Digitization and the Quality and Quantity of New Music, Books, and Movies

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Introduction

• Digitization and media industries: a two-part story
  – Bad news on demand side
    • Napster, BitTorrent, etc
  – Cost reduction on supply side
    • Reduced costs of production, distribution, promotion
• ...along with “nobody knows” effect
• Revolutionary effects on recorded music, books, movies, television,...
  – Lots of new products, many of which are consequential
My additional goals today

• While piracy is interesting/important, we should focus more research energy on whether the supply of new products remains robust

• Rethink which evidence addresses whether copyright is fulfilling its function

• Are we experiencing a crisis?
  – Evidence on music, books, movies, & television

• Copyright research needs more and better data
  – Data availability woes necessitate flexibility
Outline

• Music quality since Napster: rising or falling?
• Why?
• Then revisit the relevant questions in book, motion picture, and other creative sectors
• ...in the order of the evolution of my understanding
Digitization in music, round 1

• The standard music paper motivation since ’99: “the sky is falling!”
Research Response

• Mostly a kerfuffle about whether file sharing cannibalizes sales

• Surprisingly hard question to answer
  » Oberholzer-Gee and Strumpf (2006), Rob and Waldfogel (2006), Blackburn (2004), Zentner (2006), and more

• ...but most believe that file sharing reduces sales
My Epiphany

• Revenue reduction, interesting for producers, is not the most important question
• Instead: *will flow of new products continue?*
  – (We should worry about both consumers and producers)
• RIAA, IFPI: reduced investment will lead to an audio stone age
File sharing is not the only innovation

• “Compound experiment”
  – Costs of production, promotion, and distribution have also fallen
  – Maybe weaker IP protection is enough

• What has happened to the “quality” of new products since Napster?
  – Contribute to an evidence-based discussion on adequacy of IP protection in new economy
Hard problem: assessing quality/service flow of work over time

• 2 approaches:

• Critics’ best of lists
  – E.g. Number of albums on a best-of-the-decade list from each year
  – Retrospective: to be on list, album’s quality must exceed a constant threshold

• Usage information by time and vintage

• Regression:
  \[ \ln (y_{i\tau}) = \mu_i + \theta_t + \epsilon_{i\tau} \]

• Plot \( \theta \)'s

“Splice” together to create overall index, covering pre- and post-Napster era.
And voila: Index of vintage quality

Index is falling prior to Napster

Post-Napster constancy is, if anything, a relative increase
Approach #2

• Measure of vintage “quality” based on service flow/consumer decision
  – Sales and airplay

• **Idea:** if one vintage’s music is “better” than another’s, its greater appeal should generate higher sales or greater airplay through time, after accounting for depreciation
Data

• Airplay 2004-2008 by vintage
• Sales 1970-2010, by vintage
  – From RIAA certifications
Regression approach

• Define $s_{t,v} = \text{share of vintage } v \text{ music in the sales or airplay of music in period } t$.
  – For a given year $t$, $s$ varies across vintages because of depreciation and variation in vintage quality

• Regress $\ln(s_{t,v})$ on age dummies, vintage dummies.
  – Allow flexible depreciation pattern

• Then: vintage dummies are index of vintage “quality”
Resulting Airplay Index

Airplay-Based Index
Flexible Nonparametric

Vintage

0 0.5 1 1.5 2 2.5


Index
top of 95% interval
bottom of 95% interval
Sales-Based Index

Flexible Nonparametric

Vintage

Index
Bottom line

• No evidence that vintage quality has declined
• More compelling evidence that it has increased
• Hard to know what it might otherwise have been
• Big contrast to IFPI/RIAA view
• **Puzzle: why continued quality despite revenue collapse?**
Fundamental features of creative products

• “nobody knows anything” (Caves/Goldman)
  – Hard to predict success at time of investment
  – Perhaps 10 percent succeed

• Traditionally, it has been expensive to “experiment” (Tervio)
  – Must bring a product to market to learn whether it will succeed
  – Music: ≈$1 million using traditional means
  – So bet on a few artists with ex ante promise
Along comes digitization

• (...and demand: piracy)
• ...and supply
  – Obvious effects on production and distribution
    • Recording, distribution are now inexpensive
  – Promotion too?
    • Traditionally, radio is a bottleneck
    • Now Internet radio and online criticism
• It has become cheaper to “experiment”
  – Do we end up discovering more artists with ex post value?
How could quality improve?

“Model” inspired by Goldman ("nobody knows")

• Label forms estimate of album marketability $q'$ as truth + error: $q' = q + \epsilon$
• Bring a product to market if $q' > T$.
• Cost reduction trumps piracy, so that on balance, digitization reduces $T$, raising the number of projects that can be brought to market.
• Big question: what happens to the volume of “good” work available to consumers?
Suppose marketability were predictable

- Then reduction in $T$ brings more products
- But they are of modest quality: $T' < q < T$
With unpredictability

• Release all products with expected quality above T’
• Result: more products with quality > T

• Release of products with less ex ante promise leads to a greater number of products with ex post success/value
Is this explanation right?

Some questions:

• More new products?
  – ...including “indies” with less ex ante promise?

• Do consumers have ways to learn about a proliferation of new products?
  – Changing roles of traditional radio, Internet, and critics

• Do the products with less ex ante promise – e.g. indie artists who would not have been released before digitization – account for a rising share of ex post success?
Illustrative Anecdote:
Arcade Fire’s *The Suburbs*

- Released by indie Merge Records August, 3, 2011
- Critical acclaim
  - Metascore=87 (top 5%)
- Little conventional airplay
  - Not on BB Airplay Chart
  - But big on Internet radio
- Success
  - Sold >0.5 million copies
  - Best Album Grammy for 2011
Answers

• **Growth in releases?**
  – Yes. Nielsen: 35k in 2000, 100k in 2010

• Changing information environment

• Ex ante promise and ex post success
Answers

• Growth in releases?
• Changing information environment
• Ex ante promise and ex post success
Changing Information Environment

• Traditional radio
  – BB airplay – top 75 songs by week
    • 3,900 listings per year
  – But only about 300 distinct artists

• Traditional vs Internet radio
  – Compare BB list with last.fm top 420 songs of the week in 2006
  – Little overlap – 10 percent
### Top 2006 BB Airplay Artists not on Last.fm Weekly Top 420

<table>
<thead>
<tr>
<th>ARTIST</th>
<th>BB airplay index</th>
</tr>
</thead>
<tbody>
<tr>
<td>MARY J. BLIGE</td>
<td>14.3</td>
</tr>
<tr>
<td>BEYONCE</td>
<td>12.0</td>
</tr>
<tr>
<td>NE-YO</td>
<td>10.3</td>
</tr>
<tr>
<td>CASSIE</td>
<td>9.8</td>
</tr>
<tr>
<td>CHRIS BROWN</td>
<td>9.8</td>
</tr>
<tr>
<td>YUNG JOC</td>
<td>8.2</td>
</tr>
<tr>
<td>SHAKIRA</td>
<td>6.9</td>
</tr>
<tr>
<td>LUDACRIS</td>
<td>6.0</td>
</tr>
<tr>
<td>CHAMILLIONAIRE</td>
<td>5.7</td>
</tr>
<tr>
<td>AKON</td>
<td>5.2</td>
</tr>
</tbody>
</table>

### Top Artists on Last.fm in 2006 without BB Airplay

<table>
<thead>
<tr>
<th>ARTIST</th>
<th>listeners</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEATH CAB FOR CUTIE</td>
<td>5,200,000</td>
</tr>
<tr>
<td>COLDPLAY</td>
<td>5,200,000</td>
</tr>
<tr>
<td>RADIOHEAD</td>
<td>4,700,000</td>
</tr>
<tr>
<td>MUSE</td>
<td>3,900,000</td>
</tr>
<tr>
<td>ARCTIC MONKEYS</td>
<td>3,000,000</td>
</tr>
<tr>
<td>THE POSTAL SERVICE</td>
<td>2,800,000</td>
</tr>
<tr>
<td>THE BEATLES</td>
<td>2,400,000</td>
</tr>
<tr>
<td>SYSTEM OF A DOWN</td>
<td>2,300,000</td>
</tr>
<tr>
<td>BLOC PARTY</td>
<td>2,100,000</td>
</tr>
<tr>
<td>NIRVANA</td>
<td>1,900,000</td>
</tr>
<tr>
<td>THE ARCADE FIRE</td>
<td>1,900,000</td>
</tr>
</tbody>
</table>

**Takeaway:** Internet radio allows promotion for artists with less promotion on traditional radio.
Second, growth in criticism

- Much of it online
Success and promotional channels

• What’s happening to the role of traditional airplay among successful artists?
• What’s happening to the role of critics?
Learning from critics vs radio
Of commercial successes:

Declining share with airplay, especially since 2000

By contrast: increasing share with critical attention
Answers

- Growth in releases?
- Changing information environment
- Ex ante promise and ex post success
Ex ante promise and ex post success

- Do artists with less ex ante promise – who would not have made it to market prior to digitization – now achieve sales success?
- Specifically, do indies account for a growing share of sales?

“Even the losers get lucky sometimes”
Summing up music

• Digital disintermediation provides possible explanation for increased “quality”

• Given unpredictability, more “experimentation” leads to discovery of additional “good” music
  – Ex ante loser become ex post winners

• Much of which would not have come to market before digitization
What about other cultural products?

• **Books, motion pictures, television,**...

• Of each, ask the questions (when possible):
  – More products?
  – Ways to learn about new products?
  – Changing sales concentration
  – Growing success of ex ante “losers”?
  – Are the new vintages “good”?
Books

• Growth in new products, “ecosystem”?

• Yes, especially self-published e-books, supported by diffusion of tablets & e-readers
Commercial success of ex ante losers

- From Storming the Gatekeepers, Waldfogel and Reimers (2013)
Movies

• Different?
  – More costly: $100m for an average MPAA title

• An important US export industry
  – “Jobs, jobs, jobs”
Digitization and cost reduction in motion pictures

• Production
  – Digital cameras that are cheap and good

• Distribution
  – Digital sales (iTunes, Netflix, Amazon,...)

• Promotion
  – Lots of movies reviewed online + user-generated reviews

• ....raising the possibility of 1) new movies that 2) might be discovered by, and of interest to, consumers.

• True?
Production

• Digital cameras introduced around 2000
  – Widely adopted by even major productions ca 2009
  – Arri Alexa, Red One, Canon 5D, Canon 70D
  – Prices: $250,000, $50,000,...,$2,000
  – Creates opportunity for indie film makers
(Attack of the digital clones)

Camera Types for Theatrical Releases

- mean of arri
- mean of pana
- mean of moviecam
- mean of aaton
- mean of alexa
- mean of red
- mean of canon
- mean of other
Major titles are steady, even declining

Source: MPAA
...but huge growth in overall production

Movies with IMDb pages as of August 2013
Growth in small-scale theatrical release

Sources: MPAA, Box Office Mojo, Metacritic
In 2013, over 1000 vintage-2010 movies available on streaming Netflix, over 1,200 at Amazon Instant.
Product discovery

• Significant growth in review provision and availability
• A range of “professionals” plus amateurs
Pro review availability goes deeper

Reviews of selected movies at IMDb
Many movies have user ratings at IMDb

User-rated Movies at IMDb by Vintage

Source: IMDb, movies with 5+ user ratings
“Argo” example: wide range of “pros”

Alexa Traffic Ranks of IMDb Argo Reviewers

vertical lines at Rolling Stone, indiewire

588 reviews and the Alexa ranks of their sources.
Median rank: 1.6 million
Do independent movies succeed?

• What is “independent”?  
  – “I know it when I see it”  
    • Independent Spirit  
  – Limited appeal  
    • Indiewire  
  – Not produced by major studio
Indies are growing share of box office and DVD revenue
...and a growing share of what’s available through various channels

- **Growth in independent movies by many measures**
Are the new movies “good”

• Two kinds of approaches, based on critics and usage
Absolute number of movies with high grades has risen a lot
Independent movies account for growing share of RT-top movies

Share of RT Top Movies from Independent Studios

Not Major
Btw: pro and amateur opinions are positively correlated
Are new vintages “good”? Usage evidence

- As before:
- Regress $\ln(s_{t,v})$ on age dummies, vintage dummies.
  - Allow flexible depreciation pattern
- Then: vintage dummies are index of vintage “quality”
Movies have been getting better

Mixed result: no apparent increase in vintage service flow during most recent growth, since 2005
Television

• Growth in products?

• Yes: more “draws”
Falling traditional-network share of acclaimed shows

Traditional Broadcast Network Share of Metacritic top 25 by series vintage

Top Shows by Vintage and Source IMDb ratings

- mean of traditional
- mean of other
- mean of premium
The best new shows are “good” compared to history

The Golden Age of television is now
Where else?

- Video games?
- Photography?
  - Democratization of means of production
Conclusion

• While new digital technology brought threats to creative industries (piracy), it also brought opportunities
• Huge growth in new products and distribution
• And “new products” make up large and growing share of successful
• Threats to revenue are real, but
  – no sign of diminished output
  – and works are better
Public Policy

• Rights holders are concerned about declining revenue from some sources
  – Understandable
• Copyright exists to provide incentives for creative activity
• Despite revenue performance in recorded music and newspapers, and fears in movies, *there is no crisis in creative activity*
Underlying works

• “Piracy on the High C’s. . .,” with Rob, JLE 2006
• “Copyright. . ., JLE 2012
• “And the Bands Played on. . .” NBER volume 2015
• “Storming the Gatekeepers. . .” with Reimers, IEP 2015
• “Cinematic Explosion. . .” forthcoming, JIE
• Digital Renaissance, Princeton Univ Press, 2016?
• “Even the Losers. . .” with Aguiar, forthcoming, IEP
• “Quality Predictability. . .” with Aguiar