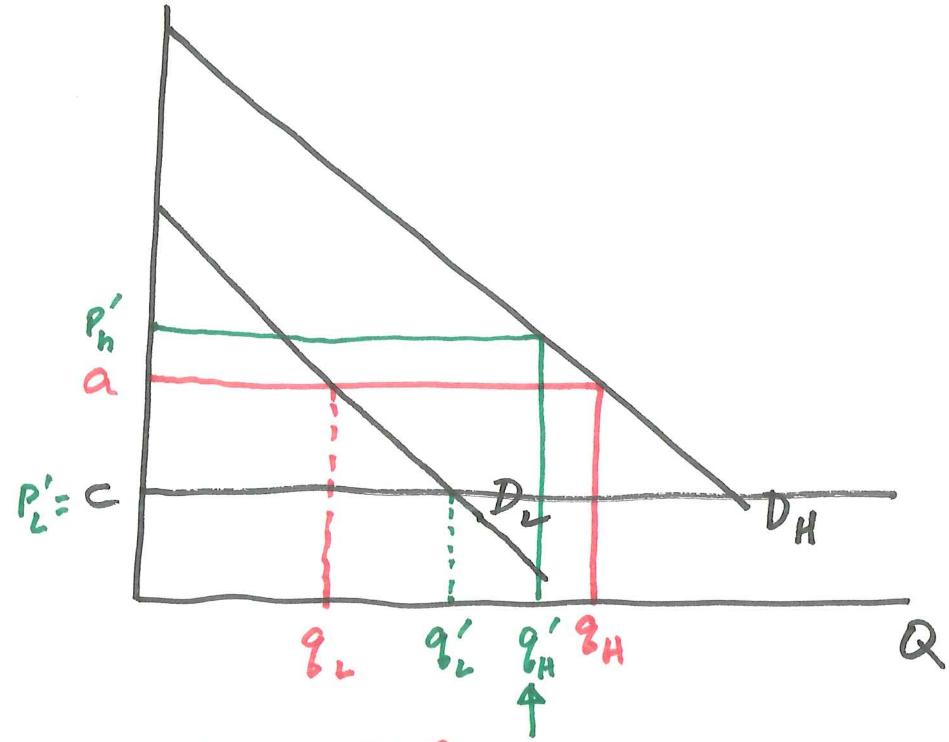
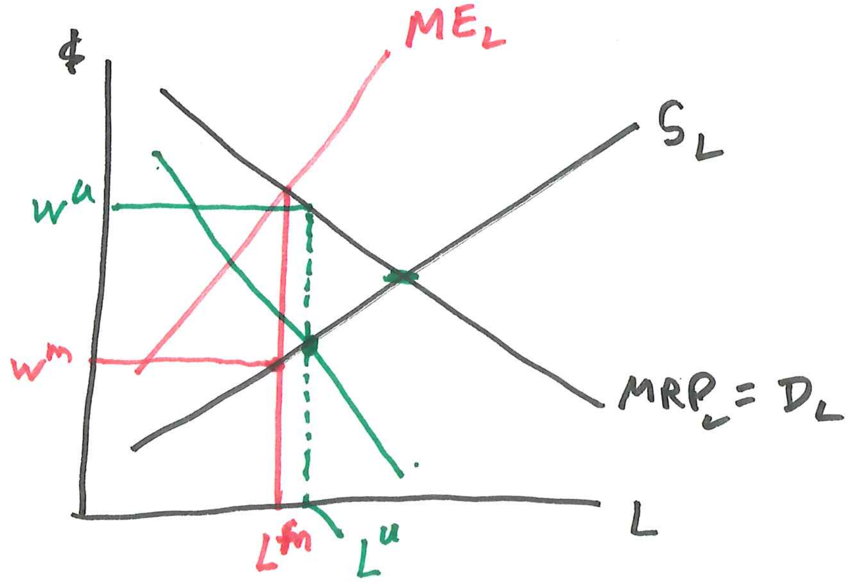
Peak-Load Pricing or "Time of day" pricing



$a \cdot q_L + a \cdot q_H$

$c \cdot q_L' + P_h' \cdot q_H'$

Bilateral Monopoly.



Theory of Games

Players

Actions

Strategies

Payoffs

Information + Beliefs

Stages

Repetitions, one-shot or repeated?

Equilibrium

Form (Normal vs Extensive)

Prisoner's' Dilemma.

Dominant Strategy Eq^{m}.

(C, C)

(DC, DC)

		Column	
		* Confess	Don't Confess
Row	* C	-10, -10	-1, -20
	DC	-20, -1	(-2, -2)

Battle of the Sexes

Nash Equilibrium:

each player is optimizing their payoff, given what the others are doing.

		Gal	
		Baseball	Ballet
Guy	Baseball	3, 2	1, 1
	Ballet	0, 0	2, 3

Matching Pennies

There is no N.E. in pure strategies

		Column	
		q H	$1-q$ T
Row	p H	1, −1	−1, 1
	$1-p$ T	−1, 1	1, −1

Mixed strategy:

$$E\Pi_r = p\left[1\cdot q - 1(1-q)\right] + (1-p)\left[-1\cdot q + 1(1-q)\right]$$

$$= p\left[q - 1 + q\right] + (1-p)(-q + 1 - q)$$

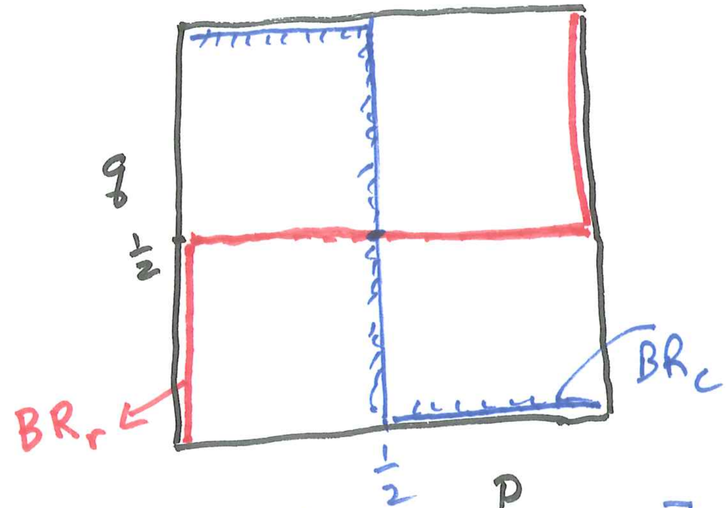
$$= p(2q-1) + (1-p)(1-2q)$$

$$\frac{\partial E\Pi_r}{\partial p} = 2q - 1 - 1 + 2q = 4q - 2$$

If $q < \frac{1}{2}$, $\frac{\partial E\Pi_r}{\partial p} < 0 \longrightarrow p^* = 0$

If $q > \frac{1}{2}$, $\frac{\partial E\Pi_r}{\partial p} > 0 \longrightarrow p^* = 1$

If $q = \frac{1}{2}$, $\frac{\partial E\Pi_r}{\partial p} = 0$



$$E\Pi_c = q\,[-1 \cdot p + 1\,(1-p)] + (1-q)\,[1 \cdot p - 1\,(1-p)]$$
$$= q\,[1-2p] + (1-q)\,[2p-1]$$

$$\frac{\partial E\Pi_c}{\partial q} = 1 - 2p - 2p + 1 = 2 - 4p$$

If $p > \frac{1}{2}$, $\frac{\partial E\Pi_c}{\partial q} < 0 \rightarrow q^* = 0$

If $p < \frac{1}{2}$, $\quad > 0 \longrightarrow q^* = 1$

		L (q)	R ($1-q$)	
p		3,2	1,1	T
$1-p$		0,0	2,3	B

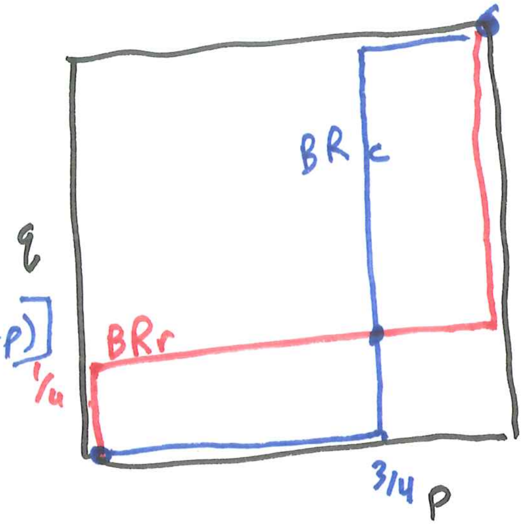
$$E\Pi_r = p\left[3q + 1(1-q)\right] + (1-p)\left[0\cdot q + 2(1-q)\right]$$

$$= p\left[2q+1\right] + (1-p)(2-2q)$$

$$\frac{\partial E\Pi_r}{\partial p} = 2q + 1 - 2 + 2q = 4q - 1$$

For $q < 1/4 \longrightarrow p^* = 0$

$q > \frac{1}{4} \longrightarrow p^* = 1$



$$E\Pi_c = q\left[2p + 0\right] + (1-q)\left[1\cdot p + 3(1-p)\right]$$

$$= q(2p) + (1-q)(3-2p)$$

$$\frac{\partial E\Pi_c}{\partial q} = 2p - 3 + 2p = 4p - 3$$

For $p < 3/4 \longrightarrow q^* = 0$

For $p > 3/4 \longrightarrow q^* = 1$

$(3/4, 1/4)$ is a mixed-strategy NE

Sequential Game.

	LL	LR	RL	RR
T	3, 2	3, 2	1, 1	1, 1
B	0, 0	2, 3	0, 0	2, 3

Subgame Perfect Equilibrium.