

# Is Scholarly Publishing Like Rock and Roll?

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## Abstract

This article uses Alan B. Krueger's analysis of the music industry in his book *Rockonomics: A Backstage Tour of What the Music Industry Can Teach Us About Economics and Life* as a lens to consider the structure of scholarly publishing and what could happen to scholarly publishing going forward. Both the music industry and scholarly publishing are facing disruption as their products become digital. Digital content provides opportunities to create a better product at lower prices and in the music industry this has happened. Scholarly publishing has not yet done so. Similarities and differences between the music industry and scholarly publishing will be considered. Like music, scholarly publishing appears to be a superstar industry. Both music and scholarly publishing are subject to piracy, which threatens revenue, though Napster was a greater disrupter than Sci-Hub seems to be. It also appears that for a variety of reasons market forces are not effective in driving changes in business models and practices in scholarly publishing, at least not at the rate we would expect given the changes in technology. After reviewing similarities and differences, the prospects for the future of scholarly publishing will be considered.

## Introduction

In his 2019 book, *Rockonomics: A Backstage Tour of What the Music Industry Can Teach Us About Economics and Life*, Alan B. Krueger examines the economics of the music industry and outlines seven lessons he draws from it.<sup>1</sup> The most important is that music creates superstars. As he says:

Music is the quintessential example of a superstar market, with a small number of players who attract most of the fanfare and earn most of the money. These markets have two critical characteristics. First, the top performers, professionals, or firms are able to reach a large audience or customer base; this is what is called *scale*. Second, the sound, service, or product sold in superstar markets must be unique, with distinct features. There is no substitute for it as far as consumers are concerned, and combining the second- and third-best performers in the market does not create a sound, service, or product that is as good as the best.<sup>2</sup>

Krueger argues that digital technologies are creating superstar markets in many parts of the economy and the thus driving higher levels of inequality, withering the middle class, and that these changes should be a major concern for all of us.

Joseph Esposito, in a *Scholarly Kitchen* post, praises Krueger's book and goes on to say, "What Taylor Swift is to music, Google and Facebook are to tech industries – and, I believe, what Elsevier is to scholarly publishing."<sup>3</sup> Esposito, following Krueger's lead, argues that in scholarly publishing, as is the case in music, most of the rewards will flow to the few winners and the many in the "long tail" will receive little. As Esposito puts it, "All those seeking to create a distributed infrastructure of small entities for scholarly communications take heed. The tendency to power laws – to industry consolidation and superstars – is like the current of a huge river, which can be challenged only by the continuous injection of great and costly amounts of energy."<sup>4</sup> The consolidation of commercial scholarly publishing houses lends support to Esposito's argument. Vincent Larivière, Stefanie Haustein, and Phillippe Mongeon document that in 2013 the top three publisher – Elsevier, Springer, and Wiley-Blackwell – accounted for 47% of articles published in the natural and medical sciences. In the social sciences and humanities five publishers – Elsevier, Taylor & Francis, Wiley-Blackwell, Springer, and Sage – accounted for 51% of the articles

published.<sup>5</sup> This certainly makes scholarly publishing look like the winner-take-all market as Esposito argues.

However, this conclusion seems to me to be overly simplistic and worthy of a closer look. It is my view that scholarly publishing, while it shares many characteristics with the music industry, particularly as they have both changed dramatically with digitization and the Internet, differs in important ways from it. For example, Elsevier is not to scholarly publishing what Taylor Swift is to music, rather Elsevier is to scholarly publishing what Universal Music Group is to music. This is an important difference. Taylor Swift is the creator and performer. She, not Universal Music Group, is the superstar. There are no Taylor Swifts among scholarly authors. A few scholars, like musicians, make good money by performing, that is lecturing. And while you can purchase a Paul Krugman hoodie on the web, he is unlikely to be able to sell out a twenty city arena tour with scalpers getting two or three times the list price for tickets. Paul Krugman might be the Taylor Swift of economics, though that is a bit of a stretch, but he has nowhere near to market power of Ms. Swift. Unlike music, the market for scholarship is segmented into hundreds, if not thousands, of distinct disciplinary markets, and these many scholarly market don't necessarily cumulate to a market that will act in the way the market for music does. Each of these disciplinary markets might have a superstar of two, but when you consider scholarship as a whole none appears to come close to the star power of a top tier musician.

Another striking difference is cost. Krueger concludes his book by noting that Americans spend less money on recorded music in a typical year than they do on potato chips. He goes on to say, "Few activities absorb as much time as music yet provide as much pleasure. What's more, the time we spend listening to music is up, while spending on music is down by 80 percent in real terms since 1999. A great deal has gotten even better."<sup>6</sup> Scholarship may not provide the pleasure of music, but its value to society is in its way comparable. Unfortunately, while technology and changing business models have significantly reduced the cost of music, scholarly publishing has seen the opposite. If the price of gasoline had increased at the same rate as chemistry and physics journals between 1975 and 2018, in 2018 gasoline would cost \$31.63 a gallon.<sup>7</sup>

Despite these differences, and others, using Krueger's examination of the music industry as a lens to consider scholarly publishing can provide useful insights. The

goal of this investigation will be to how we might move scholarly publishing towards the increases in use and decrease in cost that has occurred in the music industry.

### Krueger's Seven Lessons

Krueger drew the following seven economic lessons from his study of the music industry:

1. *Supply, demand, and all that jazz.* You would expect an economist to begin with supply and demand, and unsurprisingly it plays a role in the music business that can be seen clearly when supply is limited, as is the case for concert tickets. But Krueger notes that what he calls "all that jazz" also plays a role. Musicians understand that their relationships with their customer is more complex than a simple market transaction. They don't think about having customers, rather they have fans. As Krueger puts it, "You can't understand markets or the economy without recognizing when and how the jazz or emotions, psychology, and social relations interfere with the invisible hands of supply and demand."<sup>8</sup>
2. *Scale and non-substitutability: the two ingredients that create superstars.* We discussed this lesson above. When the sound, service, or product is unique you have non-substitutability, and when the top performers, professions, or firms are able to reach a large audience you have scale. Because of network effects markets of this sort create a few big winners and a long tail of less successful participants. In the music industry at least, and contrary to what Chris Anderson predicted in his book *The Long Tail*, the coming of the Internet and other digital technologies did not enable those in the long tail to enhance their access to the market.<sup>9</sup> In fact, they became relatively less successful.
3. *The power of luck.* As Krueger says, "Talent and hard work are required ingredients for success, but they are not sufficient. Luck, the unpredictable, random spins of fortune that affect our lives in countless ways, is particularly important in the music industry, where tastes are fickle, quality subjective, and many talented would-be stars toil away but never get their shot."<sup>10</sup>

4. *Bowie theory.* David Bowie once remarked, "Music itself is going to become like running water or electricity... You'd better be prepared for doing a lot of touring because that's really the only unique situation that's going to be left."<sup>11</sup> This means that in the music business you need to have something unique to sell as recorded music as recorded music becomes a utility. To do so requires creating products or experiences that are complementary to recorded music. This could be anything from live concerts to t-shirts. This applies not just to musicians, but also to others in the music industry, for Apple, it means selling devices even as Apple Music losses money.
5. *Price discrimination is profitable.* With price discrimination the market is segmented so that those who are willing to pay more, usually for some special feature do so, and others pay less. The total take is thus increased. This can be done by charging more for good seats or a VIP experience at a concert or delaying the release of the streaming version of an album so that those who want it right away need to purchase the higher priced download.
6. *Costs can kill.* To quote Krueger again, "Making money, even a lot of money, is not a guarantee of success. Successful bands and businesses have to monitor and minimize their costs to maximize their profits."<sup>12</sup> Krueger argues that sectors with stagnant productivity will face intense pressure to contain costs. This is the result of what is sometimes referred to as Baumol's cost disease. Formulated by William J. Baumol and William G. Bowen, it asserts that in sectors where wages rise but productivity does not because of constraints in the nature of the work will end up having prices rise faster than other sectors. The classic example used to illustrate the point is that the same number of musicians are needed to play a string quartet today as were required two hundred years ago.
7. *Money isn't everything.* "Too many people confuse the underlying motivation of economic life with greed and blind pursuit of money," says Krueger, "At its best, economics recognizes that people are motivated by much more than money... Music, more than money is the tonic of happiness."<sup>13</sup> Many musicians behave in ways that are not in their narrow economic interests, Bruce Springsteen sells all of the tickets to his concerts for the same price. The Grateful Dead encouraged bootleg recording of their concerts. Garth Brooks in his 2014-2017 tour charged reasonable ticket prices and added more shows

when they sold out. Or as Tom Petty is quoted as saying, "I don't see how carving out the best seats and charging a lot of money for them has anything to do with rock & roll"<sup>14</sup> Music can make money, sometimes lots of it, but for many, even the superstars it is almost never just about the money. It is about creating, about making something special with colleagues, and about the energy and affirmation that comes from the audience.

We will look at Krueger's seven lessons as the structure for comparing music and scholarly publishing. Considering the similarities and differences should help us shape scholarly publishing.

### Supply, Demand, and All that Jazz

Scholarly publishing is a broken and quirky market. Supply and demand often take a back seat to all the other jazz. The market should drive change does not because the sellers are an oligopoly and they have most of the power in the market they can take monopoly rents.

Complicating the situation researcher who and consume the content are not motivated by market forces, at least not directly. In most cases the authors make little or no money for the articles they write. They also, usually gratis, do the editing and reviewing. Their rewards come from the enhanced reputation that their publications bring. There may be some indirect financial reward, but it is modest and rewards for prestige are difficult to attribute to any particular piece of work. The supply of scholarship is driven not by demand, but rather by the scholar's desire to create, to contribute to the field, and enhance their reputation.

In addition, the largest consumers in the scholarly publishing market are not the ultimate users of scholarship, rather the largest customers are libraries who purchase content on behalf of their users. Supply and demand are thus mediate through a third party, who often has difficulty judging the value of a given purchase and is subject to political pressure from faculty who disagree with library decisions.

Importantly nearly all of the money in the scholarly publishing market, one way or another, comes from funders – governments and foundations – who pay for both the research that creates scholarship and the universities, who in turn fund libraries. They

are the ultimate customers. It is in the clear interest of these funders to get the maximum exposure to the work they fund and to pay as little as possible for library purchases. Until recently funders let the market function without interfering. But since digital technologies make broad distribution possible and the market has failed to deliver on this promise, funders, as the ultimate customer, have stepped in to insist on changes, for example with the NIH Public Access policy and Plan S.

What we see happening today in scholarly publishing may actually be the working of supply and demand as the ultimate customers – the funders, governments and foundations – are demanding a product that meets their needs. We can see by the sellers' response that they are unhappy. The interesting and important question is at the end of the day will the market provide what the government and foundation customers demand. And if it does, what changes in business models and practices will be required to get a good product at a reasonable price?

#### Scale and Non-substitutability: The Two Ingredients that Create Superstars.

The important question here is whether the scholarly publishing market is a superstar market where the money and attention go to the few, or was Chris Anderson correct when he said, "Forget squeezing millions from a few megahits at the top of the charts. The future of entertainment is in the millions of niche markets at the shallow end of the bitstream."<sup>15</sup> As noted above, if there are any superstar scholarly authors, they aren't in the league of the superstars of the music world.

When we look at the two ingredients that drive superstar markets one clearly applies to scholarly publishing – non-substitutability. Scholarly works are unique and one cannot be substituted for another. The question then becomes to what extent the second ingredient – scale – comes into play. Scholarship has the same global market as music. Researchers everywhere can benefit from scholarly publication. The market for most academic work is not large, at least when compared to music. In 2015 Elsevier had 900 million total downloads.<sup>16</sup> In 2015 one artist, Drake, had 1.8 billion streams on Spotify.<sup>17</sup> But size is less important than the distribution of demand. Does the 80/20 rule apply where 80 of the use is provided by 20 percent of the items or is more of the use found in the long tail? As far as books circulating in library collections it appears Anderson is wrong. A 2011 study conducted by Julia Gammon and Edward T. O'Neill from OCLC of OhioLink's 89 academic institutions found, as

they put it, "The most fascinating result of the study was a test of the '80/20' rule. Librarians have long espoused the belief that 80% of a library's circulation is driven by approximately 20% of the collection. The analysis of a year's statewide circulation statistics would indicate that 80% of the circulation is driven by just 6% of the collection."<sup>18</sup>

Interestingly, Chris Anderson's point about the long tail is not that there won't be superstars, he understands power laws and network effects, rather his argument is that as content becomes digital we move from an economy based on scarcity to one based on abundance. When content was trapped in physical artifacts that were expensive and difficult to distribute, the only content that was available was the most popular. There was no access to the long tail. Now that content is digital, everything can be and often is available. Anderson's point is not that the creators of works in the long tail will see many sales; they won't. Rather it is that the cumulative use of the long tail will add value and enhance the diversity of what is available. Anderson suggests that the content in the long tail might generate more use than was available before. He cites the example of books, "The average Barnes & Noble carries 130,000 titles. Yet more than half of Amazon's book sales come from outside its top 130,000 titles. Consider the implication: If the Amazon statistics are any guide, the market for books that are not even sold in the average bookstore is larger than the market for those that are."<sup>19</sup> What is important to understand is that the 130,000 titles in the average Barnes & Noble store is only 0.4% of the 30 million plus titles Amazon sells.<sup>20</sup> Even a large university library with two million books hold a bit more than 5% of what Amazon sells. So, it may be that we should not think starting at 20% from the 80/20 rule, but rather should think of the long tail starting at 5%. Regardless, scholarly authors in the long tail hope for as much exposure as possible, making money on their scholarship this is not usually a primary concern. What matters is that their work is available to others who can find it and make use of it.

It is worth considering the prospect that some of the concentration of use was the result of access constraints of access, where most researchers could easily read the only the books and journals their library subscribed to. It may be that as more of the scholarly record becomes open access, the distribution of use will be less concentrated. Two Google studies support this argument. They indicate that digitization and thus wider availability has increased the use of older content and the use of articles in non-elite journals.<sup>21</sup> This matters because it means that smaller scale efforts to make less privileged long tail scholarship openly available, discoverable

and preserve it will expose it to a potentially large audience. This will add diversity and lessen inequities in the scholarly record.

Anderson has three rules for companies engaging in the digital content economy:

1. Make everything available.
2. Cut the price in half. Now lower it.
3. Help me find it.

Interestingly, the music industry has followed Anderson's advice. Spotify has over 50 million tracks. As noted above, while people are paying significantly less while listening to more music. All of the current music services have recommendations and other discovery tools such as playlists. Data from Spotify suggest Anderson's long tail theory may apply as his rules are put into effect. A 2017 a Spotify report said, "We're seeing an explosion in listening diversity, defined here as the number of artists each listener streams per week... Spotify listeners are hearing more artists than ever. Since 2014, the average number of artists each listener streams per week has increased 37 percent, from just under 30 to about 41 artists per week so far in 2017."<sup>22</sup> They attribute this to the availability of personalized and editorial playlists and other discovery tools.

As Anderson says in concluding his article, "And the cultural benefit of all of this is much more diversity, reversing the blanding effects of a century of distribution scarcity and ending the tyranny of the hit. Such is the power of the Long Tail."<sup>23</sup>

I would conclude that the scholarly publishing market is today about superstars, rather than the long tail. But that if we build systems that follow Anderson's three rules, a more diverse digital scholarly publishing ecosystem will be created.

### The Power of Luck

Luck undoubtedly plays a role in the lives of scholars. The quirks of admissions and hiring decisions, chance encounters that lead to productive collaborations or generate novel ideas, and countless other bits of chance affect those engaged in scholarship, but the stakes are probably much lower than in music. Most scholars work in reasonable comfort whether they a superstars or somewhere out in the long tail. Luck is likely less important than talent and hard work.

## Bowie Theory

The Bowie Theory has two parts. The first is the assertion that recorded music is going to become a utility, like electricity or running water. The second part is that given what is coming musicians need to have something besides recordings to sell. For us, the first is the more important.

It is useful to look at the recent history of the music industry and its transition to digital formats as compared to how scholarly publishing is managing a similar transition. Both music and scholarly content are born digital and largely distributed over the network. Legacy formats like the printed books and vinyl records are still in use, but the economics and markets for the digital products is what matters. Both music and scholarly content share the same characteristics that all digital objects have. They are as Andrew McAfee and Erik Brynjolfsson put it, “free, perfect, and instant.” That is: a copy can be instantaneously delivered anywhere in the world; a copy is the same as the original, and a copy can be made at zero marginal cost.<sup>24</sup>

These characteristics make digital objects easy to pirate. Napster, which operated for two years beginning in June of 1999, made the free acquisition of MP3 music files simple. At its peak it was estimated to have had more than 26 million unique users and was said to have taken as much as 60% of network capacity in some college dorms.<sup>25</sup> Napster sued for contributing to mass copyright violations and was closed down in July 2001, but other pirate services continued to provide free access to music files. In 1999 global recorded music revenue was \$25.3 billion all from the sale of physical media. Revenue from recorded music declined every succeeding year until it bottomed out in 2014 at \$14.2 billion, a 43.9% decline in fifteen years. Largely because of streaming revenues, revenues for recorded music increased beginning in 2015.<sup>26</sup> In 2018 global recorded music revenue was \$19.1 billion with \$8.9 billion or 46.6% from streaming.<sup>27</sup> Napster clearly broke the recording industry business model that had been based on selling albums on physical media. It was not easy to compete with free. But Napster has a second impact, the track became disassociated from the album. Interestingly though, it turns out that you can compete with free. First with digital downloads from iTunes, and then with streaming the revenues from recorded music began to recover.

So how do you successfully compete with free. It is actually simple, you create a low cost, very easy to use service. As Krueger puts it "From the music consumer's perspective, streaming converts recorded music from an à la carte menu to an all-you-can-eat buffet that is more convenient than downloading pirated music from unauthorized websites."<sup>28</sup> As Krueger notes as is often the case with you-can-eat buffets people consume more, and so streaming grows the revenue pie. By the end of 2018 there were 255 million paid users of paid streaming services, nearly ten times the peak number of Napster users.<sup>29</sup> On-demand audio song streams increased 49% in 2018 to 611 billion streams.<sup>30</sup> As Bowie predicted, recorded music has become a utility like running water or electricity.

From the perspective of scholarly publishing there are several interesting questions. The first is, is there a path that gets scholarly publishing to a structure that works like streaming? What I think we really want from scholarly publishing, at least from the reader's perspective is a system like contemporary music streaming services. Reader's want a service that follows Anderson's three rules. Everything should be available at a reasonable fixed price and there should be recommendation and discovery tools to assist in navigation of the content universe. Second, will Sci-Hub, as Napster was, be disruptive enough to drive a radical shift in scholarly publishing business models.

Let's begin with the second question. Sci-Hub contains most of the scholarly literature. In August 2019 Sci-Hub claimed to hold 74 Million papers.<sup>31</sup> Daniel S. Himmelstein and his colleagues found that as of March 2017, Sci-Hub's database contains 68.9% of the 81.6 million scholarly articles registered with Crossref and 85.1% of articles published in toll access journals.<sup>32</sup> By one estimate Sci-Hub may be siphoning off a bit less than 5% of publisher's traffic.<sup>33</sup> Sci-Hub has been sued multiple times by multiple publishers, losing each time. While access has been restricted in several countries, as is the case with most pirate sites, there are workarounds. Himmelstein's study looked at Google Trends data that showed that the publicity from the law suites generated searches for "Sci-Hub", suggesting that the publicity was drawing users to the site.<sup>34</sup> When Himmelstein was asked what he hoped the impact of his study would be, he relied, "I think the larger picture of this study is that this is the beginning of the end for subscription scholarly publishing. I think it is at this point inevitable that the subscription model is going to fail and more open models will be necessitated."<sup>35</sup> As the publisher suites indicate the big commercial publishers see Sci-Hub as a threat, maybe because the existence of Sci-

Hub increases the bargaining power of libraries in their negotiations with publishers. David Sundahl, who studies disruption says, "To revolutionize academic publication, a new system would need to be developed in a basement market which would eventually enable people to gain enough credibility doing this new solution. People would then begin to value this lower end, well done research, and that is when the world starts to change,"<sup>36</sup> It is too soon to say if Sci-Hub is this basement market solution that will bring down the subscription model as Himmelstein predicts, and, as Napster did with recorded music.

If Sci-Hub forces a change in the business model for scholarly publishing, is there a path to a new model that provides easy access to everything at a price customers are prepared to pay? As discussed above, we know what such a service would look like. It would look like Sci-Hub, but it would be legal. The result would be a fully open commons containing all scholarship. I think it is fair to assume that, as was the case in the music industry, that the legacy big firms will not be able to create this solution. They are wed to their profit margins and it hard to imagine them giving them up. It is likely that, as was the case with music, outside entities will need to create the new systems and services.

One approach that has gotten some recent traction are publish and read agreements with large commercial or society publisher, though to date Elsevier has refused to seriously consider them. It is also useful to look at the Latin American experience where most scholarly journals and many scholarly books are open access and are funded, not by APCs, but rather by governmental and institutional subsidies.<sup>37</sup> As noted above governments and foundation are the ultimate paying customers and if they are willing to demand a reconfigured scholarly publishing ecosystem and pay for it, it might happen. Whether or not Plan S is successful will be the first test.

Turning to Bowies second point. When scholarly content becomes a utility, do scholarly authors need something else to sell? I think not. In reality most for scholarly authors publishing revenues have only a very modest impact on income. Most academic authors have a daytime job and are doing alright. Commercial publishers and scholarly societies that are dependent on revenue from publications will be forced to find new sources on income, which is likely to be a challenge. As documented by Alejandro Posada and George Chen and by the SPARC *Landscape Analysis*, the large commercial are preparing for this contingency by acquiring assets in other parts of the research workflow.<sup>38</sup>

## Price Discrimination is Profitable

Price discrimination is possible when customers can be divided into distinct groups and offered different prices. The groups in which demand for the product is strong will be willing to pay a higher price than those with a weaker demand for the product. Sometimes those paying the higher price get some additional benefit, but not always. Airlines are masters at using price discriminating to fill all the seats while maximizing revenue for each flight. Scholarly journal publishers began price discrimination in the 1970s when they introduced institutional and individual prices. They moved to more extreme price discrimination with “big deals”, where each customer has their own price and usually are bound by non-disclosure agreements from disclosing it. Price discrimination also exists in the e-book market where libraries pay more than individuals. In these cases, there is no extra benefit that comes with the higher price. Libraries pay the higher price because publishers have the market power and libraries do not.

In scholarly publishing price discrimination advantages large publishers and disadvantages consumers. It is used as a means of monopoly rent seeking. Rent seeking, as Krueger nicely defines it, is, “An attempt to extract greater compensation without creating additional value for society. In other words, rent-seekers expend resources to obtain a larger slice of the pie, while doing nothing to increase the size of the pie.”<sup>39</sup> Going forward we should look to minimize price discrimination and demand pricing transparency.

## Costs Can Kill

One of the things that is clear about scholarly publishing is that costs need to be reduced. Baumol’s cost disease is often cited to justify high prices, but this is hard to square with the digitization of the industry, which should result in reduced costs for publications. It is also hard to reconcile with the experience of the music industry where aggressive application of new technologies and changes in business models that achieve scale and revised revenues, and also created new distribution channels that can provide artists who choose to use them unmediated access to their fans. As

a result, as noted above the cost of recorded music has declined 80% in real terms in the last 20 years.

In the scholarly publishing market, prices have risen relentlessly, especially for science and technology journals, but for other types of content as well. This has been possible because the products don't have substitutes and consumers have had little if any market power so publishers can and do extract monopoly rents. Because most are often purchased, not made by the people who actually use the content, but by libraries, value is hard to establish. Price discrimination is common and prices are not transparent. As long as these factors remain in place, market forces will have a hard time forcing efficiencies on the industry.

What we can see, if we look, is that costs are high. In a 2016 Ithaka S+R report on university press, monograph publishing Nancy Maron, Christine Mulhern, Daniel Rossman, and Kimberly Schmelzinger found that for 382 titles published in 2014 by 20 university presses a wide range of costs per title, from a low of \$15,140 to a high of \$129,909.<sup>40</sup> Scott Smart, Charles Watkinson, Gary Dunham, and Nicholas Fitzgerald studied 2015 costs for monographic publishing at the university presses of Indiana University and the University of Michigan and found the average price per book was \$33,813 at Michigan and \$34,590 at Indiana.<sup>41</sup> This is for a book that will likely sell 200 print copies. By way of comparison, for a book pressing cost of about \$8,500 Ubiquity Press, which focuses on academic books, will provide peer review, a core set of services, copy editing, indexing and promotion for a three hundred page book. The book is released as an open access e-book with a print option. Royalties are paid on print sales.<sup>42</sup> Outside of scholarly publishing, BookBaby, the self-publishing company, will print 200 copies of a 300 page book and provide e-book files for less than \$2,000.<sup>43</sup> It may be worth noting that in 2017 for the first time, more than a million books were self-published using systems like BookBaby.<sup>44</sup>

Scholarly journals are not much better. In 2013 Philip Campbell, Nature's editor-in-chief estimated that the journal's internal costs were £20,000–30,000 (\$30,000–40,000) per paper.<sup>45</sup> In 2005, Sally Morris estimated the publish costs of a journal article to be between \$7,890 and \$10,015.<sup>46</sup> In 2019 dollars the costs would be \$10,120 and \$12,845. Richard Van Noorden using Outsell data calculates a 2011 price per scholarly article of between \$3,500 and \$4,000.<sup>47</sup> In 2019 dollars this would be \$3,900 to \$4,455. Article processing charges (APCs) should reflect the cost of publishing an article. Like the estimates cited above they vary greatly. The APC for

*PLOS One* is \$1,595. For *PLOS Medicine* and *PLOS Biology* the APC is \$3,000. Hindawi APCs range from \$775 to \$2,100. The American Chemical Society APC for immediate access for non-members is \$4,000. The range of APCs for Elsevier is a low of \$500 for *Case Reports in Women's Health* to a high of \$5,900 for *Cell*. In addition, *Cell* has color charges for figures of \$1,000 for the first image and \$275 for any additional images. The *Proceedings of The National Academy of Science (PNAS)* charges pages charges beginning at \$1,640 for six pages. *PNAS* APCs charges are based on the type of license with a CC-BY-NC-ND costing \$1,500 and a CC-BY costing \$2,500. *PeerJ's* APCs are \$995 and \$1,095. In addition, *PeerJ* has lifetime memberships which range from \$399 to publish one article per year and \$499 to publish up to five articles per year (all authors need to be members). The range of cost estimates for publish costs and APC charges is reflective of a lack of transparency and would suggest that publishers are content with existing business models and practices and charge what they need to maintain them.

APCs, particularly for commercial publishers have recently risen at rate well above inflation. Shaun Yon-Seng Khoo look at APC price increase and found, "From 2012 to 2018, APCs paid by European institutions increased from €1,173 to over €1,600, or 40%. Similarly, overall APC increases by BMC, Frontiers, MDPI, and Hindawi was 31.6%, with publisher-specific increases of between 17% and 220%." Khoo concluded, "This data suggests that publishers are adept at pricing journals according to the prestige value of the title and the funding available to authors in each market. Unless funders and institutions leverage their negotiating and policy-setting power to constrain costs, author price insensitivity will ensure that APC-funded open access will merely be a sequel to the serials crisis."<sup>48</sup>

As noted above, it is clear that market forces have yet of put much pressure on scholarly publishers to adjust their business models or practices. *PLOS One*, *eLife*, and *PeerJ* have introduced new low-cost business models, but to date there seems to be little incentive for other publishers to follow. Plan S, with its requirements for immediate open access and cost transparency and the threat of imposing APC caps, might bring some change, but these will inevitably be fought by large publishers.

Cost can kill and in scholarly publishing today the damage to date has mostly be done to the customers – funders, libraries, and readers. If the disruption of Sc-Hub is sufficient to embolden a large number of library to follow the lead of Sweden, Germany, and the University of California, and walk away from "big deals", and if Plan S forces the reforms they

have proclaimed, then scholarly publishing business models and practices would be forced to change.

### Money Isn't Everything

Like music, in scholarly publishing money isn't everything. Few academics write for the money, which is a good thing because they make very little from their publications. Academic authors write because they feel they have something important to say and because publications and their impact are the way they are judged and rewarded.

Scholarly publishers nearly always make claims that they are serving knowledge not profit. Even Elsevier claims a lofty mission, "Elsevier is a global information analytics business that helps institutions and professionals advance healthcare, open science and improve performance for the benefit of humanity."<sup>49</sup> But as profit making enterprises, commercial publishers have a fiduciary responsibility to maximize profits, and they do, often by taking monopoly rents. So, for them it really is mostly about the money.

What may be most important about money in scholarly publishing, is that the market does not seem to be able to force change. The combination of the market power of the large commercial publishers, the large amount of free labor that is contributed, and the general inertia of the academy keeps market forces from functioning. Everyone knows that the system is broken and know it has been broken for some time, but no one seems to care to force change. Or, those who do care have not yet been able exert the force required to bring on the change.

### Conclusion

What Krueger's work shows us is that an industry can emerge from severe disruption caused by digital technologies and resume growth. The music industry did so because cost cuts were forced that required new business models and practices. Physical media became unimportant and the tract, not the album became the unit that mattered. The result, with streaming, is that listeners get access to almost every piece of music for a small fixed cost. Music is still a superstar economy, but entry into

the business is more open than in the past and artists can, if they choose, make direct unmediated connections with their audiences.

The question for us is, what do we want scholarly publishing to look like when business models and practices fully adapt to digital technologies? The adaptation might be forced, as was the case in music with Napster, and could be in scholarly publishing with Sci-Hub, or it could be more gradual, shaped by consumers, libraries and funding bodies insisting on them as with Plan S and withdrawals from “big deals”. The simple answer would be a legal Sci-Hub. Getting there is the trick because Sci-Hub is parasitic on the legacy publishing system. What is required is a restructuring of scholarly publishing processes so that the whole system costs less money. Anderson’s second rule should be the standard, “Cut the price in half. Now lower it.” The goal should be to have scholarly publishing cost less than half of what it does today.

To accomplish this will require a restructuring of business models and practices. Exactly how this will happen is unclear, but here are some possibilities.

1. Reduce the profit margins of the large commercial publishers. Between them Elsevier, Springer Nature, and Wiley-Blackwell make about \$2.2 billion in profits. If through harder nosed bargaining their 35% to 40% margins can be reduced by half, which is still not a bad return, \$1.1 billion of cost could be removed from the system.
2. Apply AI to publication processes. Meta, a machine learning system that is now a project of the Chan Zuckerberg Initiative, claims that, “Bibliometric Intelligence out-performed tens of thousands of human editors by a factor 2.5x at predicting article-level impact for new manuscripts, prior to publication. It also performed 2.2x better than the same group of editors at identifying ‘superstar articles’ - those that represent the top 1% of high-impact papers, prior to publication.”<sup>50</sup> The Danish company UNSILO has also developed AI tools to assist in the publication process. David Worlock, a publishing consultant said after seeing a demonstration of UNSILO’s system said, “It doesn’t replace editorial judgement but, by God, it makes it easier,”<sup>51</sup> Peer review is generally thought to be slow, unreliable, and costly. Applying AI applications to at least the initial review cannot help but improve it and make it cheaper.

3. A more radical reconstruction for the process of article publishing has been proposed by Michael Eisen, one of the founders of *PLOS* and now Editor in Chief at *eLife*. He says, "I think journals are an anachronism – a product of the historical accident that the printing press was invented before the Internet. I want to get rid of them. More specifically, I want to get rid of pre-publication peer-review and the whole 'submit - review - accept/reject - repeat' paradigm through which we evaluate works of science and the scientists who produced them. This system is bad for science and bad for scientists."<sup>52</sup> He proposes that scientist deposit their articles in subject repositories like ArXiv or bioRxiv and an editorial process of some sort would select and review papers from these repositories and tag them in some way.
4. The scholarly monograph needs to be rethought. Spending \$25,000 to \$40,000 for a book that sells only a couple of hundred copies is a waste of resources. Lower cost open access options, like those offered by Ubiquity Press, should become the standard. Getting scholars, particularly in the context of promotion and tenure, to accept open e-books will probably mirror the debates that have gone on about open access journals. In the end, the increase in impact and citations will likely carry the day, but getting here will be contentious.
5. Expand the use of open publishing infrastructure. Systems like the Open Journal System (OJS), which has been in existence since 2001 currently supports over 10,000 journals. Many academic libraries host OJS and support journals, usually at no cost. The Public Knowledge Project, the parent organization of OJS will host a journal for as little as \$850 per year. Systems like it could be more heavily used, especially by small scholarly societies and similar groups migrate their journals from subscription to open access.

There are undoubtedly other changes that can be made as technologies become more powerful. In 1999 when Napster began disrupting the music business few in the music industry would have predicted iTunes or the iPod, though clearly some at Apple were working on them. Even harder to imagine would have been streaming music services.

We can expect the disruption that is underway in scholarly publishing will be traumatic, as it was for the music industry. We should expect the disruption to take place in promotion and tenure committees as well as in publishing houses. In the end costs will go down, processes will become more efficient, and one result will be fewer people working in the sector. It would be surprising if the dominate firms today will emerge on top a decade from now. Universal Music Group does not run a streaming service. What will be paid for and how the money flows can also be expected to change. As it does today the funding for scholarly publishing will largely come from governments and foundations. Whether most of it will flow through libraries, as it does today, is an open question, though library hosting and publishing of local content will likely increase.

It took the music industry 15 years to recover from the digital disruption that began with Napster. It has been eight years since the founding of Sci-Hub, and the disruption in scholarly publishing is moving at a slower pace, but with Plan S and more libraries walking away from “big deals”, it seems like the disruption is accelerating. Alternative business models and processes are emerging even if they are not yet widely used. It is likely that the next decade will be one of great change ending, hopefully, with all scholarly content following the lead of recorded music in being freely, or at least cheaply, and easily available to everyone who has need for it.

So, is scholarly communications like rock and roll? We can only hope so.

## Notes

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- <sup>3</sup> Joseph Esposito, "A Case for Popularization: A Review of *Rockonomics*," *The Scholarly Kitchen: What's Hot and Cooking in Scholarly Publishing*, August 5, 2019, <https://scholarlykitchen.sspnet.org/2019/08/05/a-case-for-popularization-a-review-of-rockonomics/>
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- <sup>7</sup> Jere Odell and Gary Maixner, "The Lewis Journals-to-Gas-Price Inflation Index for 2018," IUPUI ScholarWorks, December 12, 2018, <http://hdl.handle.net/1805/17973>
- <sup>8</sup> Krueger, *Rockonomics*, page 6.
- <sup>9</sup> See: Chris Anderson, *The Long Tail: Why the Future of Business is Selling Less of More*, New York, NY: Hyperion, 2006, or the article version, Chris Anderson, "The Long Tail," *Wired*, October 1, 2004, <https://www.wired.com/2004/10/tail/>
- <sup>10</sup> Krueger, *Rockonomics*, page 7.
- <sup>11</sup> Jon Pareles, "David Bowie, 21st-Century Entrepreneur," *New York Times*, June 9, 2002, <https://www.nytimes.com/2002/06/09/arts/david-bowie-21st-century-entrepreneur.html?searchResultPosition=9> It is interesting to note that in the same article Bowie said, "I'm fully confident that copyright, for instance, will no longer exist in 10 years, and authorship and intellectual property is in for such a bashing." This certainly did not happen in the music industry, so Bowie might be wrong about water and electricity as well, or he might just have underestimated the time frame.
- <sup>12</sup> Krueger, *Rockonomics*, page 8.
- <sup>13</sup> Krueger, *Rockonomics*, page 9.
- <sup>14</sup> Krueger, *Rockonomics*, page 140.
- <sup>15</sup> Chris Anderson, "The Long Tail," *Wired*, October 1, 2004, <https://www.wired.com/2004/10/tail/>

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- <sup>18</sup> Julia Gammon and Edward T. O'Neill, *OhioLINK-OCLC Collection and Circulation Analysis Project 2011* (Dublin, OH: OCLC Research, September 2011), 31, <http://oclc.org/research/activities/ohiolink.html>
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- <sup>20</sup> It is not easy to find current figures for the number of books available from Amazon, but the commonly found answer on the web is 32.8 million from 2014. See: "How many books does Amazon have for sale?" Quora, <https://www.quora.com/How-many-books-does-Amazon-have-for-sale> (accessed August 17, 2019).
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- <sup>27</sup> *IFPI Global Music Report 2019: State of the Industry*, April 2019, page 13, <https://www.ifpi.org/news/IFPI-GLOBAL-MUSIC-REPORT-2019>
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- <sup>29</sup> *IFPI Global Music Report 2019*, page 13, <https://www.ifpi.org/news/IFPI-GLOBAL-MUSIC-REPORT-2019>

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