Economics 326: Partial Equilibrium and Market Clearing

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Outline

1 Partial Equilibrium

- Partial Equilibrium

  - Consumers maximize utility choosing how much of a commodity to purchase: $X_D^* \left(p_x, p_y, I \right)$

– Producers maximize profits choosing how much to supply $X_S^*(p_x, w, r)$

– Free entry and exit (i.e. long run supply curve)

– Supply equals demand (the market clears)

- Example: Linear Demand and Linear Supply

$$
\begin{aligned}
X_D^*(p_x, p_y, I) &= \alpha - \beta p_X \\
X_S^*(p_x, w, r) &= \gamma + \delta p_X
\end{aligned}
$$

- What are the signs of β and δ? Why? What are the meanings of β and δ?

- What are the endogneous variables? Exogenous parameters? Endogenous control variables?

- We have two equations (Demand and Supply) and three unknowns: P_X, X_D^*, X_S^*. How can we solve?

- We impose market clearing - the amount supplied to the market is equal to the amount demanded:

$$X_D^* = X_S^*$$

- Now we have three equations and three unknowns. However, since $X_D^* = X_S^*$, we get:

$$
\begin{aligned}
\alpha - \beta p_X &= \gamma + \delta p_X \\
\alpha - \gamma &= (\beta + \delta)\, p_X \\
\implies p_X^* &= \frac{\alpha - \gamma}{\beta + \delta}
\end{aligned}
$$

- Solving for the quantity in the market, we get:

$$
\begin{aligned}
X_S^* &= X_D^* = X^* = \alpha - \beta \frac{\alpha - \gamma}{\beta + \delta} \\
&= \frac{\alpha\,(\beta + \delta)}{\beta + \delta} - \frac{\alpha\beta - \beta\gamma}{\beta + \delta} \\
&= \frac{\alpha\delta + \beta\gamma}{\beta + \delta}
\end{aligned}
$$

- Show graph.

2 Market Clearing

- Why do economists assume that markets clear?

- If there is excess demand, prices rise.

- If there is excess supply, prices drop.

- Empirically, what do we see?

  - 9% unemployment for multiple years. Labor market does not always clear. Full employment is often considered to be 4-5% in the US. It used to be 2-3%.

  - Houses take a while to sell. Most do eventually sell.

  - What percentage of perishable food gets thrown out?

– What percentage of consumer durables get sold at prices lower than production cost because they didn't sell?

• In reality, most markets probably come close to clearing but don't exactly clear.

• Hayek: "The Use of Information in Society" in the *American Economic Review* (1945). Firms and consumers contain a lot of private information about the costs of production and tastes for products. They use this information when setting prices. However, they don't always get the price correct. They learn but mistakes are costly. What do they learn about?

$$\text{Firms:} \quad \alpha, \beta$$
$$\text{Consumers} \ : \ \gamma, \delta$$

3 Discontinuities in Demand and Supply

- What can prevent markets from clearing?

  1. There is no market clearing price: discontinuities in Demand and Supply.

  2. There is a market clearing price but the market has troubles finding it (related to Hayek): We will discuss this later.

- Show graphs.

- How can discontinuities in Demand and Supply Occur?

- Example 1: The Liquidity Trap and the Zero Lower Bound

– Supply and Demand or Loans. What is the price of a loan? The interest rate.

– Loans to the government are very liquid. People like to hold them (treasury notes, treasury bills, treasury bonds). Currently, interest rates for short term notes and bills are actually zero! This remained true even after U.S. debt was downgraded (markets do not seem to think the U.S. government is in a debt crisis similar to Greece; quite the opposite, the market is willing to supply money to the government for free).

– Basically, people prefer to hold treasury bills rather than dollar bills even at a zero percent interest rate because they think the chance of default is zero.

– However, for any interest rate below zero (i.e. I end $100 and get less than $100 back years later), they prefer to hold dollars rather than government debt.

- So, for any positive interest rate, there is large demand for treasury securities and for any negative interest rate, the demand is zero. Currently, we are at the zero lower bound.

- Example 2: Efficiency Wages and Unemployment (Shapiro and Stiglitz, *American Economic Review,* 1984)

  - Demand and Supply for Labor is a function of the wage.

  - If there is no unemployment, it is very easy to find a job.

  - Then, it is hard to motivate workers to work.

  - Workers will only work when unemployment is sufficiently high that they will have a hard time finding a job once they are unemployed. Karl Marx distinction between Labor and Labor Power.

- There is a wage below which workers won't work if hired.

- This leads to a discontinuity in the demand for labor.

- Equilibrium occurs without market clearing.

- What happens when there is no market clearing price?

  1. Price is at the discontinuity and quantity is a minimum of supply and demand at that price.

  2. Some other factor determines equilibrium (leave this as nebulous for now).

4 Multiple Equilibria

- Usually we think of there as being one price that satisfies market clearing.

- However, if there is a discontinuity in Demand or Supply (as above), there can be zero prices at which supply equals demand.

- Somtimes there can be two or more prices where markets clear. We don't have a good way of predicting which equilibrium will occur then. This necessitates either supply or demand (or both) being non-monotonic.

- Show graph. How can this happen? Explain.

- Summary:

Number of Equilibria	Equilibria Type	Reason
0	Non-Existence	Discontinuity
1	Unique	Monotonic and Continuous
> 1	Multiple	Non-Monotonic