I. Space in economics

II. Historical context: urbanization, innovation, and development

III. Micro-economics perspective:
- internal structure of cities
- industrial location

IV. Macro-economics perspective:
- spatial variation in development status
- models of regional economic development

I. SPACE IN ECONOMICS

A. historical context
- emergence and evolution of spatial economic systems
- urbanization
- inequality
- innovation and development

B. micro-economics
- individual or firm decision-making
- utility or profit maximization (recall migration models and land use models)
- evaluate benefits versus costs in either static or dynamic setting
- market supply and demand curves.
- price is single that allows for efficient outcomes given competitive markets.

- Spatial aspects:
  * search costs in dynamic decision making
  * spatial variation in prices
  * attributes in utility or profit function vary spatially
  * physical and opportunity costs involved in overcoming distance.
  * industry location decisions.
  * spatial externalities

- Fundamental question: How does space enter into the utility or profit maximization calculus?

C. macro-economics
- aggregate indicators of international, national, or regional economic performance and their interrelationships.

- Spatial aspects:
  * Spatial variation in development indicators
  * Indicators and theories of uneven spatial economic development.
  * International or interregional trade flows. Who benefits from trade?
II. HISTORY OF URBANIZATION

A. Three epochs

1. PREURBAN: 50,000BC - 4,000BC,
   - Humans have evolved in modern form up to emergence of first cities
   - Hunting and gathering
   - No urban population – moving from place to place.

2. PREINDUSTRIAL URBAN: 4,000BC - 1800.
   - Permanent settlements begin to emerge in Mesopotamia and other locations
     - 3500BC Mesopotamia - Tigris/Euphrates
     - 3200BC Egypt - Nile
     - 2400BC Pakistan - Indus River
     - 1600BC Aegean - Crete
     - 1600BC China - Yellow River
     - 200BC Mexico - Yucatan Peninsula
   - locational factors: resources (land, water), defense, trade

   • Why do cities emerge?
     - a city is an innovation
     - was hunting/gathering so bad after all?
     - climate or population pressure
     - independent invention versus diffusion
     - Agricultural revolution - movement from horticulture (supplemental food) to farming (sedentary agriculture) of cereal grains.

   • Were the city populations stable?
     - no, figure 1.4 from Ivan Light.
     - disease, war, starvation all took their toll
     - relate back to demographic transition.

   • How was city life different?
     - notion of agricultural surplus
     - specialization (labor, governance) and social stratification

   • Functions of early cities
     - collection, storage, distribution, and protection of surplus food
     - religion
     - defense
     - emergence of the city as cultural vessel.
     - religious
• **Greek and Roman cities** (SKIM)
  - 3,000BC Greece 500 cities and towns, about 250,000 inhabitants
  - importance of Greek cultural forms: leisure activities, architecture, market areas (agora)
  - Roman cities supercede and improve of Greek structure/culture
  - City system - expansive empire
  - infrastructure: roads, water, sewage
  - culture of cities
  - slavery as lynchpin.

• **Feudal -> Mercantile cities** (SKIM)
  - Feudal: manor estate, walled city
  - lord-serf relationship
  - isolation, defense, and city/region market
  - disease
  - Mercantile city: rise of commerce
  - consolidation of power over large regions
  - professional army
  - long distance trade
  - Amsterdam, Milan, Florence, etc.

3. INDUSTRIAL URBAN: 1800- present.
  - Agriculture/craft labor to manufacturing labor
  - US 69% ag 1840, 2.8% ag 1988
  - innovations
    - machinery
    - infrastructure
    - public administration-planning
  - transportation and effect on city form
    - *intercity vs. intracity.*
    - accessibility
    - space-time compression
II. Microeconomics in space

A. Internal structure of cities.

1. Policy issues related to the internal structure of cities
   - economic spatial structure
   - social spatial structure
   - interaction

2. Land uses and land rent

   - Supply and demand basic ideas..

   - **Assumption**: spatial structure of city is outcome of competitive bidding for land.

   - Land price = discounted stream of land rent values over a finite or infinite time horizon.

   - Land rent = price individuals have to pay to land owners to use the land.

   - von Thunen / Alonso model of land uses

Assume:  
1. Fixed output and input prices
2. Central marketplace
3. Competitive bidding for land (entry/exit, zero economic profits)
4. Equal fertility and accessibility to market for all land.

**Profit Function**: \[ \text{Profit} = PQ - C - tQu - R \]

- \( P \) = price of product
- \( Q \) = quantity of product sold
- \( C \) = non-transport and non-land production costs
- \( t \) = transport costs per unit
- \( u \) = distance to market
- \( R \) = land rent

**Bid Rent function**:

Assume bidding results in zero economic profits, then...

\[ R = PQ - C - tQu \]

**Agricultural application**:

* Two crops: strawberries and carrots...
* What happens if new transport technology introduced for strawberries?
* What happens if demand for strawberries increases?

**Urban application**: residential versus commercial land use in a city
II. Microeconomics in space (cont.)

B. Interregional industrial location

1. Transfer-oriented firms (transport costs are major portion of total production costs).
   - procurement costs (PC) = $w_i \cdot t_i \cdot d_i$
   - distribution costs (DC) = $w_o \cdot t_o \cdot d_o$
   - monetary weight (MW) = $w \cdot t$

   - $MW > MW_o$: resource-oriented; weight losing activities (paper)

   ![Resource-oriented](image)

   - $MW < MW_o$: market-oriented; weight gaining activities (soft drinks), high transport costs.

   ![Market-oriented](image)

C. Multiple inputs: (Alfred Weber)

   - firm chooses median location (weighted Euclidean median); the location $(x_{we}, y_{we})$ that
minimizes:

$$\min \sum_j w_j \sqrt{(x_j - x_{\text{org}})^2 + (y_j - y_{\text{org}})^2}$$

Assumes:
1. Transport costs linear function of distance
2. Weights on points represent weight of raw material to product a unit of output.
3. Weight at market equals 1.

D. Intraurban industrial location:

Recall: 

- **internal scale economies**: cost per unit output decreases as the firm’s volume of output increases.

- **external scale economies**: cost per unit output for a given firm decreases as the industry’s or region’s volume of output increase.

**Agglomeration economies**: gains in economic efficiency (lower production costs) when firms locate near each other.

1. **Localization economies**: agglomeration economies that accrue to a particular industry sector when that industry sector co-locates.

- labor pooling - cost of hiring workers unique to the industry are lower when the size of the local labor market for that occupation is larger.

- knowledge spillovers - industry-specific knowledge is shared through informal networks of proximate industries.

- intermediate inputs - the most efficient scale (level of output) for a firm providing inputs to the localized industry is larger than any single firm in the industry would buy alone.

2. **Urbanization economies**: agglomeration economies that accrue to all industries in an urban area.

- labor pooling - same idea as above except for non-specialized labor.

- innovate capacity/knowledge spillovers - the innovative capacity of all industries tends to increase with urban size.

- intermediate inputs - same idea as above but also including public infrastructure. Highways, sewage, etc. will benefit all industries in a given urban area.
III. Macroeconomics in space

A. Spatial variation in development status -

1. What is development?
   - material well-being
   - spiritual well-being
   - quality of life

2. Development indicators

   **Economic:**
   - **GNP** gross national product - value in U.S. dollars of final output of goods and services produced by the economy in a year.
   - **PPP** purchasing price parity - A measure of relative purchasing power that accounts for differences in the costs of a typical bundle of goods in different countries.

   **Technology**

   **Sectoral distribution of the economy**

   **Non-economic**
   - **Political system / stability**
   - **Education levels**
   - **Infrastructure**
   - **Health/Nutrition**

3. Examples of spatial-temporal variation in economic ‘distress’ in the U.S.

B. Models of uneven development

1. Why distress persist in certain regions? Income convergence/divergence?

2. Models
   - neo-classical growth theory / interregional trade
   - growth poles
     > spread-backwash
     > circular and cumulative causation
     > ex. St. Louis.

   - entrepreneurship

   - *new* growth theory

C. Development issues and policy.