11.481J / 1.284J / ESD.192J Analyzing and Accounting for Regional Economic Growth
Spring 2009

INTERDEPENDENCE AND INDUSTRIALIZATION

Interdependence

- Used to explain inter-industry production relations, illustrated through *linkages*; The degree of interdependence is measured by:
  - Backward Linkages: Proportion of output that "represents purchases from other industries"
    - Link from an industry to its suppliers
  - Forward Linkages: Proportion of total output that goes to other industries
    - Link from an industry to its users (not final demand)

Assumptions

Assumptions:

- Input coefficients are fixed, or, needed inputs increase "monotonically" with outputs

- If a required input is not supplied from domestic sources it can be imported

Maximizing Linkage Effects

- "Development policy must attempt to enlist these well-known backward and forward effects; but it can do so only if there is some knowledge as to how different economic activities 'score' with respect to these effects" (p.100)

Importance vs. Strength of Linkage Effects

- Importance of effect: The net output (x) of new industries (n) that might arise

- Strength of effect: The probability (p) that the new industries will actually "come into being"

- Total linkage effect:
  - Summation of product of x's and p's

Satellite Industries

Satellite Industry: When the probability (p) that a new industry will come into being is high, but its net output (x) is small. Can be established through backward *or* forward linkages.
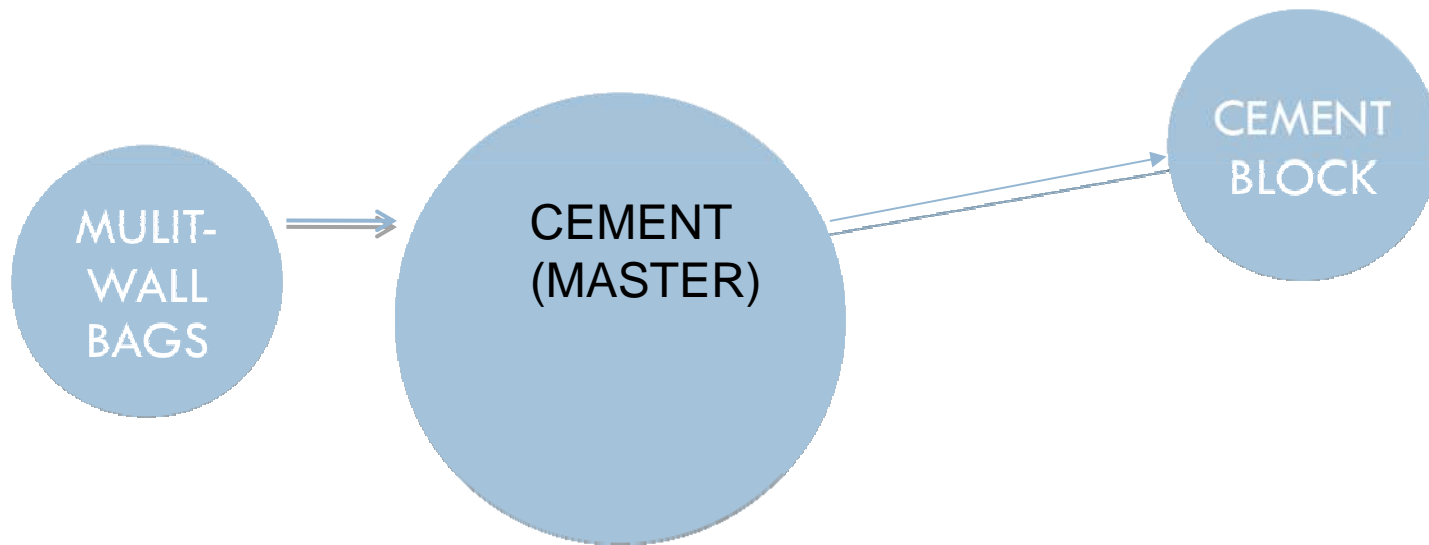
Joint Linkage Effects
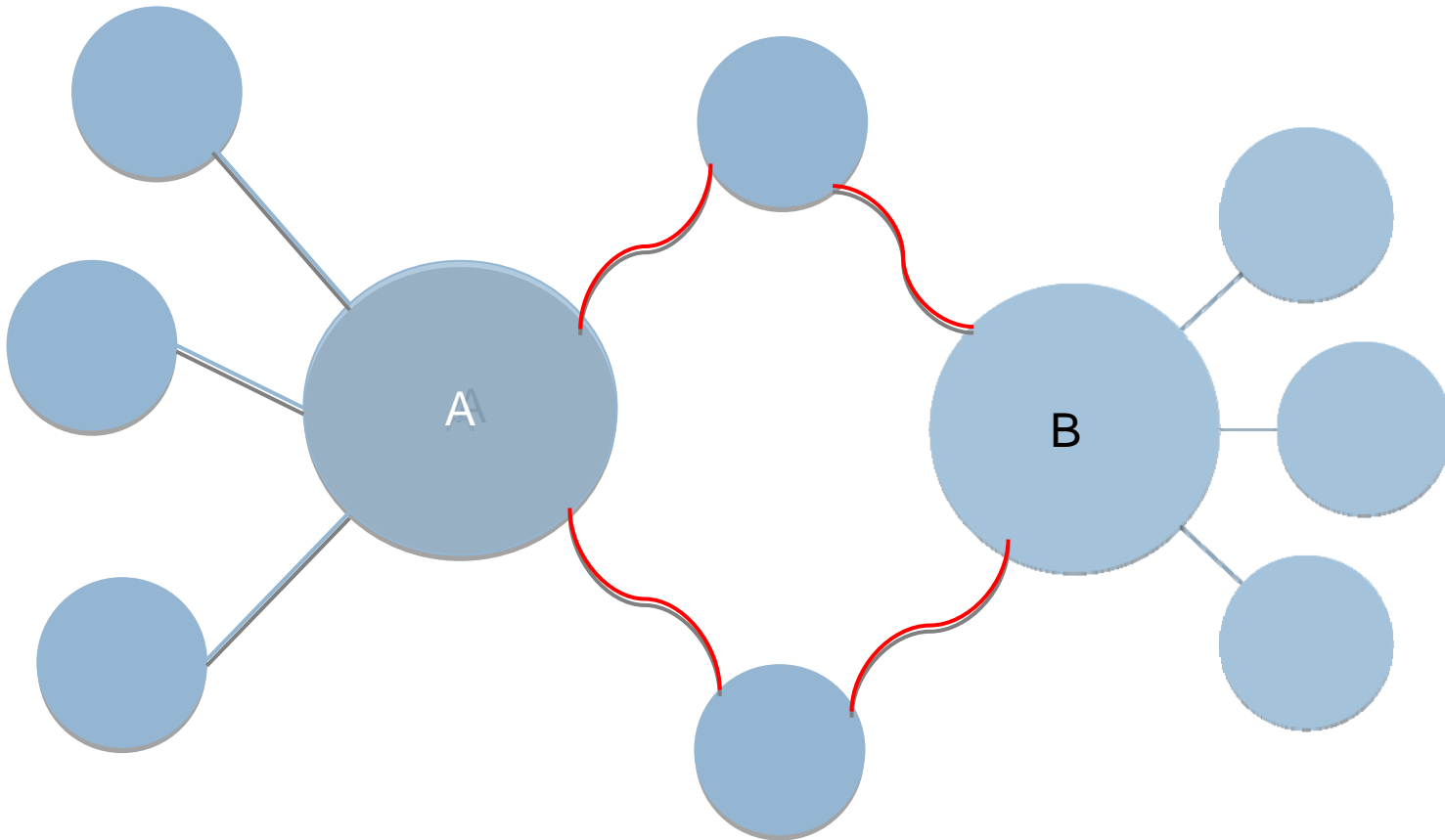
According to Hirschman: "This mechanism may go far toward explaining the acceleration of industrial growth.." (p. 104)

A Mental Experiment

- For development, we're interested in finding "the most efficient sequence for industrialization" (p. 105)

- Takes an example of averaged degrees of interdependence of various industries from Chenery and Watanabe; ranked by their combined score of backward and forward linkages.

- Warns that "excessive reliance should obviously not be placed on these ranking" (p. 108)

A Mental Experiment, Continued

☐ **Intermediate Manufacture**: Backward and forward linkages both high (e.g. Iron and Steel, Nonferrous Metals, Paper and Products, Coal Products)

☐ **Final Manufacture**: Backward linkage high, forward linkage low (e.g. Grain Mill Products, Lumber and Wood Products)

☐ **Intermediate Primary Production**: Forward linkage high, backward linkage low (e.g. Metal Mining, Petrol and Natural Gas, Coal Mining, Agriculture and Forestry)

☐ **Final Primary Production**: Backward and Forward linkages both low (e.g. fishing, transport, services, trade)

Backward Linkage at Work

- To start industrialization, then, a country must set up one of two kinds of industries:
  - "Those that transform domestic or imported **primary products** into goods needed by final demands", or
  - "Those that transform imported **semi-manufactures** into goods needed by final demand"

- Hirschman explains how underdeveloped countries often set up "last industries first", and then work their way backward from " 'final touches' stages to domestic production of intermediate, and finally to that of basic industrial materials" (p. 112)

- This import-substitution lead growth, however, has its risks

Defense of the Status Quo

- The chances that domestic production will arise when domestic demand reaches a certain threshold needs to be weighed against the "counter-forces" of industrialists that are comfortable with the status quo.

Conclusion

- "Excessive gradualism in introducing industry by successive small bits of value added may not pay off... Much is to be said for biting off as large pieces of value added at a time as the underdeveloped country can possibly digest" (p. 119)

Critiques

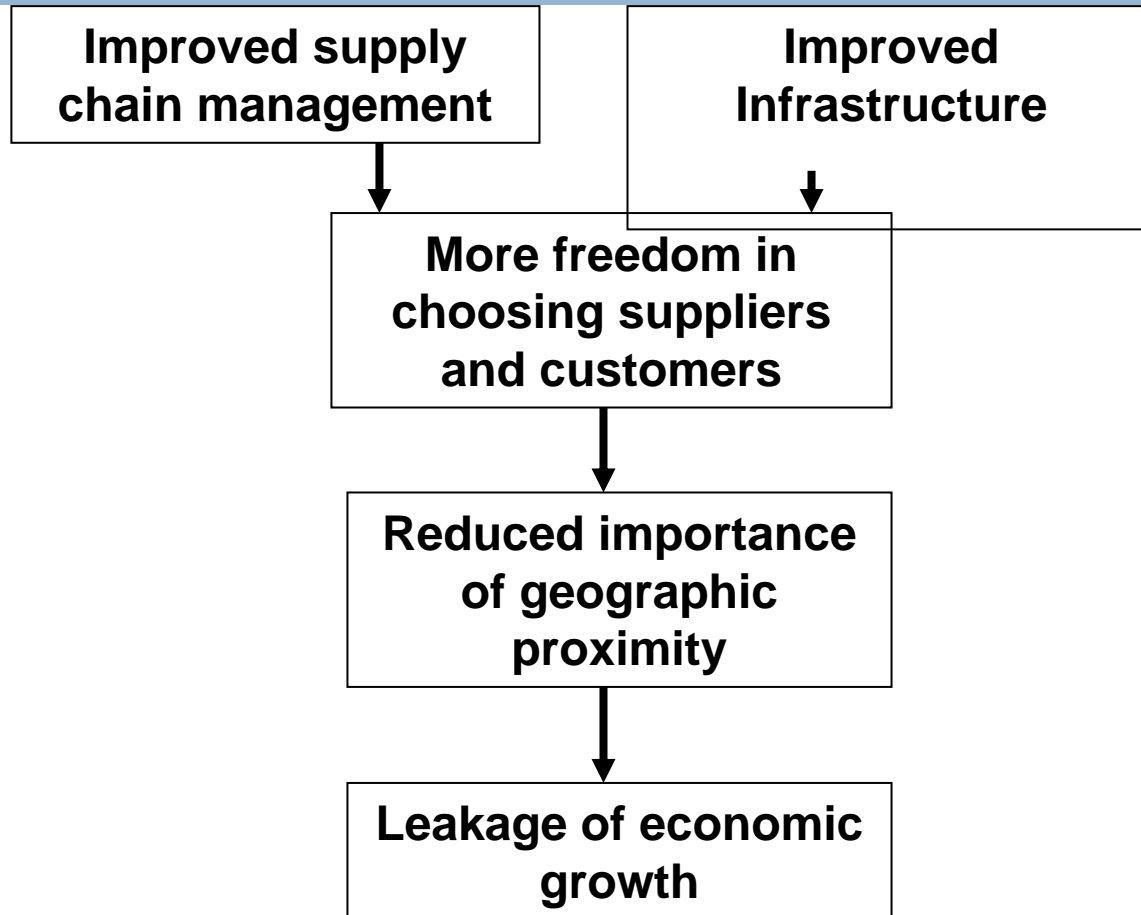# 1. Linkage, Supply Chain and Leakage

The three dimensions of linkage:

☐ **The "strength" of linkage**
- measures the dependence of an industry on other industries

☐ **The "length" of linkage**
- the geographic distance between supplier and purchaser
- associated with transportation cost

☐ **The "stability" of linkage**
- whether the producer-purchaser partnership is reliable
- associated with risks, contractions, mutual trust, etc.

Supply chain reduces the importance of "length", while enforces "stability".

1. Linkage, Supply Chain and Leakage

Improved supply chain management	Improved Infrastructure

↓ ↓

More freedom in choosing suppliers and customers

↓

Reduced importance of geographic proximity

↓

Leakage of economic growth

Even if a sector with strong linkages is established, it is difficult to capture all induced economic growth within the region.

2. Intermediate Demand and Final Demand

- **No final demand, no intermediate demand**

- Final demand: not fully captured in linkage analysis

- Sector with strong linkages
  ≠ Accelerator of economic growth

- Important cause of failure in the practice of Growth Pole Theory

3. Linkage Analysis on Plant Scale

Important question for local government:

How much economic growth can a new plant induce in the region?

Drawbacks of current linkage analysis (and I-O tables) :

* Analysis on industry scale: too general too be informative

* Analysis on plant scale: limited practice in very few nations
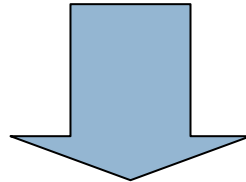
→ Failure to support well-rounded cost-benefit analysis in project appraisal

→ Limited usefulness for decision makers in local government

4. Policy Implication for Developing Countries

Over-optimism about the implant of "final industries" and import substitution

Applicable in developing countries with regional advantages such as:
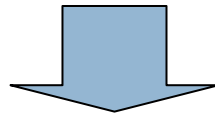
Low labor cost	Ocean shipping access	Potential domestic input suppliers	Large local market

Not applicable in other developing countries because:

* Not attractive to "final industries": no cost-saving or profit-generating incentives

* Insufficient capacity of import substitution

Marginalization in global economy: doomed destiny?

Thank you!

Questions and Comments?