

General Equilibrium and Core Theorems

Key issues

1. general equilibrium
2. Pareto principal
3. efficiency and equity

Partial equilibrium analysis

- an examination of equilibrium and changes in equilibrium in one market in isolation
- problem: by holding prices and quantities of other goods fixed, we ignore possibility that events in this market affect other markets' equilibrium prices and quantities
- doing so is OK for small markets (hoola hoops)

General-equilibrium analysis

- study of how equilibrium is determined in all markets simultaneously an event in one market may have a spillover effect on other markets may be linked
 - through demand
 - through supply
- because output in one market is an input in another

Partial vs. General Equilibrium

- study equilibrium in several—but not all—markets simultaneously
- shock in one market has spillover effect in another market
- general-equilibrium analysis takes account of spillover, unlike partial-equilibrium analysis
- partial-equilibrium and general-equilibrium analyses give different answers if spillover effects are large

Feedback between competitive markets

- corn and soybean markets are linked
- consumers substitute between corn and soybeans
- producers substitute between corn and soybeans



Sequence of events

- shock in corn market affects soy market
- resulting shift in the soy market affects corn market
- diminishing reverberations occur until markets settle at new equilibria
- whether nearly instantaneously or not depends on reaction speeds of consumers and producers

Suppose

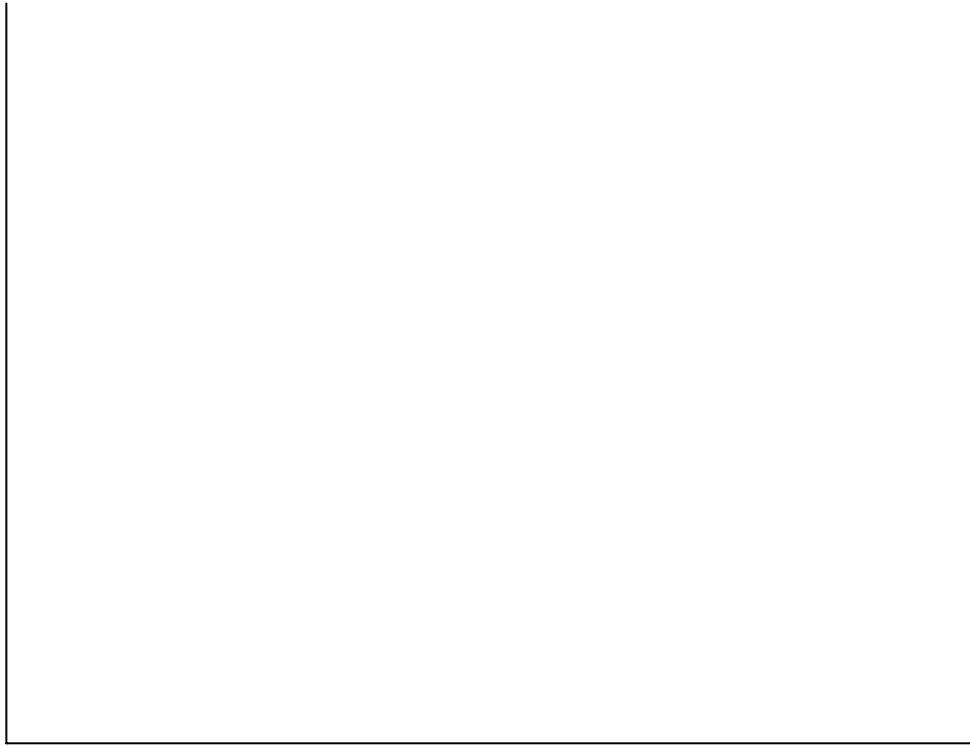
- foreign demand for American corn decreases
- export of corn falls by 10% at the current price
- total American demand for corn shifts left



Adjustment in the Corn and Soybean Markets

Step	Corn		Soybeans	
	<i>Price</i>	<i>Quantity</i>	<i>Price</i>	<i>Quantity</i>
Initial (0)	2.15	8.44	4.12	2.07
1	1.9171	8.227		
2			3.8325	2.0514
3	1.9057	8.2613		
4			3.818	2.0505
5	1.90508	8.26308		
6			3.81728	2.05043
.
.
.
Final	1.90505	8.26318	3.81724	2.05043

Relationship Between the Corn and Soybean Markets



Relationship Between the Corn and Soybean Markets

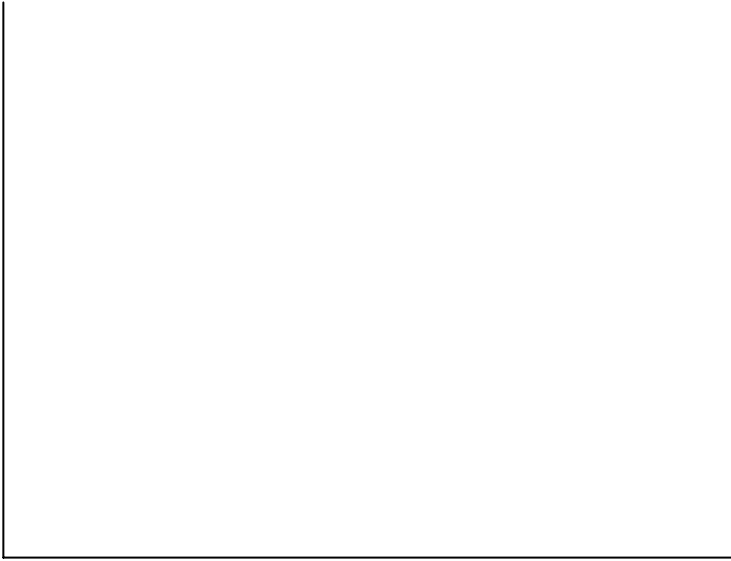


Partial equilibrium bias in corn market is small

	<i>Drop in price</i>	<i>Drop in quantity</i>
partial equilibrium	10.8%	2.5%
general equilibrium	11.4%	2.1%

General vs. Partial Equilibrium

- In the early 1970s, OPEC dramatically reduced its output of oil.
- Use general equilibrium analysis to determine the effect of the shock on the markets for gasoline and automobiles.
- In this example, the initial response in the gasoline market was larger than the final response. Can you think of an example of related markets where the initial response would be smaller? What must be true about the two goods being analyzed?



Welfare

society decides whether a particular equilibrium (or change in equilibrium) is desirable by answering 2 questions:

- Is the equilibrium efficient?
- Is the equilibrium equitable?

Efficiency

- *production efficiency*: cannot produce more output at current cost given current knowledge
- *consumption efficiency*: goods cannot be reallocated across people so that at least someone is better off and no one is harmed

Pareto principle

allows us to rank different allocations of goods and services where no interpersonal comparisons need to be made



Pareto efficient

any allocation where we cannot make one person better off without harming another person is Pareto efficient

First theorem of welfare economics

any competitive equilibrium is Pareto efficient

Second theorem of welfare economics

any Pareto-efficient equilibrium can be
obtained by competition, given an
appropriate endowment

- Derek and William are at a picnic. Between the two of them, they have 12 cans of Coke and 15 cans of Pepsi.
- Both Derek and William consider Coke and Pepsi perfect substitutes. However, Derek perceives no difference between Coke and Pepsi and is willing to trade 1 for 1, while William will only give a can of Coke if he gets 1.5 cans of Pepsi.
- Using an Edgeworth box, find the contract curve for Derek and William.



“Jack Sprat can eat no fat,
his wife can eat no lean”

Draw an Edgeworth box for Jack and his wife

- Identify the indifference curves for each
- Find the contract curve



- Peter is willing to give up 2 loaves for 1 fish.
- Paul's consumption is optimal given that loaves cost 10 pieces of silver and a fish costs 20 pieces.
- The marginal product of labor in loaves is 10 loaves, in fish it's 30.
- The marginal product of capital is 5 loaves or 10 fish.

Is it possible to pay Peter without robbing Paul?

General Equilibrium

- Magnitude of spillover effects
- General vs. partial equilibrium models

Pareto-Efficient Equilibrium

- Can make one **better off** iff no other party is harmed
- Competitive exchange: All traders are price takers
- Ratio of relative prices equals marginal rates of substitution for each person
- Competitive equilibrium is Pareto-efficient
- First and second Theorems of Welfare Economics

- Edgeworth Box Diagram Analysis
- Efficiency vs. Equity Tradeoffs:
 - Need welfare function