Chapter 10: A Locationally Fixed, Multipurpose Resource: Land

- Introduction
- The Economics of Land Allocation
- Sources of Inefficient Use and Conversion
- Innovative Market-Based Policy Remedies
Introduction

• Land has special characteristics that affects its allocation.

  1. Locationally fixed

• Can’t move
• Location affects the value of the land.
• Value of any particular piece of land is affected by the uses of the land around it.
  – Both topography and location matter.
Introduction

2. Multipurpose
   • Wilderness
   • Agriculture
   • Urban development (residential/commercial)
   • Ecosystem (habitat, watershed)

• This chapter will investigate the efficiency of land use and transactions.
The Economics of Land Allocation

Land use

- In general, (as with other resources) markets tend to allocate land to its highest valued use.
  - Particularly true for economies with strong private property laws.
The Economics of Land Allocation

• Example:
  – Suppose there are 3 possible land uses:
    • Residential Development (R)
    • Agriculture (A)
    • Wilderness (W)
  – Suppose the net benefits of an acre of land depends on its proximity to the center of an urban area.
The Economics of Land Allocation

• The use of land in a particular use generates a net benefit to the society
  - Net benefits \( \sim \) land rents
  - Rents/net benefits are enjoyed by using a piece of land in a certain way.

• The socially optimal/efficient allocation of land:
  - That which maximizes the net benefits of all land in a region.
  - This requires that each acre of land be used in its maximum valued (net benefit) way.
**Exhibit 7: Land Use Plan**

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Acreage</th>
<th>% Of Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>Village</td>
<td>6,618</td>
<td>48%</td>
</tr>
<tr>
<td>Industrial &amp; Business Park</td>
<td>2,052</td>
<td>15%</td>
</tr>
<tr>
<td>Major Public Open Space</td>
<td>940</td>
<td>7%</td>
</tr>
<tr>
<td>Regional Parks</td>
<td>449</td>
<td>3%</td>
</tr>
<tr>
<td>Open Space</td>
<td>1,797</td>
<td>13%</td>
</tr>
<tr>
<td>Urban Center</td>
<td>746</td>
<td>5%</td>
</tr>
<tr>
<td>Business Park</td>
<td>697</td>
<td>5%</td>
</tr>
<tr>
<td>Town Center</td>
<td>536</td>
<td>4%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>13,651</td>
<td></td>
</tr>
</tbody>
</table>

NOTES:
1. Acreage numbers include right-of-way and Village Centers.
2. Roads are preliminary. Interstate 40 interchanges at 118th Street, Atrisco Vista, Paseo Del Volcan, Shell Road and frontage roads shall be by others.
3. Boundaries between uses are approximate. Final parcel boundaries and acreage amounts will be determined by plat and Level B and C plans.
4. Village, land use and open space boundaries are approximate and will be adjusted at Level B and C plans to reflect actual locations of roadways, utilities, easements, drainage and other infrastructure.
Guardian Article: Why does Barclays want to build a city in the middle of the New Mexico desert?

https://www.theguardian.com/cities/2015/may/19/barclays-city-new-mexico-desert-santolina-urban-sprawl-albuquerque
The Economics of Land Allocation

Bid-Rent function:
- The relationship between net benefits (per acre) of land in a particular use and the distance to the center of an urban area.
Housing price function (w/o substitution)

Housing Price Function

- Distance to center (in miles)
- Price of housing without substitution
The Economics of Land Allocation

Bid-Rent Theory

- The price and demand for land changes with distance from the center of the town.
- Different land uses will compete for desirable prices of property in order to maximize profits.
Land-Use Conversion (Urban Use)

- Conversion from one land use to another occurs whenever the underlying bid rent functions shift.

- The US has experienced rapid increase in urban land area from 1945 to 2002.

- Main sources of land conversion to urban uses in the US include:
  1. Increasing urbanization and industrialization (shifts upward the bid rent functions for urban land);
  2. Rising productivity of remaining land allowed smaller amount of land to produce a lot more food.
The Economics of Land Allocation

Land-Use Conversion (Agriculture)

- The bid rent function for agriculture increases:
  - As domestic population grows (*increases domestic demand for food*)
  - If export markets open for agriculture (*increases foreign demand for local crops*)
  - As there is a shift from subsistence crops to cash crops for exports
  - With new planting or harvesting techniques that lower the cost and increases the profitability of farming
  - With lower agricultural and transportation costs due, for example, to the building of new roads into forested land.
The Economics of Land Allocation

• Does the market allocate land efficiently?
  – Not Always!
Sources of Inefficient Use & Conversion

• The common problems that lead to land-use inefficiencies in the industrialized nations are:

1. Sprawl and Leapfrogging
2. Incompatible Land Uses
3. Undervaluing Environmental Amenities
4. The influence of Taxes on Land-Use Conversion
5. Market Power
Sources of Inefficient Use & Conversion

1. Sprawl and Leapfrogging

- **Sprawl** occurs when land use in a particular area are inefficiently dispersed, rather than efficiently concentrated.
  - E.g., If someone builds residential areas in agricultural or commercial areas (different zones have different uses.)
Sources of Inefficient Use & Conversion

**Sprawl and Leapfrogging**

- **Leapfrogging** refers to a situation in which new development continues not on the very edge of the current development, but further out.

  - Developers ‘leapfrog’ over contiguous vacant land in favor of land that is farther from the center of economic activity.

  - E.g., the city has grown to 4 miles out, but someone decides to build a property 6 miles out. This is not efficient location to build.
Sources of Inefficient Use & Conversion

Sprawl and Leapfrogging

• Several environmental problems are intensified with dispersed development.
  – Trips to town to work, shop, or play become longer.
    • Longer trips => more energy consumed.
    • Also, increasing likelihood that one changes from the least polluting modes of travel (such as biking or walking) to automobiles, a much more heavily polluting source.
Sources of Inefficient Use & Conversion

Sprawl and Leapfrogging

- **Why do sprawl & leapfrogging occur?**
  
  - To understand why sprawl and leapfrogging are occurring, we must understand examine the incentives faced by developers and how it affects location choices.

  - One set can be found in the pricing of public services.

  - Since, public infrastructure is subsidized by all taxpayers.
    - Potential buyers find that living farther out can be potentially cheap.
    - This reduced cost of developing farther out increases the likelihood of leapfrogging.
Sources of Inefficient Use & Conversion

- **The Public Infrastructure Problem**: Inefficiently low transportation costs that have not been internalized can create inefficient favors over more distant locations, such as *low marginal cost of driving and free parking.*
Sources of Inefficient Use & Conversion

The Public Infrastructure Problem:

• Driving:
  – When the social cost associated with pollution is not internalized, the MC of driving an extra mile is inefficiently low.
    • Excessive miles will be driven than if the pollution costs were internalized.
    • Dispersed developments would be inefficiently attractive.
Sources of Inefficient Use & Conversion

The Public Infrastructure Problem:

• Free Parking:
  – Free parking represents an subsidy to the auto user and lowers the cost of driving to work.
    • In an ideal world, it is part of your transportation cost. Free parking creates a bias towards more remote residential developments and encourages sprawl.
    • Some companies even pay other transportation costs like gas, in addition to parking, which makes it even worse.
2. **Incompatible Land Uses**

- The value of a parcel of land will be affected not only by its location, but also by the character of the nearby land.
  - This interdependence can create inefficiencies.
  - Negative externalities are rather common in land transactions.
The Economics of Land Allocation

2. Incompatible Land Uses

• Negative Externalities

  – Houses near the airport are affected by the noise.

  – Neighborhoods near a toxic waste facility may face higher health risks.

• If these costs are externalized, it creates a bias.
• The private net benefits are above the social net benefit curve, resulting in an inefficiently high allocation of land to activities that lead to externalities.
Incompatible Land Uses

- One remedy to incompatible land use: **zoning**.
  - Zoning involves land use restrictions enacted via an ordinance by local government to create districts (zones) that establish permitted and special land uses.

- Land uses are regulated by characteristics such as type of use (residential, commercial, and industrial), density, structure height, lot size etc.
  - The thinking is that by locating similar land uses together, negative externalities can be limited or at least reduced.

- One limitation of zoning is that it could promote urban sprawl.
3. Undervaluing Environmental Amenities

- **Positive externalities** represent the mirror image of the negative externalities discussed in the land uses.

- Net benefits from **positive externalities** may be undervalued by land owners.
  - The owner of land that contains vast open spaces, wildlife areas, or wetlands is not likely to consider the value of this resource to other people in society.
    - The owner would not be unlikely to reap all the benefits from providing these services because travelers could not always be excluded from enjoying them, despite the fact that they contribute nothing to their preservation.
      - The land will be undervalued.
Undervaluing Environmental Amenities

• One remedy involves direct protection of the assets by regulation or statute.

• Take wetlands, for example:
  – Wetlands help protect water quality in lakes, rivers, streams, and wells by filtering pollutants, nutrients, and sediments.
  – They reduce flood damage by storing runoff from heavy rains and snow melts. They also provide essential habitat for wildlife.
  – Regulations help to preserve those functions by restricting activities that are likely to damage these ecological services. Draining, flooding etc. are frequently prohibited in shore land wetlands.
4. The Influence of Taxes on Land Use and Conversion

- Taxes also can affect incentives to convert land from one use to another, even when such conversions would be inefficient.

1. The Property Tax Problem

- Property tax: the tax rate and the tax base.
  - The tax base (the value of the land) is determined by either the market value or by a professional estimator called an assessor.

- Perceived value may not be equal to the value of land in current use.
  - Can create a bias.

- E.g., A piece of farmland in a region that has gone significant urban development.
  - If the municipality changes the tax law to favor buildings because of urbanization, the pressure to convert farmland into urban land increases due to higher taxes.
The Economics of Land Allocation

2. The Inheritance Tax Problem

• The death of someone who has been engaging in land-intensive activities (such as farming) poses a specific tax problem to those who inherit the estate.
  
  – Depending on the size of the estate, the heirs may owe a considerable estate tax, a type of tax levied on the value of the assets held by the deceased at the time of death.
  
  – Considering the estate tax, tax-driven liquidity might dominate land conversion, instead of efficiency consideration.
    • Since the inherited land may not produce a sufficient cash flow to pay the taxes, part or all of the land might have to be sold to raise the necessary funds.

  – Here the conversion of land would be dictated by tax-driven liquidity considerations, not efficiency considerations.
5. Market Power

- Total supply of land is fixed and in some cases individuals can have a large influence over a region.
  - One example where this causes problems is when governments attempt to convert private land into public.
  - If the owner of the private land recognizes that their ownership of the land is suited for public purpose (e.g., for parks, bike paths, nature trails etc.), it creates an opportunity for them to be a monopolist seller.
    - To capitalize on this opportunity, the land owner could hold out until such time as the public sector paid monopoly profits for the land.

- Because market power allows the seller to charge inefficiently high prices, market power can frustrate the ability of the market to achieve efficiency by preventing transfers that would increase social value.
Market Power

- The main device for controlling the “Frustration of Public Purpose” problem is **eminent domain**.

  - Eminent domain is the doctrine under which government can legally acquire property for a “public purpose” by condemnation as long as the landowner is paid “just compensation.”
    - The transfer is mandatory, unlike market transfer which is voluntary.
    - The compensation is determined by a legal determination of a fair price (not by agreement of both parties).

  - This approach can eliminate the holdout problem.
The Economics of Land Allocation

Special Problems in Developing Countries

• Insecure Property Rights
  – In many developing countries land uses may be determined on a first come, first-served basis.
    • The occupiers of the land may not hold the title of the land.
    • It creates an efficiency and equity problem.
    • Extremely valuable lands like forests or biologically diverse lands could be converted to housing even when other locations could be efficient.
The Economics of Land Allocation

Special Problems in Developing Countries

**The Poverty Problem**

- The degradation of the land can dominate sustainable use, simply as a matter of survival.

- Degradation of land, due to inadequate investment in maintaining it, can cause farmers to migrate from that degraded land to other marginal land, only to have it suffer the same fate.

- Poverty can exacerbate tropical deforestation, promote overgrazing, and hasten the inefficient conversion of land to agriculture.
The Economics of Land Allocation

Special Problems in Developing Countries

- **Government Failure**
  - It occurs when the public policies have the effect of distorting land use allocations.
  - For example, building roads into previously preserved land, rendering that land suitable for new land uses.
    - This lowers that transportation costs, and makes the bid rent function flatter and extends the allocation further from the urban area.
Innovative Market-Based Policy Remedies

1. Establishing Property Rights

- It can mitigate or avoid the problems of over exploitation that can occur when land is merely allocated on a first-come, first-served basis.

- Adequate property right systems can encourage efficient transfers and efficient maintenance of the value of the property, since in both cases the seller would benefit directly.
Property Rights Problem
2. Transferable Development Rights

- It is a method for shifting residential development from one portion of a community to another.
  
  • Local units of government identify *sending areas* (areas where development is prohibited or discouraged) and *receiving areas* (areas where development is encouraged).
  
  • Landowners seeking to develop in a receiving area must first buy a certain amount of development rights from landowners in a sending area.
    
    - In principle, the revenue from selling these rights compensates the sending area owner for their inability to develop their land and, hence, makes them more likely to support the restrictions.
Innovative Market-Based Policy Remedies

• *Transferable Development Rights*

I want to develop in a receiving area (where governments allow me to) and you live in a sending area (where you are unable to develop). Without any development, you miss out on a lot of opportunities. To compensate you, when I want to develop, you sell permits to me, that compensates you for this inability.
EXAMPLE 10.1

TDR: Pierce County, WA
Innovative Market-Based Policy Remedies

- **Conservation Easements (CE)**
  - Legal agreement between a landowner and private or public agency that limits uses of the land in order to protect its conservation values.
  
  - CE allow landowners to hold on to and use their property but permanently remove development rights in exchange for tax benefits.
  
  - Once created, CE can be either sold or donated. If the donation benefits the public by permanently preserving important resources and meets other federal tax code requirements, it can qualify as a charitable tax deduction.
Innovative Market-Based Policy Remedies

- **Conservation Easements (CE)**
  - Suppose a landowner wants to continue to harvest timber from her land, but not to convert it to housing. In the absence of CE, the owner is likely to face property tax that are based on the highest valued use (development) rather than its current use (timber harvest).

  - If, however, the owner executes an agreement with a public or private entity that can legally administer a CE on the land, property taxes will fall (since the assessed value is now lower).
    - Meanwhile the land is protected in perpetuity from development, and the current owner can use the land for all purposes except those explicitly precluded by the easement agreement.
Innovative Market-Based Policy Remedies

• **Land Trusts**
  – A *conservation land trust* is a nonprofit organization that actively works to conserve land using a variety of means.
    • It can purchase land for permanent protection or accept donations of either land or the funds to purchase land.

  – A *community land trust*, focuses on using land for housing and community service, rather than land conservation.
Innovative Market-Based Policy Remedies

• Safe Harbor Agreements
  – This is a means of conserving endangered and threatened species on privately owned land.

• Grazing rights
  – The Taylor Grazing Act of 1934 attempted to prevent overgrazing by setting up a system involving the issuance of grazing permits to farmers.
    • The act assured that the amount of grazing was consistent with the carrying capacity of the land.
Innovative Market-Based Policy Remedies

• Development Impact Fees
  – They are charges imposed on a developer to offset the additional public-service costs of new development.

• Property Tax Adjustments
  – States sometimes offer programs to discount property taxes to protect a socially desired use, particularly when undiscounted taxes are seen as an inefficient bias against that use.