

Brett M. Frischmann

Professor of Law

Director of IP and Information Law

Program

Cardozo Law School

Project

- Approaching the economics of foundational resources from the demand side
 - Where does the value come from?
- Interdisciplinary
 - law and economics
 - many disciplines within law
 - many disciplines within economics

Introduction

Part I: Foundations

Chapter One: Defining Infrastructure and Commons Management

Chapter Two: Overview of Infrastructure Economics

Chapter Three: Microeconomic Building Blocks

Part II: A Demand-Side Theory of Infrastructure and Commons Management

Chapter Four: Infrastructural Resources

Chapter Five: Managing Infrastructure as Commons

Part III: Complications

Chapter Six: Commons Management and Infrastructure Pricing

Chapter Seven: Managing Congestion

Chapter Eight: Supply-Side Incentives

Part IV: Traditional Infrastructure

Chapter Nine: Transportation Infrastructure : Roads

Chapter Ten: Communications Infrastructure : Telecommunications

Part V: Nontraditional Infrastructure

Chapter Eleven: Environmental Infrastructure

Chapter Twelve: Intellectual Infrastructure

Part VI: Modern Debates

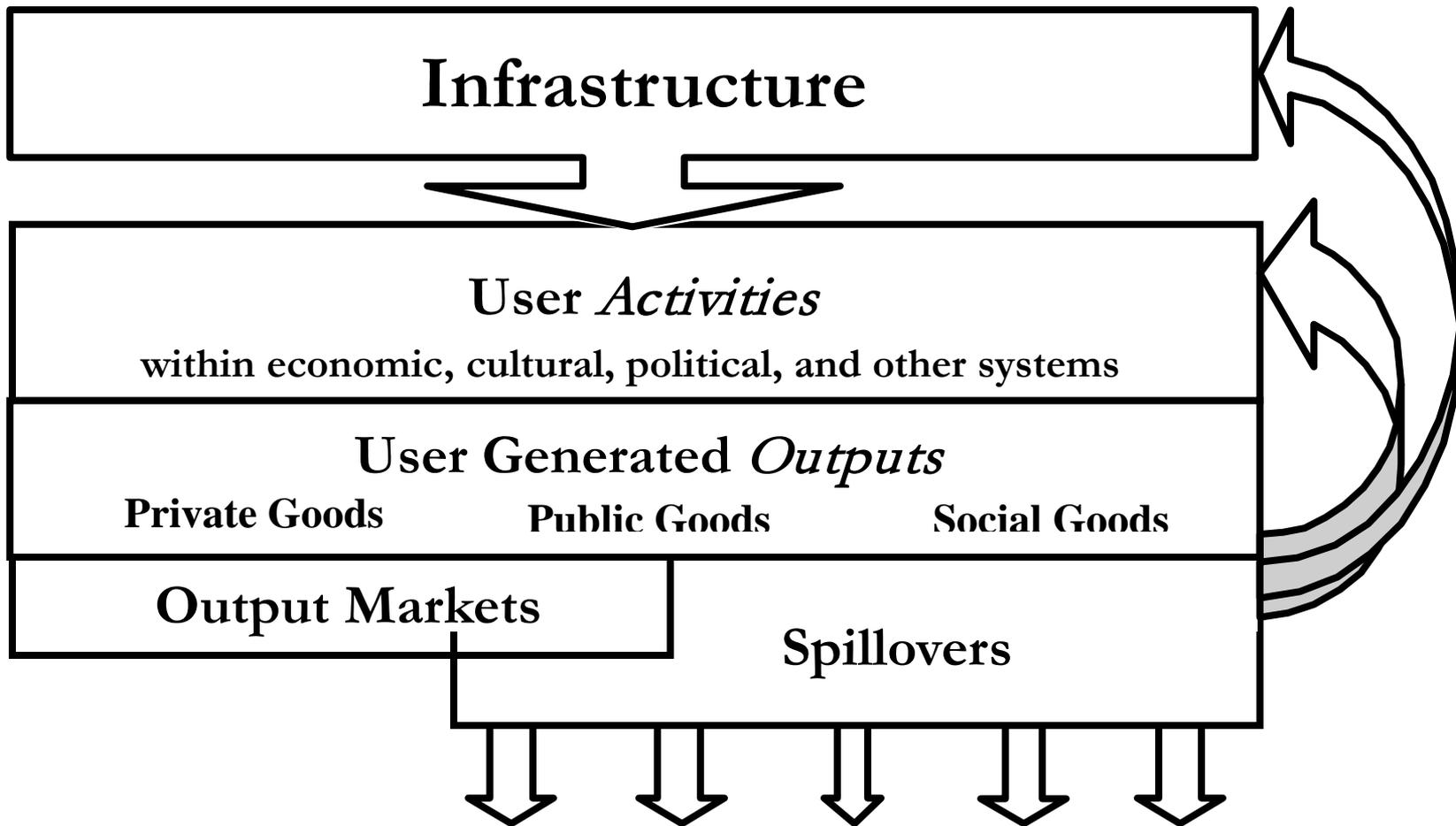
Chapter Thirteen: The Internet and the Network Neutrality Debate

Chapter Fourteen: Application to Other Modern Debates

Conclusion

Background

- Government intervention
- Commons management
- Positive externalities / large social surplus



Background

- **Comedy of the commons**
- Connecting commons management with the positive externalities and social surplus.

- Simple thesis:
 - If Infrastructure, then commons?
 - *NO: Too simple!*
 - *But decent organizing principle*
- More complicated set of arguments:
 - Depends upon the mix of outputs
 - Infrastructure typology helps sort arguments
 - Need to consider value of commons management more carefully

Infrastructural Resources

1. The resource may be consumed nonrivalrously,
2. social demand for the resource is driven primarily by downstream productive activity that requires the resource as an input, and
3. the resource is used as an input into a wide range of goods and services, including private goods, public goods and/or social goods.

		CAPACITY	TYPE OF GOOD
(NON)RIVALROUSNESS OF CONSUMPTION	Nonrival	<ul style="list-style-type: none"> • Infinite • Sharable • Not congestible 	Pure public good (idea)
	Partially (non)rival	<ul style="list-style-type: none"> • Finite • Potentially renewable • Potentially sharable • Congestible • Depreciable 	Impure public good (lake, road, the Internet)
	Rival	<ul style="list-style-type: none"> • Finite • Nonrenewable • Not sharable 	Private good (apple)

Infrastructural Resources

1. The resource may be consumed nonrivalrously,
2. social demand for the resource is driven primarily by downstream productive activity that requires the resource as an input, and
3. the resource is used as an input into a wide range of goods and services, including private goods, public goods and/or social goods.

Infrastructural Resources

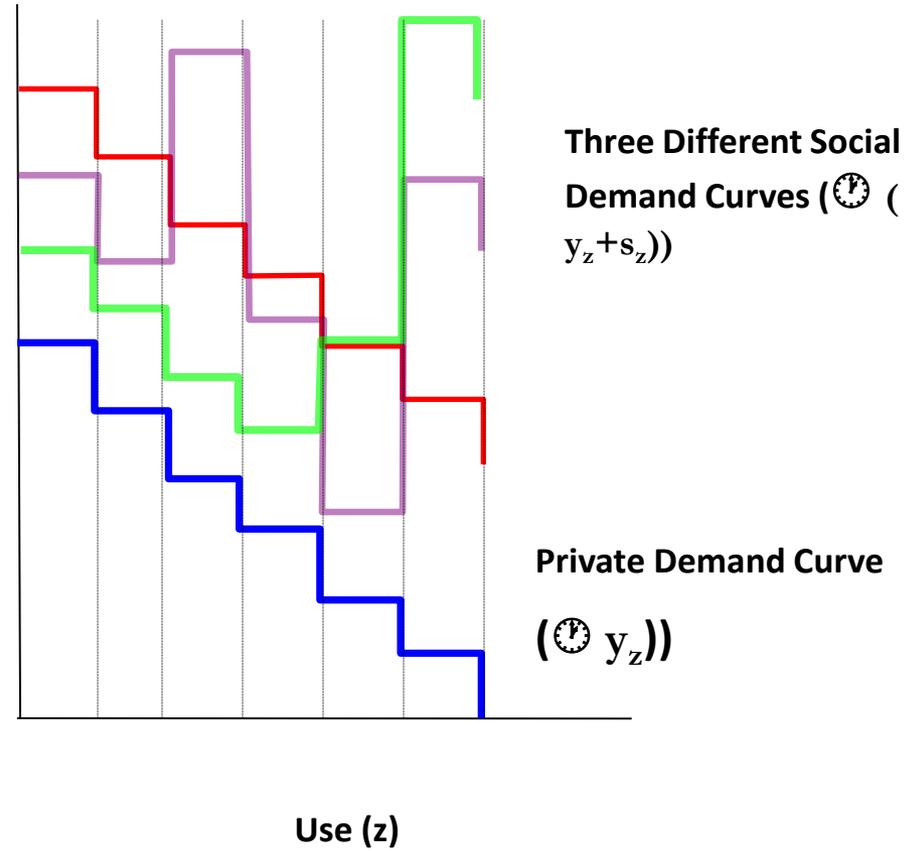
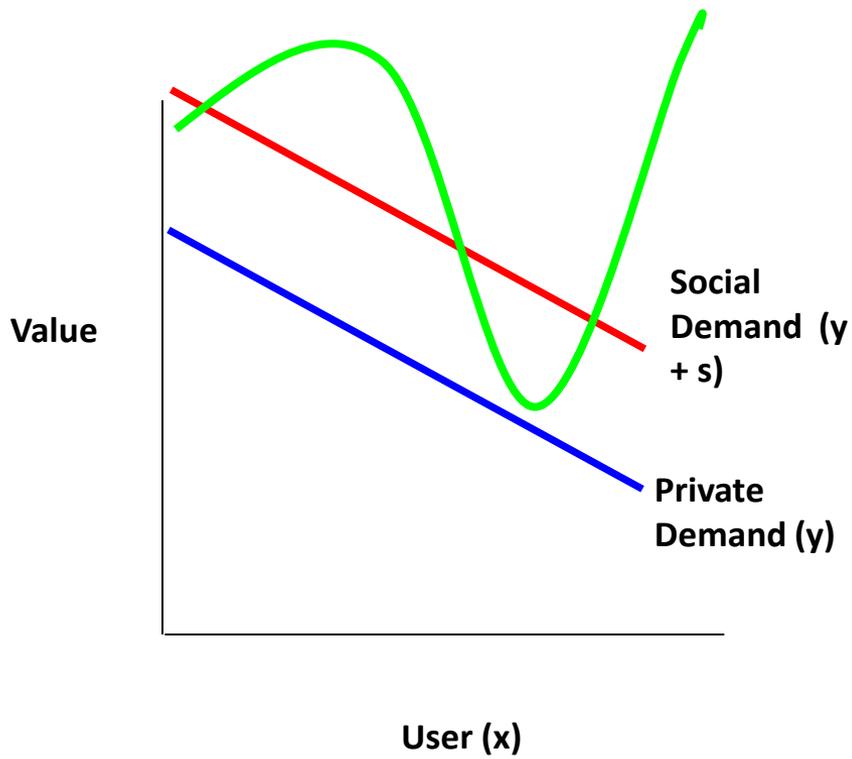
1. The resource may be consumed nonrivalrously,
2. **social demand for the resource is driven primarily by downstream productive activity that requires the resource as an input, and**
3. the resource is used as an input into a wide range of goods and services, including private goods, public goods and/or social goods.

		Demand	
		Consumption	Derived
(NON)RIVALROUSNESS OF CONSUMPTION	Nonrival or Partially (Non)rival	Public consumption good	Public capital good
	Rival	Private consumption good	Private intermediate good or raw material

Infrastructural Resources

1. The resource may be consumed nonrivalrously,
2. social demand for the resource is driven primarily by downstream productive activity that requires the resource as an input, and
3. **the resource is used as an input into a wide range of goods and services, including private goods, public goods and/or social goods.**

- Infrastructure enable many systems (markets and non-markets) to function and satisfy demand derived from many different types of users.
- Infrastructure are *not* special purpose resources, optimized for a particular user or use to satisfy the demand derived from a particular downstream market or set of markets.
- Infrastructure provide basic, multi-purpose functionality.



Note: Uses z_1, z_2, z_3, \dots ranked according to aggregated willingness to pay.

Infrastructure typology

- Output focused
- Potential to generate positive externalities
- Potential for demand side market failure because output producers will not fully represent societal demand

Infrastructure Typology

Commercial:

Nonrival or partially (non)rival input into the production of a wide variance of *private goods*.

Public:

Nonrival or partially (non)rival input into the production of a wide variance of *public goods*.

Social:

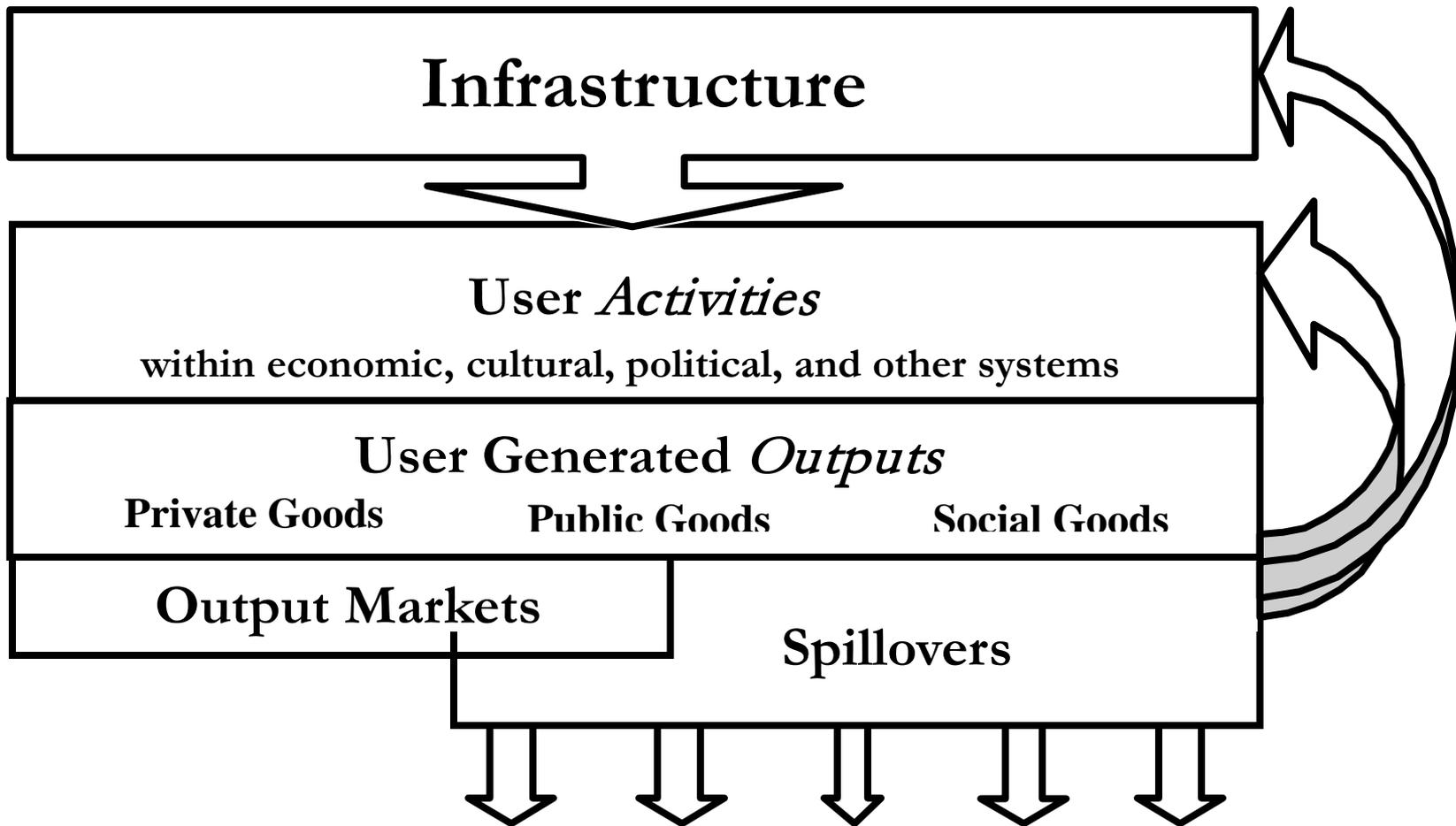
Nonrival or partially (non)rival input into the production of a wide variance of *social goods*.

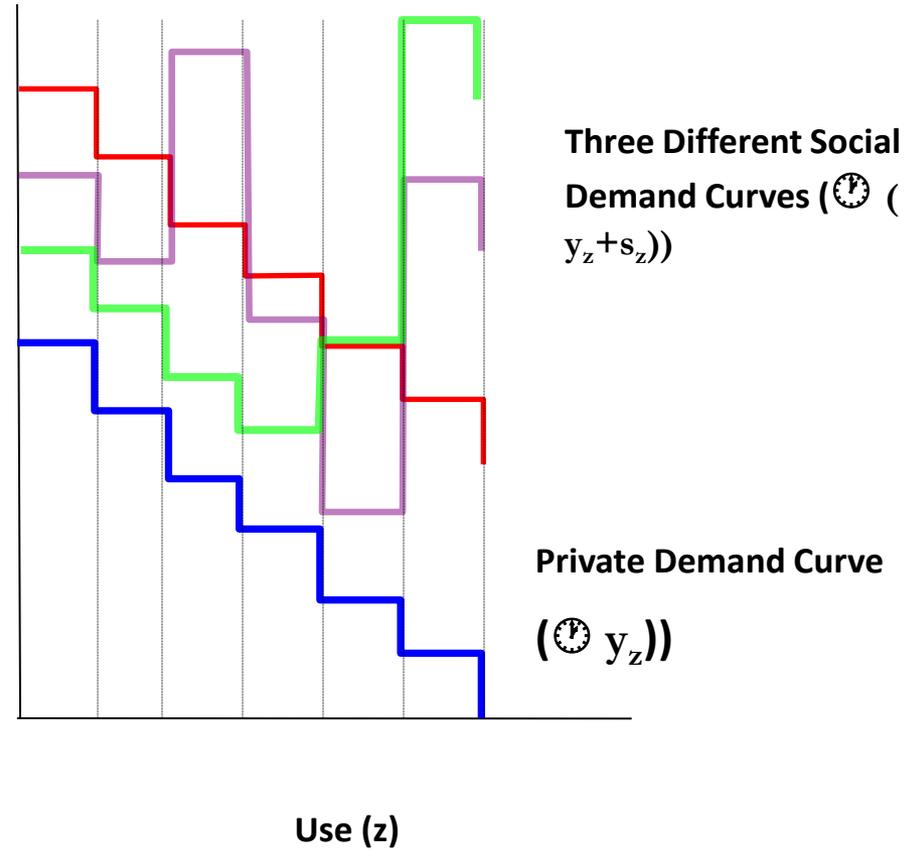
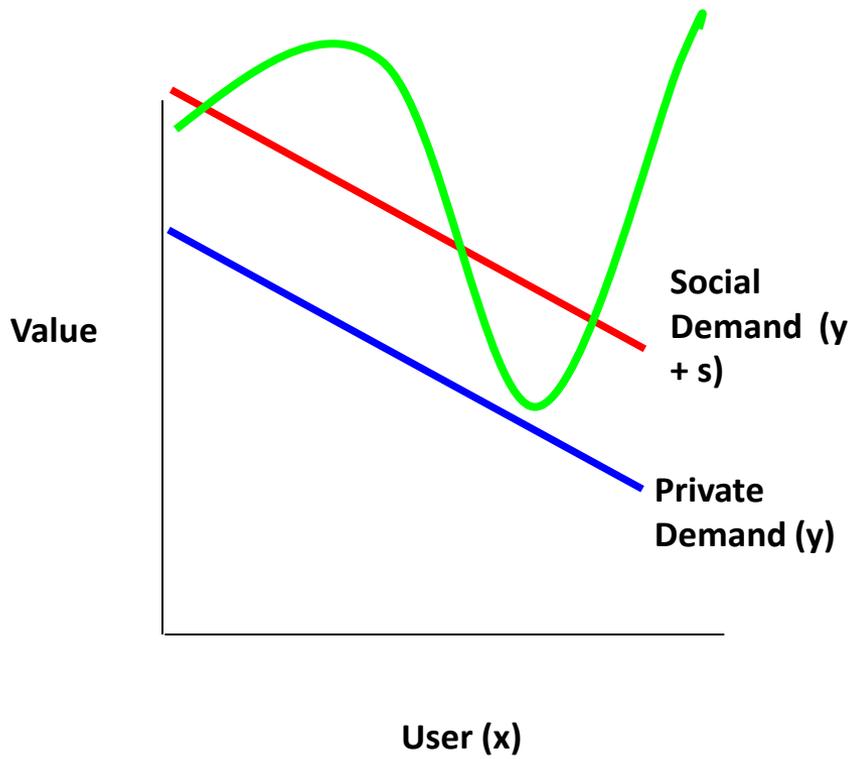
Demand side problems?

- Commercial Infrastructure
 - competitive markets (for both inputs and outputs) should work well
 - rely on antitrust principles
 - from the demand-side, there is less reason to believe that government intervention into markets is necessary, absent anticompetitive behavior

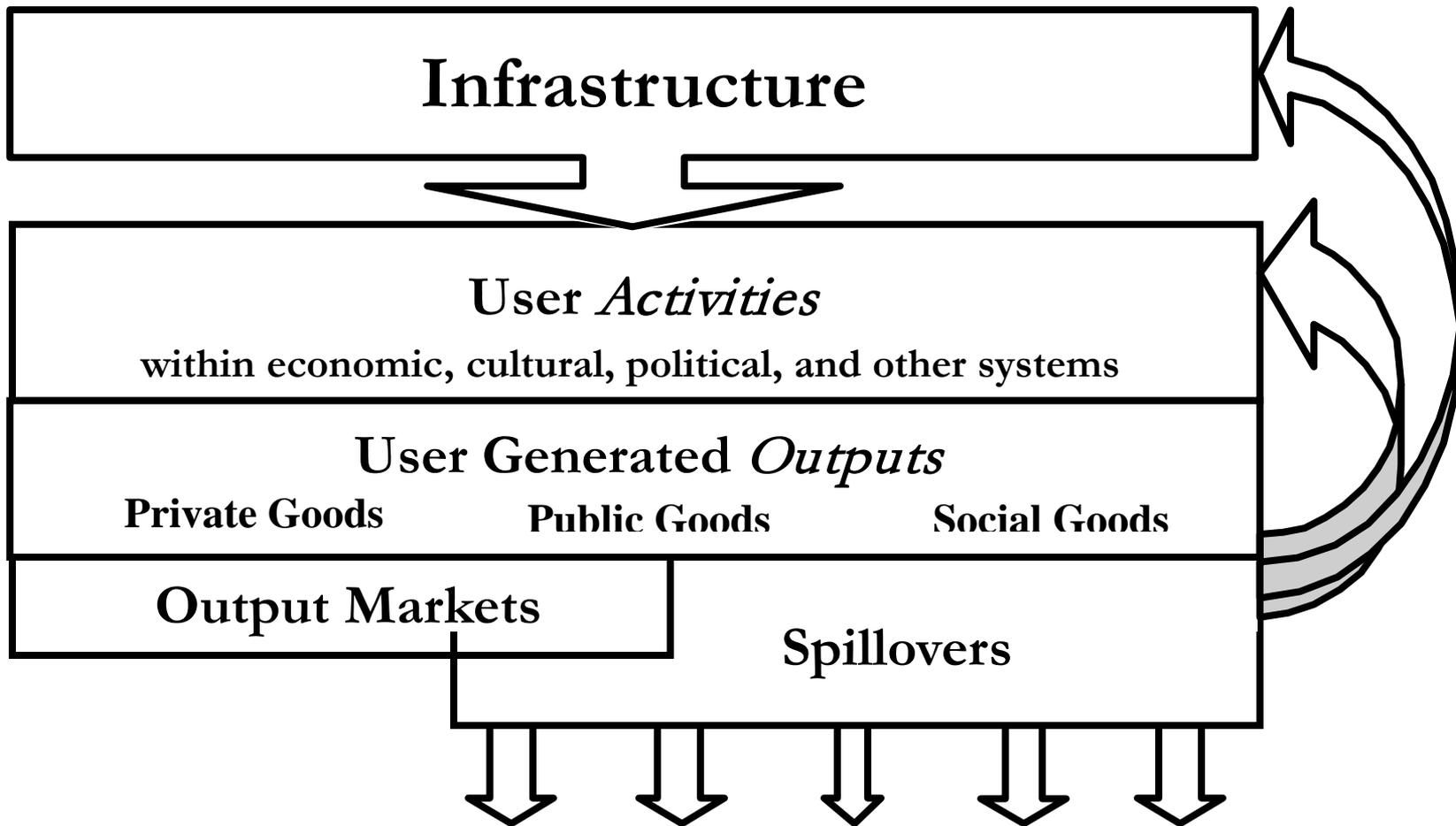
Demand side problems?

- Public and Social Infrastructures
 - Market bias / Optimization for
 - Applications/uses that generate observable and appropriable value (rather than spillovers)
 - Known or expected applications/uses
 - Demand manifestation problems may lead to undersupply of public and social goods and/or misoptimization of infrastructure





Note: Uses z_1, z_2, z_3, \dots ranked according to aggregated willingness to pay.



- Commons alleviates the need to rely on either the market mechanism or the government to “pick winners”
 - Market allocates access to infrastructure based on appropriability of returns from outputs
 - Could rely on the government to figure out which public good or nonmarket good outputs are worthy of subsidization or special treatment
- Social option
 - high uncertainty regarding which users or uses will generate social value

Chapter 13: Network Neutrality

A. Internet Infrastructure and Commons Management through End-to-End Design

B. The Network Neutrality Debate

1. Network “Neutrality”

2. The Role of Antitrust and Regulatory Economics

a. The Supply-Chain View of the Internet

b. The False Supplier/Consumer Dichotomy

c. The Competition Red Herring

3. Innovation

C. Reframing the Debate

1. The Internet as Mixed Infrastructure

2. Commons Management

D. A Proposed Nondiscrimination Rule and Various Complications

1. Proposed Rule

2. Managing Congestion

3. Managing Unlawful, Hazardous, or Otherwise Harmful Traffic

Internet

- What makes the Internet valuable to society?

Layer	Description	Examples
Social	Relations and social ties among users	Social networks, affiliations, groups
Content	Information/data conveyed to end-users	E-mail communication, music, web page
Applications	Programs and functions used by end-users	E-mail program, media player, web browser
Logical Infrastructure	Standards and protocols that facilitate transmission of data across physical networks	TCP/IP, domain name system
Physical Infrastructure	Physical hardware that comprises interconnected networks	Telecommunications, cable and satellite networks, routers and servers, backbone networks

Five-Layer Model of the Internet

Chapter 13: Network Neutrality

B. The Network Neutrality Debate

1. Network “Neutrality”
2. The Role of Antitrust and Regulatory Economics
 - a. The Supply-Chain View of the Internet
 - b. The False Supplier/Consumer Dichotomy
 - c. The Competition Red Herring
3. Innovation

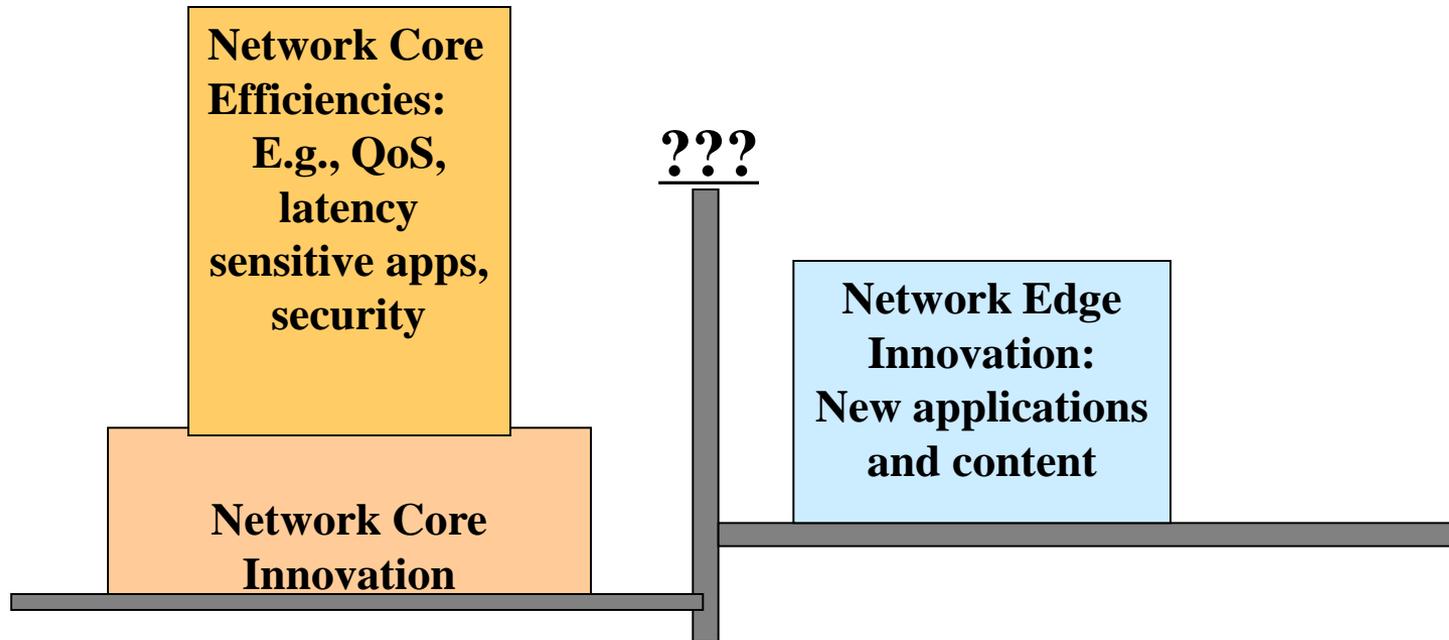
Comment to FCC

1. Myopic focus on antitrust and regulatory economics misses forest for the trees.
 - Even if we assume competitive markets – a heroic assumption – the case for network neutrality regulation remains quite strong

Comment to FCC

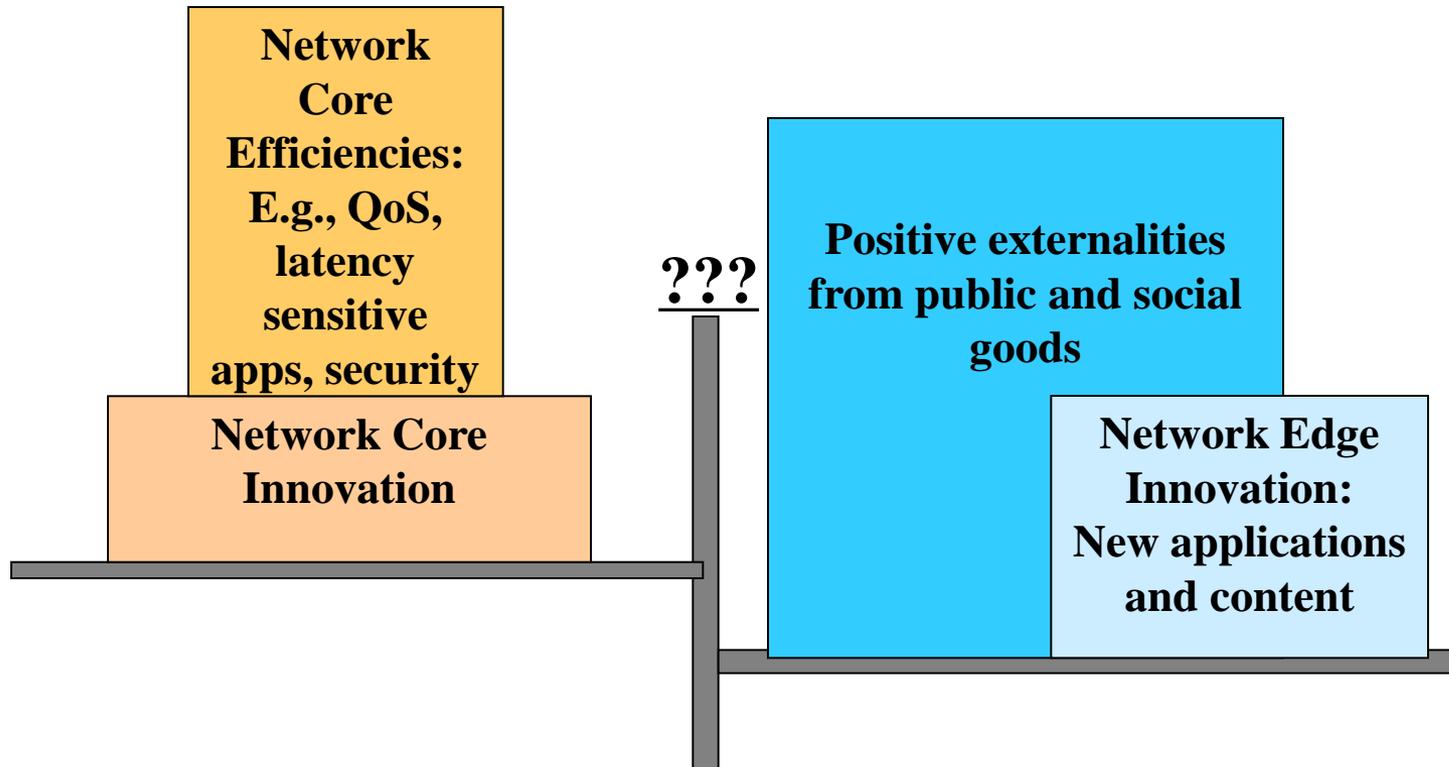
2. Proposed rule:

- FCC should prohibit broadband Internet access service providers from discriminating based on the *identity* of the *user or use* in the handling of packets. Under this approach, user may be defined as sender or receiver; use may be defined as application or content type; handling may be defined as all transport and related services associated with delivery of packets.



Network *Neutrality* Balancing:

A simplified view of the current debate



Network *Neutrality* Balancing:

Modified by Infrastructure Theory

Thank you!