The Bid-Rent Function
Outline

- Leftover Principle
- Von Thunen’s Model
- Comparative Statics
Ricardo

- Fixed prices
- Zero economic profit
- Fertility of land varies
- Land to highest bidder
- Zero Transport Costs
Leftover Principle

\[ \pi = P \cdot Q - C(f_i) - R = 0 \]

\[ R = P \cdot Q - C(f_i) \]

where \( f_i \) is fertility of the acre of land; \( C \) is production cost; \( P \) is price; \( Q \) is output; \( R \) is rent.
Von Thunen

- Fixed prices
- Central market place
- Competitive markets
- Production costs same at all location
- All farmers use 1 acre of land
Land Rent and Accessibility

$$\pi = P \cdot Q - C - t \cdot Q \cdot u - R = 0$$

$$R = P \cdot Q - C - t \cdot Q \cdot u$$

where $t$ is unit transport cost; $u$ is distance; $C$ is production cost; $P$ is price; $Q$ is output; $R$ is rent.
Flexible Farmer

- For each distance, firm chooses acreage and non-land inputs to minimize costs of producing Q.
- As rents increase, firm will use less land and more land inputs.
- Bid rent function will be steeper close to city.
- Flexible firm will have lower costs than inflexible firm.
- Decrease in transport costs will make bid-rent less steep if output prices unchanged. If output prices affected, bid-rent will be lower.
Bid Rent for Flexible Farmer

BID-RENT for Flexible Farmer

Distance to Market

Rent
Increase in Transport Costs

Effect of Increase in Transport Costs on Bid-Rent

- Original Rent
- New Rent
Increase In Price of Output

![Graph showing the increase in price of output with distance from the market. The graph indicates that as distance from the market increases, land rent per acre decreases for both Original Rent and New Rent. The curves show a downward trend, with New Rent being lower than Original Rent at all distances.]