



EE475 Natural Resource Economics

A locationally fixed, multipurpose resource: Land

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Outline

- Revisiting Property Rights
- Concept of Economic Rent
 - Ricardian or Differential Rent
 - Location Rent (von Thunen Theory) and land allocation
- Source of inefficient use and conversion
 - Sprawl and Leapfrogging
 - Incompatible Land Use: Negative and Positive Externalities
- Some policy remedies



Land resource

- ▶ Land is a factor of production, an input factor into many economic activities
 - ▶ Agriculture and forestry
 - ▶ Residential
 - ▶ Commercial
 - ▶ Industrial uses
 - ▶ mineral Exploration
- ▶ Land also supports ecosystems.



Land resource

- ▶ Land ownership was the key to personal wealth and social power.
- ▶ Our focus
 - ▶ Efficient use of land as a natural resource
 - ▶ The determination of value of land
 - ▶ How different type of ownership of land affects land use and value

Property Rights as a bundle of Rights

- **Access Rights:** The right to enter a defined physical area and enjoy nonsubtractive benefits (e.g., hiking, canoeing, sitting in the sun).
- **Withdrawal Rights:** The right to obtain resource units or products of a resource system (e.g., cutting fire wood or timber, harvesting mushrooms, diverting water).
- **Management Rights:** The right to regulate internal use patterns and transform the resource by making improvements (e.g., planting seedlings and thinning trees).
- **Exclusion Rights:** The right to determine who will have an access right, and how that right may be transferred.
- **Alienation Rights:** The right to sell or lease management and exclusion rights.

Types of Land Rights	Access Right	Use Right	Management Right	Exclusion Right	Alienation Right
Title Deed โฉนด/น.ส. 4	X	X	X	X	X
Certification of Use น.ส. 3 / น.ส.3ก.	X	X	X	X	
Pre-emption ส.ค. 1 (Pending)	P	P	P	P	P
ใบจอง (น.ส.2)	X (In 6 months)	X (in 6 months)			
ใบไต่สวน (น.ส.5)	?	?	?	?	?
ใบเหี้ยบย้า	X	X	P	P	P
น.ค. 3 (นิคมสร้างตนเอง)	X	X	P	P	P
Certification of Use (forest) สทก.	X	X			
กสน. (นิคมสหกรณ์)	X	X			
ส.ป.ก. 4-01	X	X (Agriculture)		X	Inheritance only



Concept of Economic Rent

- ▶ Rent per unit is a difference between...
 - ▶ **[the price** of goods produced using natural resource]
 - ▶ **[the unit cost** of turning that natural resource into the good]
- ▶ Imagine you are a landlord and doing agriculture on your land. Netted value of your farm product is the rent.
- ▶ If you let others use your land, rent you collect represents the opportunity cost that you did not use the land for yourself.
- ▶ Is “Rent” for a piece of land the same thing as the “Price” of that land?



Concept of Economic Rent

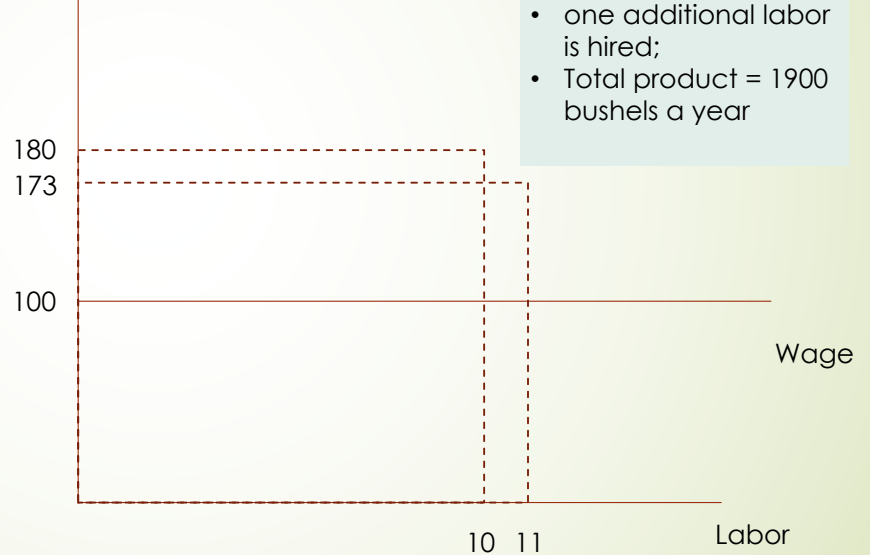
- ▶ There are at least 2 types of rent:
 - ▶ Ricardian or Differential Rent
 - ▶ Land rent is determined by differences in quality / fertility of land. (Late eighteenth century context).
 - ▶ Different quality of land, different level of rent.
 - ▶ Location rent (von Thunen theory)
 - ▶ Rent can be different even when the quality of land is homogenous.
 - ▶ Different in rent can be determined by the land location.

Ricardian or Differential rent

Box 1.1:

- In the late eighteenth century, main production activity is agriculture.
- Labor is a major factor of production used with land. Supply of labor is assumed to be perfectly elastic.
- Assuming there is no other unit costs, wage is the only cost of production.
- Suppose,
 - Land = 150 acres
 - Labor = 10 people
 - Wage = 100 bushels a year
 - Total product = 1800 bushels a year

Output per worker



Box 1.2:

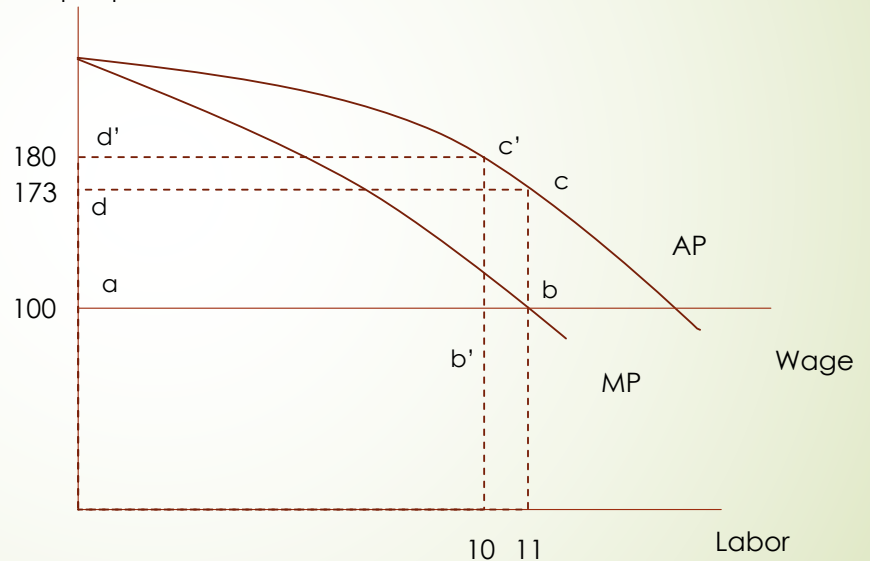
- Suppose further
- one additional labor is hired;
 - Total product = 1900 bushels a year

Ricardian or Differential rent

Box 1.3:

- AP = Average product of labor
- MP = Marginal product of labor
- Rent at production of 10 labors = area $ab'c'd$
- Rent at production of 11 labors = area $abcd$
- Rent is maximized at production of 11 labors

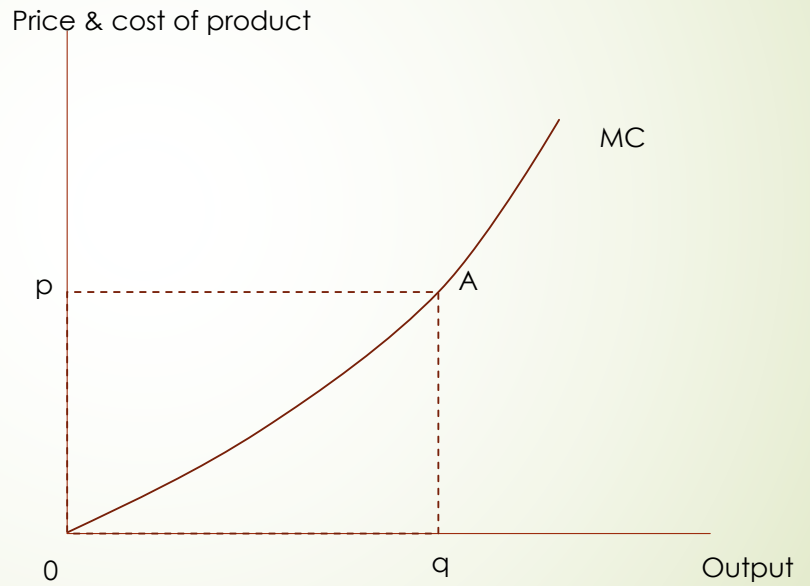
Output per worker



Ricardian or Differential rent

Box 1.4: From different perspective

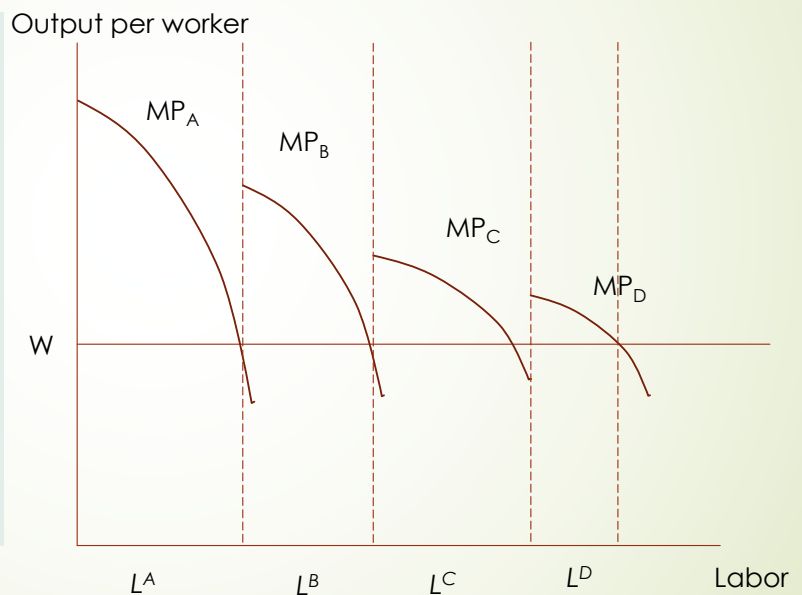
- In this graph, rent is area $pAq0$.



Ricardian or Differential rent

Box 1.5: More than one plot of land

- Suppose, the landlord has 4 plots of land with different fertility.
- More fertile plots are brought into use first.
- Wage rate is determined by the intersection between the MP and supply of labor.
- Total land rent is the sum of areas under the marginal product schedules less wage "costs".

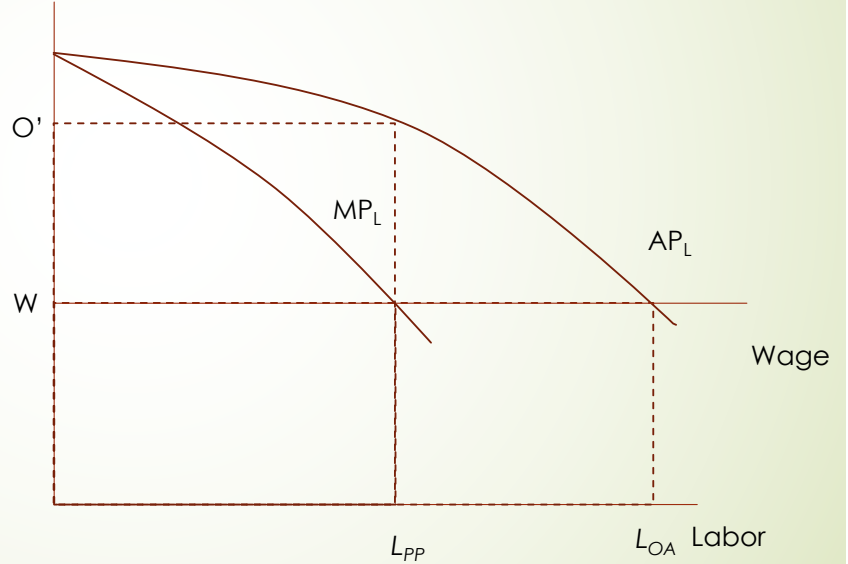


Ricardian or Differential rent

Box 1.6: Rent under different ownership.

- Private property rights : Landlord will hire labor at L_{PP} .
- Government property rights : with goal to maximize public benefit, government will hire labor at L_{PP} .
- Open access (land with no landlord): with no excludability, more labor will be attracted to exploit the land until output per worker equals wage.

Output per worker

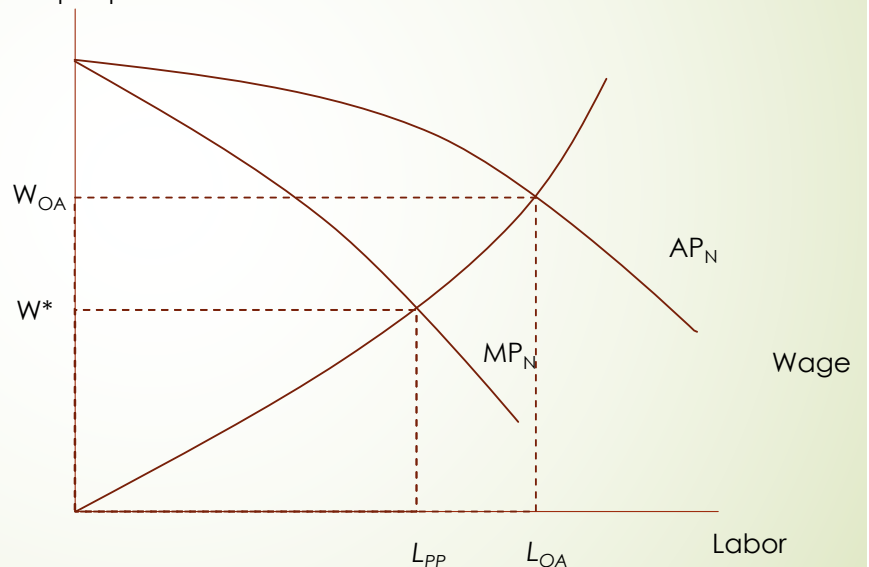


Ricardian or Differential rent

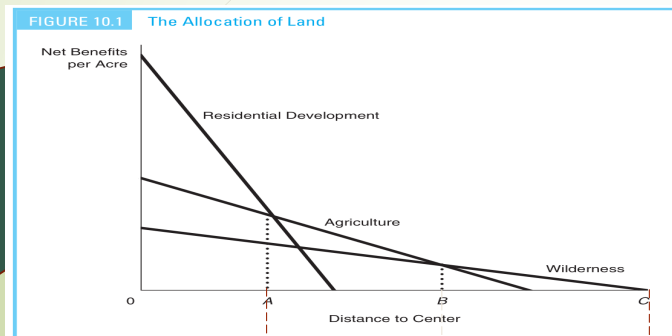
Box 1.7: Rent under different ownership with rising supply curve.

- In this case, workers earn higher wage under the open access regime. (W_{OA})

Output per worker



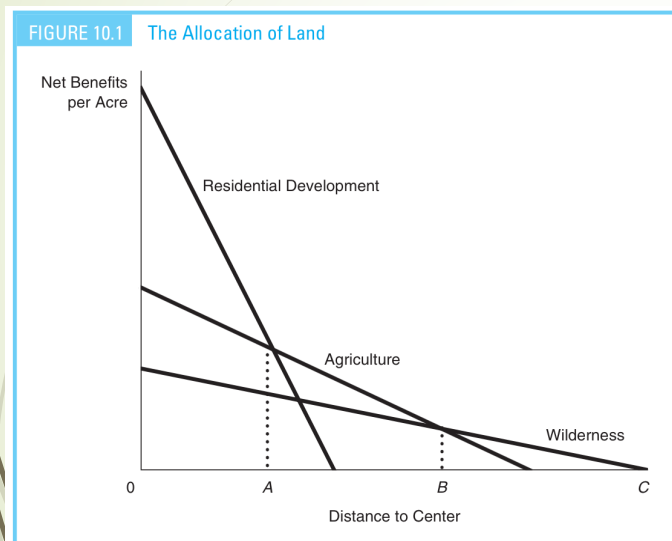
Location Rent (von Thunen theory)



Box 2.1: Bid Rent Function

- Relationship between distance to the centre of the town or urban area and the maximum net benefits per acre received from each type of land
- The function is downward sloping because the cost of transporting both goods and people lowers net benefits per acre more for distance locations.

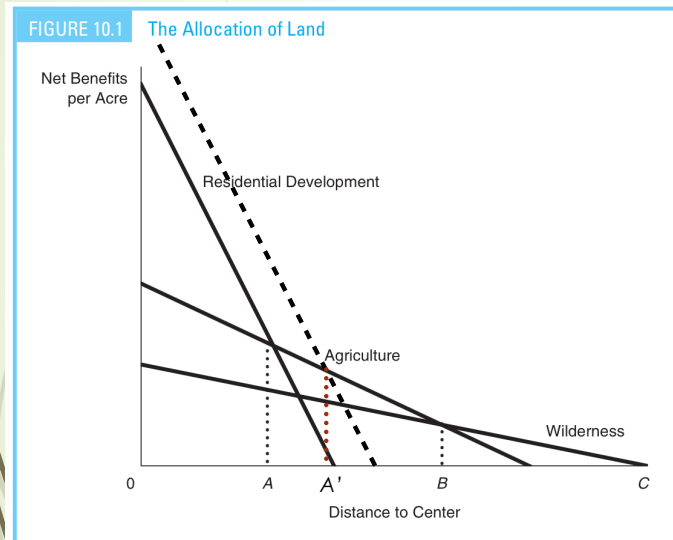
Location Rent (von Thunen theory)



Box 2.2: Land Use Conversion

- Occur whenever the underlying bid rent functions shift
- The shift occurs when net benefits per acre of a type of land use change because of the change in benefits or costs associated to that type.

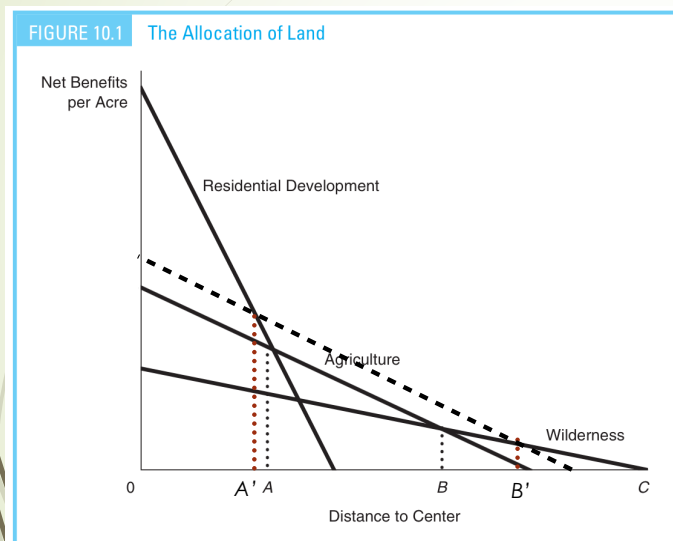
Location Rent (von Thunen theory)



Box 2.3: Conversion of non-urban land to residential area

- increasing urbanisation and industrialisation
- More residential, commercial, industrial and recreational uses of land.
- Development of transportation

Location Rent (von Thunen theory)

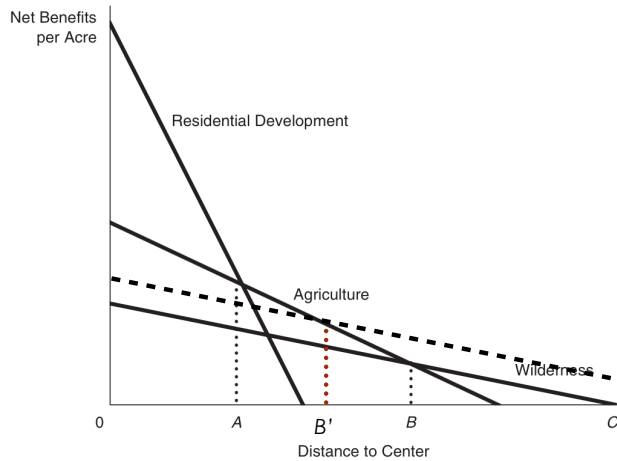


Box 2.4: Increasing in bid rent function for agriculture

- Domestic population growth
- Opening of export market for agriculture
- Shifting from subsistence crops to cash crops
- New planting or harvesting technologies
- Lower agricultural transportation cost

Location Rent (von Thunen theory)

FIGURE 10.1 The Allocation of Land



Box 2.5: Increasing in the bid rent function for wilderness

- Increasing demand for wilderness-based recreation
- Increasing public knowledge about the ecosystem goods and services the wilderness provides.

Sources of Inefficient Use and Conversion

- Sprawl and Leapfrogging



Sources of Inefficient Use and Conversion



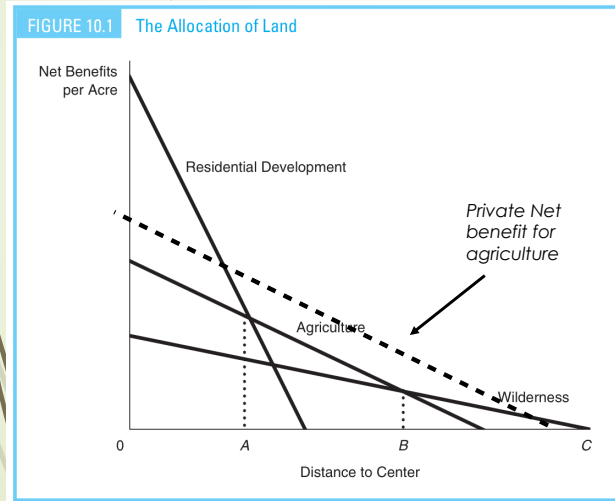
- Sprawl
 - Producers or household do not bare the marginal cost of public infrastructure when they decide to locate far away from the center.
 - Subsidies for transportation, e.g. free parking
 - Uninternalised negative externalities, e.g. pollution from traveling a long trip, traffic jam.

Sources of Inefficient Use and Conversion



- Leapfrogging
 - Features of the terrain (its suitability for development)
 - Land-use externalities (e.g. access to scenic body of water)
 - Government policies (e.g. road buildings, large lot zoning)

Sources of Inefficient Use and Conversion



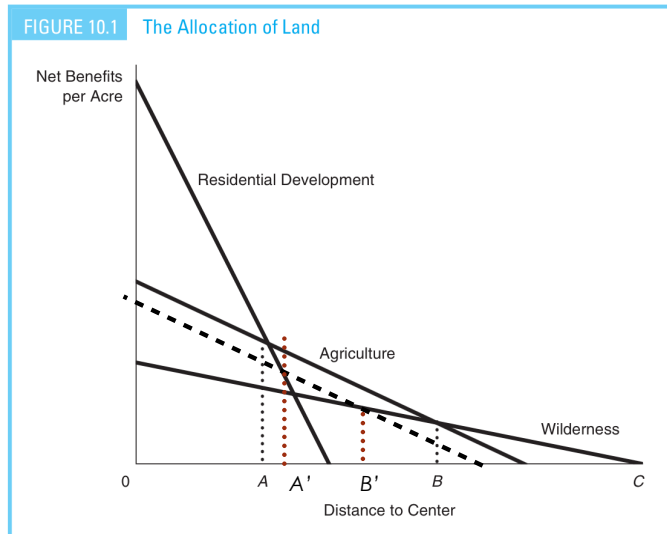
Incompatible Land Uses

- The value of a parcel of land will be affected not only by its location but also how the nearby land is used.

Box 3.1: Negative externalities

- Noise to residential area from a nearby airport
- Odor and water pollution from animal waste from hog farm and slaughter house to nearby residential area
- Example of the hog farm and slaughter house and the residential area.

Sources of Inefficient Use and Conversion



Box 3.2: Undervaluing Environmental Amenities

- Many beneficial ecosystem goods and services associated with a particular land use may not accrue exclusively to the landowner. That particular use may be undervalued by the land owner.
- If the owner is selling the land, these values will not be included in the price.
- Example: Beautiful views, habitat for wildlife in the forest and rangeland in a large farm



Some market-based policy remedies

- ▶ Establishing Property Rights
- ▶ Safe harbour agreements
- ▶ Conservation easement
(<https://www.youtube.com/watch?v=yAhr7EKy0X8>)
- ▶ Valuing Ecosystem Goods and Services: Ecotourism
(<http://www.bbc.com/news/business-30550159>)