

IT and Public Policy - Oct. 21, 2004

Networks & Interoperability & Standards

Stephen M. Liebowitz
Goldman School of Public Policy

1

Networks Introduction

Motivating Examples:

- TCP/IP & Berkeley Unix
- GSM
- The Web
- The Browser Wars
- etc., etc., etc..

2

Networks Introduction

Old Economy Externalities

- Pollution (Negative)
- Flower Gardens (Positive)

Network Externalities

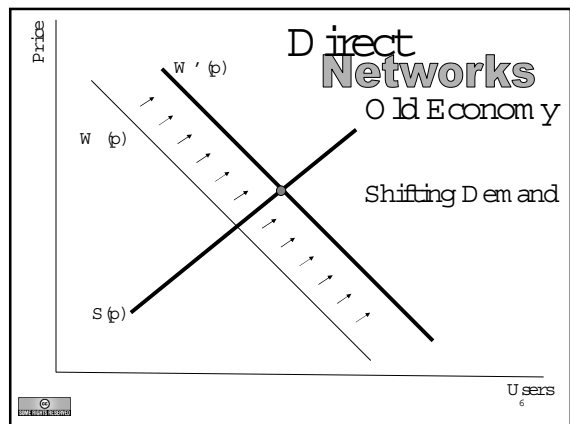
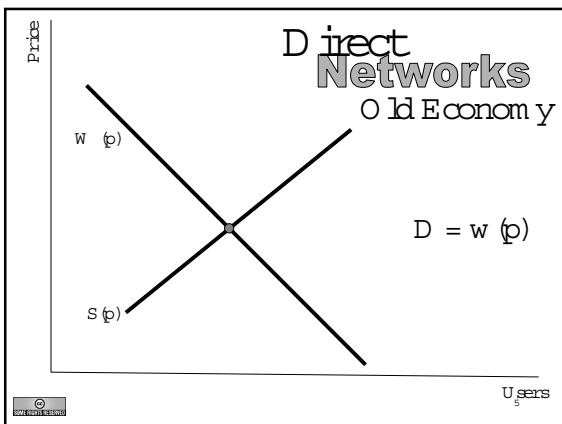
- "I Care If You Use It"
- How Big Should the Network Be?
- Lawyers & WordPerfect...

3

Networks Introduction

- Direct Network Externalities
 - MS Word
- Indirect Network Externalities
 - Operating Systems & Games
- Physical Network Externalities
 - Internet & Telephones

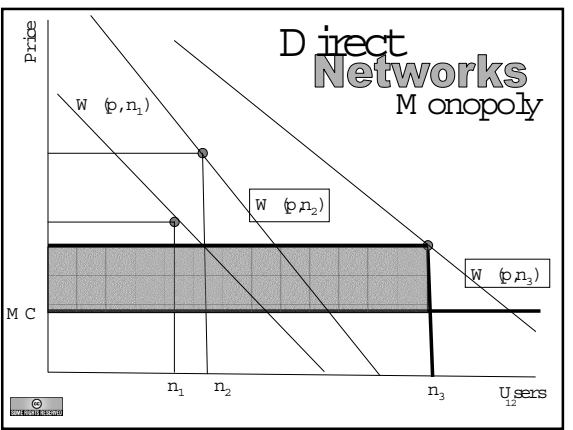
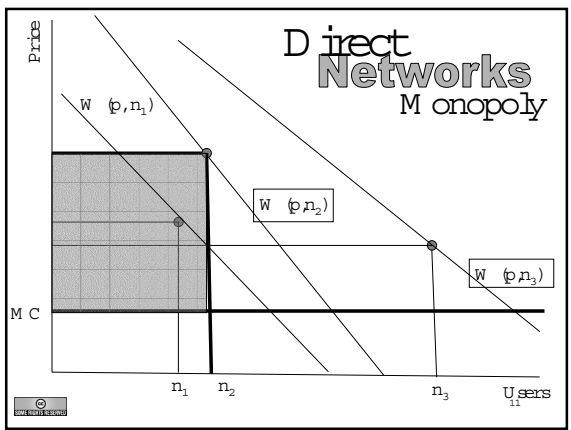
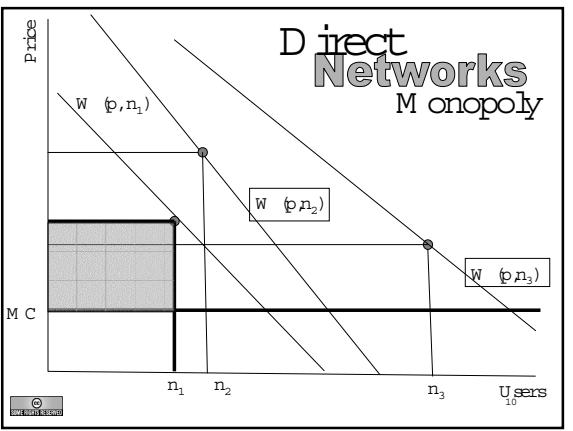
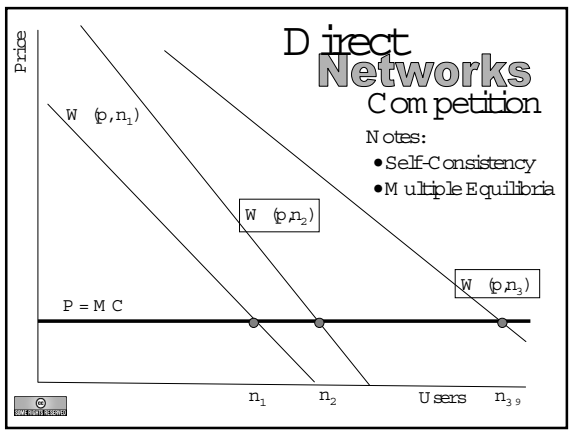
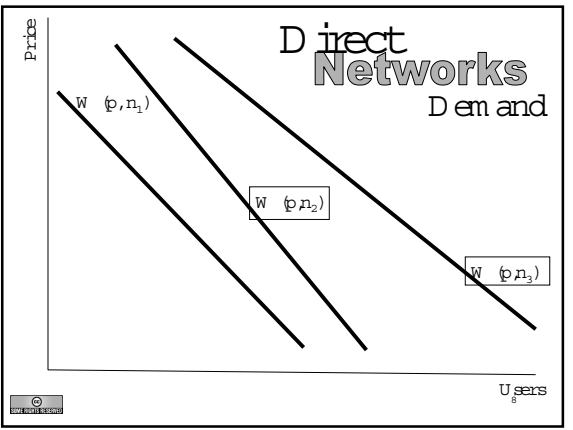
4



Direct Networks

New Economy
 "I Care if You Use It"
 $D = w(p, n)$
 Multiple Demand Curves
 Implications for Efficiency

7



Direct Networks Tactics

User Networks
 Penetration Pricing
 Consumers Expectations
 Hype
 Vaporware
 Attack Ads



13

Direct Networks Tactics

Commitment Strategies
 Second Sources
 Intel, IBM PC
 Renouncing Monopoly
 Netscape Navigator
 Investments & Alliances
 The PC
 Reputation



14

Direct Networks Tipping

Network Effects

The Best Product Doesn't Always Win!
 VHS vs. Beta

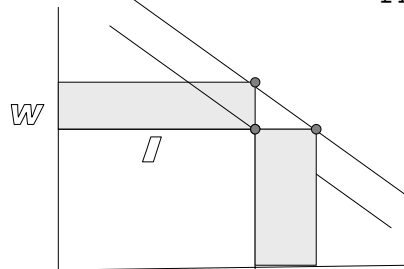
R & D Effects

Appropriability
 Increased Demand



15

Direct Networks Tipping



16

Direct Networks Efficiency

Static Efficiency

The Old Economy Answer
 How Big Should The Network Be?
 Which Institution Comes Closest?

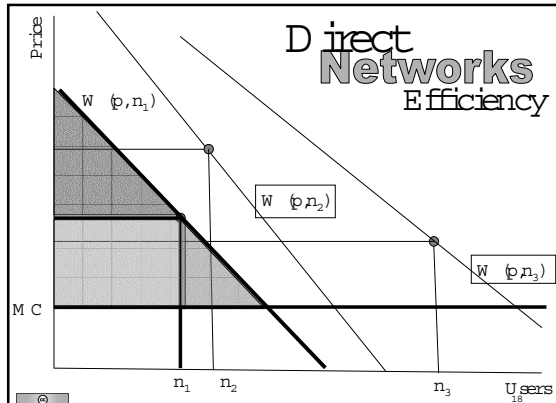
Dynamic Efficiency

Lock-In vs. Stranding

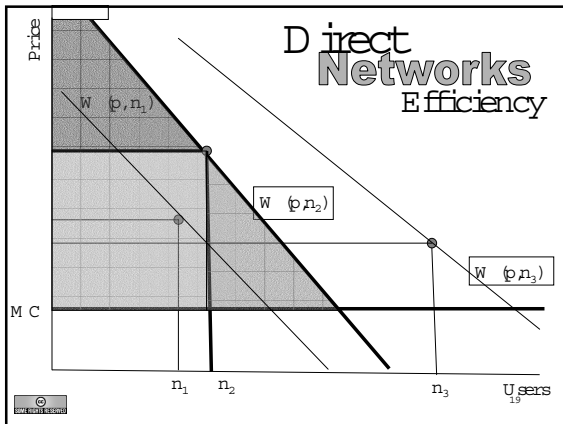


17

Direct Networks Efficiency



18



Direct Networks Efficiency

Monopoly vs. Competition

- Network Externalities
- Price & DWL
- Variety
- Economies of Scale & Duplicated R & D

Is The Competitive Solution Ideal?

Direct Networks Efficiency

Stranding vs. Lock-In

- Switching Costs
- Coordination Problems
- Aggressive Pricing
- Beta vs. Leaded Gasoline

Direct Networks Efficiency

Open Standards

"Look and Feel"

Ex Ante vs. Ex Post Efficiency

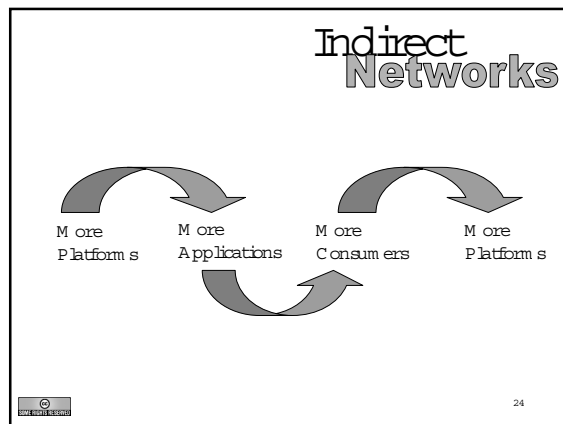
- How Big Does Π Have to Be?
- Happy Accidents

Indirect Networks

Consumers Care About Supply of a Complementary Good

Platforms & Applications

- Operating Systems and Software
- Consoles and Games
- DVDs and Movies



Indirect Networks Interoperability

Closed Standards

- Exclusive Licenses
 - Games

Open Standards

- Reducing The Platform's Power

Should We Protect Interfaces?

- Happy Accidents

© 2004 MIT 25

Physical Networks

Natural Monopolies

- Hydroelectric Dams
- Marginal Cost
- Competition
- Congestion

© 2004 MIT 26

Physical Networks

Physical Networks

- Internet, Telephones
- Competition
- Congestion

Opening The Network

- The Last Mile

© 2004 MIT 27

IT and Public Policy – Oct. 21, 2004

Networks Interoperability & Standards

Stephen M. Liebowitz
Goldman School of Public Policy 28