EC2212 Industrial Growth
and Competition

Lecture 10

Firms' technological success fuels nations' economic growth.

Comparative Advantage in International Trade

- Classical international trade models
  - Different countries' comparative advantage in different industries
  - Produce where the advantage exists, and trade
- International trade in new growth models
  - Concentrations of success build up
  - Success breeds success, and may pertain to all industries
  - Possibly yielding a poverty trap

Comparative Advantage Example

- Utility = F*E, from Food and Entertainment
- 100 people each in countries A and B

	Country A			Country B		
	Pvity	Output	Cons.	Pvity	Output	Cons.
Food	2	200	100	1	0	100
Entert.	1	0	100	2	200	100

Poverty Trap Example

- Utility = F*E, from Food and Entertainment
- 100 people each in countries A and B

	Country A			Country B		
	Pvity	Output	Cons.	Pvity	Output	Cons.
Food	2	100	100	1	50	50
Entert.	2	100	100	1	50	50

- No trade needs to occur, A better off than B
- Can B improve its productivity?

Linear and Leapfrog Models of Technology Development

- Depictions of technology development for developing countries
  - Linear: Start with simplest technology, gradually build up
  - Leapfrog: Jump immediately to a complex technology, use for international competition
- These development patterns happen not just for a country in aggregate, but also for its companies
  - Companies are the bulk of the technology development process

Anam Industrial: Linear Development

- Korea's Anam Industrial, world's largest semiconductor packaging company
- Hobday (1995) characterizes linear growth phases:
  - 1968-80 Packaging chips into plastic/ceramic cases
    - machinery, engineering, product design, materials from US
  - 1980-85 Greater in-house process engineering
    - aided by US companies such as Texas Instruments
  - 1986-1990s In-house process engineering, products
    - technology diffusion & in-house engineering growth
  - By 1992, US $1.8 billion of export sales

Founder: Leapfrog Development

- China's Founder, for Chinese language printing systems
- Lu (2000) describes its growth:
  - Drew on knowledge and skills from Beijing University
  - Copied & created state-of-the-art laser printing technologies
  - Introduced a product competitive internationally
  - Able to outcompete British, Japanese, US firms

Leapfrogging Argument

In high-tech areas, there are big lags between our country and advanced countries. Many new ideas and methods originate abroad…. However, we should not be satisfied with merely catching up because this would not come up with competitive products. It was inevitable that we would catch up for quite a long time. However, it was possible to leap forward based on our indigenous innovative capabilities.

- Chief Designer of the Founder System

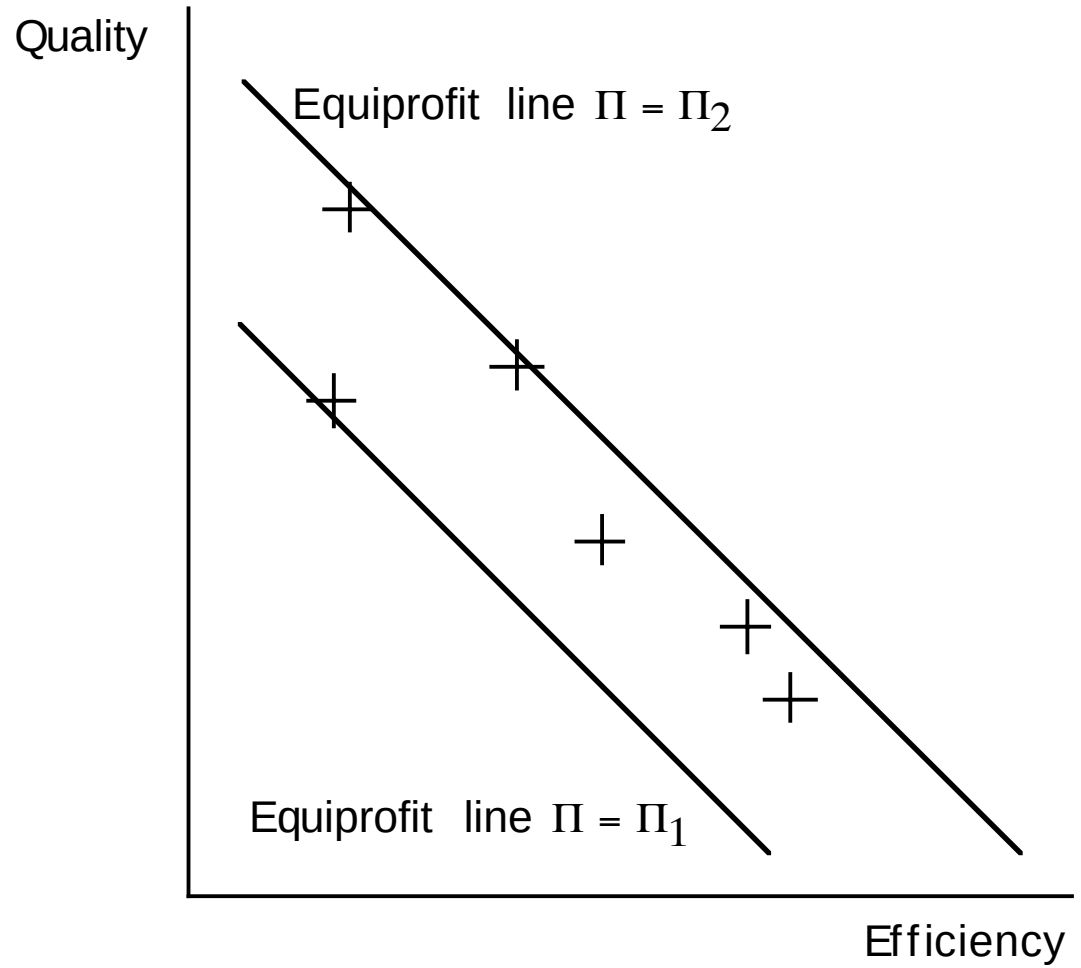
When Can Leapfrogging Work?

- Either competitors don't exist yet
  - Enter early in an industry with a shakeout
- Or new technology helps surpass the competition
  - Facilitates turnover of corporate leadership
- Or technology (etc.) not competitively crucial
  - No shakeout, no disadvantage to late entrants
- Indigenous advantages, such as initially low labor costs, also help

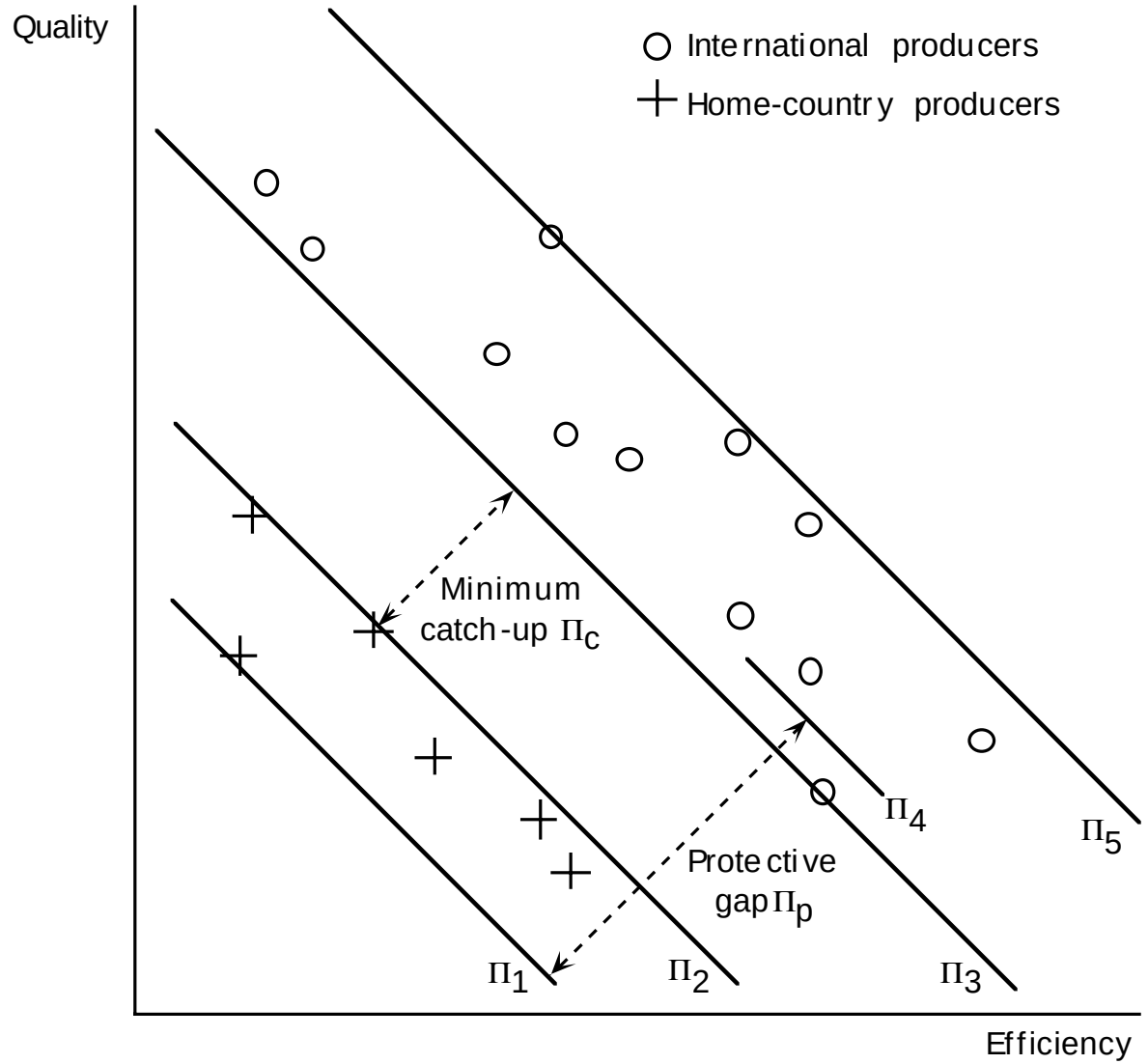
Catching Up to the Competition

- A. Producers within a country's protected market
  - Vary in quality, efficiency
  - Quality and efficiency enhance profit
  - Minimum competitive quality, efficiency yields 0 profit
- B. International producers: higher quality, efficiency
  - How can you measure what it takes to catch up, i.e., be competitive internationally?
  - Look at quality, efficiency differences
  - Benchmarking

A. Within-Country Competition



B. Between-Country Competition



C. Catching Up

- Benchmark to determine differences now
- Estimate technology growth rates for competitors
- How much technology is needed in future to be competitive?
- How can you catch up?
  - What improvements to make, strategies, how to get technology?
  - Cost? Worth the investment?
  - What are the odds?

National Technology Policy

- What can a national government do?
- National technology programs:
  - MITI (Ministry of International Trade and Industry, now METI: Ministry of Economy,Trade, and Industry)
  - Advanced Technology Program
  - Big government-funded projects often spectacular failures, are out of favor
  - But not always failures, operate at varying scales
  - Best not to presume inter-firm cooperation

National Technology Policy cont.

- Other policies:
  - Location incentives (including for multinationals)
  - Tax & funding incentives targeted by technology
  - University R&D funding
  - Education
  - Change cultures that hinder innovation
  - Shift emphasis off military R&D, or encourage transfer of military technology