5) Scale will become more important. The streaming industry has relatively high barriers to entry given the need to meet rights holders' minimum revenue requirements and secure a broad catalogue based on multi-year agreements with labels. A new streaming service has to sign 30 different licensing deals in order to launch on a pan-European basis for instance.

We identify two key risks however for streaming players (for further detail, see second of the double album: "Paint It Black"):

- **The growth potential of the streaming market and the strategic importance of such services (interactions with users) attract a plethora of players, which will likely lead to intense competitive pressure.** Among the main risks for streaming services (and ultimately for rights owners) is the pursuit of greater differentiation through exclusivity and windowing to the detriment of the user experience. A recent move from leading label UMG, which reportedly ordered its labels to ban any exclusives with streaming services, could help curb the growth of this practice in the industry. Another source of disruption could come from tech giants (Google or Amazon) who are ruled by a different set of economics and can use music as a loss-leader. Apple's recent proposal to the CRB to shift to a statutory rate of \$0.091 per 100 streams for songwriting royalties applicable to all interactive streaming services in the US (except Apple which has a direct deal with publishers) seems to be intended as a competitive move against pure streaming players. That said, **we believe labels will be careful to keep a minimum level of competitive tension among the distributors** and therefore ensure the economics work for pure streaming players. We note that the major labels also own stakes in the major streaming services such as Spotify (UMG, Warner, Sony) and Deezer (Warner).
- **With no interactive streaming service currently being profitable, the economic viability of such business models is yet to be proven.** Internet radio or online streaming platforms are still trying to find the right balance between freemium and subscription revenues to fund growing royalty payments and, in the case of interactive services, minimum guarantees. Recent developments point to a greater emphasis on the paid model given growing complaints from artists about the free window – cf. Taylor Swift's decision to remove her entire back catalogue from Spotify in 2014. Most new services now only offer a paid tier such as Apple Music and Deezer in the US, with Pandora set to launch its on-demand service later this year and Amazon reportedly doing the same. Spotify is also said to be introducing its premium-only music windowing later this year (MBW, September 5, 2016).

Streaming services currently redirect around 70% of their revenues to rights owners (70% for Spotify; 71.5% for Apple Music in the US/73% outside of the US according to Recode), and we estimate they have to incur another 10%-15% of costs of goods sold. Producing original videos and other content, pursuing new revenue streams such as ticketing (Spotify recently partnered with Songkick and Pandora acquired Ticketfly), seeking partnerships with telecom operators (to lower customer acquisition cost) and the ongoing improvement in paid user conversion rates could help improve their profitability. Encouragingly, Deezer reported that it generated a 13% EBITDA margin in France in 1H15, its most mature market. Spotify's UK accounts showed that it generated a 16% operating profit margin in 2013 which however fell to 2% in 2014 owing to higher cost of sales and administrative expenses.

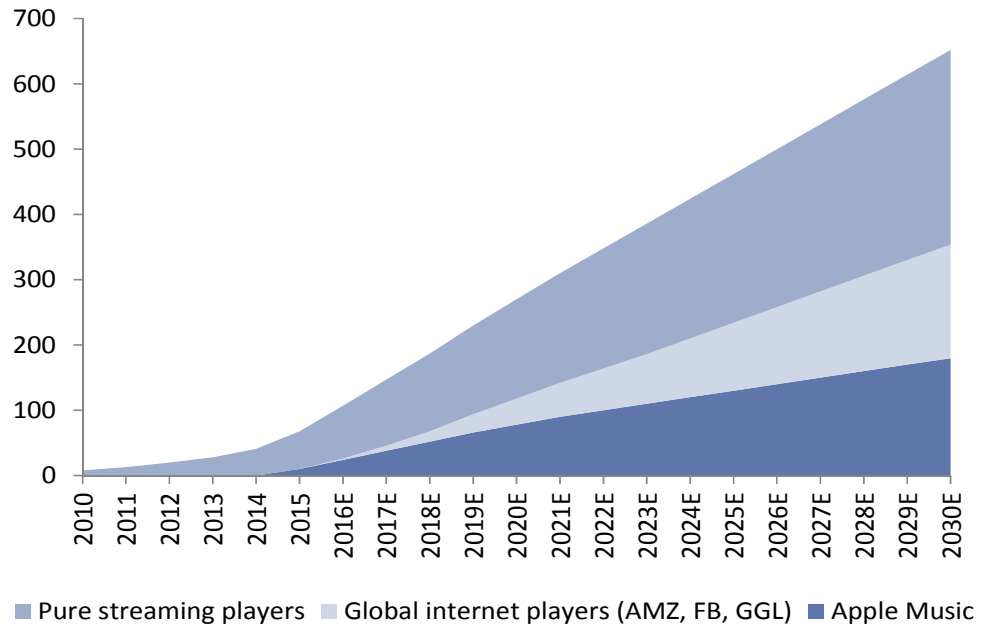
Over time, we expect to see more consolidation in the space. A few streaming services have already been discontinued (Rdio, Beatport, Zune, etc.). Apple has been reported to be interested in acquiring Tidal (Wall Street Journal, June 30, 2016). Sirius XM's owner Liberty Media was recently reported to have made an offer to buy Pandora which the latter rejected (Wall Street Journal, July 21, 2016).

As a result of these conflicting trends, **we believe streaming platforms' distributor cut will remain at around 30%**. This would leave them with a revenue (net of royalty payment) pool of \$14 bn in 2030E, from \$1 bn in 2015, and a profit pool of \$4-6 bn

based on long-term operating margins of 10%-15%. We expect the large tech entrants (Google, Amazon, BAT, etc.) to increase their market share of net adds to 30% by 2020 (from nil in 2015), meaning pure-play services (Spotify, Deezer, Pandora, etc.) will decrease from 63% in 2015 to 40% and Apple Music from 37% to 30%.

Exhibit 109: Future subscriber growth to be divided among three major groups of streaming players

Number of subscribers (mn)



Source: Goldman Sachs Global Investment Research.

An interview on music streaming with...

Dr. Hans-Holger Albrecht, CEO of Deezer



Dr. Hans-Holger Albrecht is the CEO of Deezer and a member of the company's board of directors. Prior to assuming his current role in February 2015, Albrecht served as president and CEO of media groups Millicom and Modern Times Group.

Deezer was one of the first streaming services to be launched in 2007. A number of new streaming services have launched since. Is there room for everyone? How can you differentiate yourself?

There is no one single streaming model fitting all countries in the world. We are just in the early days of streaming growth with global penetration being only 3%-4% in mature markets with plenty of opportunity for players to define their niche. In 2015, there were 68 mn streaming subscribers worldwide – which give a much lower penetration of the population. The biggest challenge for the new entrants is to build a compelling product – some of the incumbents, including Deezer, have spent years in acquiring content, building a multi-local product (languages, currencies, etc.) and developing the algorithms and data analytics that are hard to replicate – it takes time and significant funding. We also differentiate ourselves through the Flow product that creates an individually personalised listening experience the moment you press the button. It is much more responsive than a playlist that is updated every week. Another differentiation point lies in our go to market strategy – we have cultivated a partnership model that helped us build a strong position in Europe and expand in emerging markets.

Regarding your go to market strategy, you've been more reliant on telecom partnerships than others; do you still think this is the best strategy?

It really depends on the cycle of the market you are entering. It certainly has its limits, but it has proven to be the best strategy so far in entering emerging markets, but not only. It's a great way to scale quickly in a very cost efficient manner as you can leverage telecom operators' brand and marketing capabilities. However, we do realise the importance of direct customer acquisition and that is why we have gradually shifted our model from 80% of revenues being telco partnership driven five years ago, to less than 50% currently.

How do you view the competition from the larger internet players and what's the role of labels in ensuring competition is balanced?

Take Apple for example, it has around 20% of the global smartphone market, meaning there are still 80% of people who do not use Apple devices, creating room for other players and strategies to succeed as well. It is not easy to compete against the likes of Amazon, Google, Apple, but there are alternative strategies and competitive advantages you can rely on. Regarding the role of labels, I think they learned from their experience of iTunes that dominated 80% of the download market. Their role is to make sure that music has its price while maintaining some competitive pressure in the market.

Is there anything that a label does today that a streaming service can do better?

Labels' core competencies are around research and development, promotion and talent funding. I think streaming services will be able to take over the promotion capability from radio over time. On the funding side, there are artists that want and can do it on their own. But that doesn't mean we are competing against labels at this stage, it is more of a partnership and we are exploring opportunities together.

What do you think of exclusivity and windowing? Is it something you might be tempted to explore as well?

We could do that if we wanted to, but we see it as a major risk to the industry as a whole. The biggest competitor we have is piracy still – the moment we make the experience more complicated, the consumer will shift back to piracy. Look at what happened with Frank Ocean's exclusive that was illegally downloaded 750k times in a week and that probably meant a lot of money was lost. It is very naïve to think that people will go to different streaming services for different artists. Windowing, on the other hand, is interesting, but unlike sports events, it is really difficult to drive conversion from windowing while piracy remains a risk. Consumers join Deezer for the convenience and the music experience. Exclusivity and windowing risk destroying the model.

There are a lot of complaints from artists and labels against streaming services' free tier. Do you believe there is a future for freemium?

As long as the freemium model demonstrates that it converts people to pay, I do think there is a way forward. I also think that if artists complain about not being paid enough by the freemium tier they should be at least twice as angry against YouTube that directly competes against the free tier. YouTube has around 900 mn users and pays only 30% of the fees paid by subscription streaming companies to the labels and generates 20 times lower revenue per user. There is a huge value gap in that respect and labels will have to do something about it.

Will we see a streaming-only future and when? What level of paid penetration do you think we could get to?

I can't see any reason why other markets wouldn't get to Sweden or Norway's level of paid streaming penetration at around 25% of total population over time. Factors that can affect that trajectory are consumer behaviour around music – look at the Germans that are shifting to streaming very slowly or Japan that has a peculiar way of bundling CDs – and also further integration of streaming services (in cars, at home, etc.). Consumer education will play an important role as people are used to having music for free and a lot of them still like the ownership model. We have to explain to them the value proposition and the fact that we are not simply replacing download with streaming but rather offer them a completely new experience. Another factor will be the level of market development – emerging markets will shift to streaming right away for example. I think the potential is there, it is more a question of how fast we'll get there and what will be the trigger to accelerating growth.

How does Deezer pay labels/songwriters?

A couple of years ago we paid over 90% our revenues to labels and that has come down to 75%. We are negotiating with labels on a daily basis and the rates tend to come down over time, but the absolute amount is going up, so it is a win-win situation. One of the reasons why the royalties are coming down is because we can provide labels with data around the end customer.

None of the streaming services are currently profitable – what's your breakeven horizon and where do you think you can get to in terms of margins?

The business model is driven by three cost components: royalty payments to rights owners that are structurally coming down; product development and overhead costs that are currently high because we are in a start-up mode but will come down as percentage of sales as we gain scale; and finally marketing costs that are at our discretion. I'm not concerned about profitability as such as it would mean we miss out growth opportunities. The question is more what sort of operating margins we believe the industry will have and that's a wide range from single digit up to 20%.

Streaming services, labels, artists: how do you see the balance of power evolve in the future?

I wouldn't say it is all about a power shift, but rather about the opportunities we have by bringing more transparency to artists and more convenience to customers. Currently, c.90% of music industry revenues are coming from six or seven markets. And all of a sudden, we can build a model that brings double digit millions revenue from Colombia for example. Deezer is in a favourable position as it has the relationship with the end consumer and the data around it. That is why the labels have invested in us, they have to adapt and I can say they have been doing ok so far.

What do you think of the ad revenue opportunity in streaming given how large the radio market is?

When you consider that half of the usage on Deezer is a radio-like experience, i.e., in lean back mode, it gives you an idea of the impact it can have on radio. It is definitely an opportunity for streaming services to tap into the radio advertising market. It is difficult to say at this stage whether this will be done through acquisitions or organically, but the opportunity is definitely there.

What do you think of the current promotional activity in the market and how sustainable is the \$9.99 price?

Promotion is a tactical thing that you do in every subscription model as you try to get the customer over the finish line. They are normally locked in for three months or so and that's fine. The 9.99 is a given price by the label, but to be fair, if you look around the world we have more pricing points already – we have the family packages where you can sign up to six people for 14.99, we have different pricing points in the emerging markets, with the telco partnerships sometimes – so the 9.99 is not set in stone and we all adapt. I think the key point is that music is not cheap. With most of our costs being variable, if the price point goes down or royalties go down our margin as a percentage of revenues does not change.

You mentioned data analytics being a key differentiator for Deezer. Can you elaborate on that?

Today we collect around 10 bn customer data points every month and we have been using data for the past 10 years. This gives us a deep understanding of the individual customers in terms of what they listen to, where, how, their music tastes, etc. It then helps us build the consumer experience – we bring the over 40 mn tracks into personalised playlists or adapt it to the consumer's own music consumption style. I think people underestimate how difficult it is to launch a new streaming service, that will have to build the data analytics from scratch. Through our partnership with the labels, for the first time they have access to that data. Once you know the customer, you can build adjacent revenue streams such as ticketing for example. But we have to be careful not to ruin the experience.

Ad funded streaming to eat into terrestrial radio

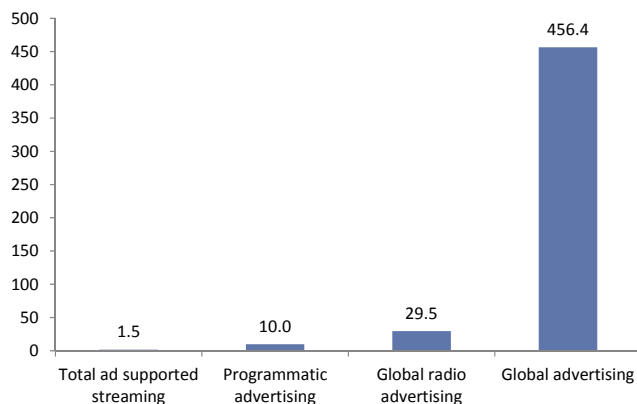
We believe ad-funded streaming (on YouTube, Pandora, Spotify, etc.) will become increasingly relevant and appealing for advertisers given the exponential growth in online audio and video consumption especially on mobile devices, the ability to better target and interact with consumers, and the opportunity to do so by leveraging programmatic advertising technologies.

We estimate the current ad funded market to be worth \$1.5 bn globally and expect this to rise to \$7 bn in 2030 – this includes revenues from purely ad funded websites (YouTube, etc.), advertising revenues from freemium services (Spotify, Deezer, etc.) and advertising revenues from digital radio services (Pandora, etc.). Note that these three items are reported under different definitions in the IFPI data (IFPI’s ad funded revenues only refer to websites such as YouTube, freemium revenues are included in paid streaming and online radio in other digital revenue). We see a huge addressable market with the global advertising market worth \$456 bn, global radio market \$30 bn and programmatic advertising \$10 bn in 2015 (MAGNA Global).

In the US, we see online radio as a substitute for terrestrial radio services and this shift is particularly positive for labels and artists who currently do not get paid performance royalties from analogue radio. Consumption of radio under its analogue form remains dominant at 54% (4Q2015, Edison Research) but is decreasing: the US Radio Advertising Bureau reported that average listening hours has decreased from 20 hours a week in 2007 to nearly 14 hours a week. A survey from Edison Research shows that nearly half of digital radio listeners are using those services as a replacement for AM/FM.

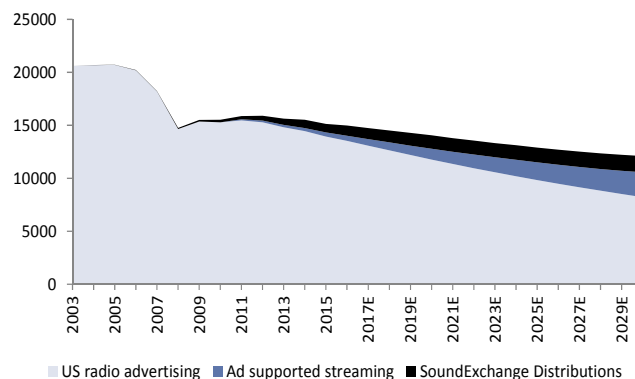
The US ad-funded streaming market was worth \$385 mn and digital radio around \$803 mn in 2015 as per RIAA data and we believe this has the potential to rise to \$2.3 bn and \$1.5 bn respectively by 2030. This compares to a radio market worth \$14 bn in 2015 (MAGNA Global). With half of terrestrial radio consumption still happening in the car in the US, we believe the replacement with newer cars with more advanced dashboards, that are compatible with smartphones or have internet connectivity, will drive greater shifts towards streaming services.

Exhibit 110: The global addressable market for advertising-funded streaming is huge
Advertising spend by category, \$ bn



Source: MAGNA Global, IFPI.

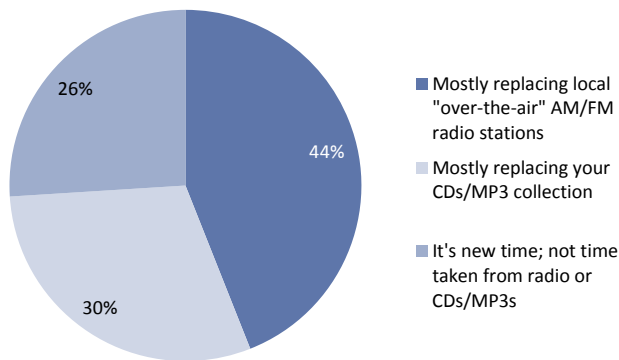
Exhibit 111: We expect digital radio and streaming services to eat into the terrestrial radio ad market in the US
Advertising spend by category, \$ mn



Source: MAGNA Global, IFPI, Goldman Sachs Global Investment Research.

Exhibit 112: 44% of digital radio listening is replacing analogue

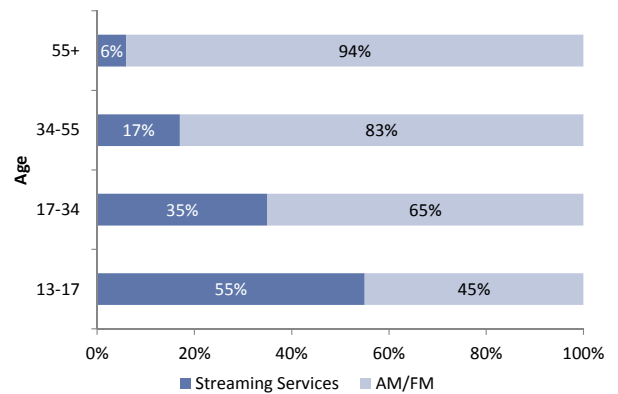
Daily listening to streaming service vs. AM/FM by age group, US, 2014



Source: Edison Research Streaming Audio Task Force, Summer 2013/ IAB.

Exhibit 113: Young listeners spend more time listening through streaming, although AM/FM radio remains the largest overall

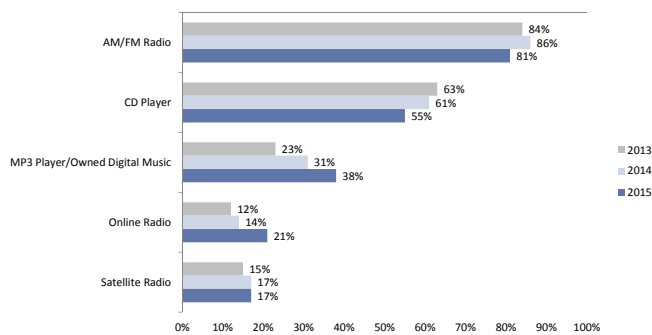
Daily listening to streaming service vs. AM/FM by age group, US, 2014



Source: Activate.

Exhibit 114: AM/FM remains dominant in the car, but decreasing

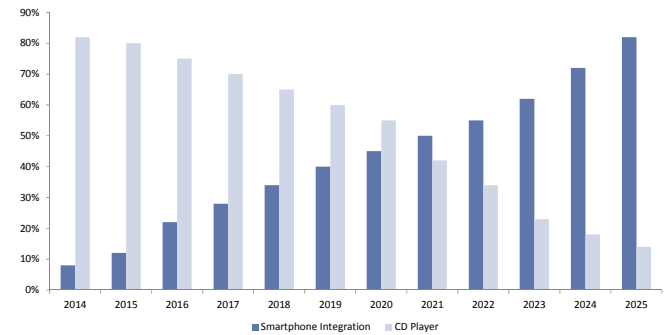
% currently using medium in primary car



Source: Edison Research, Triton Digital, Gartner.

Exhibit 115: Penetration of connected cars is rising and expected to reach 80% in 10 years' time

% of new cars sold with CD players and smartphone integration in Europe



Source: BPI.

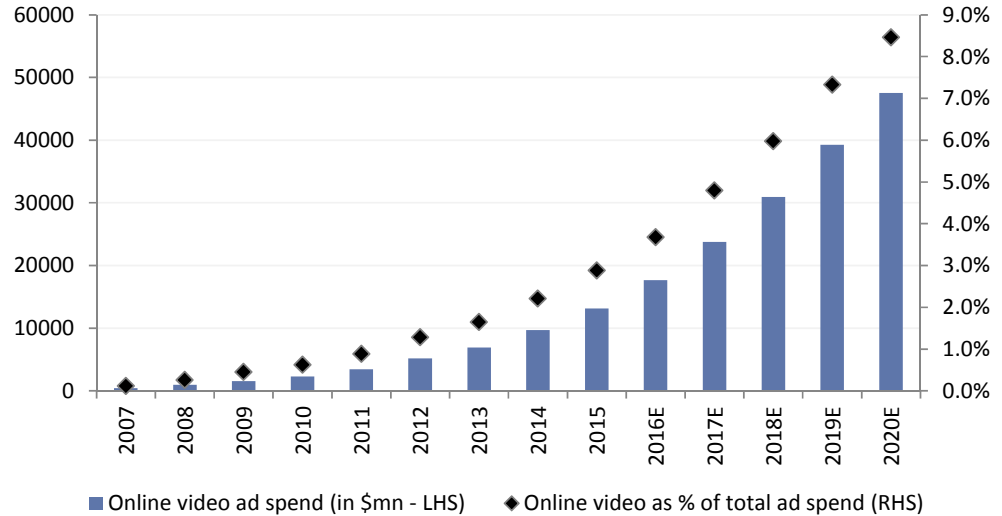
Purely ad-funded services (mainly YouTube) have plenty of growth opportunity ahead, but face greater pressure to improve monetisation for rights holders

The pure ad-funded landscape is currently dominated by YouTube which accounts for c.90% of users according to IFPI. **We see room for YouTube's revenue from music to grow as:**

1. Online video is still c.3% of overall ad spend globally but has been the main driver of online advertising growth (together with social media), growing at a CAGR of 42% over the past five years (as per MAGNA Global). We expect this strong growth to continue; MAGNA Global forecasts a 2015-29 CAGR of 29%. We believe this will continue to be funded by a shift in advertising budgets from other digital formats such as display and also TV.

Exhibit 116: Online video advertising is to reach 8.5% of overall ad spend by 2020E

Global online video ad spend

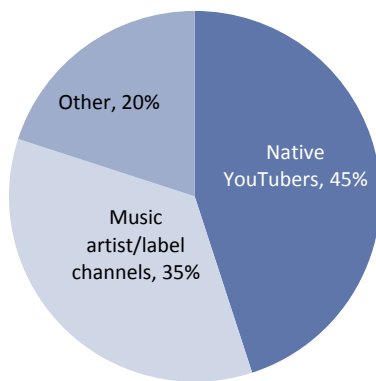


Source: MAGNA Global, Goldman Sachs Global Investment Research.

2. YouTube is particularly well placed to benefit as we estimate the platform accounted for c.40% of the online video market in 2015. We estimate that YouTube revenues grew at a 50% CAGR over 2010-15 and forecast c.30% CAGR over 2015-18, driven by further growth in YouTube consumption and improved monetization as more innovative ad formats are introduced.
3. We see music as an important driver of traffic – around 35% of YouTube viewing is on music artist/label channels, second only after channels of YouTube natives according to FT. IFPI also found that 82% of YouTube users access music content through the service in the top 13 music markets. We calculate that music accounted for around 18% of YouTube revenues in 2015, based on the global ad-funded streaming revenue reported by IFPI and YouTube’s 45% cut (according to MBW), and forecast that share to reduce slightly to 15% of YouTube revenue in 2018.

Exhibit 117: 35% of video views on YouTube are on music artist/label channels

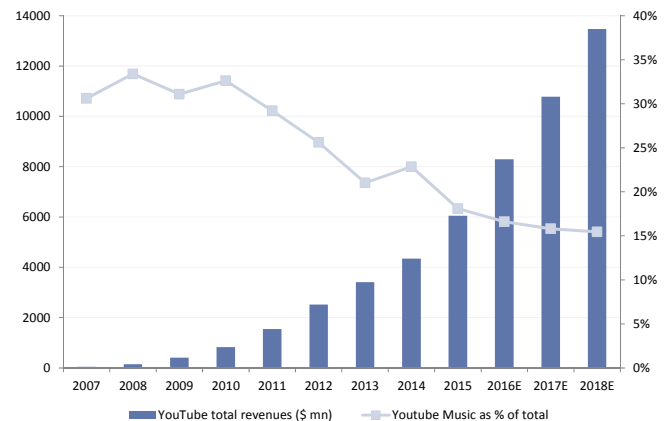
YouTube most viewed channels for last 90 days, Dec 2015



Source: FT.

Exhibit 118: We expect YouTube revenues to reach almost \$14 bn in 2018E with c.15% coming from music

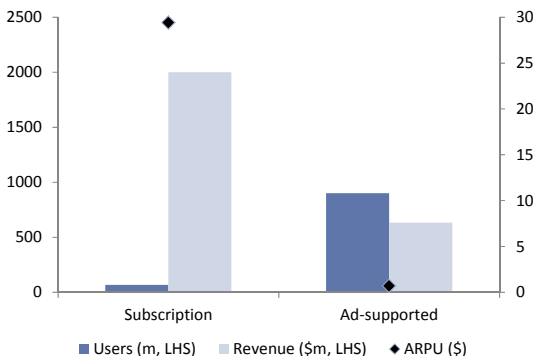
YouTube revenues, 2007-18E



Source: Company data, Goldman Sachs Global Investment Research.

We believe however that YouTube will face ever growing pressure from regulators and content owners to improve the monetization of its videos and redistribute a greater share of its gross revenues. The outcome of the US review of safe harbour rules and implications of the recent EU Copyright proposal will be important in addressing the perceived value gap between the usage and monetization of music on platforms such as YouTube (see section *Future regulatory change could present upside for rights holders*).

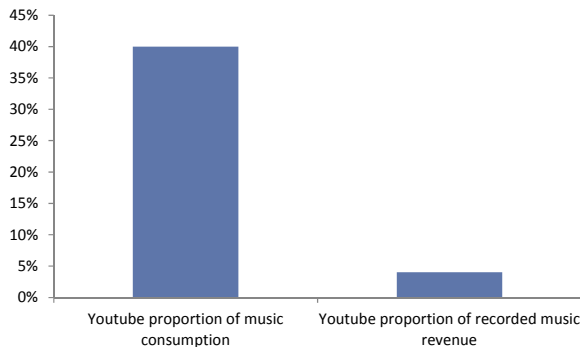
Exhibit 119: There are 13x more ad-funded users (of which 90% is YouTube) than paid users, yet ad-funded generate 3x less revenue



Source: IFPI.

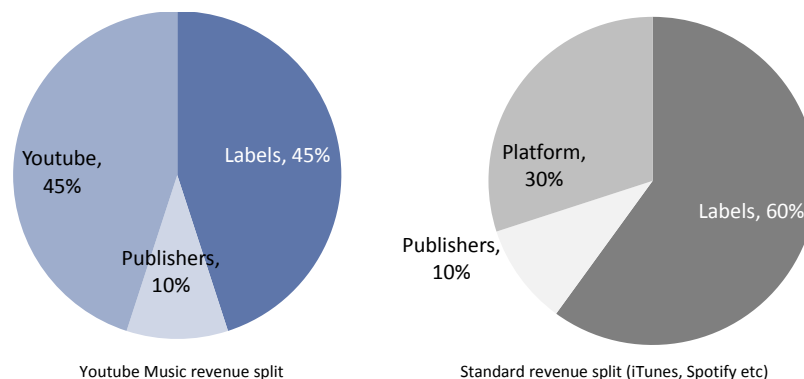
Exhibit 120: YouTube accounts for 40% of music listening but 4% of recorded music revenue

Total streams by service, 1Q-2Q, 2014 vs. 2015 (bn)



Source: Apple, IFPI.

Exhibit 121: YouTube’s distributor cut is 45% compared to 30% for music platforms
Estimated split of YouTube vs. industry standard music royalties



Source: Music Business Worldwide, Press reports, Goldman Sachs Global Investment Research.

VEVO aims to become less reliant on YouTube

VEVO is the leading music channel on YouTube, with more than 18 bn of music video views per month and 850 mn hours of viewed content, of which 60% from mobile. VEVO also claimed 17 of the top 23 YouTube videos with more than 1 bn views to date (April 2016). Recent press reports suggest that VEVO aims to reduce its dependence on YouTube following the re-launch of its app and website and ahead of the launch of a paid subscription service by the end of the year (FT, August 19, 2016). VEVO’s CEO, Erik Huggers, stated that he wanted to position VEVO more as a specialty record store as opposed to YouTube that is more of a “one size fits all” model, while recognizing that there is room for both services to grow and that YouTube will remain an important partner (FT, August 2016). We note that VEVO has just signed a distribution deal to include for the first time WMG videos on its apps and website but not on its YouTube pages. VEVO is currently owned by SME and UMG (40% stake each) with Abu Dhabi Media and Alphabet also owning small stakes.

Pandora

In the US, Pandora has rapidly grown to 78 mn active users of which 4 mn are paid subscribers, and we forecast total active users to grow to 90 mn by 2020, a 2% CAGR. Pandora reported 10.1% share of total US radio listener hours in 2Q16, which we forecast to grow to 12.4% by 2020. We believe that the leverage in Pandora's model lies in the company's ability to shift its advertising from national and remnant to a majority local mix, similar to the majority local mix of terrestrial radio. Local is the fastest growing part of Pandora's advertising revenue, accounting for 28% of ad revenue in 2Q16 (up from 20% just two years prior), while local commands eCPMs that are 2.5-3x greater than national ads. BIA/Kelsey forecasts location targeted mobile ad spend to grow from \$9.8 bn last year to \$29.5 bn in 2020, though that figure does include some national brand advertising.

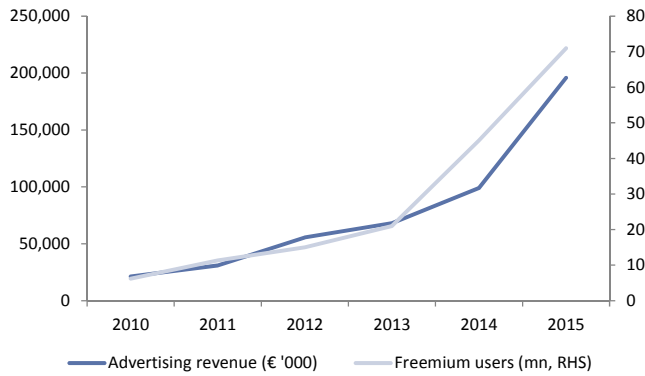
While local sales dollars are more expensive to acquire as they take more investment in both people and time, the leverage they generate from superior pricing more than makes up for the increased cost of sales on that revenue. Importantly, driving incremental local ad sales is more accretive to Pandora's bottom line than selling more national ads. Pandora believes the combination of local audience reach, local ad sales teams, and technology integration has resulted in increased momentum in local advertising revenue. Pandora currently has local sales teams in 39 markets. The company noted in 2Q16 that 154 of its 508 sales reps were specifically focused on local markets.

Pandora also intends to use its ad-supported service as a user acquisition channel for its proposed on-demand offering, which we believe creates a competitive advantage as its free, ad-supported product has shown the potential to be profitable (positive GAAP EBITDA in 3Q14 and 4Q15, and positive operating cash flow in 2014). Customer acquisition costs have generated large upfront losses for online streaming competitors, and being able to offset those costs with a potentially profitable user acquisition channel creates a unique advantage for Pandora, in our view. We also see potential for Pandora to move more local sales to a lower-cost self-service model over time, which would further increase profit potential for that product.

Spotify

Spotify's advertising revenues grew strongly from €21 mn in 2010 to €196 mn in 2015 (98% growth in 2015 alone) while freemium users grew from 6 mn at end-2010 to 71 mn at end-2015 (MBW); this implies average revenue per ad funded user of €3.6 throughout the period. Going forward, Spotify sees programmatic as a key growth driver for the ad-supported business and aims to open up all its audio inventory to programmatic within the next five years (Adage interview). Spotify introduced its programmatic offering in November 2015 and opened up its audio ad inventory for programmatic media buyers by signing a deal with Rubicon Project, App Nexus and the Trade Desk in July 2016. This enables Spotify to sell its ad inventory in near real time through private digital exchanges and in a highly targeted way, based on devices and demographics but also first-party playlist data that reflect the person's interests. Moreover, Spotify's ads are 100% viewable as they are shown in-app and only when the user is active. Spotify counted 70 mn ad-supported listeners globally in 2015 and reported that around 70% of streams were mobile.

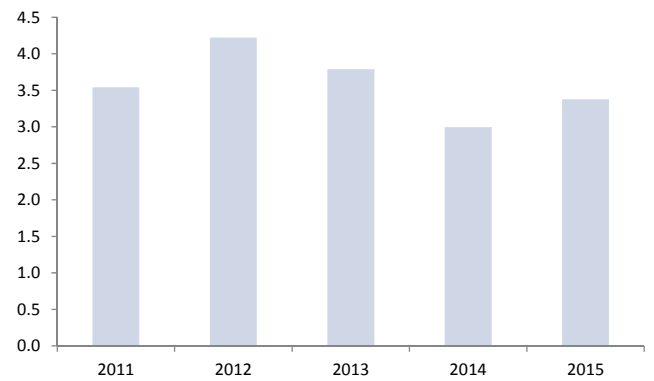
Exhibit 122: Spotify's advertising revenue has increased in line with the number of freemium users



Source: Spotify.

Exhibit 123: Spotify's ad revenue per user has hardly moved over the last five years

Spotify advertising revenues per free user (€)



Source: Spotify.

Sync revenues: An additional growth opportunity for rights holders

Synchronisation revenues refer to flat fees or royalties generated by the use of sound recordings in TV, films, games and advertising as background sound.

Sync remains small at \$360 mn or 2% of the global recorded music industry in 2015 (IFPI) but it is a growing source of recurring revenues for which we forecast a 2015-30 CAGR of c.4% after 7% over 2013-15, driven by a rising consumption of content – be it TV, films, adverts or games, especially in markets outside of the US. The US is the largest sync market accounting for 57% of the total in 2015, far ahead of the UK at 9% and France at 8%.

Not only is this becoming a more important source of revenue for rights holders, but it is also becoming a more important source of discoverability of artists with 26% of people discovering artists through sync according to a 2015 Ipsos study conducted across 13 major music markets.

We see Vivendi and Sony as well positioned to leverage their other media assets to increase sync revenues and turn artists into brands such as: TV/movies (StudioCanal, Sony Pictures), video games (Gameloft, Playstation), online video (Dailymotion, VEVO) or advertising (through the partnership with Vivendi' sister company Havas). We believe this will improve relationship with artists and strengthen their competitive advantage over time.

Vivendi: Exploiting synergies across its asset portfolio to boost sync revenue

- **TV production:** Vivendi has identified c.40 potential collaborations between UMG and StudioCanal such as documentaries, musical movies and biopics. The film "Legend", for example, was the best British box-office launch ever posted by StudioCanal whose soundtrack was produced by one of UMG's artists – Duffy. Vivendi's Studio+ will produce digital mini-series for mobile in cooperation with both UMG and StudioCanal. UMG CEO and Chairman, Lucian Grainge, was appointed on the board of Lionsgate (September 14, 2016) and was reported to have strengthened the relationship between UMG and other US entertainment companies in recent years.
- **Video games:** UMG music can be used in Vivendi's gaming assets (Gameloft, potentially Ubisoft) as soundtracks.
- **Online video:** Dailymotion and VEVO (of which Vivendi owns 40%) are among the most viewed online video platforms globally with 3.5 bn and 18 bn monthly video views and can therefore improve the visibility of UMG's artists and the monetisation of its music videos.
- **Advertising:** Vivendi's sister company Havas and UMG announced the formation of the Global Music Data Alliance (GMDA) in January 2015 in order to leverage UMG's proprietary data across multiple artists and genres by combining it with Havas' analytical capabilities to reach a holistic view of music consumption across a range of platforms. This can help provide new revenue opportunities for UMG artists and labels by creating marketing opportunities for brands. Examples of potential opportunities include driving sponsorship for live events or album tie-in promotions. There is also scope for advertisers to utilise a particular artist or tune for a campaign based on data about consumer preferences. UMG added another layer to its relationship with Havas in September 2015 by teaming up with BETC (owned by Havas) to launch a jointly-run record label called POP Records since September 2015 with an aim to launch new artists and use BETC's pop culture expertise to create content for artists.
- **Touring:** *Vivendi can also leverage its ticketing businesses (Digitick, See Tickets) and concert halls (Olympia) to promote artists and boost performance income*

Live entertainment will become more important and a growth opportunity for streaming platforms

Unlike recorded music, live music has been relatively immune to the online transition and resulting piracy over the past decade. With recorded music sales declining, artists also became more dependent on live music performance which in turn led record companies to expand into that segment. Live music has indeed been the fastest growing area of the music industry worth another \$25 bn of revenue in 2015 according to IFPI.

We forecast \$14 bn of additional revenue opportunity by 2030 as the segment will benefit from favourable demographic shifts (greater preference for experiences among Millennials and Gen Z) and optimization of vacancy rates enabled by new technologies and data. Streaming services are particularly well placed to leverage listening data for the marketing and promotion of live events and the possibility to connect directly with fans. It is estimated that 40%-50% of tickets are currently unsold in the US (Billboard, September 4, 2010). According to our analysis of over 5,000 live events in the United States (data from global concert industry trade publication, Pollstar), average vacancy was 26%, with venues with fewer than 1k seats seeing vacancy rates of 30%. This explains the move of various music players such as Pandora, Vivendi (owner of UMG) and Access Industries (owner of WMG) to acquire ticketing companies.

Exhibit 124: Vacancy rates have tended to be higher for shows at smaller venues, typically featuring lesser-known artists with smaller promotion budgets

Average vacancy rate, by venue size (maximum seat capacity)



Source: Pollstar.

Pandora’s October 2015 acquisition of Ticketfly should enable it to leverage its user data, especially listening history and location data, to drive down vacancy rates at some venues. One key driver of high vacancy rates is a lack of awareness of smaller acts which do not have national marketing campaigns. Many of the largest venues in the United States (stadiums, arenas, etc.) are booked in partnership with LiveNation for ticketing and promotion. Pandora has noted that its target market for Ticketfly is outside of those mega venues, and more focused on Tier 2 events. Pandora has deep insight into its users’ listening habits and artist preferences – the company knows where its users live and which artists they like based on station creation and thumb data (which songs a user has “thumbed up” or “thumbed down”). Given this data, Pandora believes it can help drive awareness of local events among known fans of a given artist, and more effectively fill venues. Better matching the supply and demand could save up to \$2 bn of revenues for the US live industry alone assuming 24 mn tickets are unsold every year in the US at an average price of \$67.33.

Stock implications

Vivendi (CL-Buy)

We see Vivendi as a main beneficiary of the recovery in the music industry through UMG, the world's largest record company and second largest music publisher. UMG accounted for 47% of 2015 group revenue and 63% of EBITA. We believe UMG will not only benefit from overall music market growth, especially in the recorded segment, but will also drive new revenue streams and synergies in synchronization and live through greater integration with Vivendi's other businesses and partners: leading online video services Dailymotion and VEVO, TV, video games, ticketing and telecom partnerships (Telefonica, Telecom Italia, Orange). UMG should also increasingly benefit from the marketing/branding/PR expertise brought from its partnership with Vivendi's sister company Havas, the world's sixth largest advertising agency.

We increase our UMG revenue by 3.2% and EBITA by 6.5% on average over 2016-2020E to reflect our new global industry forecasts. We now forecast revenue to grow 4.4% (2015-20E CAGR) and margins to expand to 15.2% in 2020 from 11.6% in 2015 thanks to streaming. This drives a 3% average increase in our Vivendi EPS forecasts over 2016-20. Our UMG DCF-based valuation increases by 5% to €13.1 bn leading us to raise Vivendi's 12-month SOTP-based target price to €21.5 from €21.1. We reiterate our Buy rating, and the stock remains on the Conviction List.

Sony (CL-Buy)

Music is the cornerstone in Sony's transition to becoming a global entertainment giant. We believe Sony is one of key beneficiaries of recovery in the music industry alongside Vivendi, and reiterate our Conviction List-Buy. Sony is the world's second largest record company and the largest music publisher. We estimate the music segment will account for 8% of group revenue and 23% of operating profits in FY16 (30% in FY2015). We believe Sony Music will benefit from two structural advantages which should enable it to outperform the overall music market: 1) large song catalogue, with Sony's main label Columbia Records founded in 1887, the oldest surviving record label in the world. The growth of streaming increases consumption and monetization of its catalogue. 2) Cross-media synchronization opportunity and improved discoverability, with Sony being a large media conglomerate with strong TV production activity in North America, unprofitable yet large-scale motion pictures studios and the world's most successful video game platform, PlayStation.

We raise our Sony estimates slightly (+1%) and build a more detailed growth outlook for the music business. We now assume a negative 10% CAGR (2015-20) for the physical recording business and assume a CAGR for the streaming business of +29% over the same period. We assume the recording business will grow at 7% in aggregate, with a 5% CAGR in music publishing. We also assume margins will improve as we believe digital has 7-10 pp higher operating profit margin vs. the physical business. We forecast Sony's music business operating profit margin to improve from 12.2% in FY16 to 15.7% by FY20.

Pandora (CL-Buy)

We believe Pandora's leadership in internet radio, combined with the data generated by its 100 mn+ quarterly logged-in users and nearly 6 bn hours of quarterly listening, provides a strong competitive platform, which we expect to continue taking share of listening hours from terrestrial radio in the US. Pandora has more than doubled its share of US radio listener hours from 4% in 2011 to 10% in 2015. Pandora's cost structure has also stabilized now that it has signed direct deals with all major record labels. Licensing cost for its ad-supported product will be in the region of \$33 per thousand hours, modestly above the \$31 it had been paying prior to the deals. With secular tailwinds from the proliferation of connected devices, including autos, mobile devices, and in-home entertainment, we expect Pandora to surpass 23 bn listener hours in 2017, excluding the potential impact of any on-

demand offering. We believe Pandora's move into interactive streaming will significantly expand its addressable market and monetisation of its listeners. Its unique database, long-standing brand and strong customer relationships put it in a favourable position to upsell its on-demand service to its c.80 mn ad-funded radio customers and better segment its customer base through multiple price points. We recently added Pandora to the Conviction List (see *Adding Pandora to CL ahead of subscription driven product cycle*, October 4, 2016)

Apple (Buy)

Apple is a leading provider of smartphones, tablets, and PCs with proprietary operating systems across mobile devices (iOS) and general purpose computers (Mac OS). Apple's platforms attract a robust user base with nearly 800 mn iTunes accounts, over 590mn iPhone users (GSe), and a Mac installed base of 80 mn. As we expect core device sales to slow, we believe Apple will increasingly focus on its services stream with the iTunes/Software/Services segment which we forecast to growth to \$29.9 bn of revenue in FY18 (12.8% of revenue) from \$19.9 bn of revenue in FY15 (8.5% of total). Within this, Apple should increasingly benefit from the growth of music streaming through its subscription service Apple Music which it can upsell to its large installed base of iPhones. We forecast Apple Music users as a percentage of iPhone users to increase from 2% in 2016E to 14% in 2030E. This implies that Apple will account for around 35% of global net subscriber additions over the next five years and 27% over 2020-30 (as more rival services launch). This gives revenue of US\$1.2 bn in 2016E growing to US\$13 bn in 2030. While Apple's iTunes remains a dominant player in the structurally declining downloads business, we expect the growth from streaming to more than offset the decline in downloads by 2017.

Alphabet (CL-Buy)

As the dominant online video platform for music, we view YouTube as particularly well positioned to benefit from the strong growth in music video consumption and online video advertising especially on mobile devices. We estimate the platform accounted for ~40% of the online video market in 2015. We estimate that YouTube revenues grew at a 50% CAGR over 2010-15 and forecast c.30% CAGR over 2015-18, with around 15%-20% coming from music. We believe however that YouTube will be under greater pressure to improve monetisation for rights holders amid greater regulatory scrutiny and as competition for online audiences intensifies. We estimate that YouTube accounted for 9% of Alphabet's revenue in 2015 and we forecast its share to rise to 12% by 2018.

iHeart (Not Covered)

While the overall US terrestrial radio industry is likely to lose share to digital alternatives and will need to adapt to change, we believe IHRT will continue to outperform peers by a healthy margin for years, given 1) it is the largest station and benefits from scale, particularly as it relates to national advertising, 2) it has a credible digital platform that others lack, which therefore allows it to recapture more of the terrestrial pie that is migrating to digital, and 3) it is the biggest player but is still c.20% of the industry at c.\$3 bn in radio revenues vs. a \$15 bn pie.

Sirius XM (Neutral)

Sirius XM (SIRI) is the leading subscription-based satellite radio broadcaster in the United States with over 30 mn paid subscribers. The company is best known for its curated commercial free music, live sports and talk radio content. We believe SIRI will continue to maintain its competitive advantage and market share in the in-car radio market given its (1) exclusive content portfolio (most notably major sports leagues and Howard Stern), (2) established distribution platform via +23k auto dealerships, and (3) ease of use via its driver friendly interface. SIRI is also making strides to participate in the connected car and streaming music universe via the upcoming launch of its "360L" platform. This platform looks to incorporate the economics of linear satellite distribution with interactive music streaming, customizable user interfaces and analytic abilities of two-way data networks.

We believe the launch of 360L will better position SIRI to compete with both IP radio and on-demand streamers while maintaining its industry leasing cost structure.

Our Neutral rating represents a balance of a few key factors. Key positives are (1) superior cost structure and margins when compared with streaming counterparts, (2) an expanding addressable market of Sirius-enabled vehicles within the used car market, and (2) growing FCF that we expect to fund material share repurchases over the next 3-6 years. These are balanced, in our view, by (1) potential moderation in new car sales (SIRI's key subscriber acquisition 'funnel'), (2) emerging competition as connected car sales ramp, and (3) valuation that continues to remain in-line with peers', even if we account for SIRI's strong FCF growth.

Exhibit 125: Summary of price target methodologies and risks

Company	Ticker	Rating	Price	12M Price target	Valuation methodology	Risks
Alphabet	GOOGL	* Buy	\$ 800.4	930.0	Price target is derived from a three-way equal-weighted valuation approach, which includes a five-year traditional discounted cash flow (DCF) analysis, an EV/EBITDA multiple analysis, and a P/E analysis. - On EV/EBITDA, we use a multiple of 13x - On P/E, we use a multiple of 22x - DCF assumptions are a discount rate of 7% and a FCF perpetuity growth rate of 4%.	(-) Weaker-than-expected cost discipline, competition, dilutive M&A
Apple	AAPL	Buy	\$ 112.5	124.0	Our 12-month price target is based on a 12.5X CY17 P/E	(-) Product cycle execution, end demand, and a slower pace of innovation
Pandora	P	* Buy	\$ 14.2	19.0	12m price target is based on a 70% / 30% blend of the DCF midpoint of the range of outcomes for the business over the next 5 years and 3X 2017E EV/Sales M&A valuation	(-) Competition, content costs, failure to grow monetization/engagement.
Sirius XM	SIRI	Neutral	\$ 4.2	4.5	12-month price target is based on a blend of three methods 1/2 FCF (15x), 1/4 EV/EBITDA (13x), and 1/4 DCF (7.9% WACC, 3.0% Term).	(+) Strong new car sales, higher uptake in the used car segment, increased share repurchases. (-) Competition from streaming services, loss of key content, weak auto sales.
Sony	6758.T	* Buy	¥ 3371.0	4400.0	Our 12m price target is based on a SOTP valuation	(-) Delays rebuilding the movie business, stronger yen, weak consumption.
Vivendi	VIV.PA	* Buy	€ 17.7	21.5	Our 12m price target is based on a SOTP valuation	(-) Lack of recovery in Music, worse trends at Canal+ France, M&A.

* Denotes Conviction List membership

Source: Goldman Sachs Global Investment Research.

Appendix

Exhibit 126: Vivendi: changes to our estimates

€mn	New					Old					% change				
	2016E	2017E	2018E	2019E	2020E	2016E	2017E	2018E	2019E	2020E	2016E	2017E	2018E	2019E	2020E
Sales															
UMG	5,147	5,369	5,630	5,950	6,334	5,121	5,285	5,463	5,690	5,964	0.5%	1.6%	3.1%	4.6%	6.2%
Canal +	5,371	5,413	5,541	5,682	5,836	5,371	5,413	5,541	5,682	5,836	0.0%	0.0%	0.0%	0.0%	0.0%
Vivendi Village	349	529	582	640	704	349	529	582	640	704	0.0%	0.0%	0.0%	0.0%	0.0%
Others	(22)	(20)	(20)	(20)	(20)	(22)	(20)	(20)	(20)	(20)	0.0%	0.0%	0.0%	0.0%	0.0%
Total	10,844	11,292	11,734	12,253	12,854	10,819	11,208	11,567	11,992	12,484	0.2%	0.8%	1.4%	2.2%	3.0%
EBITA															
UMG	643	725	800	881	963	640	713	754	797	847	0.5%	1.6%	6.0%	10.6%	13.7%
Canal +	375	530	668	743	768	375	530	668	743	768	0.0%	0.0%	0.0%	0.0%	0.0%
Vivendi Village + new initiatives	(50)	(20)	-	5	10	(50)	(20)	-	5	10	0.0%	0.0%	0.0%	0.0%	0.0%
Holding & Corporate	(95)	(95)	(95)	(95)	(95)	(95)	(95)	(95)	(95)	(95)	0.0%	0.0%	0.0%	0.0%	0.0%
Total	874	1,140	1,373	1,534	1,646	871	1,129	1,327	1,450	1,530	0.4%	1.0%	3.4%	5.8%	7.6%
% margin	8.1%	10.1%	11.7%	12.5%	12.8%	8.0%	10.1%	11.5%	12.1%	12.3%					
Income from Operations															
UMG	683	760	835	916	998	685	723	764	807	857	-0.3%	5.0%	9.2%	13.5%	16.4%
Canal +	398	533	671	746	771	398	533	671	746	771	0.0%	0.0%	0.0%	0.0%	0.0%
Vivendi Village + new initiatives	(50)	(20)	-	5	10	(50)	(20)	-	5	10	0.0%	0.0%	0.0%	0.0%	0.0%
Holding & Corporate	(95)	(95)	(95)	(95)	(95)	(95)	(95)	(95)	(95)	(95)	0.0%	0.0%	0.0%	0.0%	0.0%
Total	937	1,178	1,411	1,572	1,684	939	1,142	1,340	1,463	1,543	-0.2%	3.2%	5.3%	7.5%	9.1%
Associates	128	174	201	201	201	128	174	201	201	201	0.0%	0.0%	0.0%	0.0%	0.0%
Net Interest	(42)	(30)	(35)	(35)	(35)	(42)	(30)	(35)	(35)	(35)	0.0%	0.0%	0.0%	0.0%	0.0%
Income from investments	38	38	38	41	44	38	38	38	41	44	0.0%	0.0%	0.0%	0.0%	0.0%
Tax	(259)	(314)	(373)	(416)	(445)	(258)	(311)	(361)	(394)	(415)	0.3%	1.0%	3.3%	5.6%	7.3%
Minorities	(30)	(32)	(34)	(36)	(38)	(30)	(32)	(34)	(36)	(38)	0.0%	0.0%	0.0%	0.0%	0.0%
Adjusted Net Income (continued)	709	977	1,170	1,290	1,372	707	969	1,136	1,228	1,287	0.3%	0.9%	3.0%	5.1%	6.7%
Adjusted EPS (continued)	0.56	0.77	0.92	1.01	1.08	0.56	0.76	0.89	0.96	1.01	0.3%	0.9%	3.0%	5.1%	6.7%

Source: Goldman Sachs Global Investment Research.

Exhibit 127: Sony: changes to our estimates

JPY, mn	New					Old					% change				
	2016E	2017E	2018E	2019E	2020E	2016E	2017E	2018E	2019E	2020E	2016E	2017E	2018E	2019E	2020E
Revenue	7,823,182	8,199,058	8,471,616	8,705,913	8,978,869	7,821,132	8,182,528	8,435,524	8,654,208	8,905,035	0.03%	0.20%	0.43%	0.60%	0.83%
EBITDA	758,709	952,082	1,018,089	1,065,030	1,144,981	758,554	950,473	1,018,924	1,061,638	1,139,750	0.02%	0.17%	-0.08%	0.32%	0.46%
Operating profit	338,114	527,487	591,244	665,435	759,386	337,959	525,878	592,079	662,043	754,155	0.05%	0.31%	-0.14%	0.51%	0.69%
Net Income	119,087	308,904	344,309	407,551	476,576	119,009	308,100	344,726	405,685	473,698	0.07%	0.26%	-0.12%	0.46%	0.61%
EPS (¥)	94	245	273	323	378	94	244	273	322	375	0.07%	0.26%	-0.12%	0.46%	0.61%
BPS (¥)	2,003	2,198	2,421	2,694	3,022	2,003	2,197	2,420	2,692	3,017	0.00%	0.03%	0.02%	0.07%	0.14%

Source: Goldman Sachs Global Investment Research.

Disclosure Appendix

Reg AC

We, Lisa Yang, Heath P. Terry, CFA, Masaru Sugiyama, Simona Jankowski, CFA, Heather Bellini, CFA, Robert D. Boroujerdi, Piyush Mubayi, Brett Feldman, Drew Borst, Mark Grant, Otilia Bologan, Stephen Laszczyk, Yusuke Noguchi and Matthew Cabral, hereby certify that all of the views expressed in this report accurately reflect our personal views about the subject company or companies and its or their securities. We also certify that no part of our compensation was, is or will be, directly or indirectly, related to the specific recommendations or views expressed in this report.

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