The New Paradigm for Network Industries

Lecture 4

4 March 2025

Objectives of Lecture

- Understand the importance of network industries (Why are network industries important?)
- Recognize the emergence of a new utility model (How does the rise of new utility model occur?)
- Identify key objectives for regulation of privatization in developing and transition economies (What are the goals of regulation of privatization in developing and transition countries?)
- Describe the second-generation reforms for privatization (What are the second-generation reforms for privatization and regulation?)

The New Paradigm for Network Industries

- In the 20th century, most countries relied on government ownership and regulation to promote socially equitable access to network infrastructure services—electricity, telecommunications, water and sewerage, natural gas, and transportation.
- It was widely believed that network infrastructure services could not be privatized, and free markets' signals, motivations, and penalties could not be trusted to privatize the network infrastructure.
- However, in recent decades, this consensus has changed and resulted in the restructuring and privatization of crucial infrastructure sectors and services.
- This chapter explains why and what this change presents for future efforts to regulate and expand infrastructure privatization.

The New Paradigm for Network Industries

- Traditionally, governments owned and regulated essential infrastructure sectors such as electricity, telecommunications, and transportation to ensure equitable access.
- Privatization was once seen as impractical due to concerns about market failures and reliability.
- In recent decades, this perspective has shifted, leading to significant restructuring and privatization of these sectors.
- This transition presents both challenges and opportunities for the future regulation and expansion of privatized infrastructure.

Why are network industries so important?

- Network utilities provide crucial services for manufacturing and commerce and significantly influence national production growth (World Bank 1994b; Newbery, 2000a).
- Thus, economic development depends on such infrastructure.
- The basic features of network utilities, common to varying degrees to utilities across different sectors, create special challenges for effective regulation.

Why are network industries so important?

The characteristics of network utilities include (Spiller & Savedoff 1999):

1. Extensive economies of scale and scope that generally lead to market concentration and inhibit competition, also to monopolistic organization of network utilities.

2. Large sunk costs relative to fixed and variable (avoidable) costs. Such costs impose considerable risks and so discourage entry by new service providers.

3. Services deemed essential to a broad range of users, making their provision and pricing politically sensitive.

Importance of Network Industries

- Network utilities, such as electricity, water, telecommunications, and transportation, are essential for manufacturing, commerce, and economic growth (World Bank 1994b; Newbery, 2000a).
- Strong infrastructure supports national development by ensuring efficient production, trade, and service delivery.
- However, these industries pose regulatory challenges due to their unique characteristics.

Key Characteristics of Network Utilities

1. **Economies of Scale and Scope:** High infrastructure costs lead to market concentration, often resulting in monopolies.
2. **High Sunk Costs:** Significant investment discourages new competitors from entering the market.
3. **Essential Services:** Since these services are crucial for businesses and households, their pricing and availability become politically sensitive.

From State to Market—Changing Views on Utilities

- After World War II, the vertically integrated, state-owned utility became the industry model for electricity, telecommunications, water, natural gas, railways, and other transportation services.
- In electricity, for example, the same publicly owned company was often responsible for generating power, transmitting it to local networks, and distributing it to retail consumers.
- Most countries opted for nationalization instead of regulation. Vertically integrated, state-owned utilities produced reasonably satisfactory results (Fare, Grosskopf, and Logan 1985).

From State to Market—Changing Views on Utilities

- Since the early 1980s, however, the monolithic model has proven increasingly unsuited to dramatically changing conditions in both industrial and developing countries.
- This reassessment began in the late 1970s when the United States initiated wide-ranging regulatory reforms (Joskow & Noll 1994; Noll 1999).
- These changes are based on stagflation, energy crises, double-digit inflation, increased environmental concerns, the bankruptcy of backbone industries (such as railways), and a perceived erosion in national productivity and international competitiveness.
- Proponents of deregulation argued that unleashing competition among service providers would lower inflation and restore productivity growth.

From State to Market—Changing Views on Utilities

- Meanwhile, members of the European Union increasingly came to see state-owned monopolies as hindrances to international trade in goods and services.
- Thus, in the 1990s, directives were issued to create a single market where goods, services, people, and capital could move freely.
- As the United States deregulated, the United Kingdom restructured and privatized, and the European Union issued directives calling for extensive liberalization (but staying silent on the issue of ownership) and building a single market, a powerful privatization movement began sweeping developing and transition economies.

Evolution of Utility Models: State Control to Market Reforms

- After World War II, most countries adopted state-owned, vertically integrated utility models for electricity, telecommunications, water, natural gas, railways, and transportation.
- Governments favored nationalization over regulation, as state owned enterprises managed generation, transmission, and distribution.
- This model was considered effective, ensuring stability and widespread access to essential services.
- However, by the early 1980s, changing economic and political landscape challenged the sustainability of state-owned enterprises in network utilities.

Shift Toward Privatization and Market Liberalization

- Rising stagflation, energy crises, and concerns over inefficiency in state-owned enterprises led to regulatory reforms, starting in the United States in the late 1970s.
- Deregulation aimed to introduce competition, lower inflation, and improve productivity by reducing state intervention.
- In the 1990s, the European Union promoted market liberalization, encouraging free movement of goods, services, and capital while limiting state monopolies.
- As a result, a global wave of privatization emerged, reshaping utility industries in both developed and developing economies.

From State to Market—Changing Views on Utilities

Between 1990 and 2001, 132 of these countries took substantive steps to introduce private participation in their infrastructure sectors. These countries saw $750 billion in private investment in infrastructure sectors during this period.

1. For many developing countries, the primary push for privatization came from the debt and fiscal crises of the early 1980s. Heavy debt burdens forced many countries to make fiscal adjustments that hit public investment in infrastructure, especially hard.

2. Another major impetus came from the feeble infrastructure performance in these countries relative to industrial countries. Privatization was also spurred by the intolerable damage caused by mismanagement of public enterprises.

From State to Market—Changing Views on Utilities

3. Price controls were imposed without regard for their performance implications, subjecting enterprises to financial distress and impairing their ability to mobilize investments and provide reliable services (Kerf & Smith, 1996).

4. In a globalized economy, poorly performing state-owned infrastructure providers were increasingly seen as constraining economic growth and undermining international competitiveness. Developing countries simply could not continue to absorb the fiscal burden of these enterprises (Lieberman, 1997).

From State to Market—Drivers of Privatization

- Between 1990 and 2001, 132 countries took significant steps to introduce private investment in infrastructure, attracting $750 billion in private sector funding.

- Key drivers of privatization:

  1. The debt and fiscal crises of the 1980s forced many developing countries to reduce public infrastructure spending.
  2. Poor infrastructure performance, worsened by mismanagement of state-owned enterprises, highlighted the need for reforms.
  3. Price controls, without consideration for financial sustainability, led to investment shortages and service unreliability (Kerf & Smith, 1996).
  4. State-owned infrastructure providers were seen as barriers to economic growth, making privatization essential for competitiveness (Lieberman, 1997).

The Dawn of a New Utility Model

- In recent years, there has been growing recognition that network utilities are not monolithic natural monopolies.
- Instead, they encompass several distinct activities with entirely different economic characteristics—entailing a mix of competition and monopoly elements in supply.
- As a result, it has become widely accepted that the vertically integrated monopoly model no longer applies to all network utilities.
- Electricity, natural gas, telecommunications, railways, and water evolved as vertically integrated industries with transportation, transmission, and distribution networks linking upstream production to downstream supply.

The Dawn of a New Utility Model

- Reflecting these developments, a new paradigm has emerged for the organizational restructuring of network utilities. According to this model:

  1. Network utilities should be unbundled both horizontally and vertically, with different owners for potentially competitive and natural monopoly components.

  2. For competitive or structurally contestable activities, government interference with market mechanisms and restrictions on ownership should be relaxed, and the scope for introducing competition through horizontal fragmentation should be fully exploited.

  3. Only components involving unavoidable natural monopolies or substantial sunk capital should be placed under regulation and perhaps even operated by the public sector (Guasch & Blitzer, 1993).

The Evolving Utility Model

1. Traditional utility sectors, such as electricity, telecommunications, and water, were once seen as natural monopolies.
2. However, it was recognized that these industries should be open to competition, while others should remain natural monopolies.
3. This shift has led to a restructuring approach where network utilities are unbundled, separating competitive and monopoly components.
4. Competitive segments should operate with minimum government restrictions, while essential infrastructure with high sunk costs may require regulation or public sector oversight.

Technological Change—Breaking Down Monopoly Barriers

- Technological innovation is increasingly driving the move toward competition in network utilities.
- Changes in production and distribution technologies have had especially dramatic effects on the market structure of the electricity and telecommunications industries.
- For example, in electricity, new technologies have significantly reduced the minimum efficient scale of generating plants, the investment costs of new units, and the time needed to plan and build new plants.

Technological Change—Breaking Down Monopoly Barriers

- For instance, the rapid growth of cellular telephones—which increasingly substitute for wireline services—has played a big role in reducing the importance of scale and natural monopoly associated with conventional local loops. The costs of wireless technology have been declining.
- The introduction of jet engines in the 1950s and the larger aircraft sizes and loads made possible by turbofan engines and improved airplane designs resulted in lower operating costs and dramatically changed the competitive landscape for long-distance passenger and freight transport.
- These innovations have radically altered the industry's cost structure and resulted in significant, continuous increases in productivity.

Technological Change—Breaking Down Monopoly Barriers

1. Technological advancements are driving increased competition in network utilities, reducing traditional monopoly advantages.
2. Innovations in electricity generation have lowered investment costs, reduced plant sizes, and shortened construction timelines, making market entry easier.
3. The expansion of cellular networks has reduced dependence on traditional wireline services, while declining wireless costs have further encouraged competition.
4. Advances in aviation, such as jet engines and larger aircraft, have significantly reduced operating costs and reshaped competition in long-distance transport.
5. Overall, technological changes have restructured cost dynamics across industries, fostering continuous productivity growth and market liberalization.

One Model Does Not Fit All — Choosing among Imperfect Systems

- The restructuring of network utilities over the past two decades has shown that there is no universally appropriate model for reform (Laffont, 2003).
- Different sectors demand different reforms: Among network utilities, telecommunications offer the most compelling case for privatization and liberalization in developing and transition economies:
  1. Revolutionary technological change has almost eliminated natural monopoly.
  2. In most developing countries, coverage is very low, and the gains from easing restrictions on entry could be substantial.
  3. There is significant scope for flexible pricing to alleviate supply shortages, because consumers are willing to pay for new and better services and the sector is suited to competition.
  4. The financial, technical, and managerial resources of private entities may give them an advantage in keeping abreast of this increasingly complex industry.

One Model Does Not Fit All — Choosing among Imperfect Systems

- In recent years, policymakers have taken two broad approaches to restructuring utilities (Newbery 2000a, 2002).
- The radical approach has been to vertically separate the monopoly segments (transportation and distribution) of these industries from the structurally competitive segments (upstream production and downstream marketing).
- The second approach, called competitive access, allows integrated operations by the dominant incumbent utility on the condition that it makes its bottleneck network facilities available to other entities on a fair and equal basis.
- These two options have different implications for efficiency, competition, coordination economies, scope economies, transaction costs, investment structures, regulatory complexity, and overall

Choosing the Right Model for Utility Reform

- There is no single universal model for restructuring network utilities—reforms must be tailored to each sector (Laffont, 2003).
- Telecommunication is the most viable sector for privatization and liberalization in developing economies due to:
  1. Technological advancements reduce natural monopoly.
  2. Low coverage in many developing countries maks market entry crucial.
  3. Flexible pricing opportunities that help address supply shortages.
  4. Private firms' expertise in managing complex, evolving industries.

Approaches to Utility Restructuring

- Policymakers have adopted two main strategies for restructuring utilities (Newbery, 2000a, 2002).
- **Vertical Separation:** Monopoly segments (transportation and distribution) are split from competitive segments (production and marketing).
- **Competitive Access:** Incumbent utility operators remain integrated but must provide fair access to network infrastructure.
- Each approach has trade-offs related to efficiency, market competition, regulation, investment, and operational complexity.

Aims for Regulation in Developing and Transition Economies

1. The general goals of regulation are to promote efficient markets and correct for market failures.
2. Pursuing social fairness and promoting universal service—through pricing that balances economic efficiency and social equity.
3. Ensuring incentives for investment—so that reforms draw resources into the sector to expand, modernize, and improve infrastructure facilities and services.
4. Promoting fair competition—by lowering entry barriers and giving entrants access to network infrastructure.

Aims for Regulation in Developing and Transition Economies

5. Facilitating innovation—by focusing on goals to be achieved and giving operators and investors leeway to introduce more efficient technologies and innovative service arrangements.

6. Protecting public health and safety, and avoiding harm to the environment.

7. Ensuring that even where the private sector takes the lead, services are reliable and networks interoperable.