Copyright Piracy: Measuring the Extent and Impact

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for

Counterfeiting and Piracy:

Significance of Piracy

- IFPI (John Kennedy)
  - “The music industry fights piracy because if it did not, the music industry would quite simply not exist”
  - Reported piracy figures “reflect the real damage that this mass-scale copyright theft is doing ... to innovation and economic growth”

- BSA/IDC – piracy leads to
  - software industries crippled by competition
  - less software being produced and purchased
  - loss of tax revenues and jobs
BSA/IDC Economic Impact Study

- 10% decrease in worldwide piracy rate over 4 years would...
  - add 1.5 million new jobs, $64 billion in taxes, and $400 billion in economic growth
  - yield larger benefit for countries with higher piracy rates

- Piracy rate – measurement issue
- Impact – modeling and economic issue

Agenda

- Measuring the extent of piracy
  - BSA/IDC methodology
  - Our approach

- Assessing the economic impact of piracy
  - Industry estimates
  - Our findings for music CDs

- Supply of intellectual property?
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BSA/IDC Methodology

- Pirated quantity = total demand – total supply (legitimate purchases)
- Total demand = average no. of units of software installed on each PC × no. of PCs
- Total supply (legitimate) = software revenues ÷ unit price
- Separate estimates for
  - businesses / consumers
  - new computers / existing computers
  - each software category (PC gaming, utilities, etc.)
Limitations

- **Demand (installed software):**
  - Consumer and business surveys: Which are general productivity or office software, professional applications, personal finance, etc.?
  - Respondents must exclude open source or free software from their estimates

- **Supply (legitimate sales):**
  - Revenues include software outside the categories sampled in the demand survey
  - Only five categories of software are used to calculate the unit price of software

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General Challenges

- Data sources
  - Without access to industry sources or supplier estimates, most practical option → consumer and retailer surveys
- Accuracy of data

Data Sources

- Census and consumer survey
  - Software installation data
  - Purchase of new and replacement computers
  - New software installed on existing computers
- Surveys of software wholesaler and retailers
  - Direct estimation of unit shipment
  - Better source of information on site licenses and bundled software
Data Accuracy

- Count representative software in each software category, e.g.,
  - Office software: MS Office, Outlook, etc.
  - Professional Applications: AutoCAD, PhotoShop, etc.
  - Operating systems: Windows, MacOS, etc.

Advantages

- Demand side:
  - No ambiguity about which software to include
  - Explicit control for free or open source software

- Supply side:
  - Enable large-scale survey with software retailers (cf. using aggregate software revenues)
  - Not subject to biases due to inclusion of incomplete and inconsistent categories of software

- Account for: Bundled software, site licenses, software transfer from old to new PCs
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Impact of Piracy – 2004

- IFPI – world pirate music market worth US$4.6 billion
- BSA – dollar losses due to software piracy > US$30 billion
Industry Estimates

- 1 unit of pirated good = 1 unit of loss
- Limitations:
  - Absent piracy, some would simply not use / purchase a product
  - Piracy encourages sampling and sharing, which may raise sales
  - Piracy increases popularity of product due to word of mouth

Industry Estimates

- BSA/IDC Economic Impact Study (2003)
  - “While not every piece of formerly pirated software will be purchased if piracy rates go down – some will be substituted, some not used – at the same time lower piracy rates yield more economic activity that stimulates more software production and purchase. The two countervailing forces seem to cancel each other out. This is the conventional assumption for most previously published piracy studies.”
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Setting

- Music CD sales from 1994 to 1998 in 28 countries
- Data sources
  - CD sales and unit prices: GMID
  - Music piracy: IFPI
Methodology

- Economic modeling
  - Allow for both positive and negative impacts of piracy on legitimate sales
  - Control for income, ownership of CD players, and influence of music exposure
  - Net impact is derived empirically → data speak for themselves

Findings

- Absent piracy, the demand for legitimate music CD and price would be higher
- 1 unit of pirated CD = 0.42 unit loss in sale
  - By IFPI/BSA assumption, average loss in per-capita CD demand = 0.227 unit
  - Actual loss = 0.095 unit
- Revenue loss exceeded 6.6%
  - Price effect
Implications

- One-to-one assumption was not consistent with observed music data
- Other indicators?
  - Jobs increase, tax revenue, economic growth

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### Broader Issues

- Do economic incentives affect the supply of creative work?
  - If yes, would extended duration of copyright increase innovation?

### Movie Supply

- Similar methodology as music piracy study
- U.S. copyright extension – Sonny Bono Copyright Term Extension Act, 1998
  - Positive but not statistically significant effect on movie production
Supply of Intellectual Property

- **Open questions:**
  - Effect of copyright on production of creative work?
  - Effect of piracy on production of creative work?

- **Need bigger data-sets:**
  - longer time period
  - more countries
  - more products – movies, music CDs, books

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Way Forward

- **Measurement:** better data sources
  - Participation by government, industry bodies, and vendors

- **Impacts:** better methodologies
  - Critical evaluation of assumptions
  - Joint collaboration between industry and academics
## References

