



Piracy and the Legitimate Demand for Recorded Music

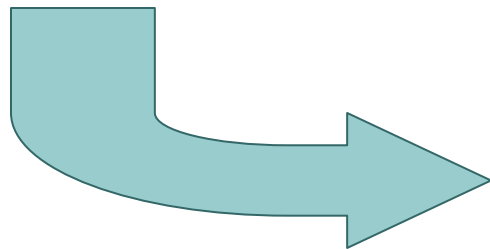
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Research Agenda: Economics of Copyright

- How does copyright affect production of creative work?
- By how much does piracy diminish creator's profit?



copyright policy



Movie Production

- national production of movies does respond to economic incentives:
 - increases with ownership of VCRs
 - increases with national income



Copyright Term Extension

- 1998: Sonny Bono Copyright Term Extension Act
- increased production of movies, but *not* statistically significant



Piracy Losses, 2002

- Business Software Alliance: \$13.08 billion
- Intl Federation of the Phonographic Industry: \$4.6 billion



Issue

- How does piracy affect demand for legitimate item?



“Good Piracy”

- demand-side externalities
 - fad
 - hardware ownership
- supply to others, product sharing
- credible price commitment



Theory

- legitimate demand

$$Q_{L,it} = \alpha_0 - \alpha_1 p_{it} + \alpha_2 X_{it} + \alpha_3 Y_{it} + \alpha_4 N_{it} + \alpha_5 M_t + \alpha_6 Q_{C,it} + \varepsilon_{it}$$

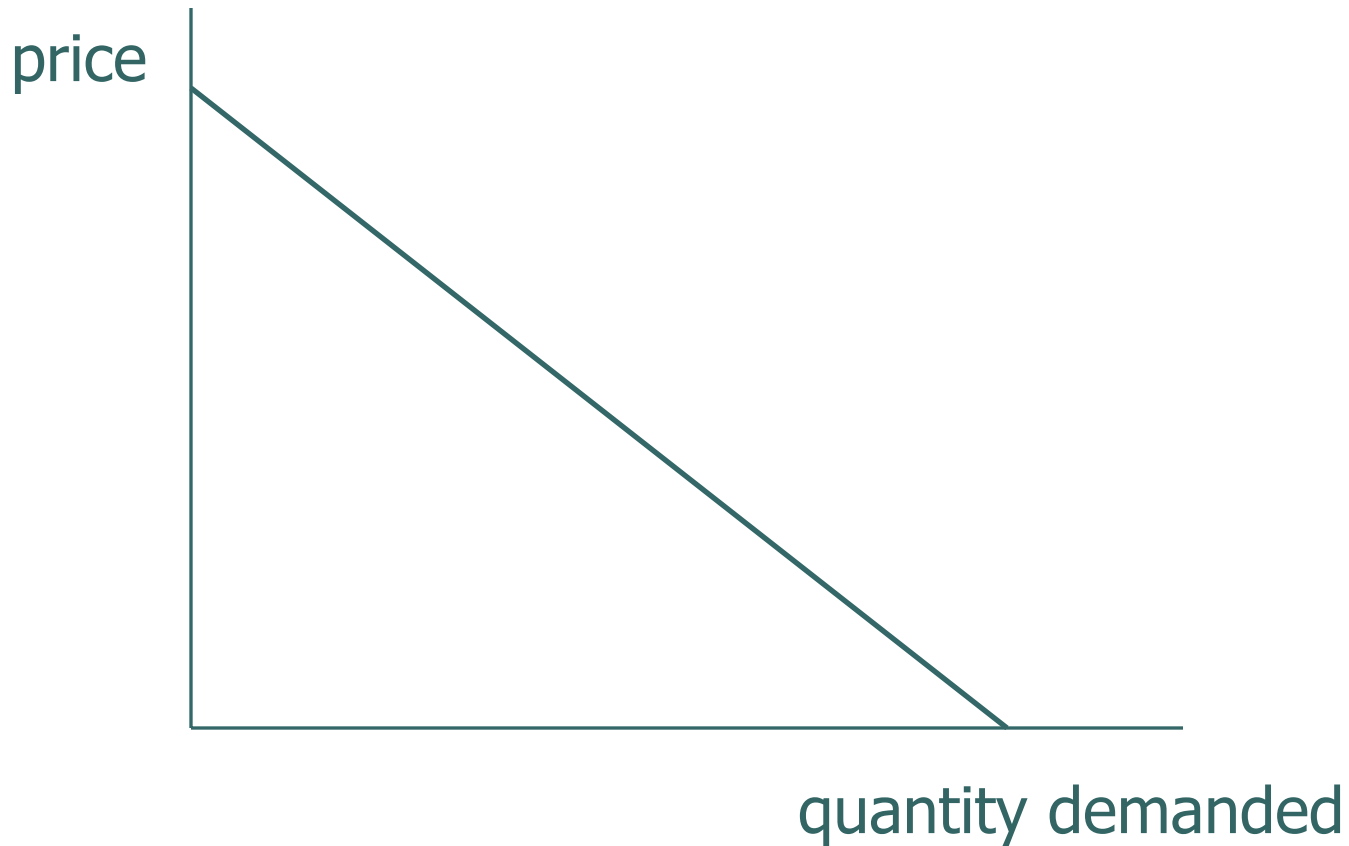
- demand for pirated item

$$Q_{C,it} = \beta_0 + \beta_1 p_{it} - \beta_2 X_{it} + \beta_3 Y_{it} + \beta_4 N_{it} + \beta_5 M_t + \beta_6 Q_{L,it} + u_{it}$$

- reduced form

$$Q_{L,it} = \gamma_0 + \gamma_1 p_{it} + \gamma_3 Y_{it} + \gamma_4 N_{it} + \gamma_5 M_t + \gamma_6 Q_{C,it} + \psi_{it}$$

Demand Curve





H1 (Theft)

- Demand for legitimate information product is decreasing in piracy rate



H2 (Positive Influences)

- Demand for legitimate information product is increasing in the piracy rate



Why Recorded Music?

- only available panel data on unit sales, prices, hardware, piracy



Estimation

- dependent variable – legitimate sales
- country fixed effects
- two-stage least squares



Data

Variable	Unit	Mean	Std Dev
Legitimate sales	per cap.	1.175	0.971
Price	US\$	11.745	5.542
Income	US\$'000	9.728	6.789
CD player ownership	per cap.	0.116	0.098
Pirate sales	per cap.	0.105	0.317



Results

Variable	Baseline	Full model
Price	-0.0355** (0.0174)	-0.0277** (0.0135)
Income	0.0852*** (0.0315)	0.0842*** (0.0297)
CD player ownership	3.1777*** (0.8687)	2.8529*** (0.9405)
Pirate sales	n.a.	-0.4205* (0.2508)



Summary of Results

- H1 (Theft) – supported
- H2 (Positive Influences) – smaller than theft, if any



Demand Losses, 1998

	IFPI	Our model
Australia	0.191	0.080
Hong Kong	3.553	1.494
UK	0.020	0.008
USA	0.044	0.019
Average	0.227	0.095



Limitations

- national differences in effect of piracy on demand
- legal penalties
- data-set limited to 1994-98



Research Directions -- Piracy

- Impact of online file sharing?



For Napster, I

“At the individual consumer level, virtually all the published studies provide evidence that consumers’ use of file sharing platforms stimulates more CD sales than it might displace.”

Peter S. Fader



For Napster, II

“sales show no sign of reduction from Napster’s and others’ activities ... sales of CDs have accelerated ... the evidence suggests that exchanges facilitated by Napster and others stimulate the overall demand for recorded music.”

Robert E. Hall



Research Directions – Piracy, cont'd

- Impact of piracy on PC software sales?
- Develop more accurate measures of piracy – “not the BSA”



Research Directions – Gray Markets

- general context: where user can choose between legitimate and illicit alternatives
 - illicit item provides lower benefit



Research Directions -- Incentives

- Longer term impact of copyright term extension
- Broader costs of copyright – foregone creativity