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Like plenty of music fans, Sam Broe jumped at the chance to join Spotify two summers ago, and he hasn't looked back.

Spotify, which began streaming music in Sweden in 2008, lets users choose from millions of songs over the Internet free or by subscription, and is increasingly seen as representing the future of music consumption. Mr. Broe, a 26-year-old from Brooklyn, said that having all that music at his fingertips helped him trim his monthly music budget from $30 to the $10 fee he pays for Spotify's premium service.

"The only time I download anything on iTunes is in the rare case that I can't find it on Spotify," he said.

A decade after Apple revolutionized the music world with its iTunes store, the music industry is undergoing another, even more radical, digital transformation as listeners begin to move from CDs and downloads to streaming services like Spotify, Pandora and YouTube.

As purveyors of legally licensed music, they have been largely welcomed by an industry still buffeted by piracy. But as the companies behind these digital services swell into multibillion-dollar enterprises, the relative trickle of money that has made its way to artists is causing anxiety at every level of the business.

Late last year, Zoe Keating, an independent musician from Northern California, provided an unusually detailed case in point. In voluminous spreadsheets posted to her Tumblr blog, she revealed the royalties she gets from various services, down to the ten-thousandth of a cent. Even for an under-the-radar artist like Ms. Keating, who describes her style as "avant cello," the numbers painted a stark picture of what it is like to be a working musician these days. After her songs had been played more than 1.5 million times on Pandora over six months, she earned $1,652.74. On Spotify, 131,000 plays last year netted just $547.71, or an average of 0.42 cent a play. "In certain types of music, like classical or jazz, we are condemning them to poverty if this is going to be the only way people consume music," Ms. Keating said.

The way streaming services pay royalties represents a major shift in the economic gears that have been underlying the industry for decades. From 78 r.p.m. records to the age of iTunes, artists' record royalties have been counted as a percentage of a sale price. On a 99-cent download, a typical artist may earn 7 to 10 cents after deductions for the retailer, the record company and the songwriter, music executives say. One industry joke calls the flow of these royalties a "river of nickels." In the new economics of streaming music, however, the river of nickels looks more like a torrent of micropennies.

Spotify, Pandora and others like them pay fractions of a cent to record companies and publishers each time a song is played, some portion of which goes to performers and songwriters as royalties. Unlike the royalties from a sale, these payments accrue every time a listener clicks on a song, year after year. The question dogging the music industry is whether these micropayments can add up to anything substantial. "No artist will be able to survive to be professionals except those who have a significant live business, and that's very few," said Hartwig Masuch, chief executive of BMG Rights Management.

Spotify has 20 million users in 17 countries, with five million of them paying $5 to $10 a month to eliminate the ads seen by freeloaders. In a recent interview, Sean Parker, a board member, said he believed Spotify would eventually attract enough subscribers to help return the music industry to its former glory — that is, to the days before Mr. Parker's first major enterprise, Napster, came along.

"I believe that Spotify is the company that will make it succeed," said Mr. Parker, who is also a former president of Facebook. "It's the right model if you want to build the pot of money back up to where it was in the late '90s, when the industry was at its peak. This is the only model that's going to get you there."

As the largest music market, the United States has been a critical proving ground for streaming companies, but competition is also quickly spreading globally. Deezer, a French on-demand service, has announced plans to be in more than 100 countries. And localized streaming services have also sprouted up: Anghami, for example, serves listeners in the Middle East, and the Indian music market has Dhingana and Saavn.

For the biggest pop stars, hit streams can provide substantial revenue. Last week, a Google executive said in a company earnings call that Psy's viral video sensation "Gangnam Style" had generated $8 million from YouTube, where it had been watched 1.2 billion times, yielding a royalty of about 0.6 cent a viewing. Many musicians whose work does not reach the top of the charts, however, are not as sanguine.

Complicating the issue, each type of service pays different rates. Pandora's are set by law. Spotify declined to comment on its rates, but according to a number of music executives who have negotiated with the company, it generally pays 0.5 to 0.7 cent a stream (or $5,000 to $7,000 per million plays) for its paid tier, and as much as 90 percent less for its free tier.

The companies behind streaming are ballooning quickly. Pandora, with 67 million regular users, is publicly traded, with a market capitalization of nearly $2 billion, and Spotify's investors have reportedly valued the company at $3 billion. Yet so far they have contributed relatively little to the American recording industry's $7 billion in annual revenue. In its last four reported quarters, Pandora paid $202 million in "content acquisition costs," including licensing fees, and Spotify recently announced that it has paid $500 million in royalties since its inception. Downloads, by comparison, had $2.6 billion in sales in 2011, according to the Recording Industry Association of America.

For those whose income depends on royalties, the biggest concern has been whether streaming cannibalizes CD and download sales by offering a cheap or free alternative.

Cliff Burnstein, whose company, Q Prime, manages Metallica and other major acts, said that even if streaming hurts sales, all is not lost as long as the number of paying subscribers continues to climb rapidly.

"There is a point at which there could be 100 percent cannibalization, and we would make more money through subscriptions services," Mr. Burnstein said. "We calculate that point at approximately 20 million worldwide subscribers."

Metallica recently announced an exclusive deal with Spotify.

If those subscriber ranks grow, royalty rates will also climb, recapitulating a process seen whenever new technologies have been introduced, said Donald S. Passman, a top music lawyer and the author of the book "All You Need to Know About the Music Business."

"Artists didn't make big money from CDs when they were introduced, either," Mr. Passman said. "They were a specialty thing, and had a lower royalty rate. Then, as it became mainstream, the royalties went up. And that's what will happen here."